

The Transnational Context of Local Environmental Harm

Rob White

Abstract

This paper examines environmental issues within New Zealand by locating them within the context of wider global developments and trends. In particular, the concern is to explore how social issues and social conflicts surrounding food provision set the scene for the specific types of farm production in New Zealand. The focus of the paper is on transnational environmental harm, and how such harm can be conceptualised and analysed by incorporating different levels of scale. Who produces what, and how, are central to issues of ecological wellbeing, and this is of local, regional and international significance.

Introduction

Pressures on grain prices, the phenomenon of food riots and the advent of genetically modified organisms represent issues that span the globe and touch billions of people on the planet. In addition to worldwide environmental impacts, there are issues that are more specific and localised. These might include things such as polluted waterways, oil spills, the threat of invasive species and so on. In either case, there is often a transborder dimension to the problem. New Zealand will not be immune from international pressures on the outside to carry out domestic production in certain ways on the inside. The ramifications for ecology, humanity and nonhuman species in New Zealand are profound.

The aim of this paper is to explore how transnational environmental harm manifests in specific local or regional contexts. The paper begins by briefly summarising recent conceptualisations of environmental harm from criminological and ecological perspectives. This is followed by consideration of examples of transnational environmental harm. The concern in this instance is how such harm can be conceptualised and analysed in a specifically New Zealand social setting. The paper then outlines some of the most pertinent environmental issues affecting New Zealand. The main concern, however, is with analysis of the particular harms associated with pastoral and agricultural production. Doing so requires sensitivity to global political economic developments, as well as local impacts and effects.

Conceptualising Environmental Harm

In recent decades environmental issues have come to the forefront of public attention, and somewhat belatedly, criminological notice. While sociology, generally, has embraced the critical study of 'nature', the 'environment' and 'environmental social movements' (see White,

2004; Hannigan, 2006; Macnaghten and Urry, 1998; Buttel, 2003), this has only become of significant concern within criminology in the last few years (Beirne and South, 2007; White, 2008a). At the centre of much of this writing has been the notion of ‘harm’, and ways in which to address environmental harm.

Conventional criminological conceptions of environmental harm tend to be based upon legal conceptions of harm as informed by laws, rules and international conventions (Situ and Emmons, 2000). The key issue is one of *legality*, and the division of activities into legal and illegal categories. Typically, from this perspective, environmental crimes include such things as the illegal taking of flora and fauna; pollution offences; and transportation of banned substances such as radioactive materials and hazardous waste.

Recent years have seen greater legislative and judicial attention being given to the rights of the environment per se, and to the rights of certain species of non-human animal to live free from human abuse, torture and degradation. This reflects both the efforts of eco-rights activists (e.g., conservationists) and animal rights activists (e.g., animal liberation movements) in changing perceptions, and laws, in regards to the natural environment and non-human species. It also reflects the growing recognition that centuries of industrialisation and global exploitation of resources are (now rapidly) transforming the very basis of world ecology – global warming threatens us all, regardless of where we live or our specific socio-economic situation.

From an ecological perspective, however, harm is conceived in terms of ecological wellbeing and holistic understandings of interrelationship between species and environments (United Nations Environment Programme, 2007). The key issue is that of *sustainability*, and the division of social practices into benign and destructive from the point of view of ecological sustainability. As with the earlier approach, ecological understandings of harm view these are essentially transboundary – there is worldwide transference of harms. The bottom line is that, regardless of legal or illegal status, action has to be taken now to prevent harms associated with global warming, further pollution and waste generation, and the threats to biodiversity. The imperative is ecological, not legal, and the outcome is human survival.

If ecological (and social and economic) welfare is to be maximised, then we need to expand our notions of what actually constitutes environmental crime. Harm, as conceived by critical green criminologists for example, demands more encompassing definitions than that offered by conventional law and mainstream criminology. When criminalisation occurs, it often reflects human-centric notions of what is best (e.g., protection of legal fisheries, legal timber coups) that treat ‘nature’ and ‘wildlife’ simply and mainly as resources for human exploitation. It is about private property and business interests and monopolies and sustainable

development. The intrinsic value of specific ecological areas and species tends to be downplayed or ignored.

For green or environmental criminology, harm is best seen in terms of justice, based upon notions of human, ecological and animal rights and egalitarian concerns (White, 2008a). The key issue is weighing up of different kinds of harm and violation of rights within a broad *eco-justice framework*, and stretching the boundaries of conventional criminology to include other kinds of harms than those already deemed to be illegal. The concerns of green criminology are with issues pertaining to environmental rights and environmental justice; ecological citizenship and ecological justice; and animal rights and species justice.

For the green criminologist the biggest threat to environmental rights, ecological justice and nonhuman animal wellbeing are system-level structures and pressures that commodify all aspects of social existence, that are based upon the exploitation of humans, nonhuman animals and natural resources, and that privilege the powerful over the interests of the vast majority. Those who determine and shape the law are very often those whose activities need to be criminalised for the sake of planetary wellbeing. Environmental harm is thus intrinsically contestable, both at the level of definition, and in terms of visions of what is required for desired social and ecological change.

Closely linked to a specifically green criminology is radical political economy, in which is posited a basic contradiction between economy and ecology. The earth is literally being eaten up by capitalism, as systemic pressures ensure constant and growing pressure on its absorptive capacity and the processes of natural reproduction. In a nutshell, ecological sustainability is made impossible by economic imperatives (Foster, 2007). Elsewhere (White, forthcoming) this has been summarised in terms of four key areas of environmental and social impact:

- *Resource depletion* – extraction of non-renewable minerals and energy without development of proper alternatives, over-harvesting of renewable resources such as fish and forest timbers.
- *Disposal problems* – waste generated in production, distribution and consumption processes, pollution associated with transformations of nature.
- *Corporate colonisation of nature* – genetic changes in food crops, use of plantation forestry that diminish bio-diversity, preference for large-scale, technology-dependent and high yield agricultural and aquaculture methods that degrade land and oceans and affect species development and wellbeing of nature, burning of fossil fuels and using up of consumables.
- *Species decline* – destruction of habitats, privileging of certain species of grain and vegetable growing over others for market purposes, super-exploitation of specific plants and animals due to presumed consumer taste and mass markets.

These areas of impact find expression in public concerns about global warming, biodiversity loss, land degradation, marine and freshwater ecosystem health, air pollution, damage to human and nonhuman health and so on. Importantly, most if not all of these issues are seen to be transnational in nature.

Meanwhile, contemporary discussions of transnational environmental crime, as conventionally understood, are highlighting issues such as:

- Illegal transport and dumping of toxic waste
- Transportation of hazardous materials such as ozone depleting substances
- The illegal traffic in real or purported radioactive or nuclear substances
- Proliferation of 'e'-waste generated by the disposal of tens-of-thousands of computers and other equipment
- The safe disposal of old ships and airplanes
- Local and transborder pollution, that is either systematic (via location of factories) or related to accidents (e.g., chemical plant spills)
- Bio-piracy in which Western companies are usurping ownership and control over plants developed using 'traditional' methods and often involving indigenous people's in the third world
- Illegal trade in flora and fauna
- Illegal fishing and logging.

Threats to global and local ecological systems are thus associated with systemic economic pressures combined with specific kinds of human initiated practices. Planetary survival is intertwined one with the other. Similar kinds of processes and interconnections are also apparent in the analysis of specific nation-states, and specific kinds of environmental harm.

Social Conflicts and Food Provision

The struggle for basic food provision has intensified over the past few years and is set to continue well into the future. Anti-privatisation protests have taken place in countries like Bolivia and South Africa in regards to provision of clean drinking water. Food riots have occurred in places such as Mexico, Haiti, Indonesia and Cameroon, as grain prices skyrocket and food availability has declined. Why and how this is occurring is of social significance and has direct implications for the wellbeing and environmental health of New Zealand.

The exploitation of the world's natural resources by the major transnational corporations occurs through the direct appropriation of lands, plants and animals as 'property' (including intellectual property as in the case of patents). It also occurs through the displacement of existing systems of production and consumption by those that require insertion into the cash-buyer nexus, in other words, the purchase of goods and services as

commodities. This has happened in the area of food production as it has in other spheres of human life.

Table 1 provides a snapshot of world grain trade over four decades from 1950. What the table demonstrates is a major shift in the status of developing countries from exporters of food to importers of food. Africa, according to this table, was virtually self-sufficient in grain production in 1950; by 1998 it was heavily reliant upon outside producers. Western Europe, by contrast, has gone from net importer to major exporter of grains. North America, and Australia and New Zealand, have systematically increased their share of world grain production over the same period of time.

Table 1: The Changing Pattern of World Grain Trade, 1950-98 ¹

Region	1950	1960	1970	1980	1990	1998
North America	+23	+39	+56	+125	+101	+86
Western Europe	-22	-25	-28	-7	+27	+19
Eastern Europe & Former Soviet Union	0	+3	0	-45	-29	+3
Latin America	+1	0	+6	+8	-1	-5
Africa	0	-1	-4	-16	-27	-38
Asia & Middle East	-6	-17	-33	-63	-71	-81
Australia & New Zealand	+3	+8	+12	+12	+15	+21

¹ Plus sign indicates net exports; minus sign, net imports. Imports and exports do not balance out due to differences in export and import data and lags in shipment times
(Source: French, 2000, p. 52)

This shift in world grain trade is best explained in terms of neo-liberal economic restructuring, which has transformed countries such as the Philippines from a net food exporter to a net food importer. The process has involved structural adjustment practices, under the auspices of the World Bank and the International Monetary Fund. This has consisted of the simultaneous phenomenon of state divestment from agricultural production (e.g., lifting of price controls on fertiliser), and trade liberalisation that has allowed heavily subsidised US and EU meat and grain producers to flood host markets with cheaper commodities. ‘From \$367 billion in 1995, the total amount of agricultural subsidies provided by developed-country governments rose to \$388 billion in 2004. Since the late 1990s subsidies have accounted for 40 percent of the value of agricultural production in the European Union and 25 percent in the United States’ (Bello, 2008). The result has been the collapse of local producer capacities and markets; and the

transformation from self-sufficiency amongst peasant producers to national dependency upon corporate supplied food (Bello, 2008).

This has not been without a major cost in global terms, as well as for the major producer countries. For example, there has been a major expansion in cropland worldwide. ‘Viewed in a wider historical context, more land was converted to cropland in the 30 years after 1950, than in the 150 years between 1700 and 1850’ (United Nations Environment Programme, 2007, p. 86). The environmental impact is loss of habitat and biodiversity; soil water retention and regulation; disturbance of biological cycle; increase of soil erosion, nutrient depletion, salinity, and eutrophication. For humans, there is greater exposure to agrochemicals in air, soil and water.

Bio-Imperialism and the Creation of New Markets

Many of the contemporary environmental harms are related to how the basic means of life of humans is being reconstituted and re-organised through global systems of production. For example, the ‘globalisation of food production and manufacture and the use of new technologies and chemicals in farming and food processing have created a variety of risks to humans, non-human animals, the environment and health’ (Croall, 2007, p. 206) and in many cases we still do not know the longer term effects of new developments in the food area. What is happening to food generally is symptomatic of how commodification is taking place vis-à-vis all aspects of human life and in all parts of the globe. The global political economy of genetically modified organisms (GMOs) provides a case in point.

According to New Zealand’s Royal Commission on Genetic Modification (quoted in Walters, 2004, p. 152), genetic modification can be defined as the use of genetic engineering techniques in a laboratory that involves:

- (a) the deletion, multiplication, modification, or moving of genes within a living organism; or
- (b) the transfer of genes from one organism to another; or
- (c) the modification of existing genes or the construction of novel genes and their incorporation in any organism; or
- (d) the utilization of subsequent generations or offspring of organisms modified by any of the activities described above.

The application of GM technologies to food production is perhaps one of the most publicly recognised, and fear-inspiring, uses of such technology. Social and political responses to the advent of GM technologies have varied greatly depending upon specific national context (see for examples, New Zealand Ministry for the Environment, 2004; Hindmarsh, 2008). Countries that have been reluctant to adopt GM crops have nevertheless been subjected to intense pressures to do so (see Walters, 2005).

One consequence of the industrialisation of agriculture, combined with and intensified by application of GMO technology, is that biodiversity is systematically reduced.

Today, a mere four crops account for two-thirds of the calories humans eat. When you consider that humankind has historically consumed some 80,000 edible species, and that 3,000 of these have been in widespread use, this represents a radical simplification of the food web (Pollen, 2007, p. 47).

It has been estimated that 75 per cent of crop diversity has been lost over the past century, and this is illustrated in various national contexts:

In the United States, more than 70 percent of all cornfields are now planted in just six varieties of corn. In India, farmers grew as many as 30,000 varieties of rice 50 years ago; today, three fourths of India's rice fields are planted with fewer than 10 varieties. And in Mexico, only 20 percent of the corn varieties that were cultivated in the 1930s can still be found today (French, 2000, p. 61).

In other words, there is a tendency toward monoculture, since uniformity means ease of cultivation and harvest, which translates into higher profit. However, the simplification of production, in turn, generates potential problems.

One consequence of the erosion of plant genetic diversity is that the capacity of the economically preferred plants to resist pests and diseases is compromised. The marketability of plant produce is not necessarily coterminous with the inherent superior quality of the plants to be marketed or selected for mono-cropping. Given the potential utility of plants that market forces may erroneously dismiss as economically useless, the short-sighted depletion of the plant genetic pool can be both costly and dramatic (Mgbeoji, 2006, p. 181).

Put simply, 'over the ages farmers have relied upon diverse crop varieties as protection from pests, blights and other forms of crop failure' (French, 2000, p. 61); reducing diversity reduces the protections. The technology used in GMOs can also prohibit farmers from growing second-generation crops from the same seed. Also known as 'genetic use restriction technology', this terminator technology involves the use of chemicals that after one season block genetically altered seeds from germinating.

Considering that at least 1.4 billion people rely on farm-saved seed for their annual crop and farming activities, the implications of the terminator technology are devastating and irreversible. For example, unsuspecting farmers whose farms are near farms planted with terminator technology plants may have their crops ruined by escaped genes from the patented seeds. In other words, the impact may not be limited to farmers who purchase artificially sterilized seeds (Mgbeoji, 2006, p. 183).

Patent protection ensures that the big agribusiness companies are able to control markets and production processes. This is based upon patents of existing organic materials

(that is, through bio-piracy) and technological developments (that is, through genetic modification of organisms). The point is to make direct producers – the farmers – reliant upon commercially-bought seeds (and related products such as fertiliser and pesticides).

The reason why GMOs are pursued so relentlessly is that their introduction and establishment is extremely profitable for powerful corporations. It also suits particular national economies that are the main source points for the production and distribution of GM crops. The prising open of new markets also means that excess GM crops that otherwise would put downward pressure on local prices can be offloaded overseas. Such is the case with US farming and its abundance of GM crops (Walters, 2005).

Pressures to change production methods and consumption habits are generated by those who have the most to win in shifting global marketplaces. Specifically, in the case of GM food, the overwhelming majority of such food (and its accompanying fertilisers, seeds and herbicides) are produced by four chemical corporations – Monsanto, Syngenta, Du Pont and Bayer (see Walters, 2005). These companies not only control GM crop production through share of market. They also control the GM technologies, built into the crops, through the use of patents. Under the guise of ‘free trade’, and with the support of the US and the World Trade Organisation, these companies are ruthless in their efforts to monopolise crop production around the globe. This is a form of bio-imperialism involving the further concentration of power, wealth and resources into fewer and fewer hands on a world scale.

The Question of Bio-Fuels

Technologies of genetics, biology, energy, matter and information cannot be neatly sorted into good and bad, or sustainable and unsustainable, piles. Produced within militaristic – or unjust or colonising or wasteful or racist or patriarchal, etc. – social practices, renewable energy technologies, sustainable forms of agriculture and other ‘green’ techniques may reduce some forms of ecological risk, but they may also help to prop up, to sustain, an unsustaining social whole (Davison, 2004, p. 144).

The interests of agribusiness are also reflected politically in terms of how some governments are responding to issues such as climate change. For example, the push toward biofuel production reflects the interests of large agricultural businesses, who can patent the monocultural crops designed as ‘energy crops’. Restoring and protecting trees, while ecologically more sound and efficient, would be less profitable (Munro, 2007). Moreover, keeping the ball in the court of the ‘new technologies’ of genetically modified organisms (GMOs) means less attention to the devastation wrought by current legal and illegal logging, which is likewise profitable for the businesses and organised criminal syndicates involved in both first and third world countries.

Powerful interests, including car manufacturers and grain farmers, have benefited from the search for energy alternatives to fossil fuels. The shift to biofuel is seen as a key source of green fuel supply for the world's car manufacturers. Greater demand for biofuel crops such as corn, palm oil or soya also means that farmers are finding the growing of such crops very lucrative economically. However, the trend toward biofuel is generating its own problems (Reuters, 2008; Reliable Plant, 2007; News.Scotsman.com, 2008). First, the use of crops for fuel is leading to food price rises and food shortages – so much so that Mexicans have protested in the streets about the price of corn flour that makes tortillas, a situation brought about by US corn growers selling an increasing portion of their harvest for the purpose of making corn-based ethanol (a diesel-type fuel made from plants). Less corn for food equals higher food prices.

Second, the profitability of biofuel production is leading to the establishment of large-scale plantations in places such as Indonesia and Brazil. This process has seen the clearing of rainforests and in some instances the forcing of indigenous people off their lands. This deforestation process has been going on for a number of years, and has been supported by organisations such as the International Monetary Fund. Clearing of land for export-oriented cash crops has been touted as a key strategy to lift developing countries economic performance (see French, 2000). Biofuels provide yet another avenue for this process to accelerate.

Third, there is evidence that the nitrogen-based fertiliser used in (the increasing) corn production is causing environmental harm in its own right. Millions of kilograms/pounds of those nitrates end up in the Gulf of Mexico each year, where it is causing a massive algae bloom. This bloom impacts negatively on the ecology of the Gulf: 'When the algae dies it sinks to the bottom, where it absorbs oxygen as it decays. In recent years that oxygen depletion has created an aquatic "dead zone" covering about 8,000 square miles in which shrimp, fish, oysters and crabs cannot survive' (Reliable Plant, 2007). Biofuels are thus not quite the panacea to environmental and energy crises that some supporters claim.

An unpublished report prepared for the World Bank was exposed by *The Guardian* newspaper in July 2008. The report describes how the World Bank's index of food prices increased by 140 per cent from January 2002 to February 2008. It argued that the most important causal factor for this increase was the large increase in biofuels production in the United States and the European Union. This has had a major impact on global wheat and maize stocks available for food. The report concludes that:

The combination of higher energy prices and related increases in fertilizer prices, and dollar weakness caused food prices to rise by about 35 percent from January 2002 until February 2008 and the remaining three-quarters of the 140 percent actual increase was due to biofuels and the related consequences of low grain stocks, large land use shifts, speculative activity, and export bans' (Mitchell, 2008, p. 1).

It is also notable that there was an increase in sugar prices despite large stocks, due to expectations of increased use of sugar cane in Brazil for ethanol and speculative activity. Maize for biofuels accounted for 25 per cent of US production in the 2007/08 crop year, and global vegetable oil supplies used for biodiesel production is on the increase:

The largest biodiesel producers were the European Union, the United States, Brazil and Indonesia, with a combined use of vegetable oils for biodiesel of about 9 million tons in 2007 compared to global vegetable oils production of 132 million tons....The estimated increase in vegetable oils use for biodiesel was 6.6 million tons from 2004 to 2007, which would attribute 34 percent of the increase in global consumption to biodiesel' (Mitchell, 2008, p. 5).

Biofuel production in places such as the United States and the European Union is encouraged through strong incentives and mandates, such as tax credits, and energy legislation such as mandatory blending requirements. As indicated, the advent of biofuels has helped to push up prices for grains worldwide, and to bolster the prospects of the grain producing countries. It has, however, been accompanied by ecological costs in the form of degraded environments and social costs in the form of high prices for food, especially in less developed and import-dependent countries.

Environmental Issues in New Zealand

Recent years have seen a myriad of issues identified as being especially pertinent to the interests and concerns of people living in New Zealand. A list of issues includes:

- the problem of e-waste and how best to dispose of old computers, televisions and other forms of electronic hardware
- major clean-up of intractable agrichemicals (some of which are Persistent Organic Pollutants) remaining on farms in each region of New Zealand
- the introduction and establishment of marine protected areas
- 'environmental refugees' from those South Pacific islands subject to the effects of rising waters due to climate change
- being part of a south Pacific and south-East Asia context in which issues such as illegal trade in wildlife and fauna, illegal fishing, illegal logging, and illegal transport of hazardous materials require cooperation across the region
- management of natural resources and the specific role of indigenous peoples, for example Maori interests in the marine environment, especially fisheries
- bio-security and free trade agendas, and the movement of plant and animal materials across borders, especially New Zealand-Australia (e.g., apples)
- the introduction of varying forms of emission trading and emission reduction policies and programmes.

New Zealand obviously shares with many other countries public concern and political interest in addressing issues stemming from global processes (such as climate change and emissions reduction), as well as issues relating to post-colonial relations (such as negotiating Maori ownership and control in regards to natural resources) and geographical considerations (such as climate-induced migration) that are specific to only certain countries of the world. There are, moreover, certain environmental problems that are directly related to the historical development and present economic realities of New Zealand. The question of food production, in particular, is crucial to analysis of environmental harm in a New Zealand context.

New Zealand Farm Production

New Zealand is heavily dependent on international trade, with exports contributing 29 per cent of Gross Domestic Product and natural resource-based exports (from agriculture, forestry, fishing and aquaculture) accounting for a large share (OECD, 2007, p.1). Indeed, the relatively recent history of New Zealand (the past two hundred years) is a history of remarkable transformations in land use. Thus, while 80 per cent of Aotearoa New Zealand was once forested, only about 20 per cent of indigenous forest-cover now remains – that is, only 22 percent of the land surface of the indigenous habitat remains in more or less primary condition (Conservation International, 2007). Moreover, ‘Land use analysis shows a net loss of nearly 175 km² of indigenous habitat between 1996 and 2002’ (OECD, 2007, p.5). In many cases this land clearance has occurred without proper permits and resource consents.

Transformations in land use are directly linked to export earnings. These, in turn, are presently at risk insofar as “environmental” considerations get translated into world trade policies. For example, the issue of “food miles” – attempts to restrict the extent to which food is transported over distances from the point of production – can potentially be economically disastrous to countries such as New Zealand, given their distance from key markets. New Zealand makes its fortune by exporting primary produce. If entities such as the European Union were to restrict or ban exports on ‘ecological’ grounds (e.g., tying consumption to distance from production), then this would simultaneously protect EU producers while disadvantaging those who depend upon long distance transport of produce. Trade and environmental policy in far flung parts of the world thus have major potential impacts upon local economies.

The emphasis and reliance upon certain types of export earnings has a number of consequences. For instance, pollution and degradation are directly linked to the economically productive use of land. Such issues are particularly central to discussion of environmental

harm in a New Zealand context. They are also associated with both past practices and contemporary realities.

For example, the chemicals listed as Persistent Organic Pollutants (POPs) under the Stockholm Convention are:

- nine pesticides (Aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, mirex, hexachlorobenzene and toxaphene)
- PCBs (polychlorinated biphenyls)
- Dioxins and furans (polychlorinated dibenzo-p-dioxins or PCDDs, and polychlorinated dibenzofurans or PCDFs)

Banning and removal of POPs has been important to New Zealand agricultural and pastoral interests. Specifically in relation to POPs, by June 2006, it was estimated that the Ministry for the Environment in partnership with regional councils had collected some 290 tonnes of material, of which approximately 225 tonnes was intractable material. It was estimated, however, that a further 175 tonnes of uncollected intractable agrichemicals still required removal (New Zealand Ministry for the Environment, 2006).

While millions of dollars have been spent on dealing with POPs and the damage left over from previous forms of production regime, new and more intensive damage is being caused by present forms of production. Just over 39 per cent of New Zealand total land cover is pasture, and it is from within the pastoral industry that we see the main environmental problems surfacing.

The New Zealand Ministry for the Environment has observed that:

Recent trends in land use in New Zealand include an increase in intensive pastoral land use (for example, higher stocking rates, increased use of fertilisers and agricultural chemicals, and increases in irrigation use). ...by 2006, dairy cow and deer numbers had increased to just over 5.2 million and 1.5 million respectively. Between 1996 and 2006, the national dairy herd grew by 24 per cent (New Zealand Ministry for the Environment, 2007, p. 40).

The amount of nitrogen fertiliser used in New Zealand has increased about ten-fold since 1985 and had doubled since the mid-1990s. Nitrogen from livestock manure, which contributes around five times the amount of nitrogen to the land as nitrogenous fertilisers, also steadily increased. These changes coincide with the trend towards more intensive forms of farming; particularly dairy farming, with its high density of grazing stock. Dairy cows excrete almost seven times the amount of nitrogen and phosphorus in their faeces and urine as breeding ewes, and around three-and-a-half times that of breeding hinds (deer) (New Zealand Ministry for the Environment, 2007, p. 42).

The combination of the sheer number of animals and the use of nitrogen fertilisers is having a major negative impact on the surrounding environments. Indeed, dairy farming has been identified as the single largest cause of environmental decline in New Zealand, due to fertiliser and animal waste runoff from farms, and the use of water itself (Scoop Independent

News, 2008). This is placing severe demands on New Zealand's natural resources, some of which are being used unsustainably. Irrigation in arid regions, cow dung and urine that affects nitrates in groundwater, and sewerage discharge into freshwater lakes are all issues of concern.

As noted in an OECD report on environmental performance:

Water quality in rivers and lakes has declined in regions dominated by pastoral farming, where high nutrient inputs and microbiological contamination destabilise natural ecosystems and pose risks to human health. In lowland areas, surface waters regularly exceed national water quality guidelines, and consequent damage to aquatic ecosystems is widespread, mainly due to run-off and leaching from pastoral farming and rural septic tanks (OECD, 2007, p. 3).

The same report notes that:

In contrast to many OECD countries, GHG [green house gas] emissions from agriculture (e.g., methane and nitrous oxide) account for some 50% of the national total, and are rising. Changes in agricultural production have led to increased intensity of inputs, including fertiliser and irrigation water, with consequent increases in environmental pressures (OECD, 2007, p. 7).

The dearth of an adequate regulatory structure has meant that: 'Farmer compliance with resource consents for the disposal of dairy shed effluent is highly variable, with some farmers still spreading manure close to waterways' (OECD, 2007, p.7). On the other hand, conservation policy and practice in regards to freshwater and wetland ecosystems have not been adequate to the task even as such biotopes are put under even greater pressures due to contemporary farming practices.

Things are hardly likely to get better vis-à-vis good environmental practices and outcomes in the near future. This is so for several reasons. First, as discussed earlier, there is a huge export market for agricultural and pastoral commodities. The global situation in regards to grain, for example, and more generally the scarcities associated with certain foods, means that profit is to be made and farmers (and their political fellow travellers) will be keen to secure as much return as possible in such circumstances. Intensification of production, that also includes the extensive use of fertilisers, is one by-product of the global situation.

Second, production will be influenced by other kinds of policy development, particularly in regards to energy. Thus, for example, a Biofuels Sales Obligation was announced in 2006. This requires companies that sell petrol or diesel in New Zealand to also sell biofuels. The amounts are not insubstantial:

The amount of biofuels they will have to sell will be a percentage of their total combined petrol and diesel sales each year, measured in petajoules and based on the volumetric energy content of each fuel. The amount has been set at a minimum of 0.53 per cent for year 1 (2008) and will increase each subsequent year. By 2012, at least 3.4 per cent of all fuel that oil companies sell in New Zealand will have to be biofuels (New Zealand Ministry for the Environment, 2007, p. 18).

Commentators have argued, however, that the biofuel industry is highly subsidised. Furthermore, they point out that one impact of switching grain production from food to biofuel, will be major increases in foodstock prices. This will thus contribute to overall price increases in both grains and meat (Roberts, 2008). For New Zealand producers, world trends in the areas of biofuel production and use of GMO crops will have significant implications for local practice, for the viability of local industries, and for the conservation and protection of local environments. Global markets and shifts in pricing will dictate to some degree the kind of production methods adopted and the ways in which environments will be affected.

Conclusion

Elsewhere I have argued that the ‘naturalness’ of systemic crime – the way in which social harms, economic exploitation and environmental destruction are built into the fabric of everyday, ordinary life as a ‘normal’ feature of how we produce and consume – makes it that much more difficult to challenge (White, 2008b). This is compounded by the fact that much of what occurs does so in a fully ‘legal’ way (regardless of actual harm). Moreover, where external controls (materially and ideologically) on profit maximisation are weakened, then we can reasonably expect to see an increased incidence in illegal activity and, more generally, greater propensity for social harm regardless of legal definition.

In the context of the present paper, the contours of the global market and the (apparently) universal appeal of neo-liberalism as a guiding ideology are bound to manifest in particular contradictions between economy and ecology. Intensified production, for example, carries with it the seeds of its own destruction. On this point we might consider the nature of the pastoral industry as a whole:

A large proportion of monitored pasture soils show moderate compaction as a result of stock treading damage, which can lead to reduced pasture growth and increased rates of sediment and nutrient run-off. Some soils under dairy pasture show high phosphate levels and may also be reaching saturation point for organic forms of nitrogen. Saturation increases the risk of excess nitrate being leached into waterways (New Zealand Ministry for the Environment, 2007, p. 45).

Market demands for more meat and grain production, plus pressures to adopt mass production methods utilising GMO and other bio-technologies, put enormous pressure on existing land (and sea) resources. Yet, the survival of humans, nonhuman animals and specific biotopes demands patterns of production and consumption that do not damage and kill the very thing that sustains life itself. This is the essential ecological contradiction of capitalism and is the central question of our age.

References

- Bello, W. (2008). *How to manufacture a global food crisis: lessons from the World Bank, IMF, and WTO*. Transnational Institute. Retrieved May 16, 2008 from http://www.tni.org/detail_page.phtml?andandact_id=18285.
- Beirne, P. and South, N. (Eds.) (2007). *Issues in Green Criminology: Confronting harms against environments, humanity and other animals*. Devon: Willan Press.
- Buttel, F. (2003). Environmental Sociology and the Explanation of Environmental Reform. *Organization and Environment*, 16(3), 306-344.
- Conservation International (2008). *New Zealand: Human Impacts*. Retrieved April 1, 2008 from http://www.biodiversityhotspots.org/xp/Hotspots/new_zealand/Pages/impacts.aspx.
- Croall, H. (2007). Food Crime. In P. Beirne and N. South (Eds.). *Issues in Green Criminology: Confronting harms against environments, humanity and other animals*. Devon: Willan Press.
- Davison, A. (2004). Sustainable Technology: Beyond Fix and Fixation. In R. White (Ed.) *Controversies in Environmental Sociology*. Melbourne: Cambridge University Press.
- Foster, J. (2007). The Ecology of Destruction. *Monthly Review*, 58(9), 1-14.
- French, H. (2000). *Vanishing Borders: Protecting the Planet in the Age of Globalization*. New York: WW Norton and Company.
- Hannigan, J. (2006). *Environmental Sociology*. London: Routledge.
- Hayman, G. and Brack, D. (2002). *International Environmental Crime: The Nature and Control of Environmental Black Markets*. London: Sustainable Development Programme, Royal Institute of International Affairs.
- Hindmarsh, R. (2008). *Edging Towards BioUtopia: A New Politics of Reordering Life and the Democratic Challenge*. Perth: University of Western Australia Press.
- Lynch, M. (1990). The Greening of Criminology: A Perspective on the 1990s. *The Critical Criminologist*, 2(3), 1-4 and 11-12.
- Macnaghten, P. and Urry, J. (1998). *Contested Natures*. London: Sage.
- Mgbeoji, I. (2006). *Global Biopiracy: Patents, Plants, and Indigenous Knowledge*. Vancouver: UBC Press.
- Mitchell, D. (2008). *A Note on Rising Food Prices, Draft World Bank paper*. Retrieved July 11, 2008 from guardian.co.uk/environment.
- Munro, M. (2007). Biofuels come up short as way to reduce carbon load, study finds. *The Vancouver Sun*, 17 August 2007: A3.
- News.scotsman.com (2008). *Burning issue: Biofuel targets and subsidies: is it time for a moratorium?* Retrieved January 21, 2008 from News.scotsman.com.
- New Zealand Ministry for the Environment (2004). *Genetic Modification: The New Zealand Approach*. Wellington: Ministry for the Environment.
- New Zealand Ministry for the Environment (2006). *Intractable Agricultural Chemicals in New Zealand*. Wellington, Ministry for the Environment.
- New Zealand Ministry for the Environment (2007). *Environment New Zealand 2007: Summary*. Wellington, Ministry for the Environment.
- Organisation for Economic Co-operation and Development (2007). *Conclusions and Recommendations, OECD Environmental Performance Review of New Zealand*. Paris: OECD.
- Pollen, M. (2007). Unhappy Meals. *The New York Times Magazine*, 28 January, 38-47, 65-70.
- Reliable Plant (2007). *New study favors trees over corn as biofuel source*. Retrieved January 1, 2008 from <http://www.reliableplant.com/article.aspx?articleid=10046>.
- Reuters (2008). *Committee calls for biofuel moratorium*. Retrieved January 21, 2008 from <http://uk.reuters.com/article/topNews/idUKL1885287820080121>.
- Roberts, G. (2008). The bad oil on ethanol: Biofuels are losing favour but some governments are still backing them. *The Weekend Australian*, May 31, 2008, 20.
- Scoop Independent News (2008). Professor slams environmental performance report. Retrieved March 28, 2008 from <http://www.scoop.co.nz/stories/SC082/S00062.htm>.
- Situ, Y. and Emmons, D. (2000). *Environmental Crime: The Criminal Justice System's Role in Protecting the Environment*. Thousand Oaks: Sage.
- United Nations Environment Programme (2007). *Global Environment Outlook*. New York: UNEP.
- Walters, R. (2004). Criminology and Genetically Modified Food. *British Journal of Criminology*, 44(1), 151-167.

-
- Walters, R. (2005). Crime, Bio-Agriculture and the Exploitation of Hunger. *British Journal of Criminology*, 46(1), 26-45.
- White, R. (2004). Introduction: Sociology, Society and the Environment. In R. White (Ed.), *Controversies in Environmental Sociology*. Melbourne: Cambridge University Press.
- White, R. (2008a). *Crimes Against Nature: Environmental Criminology and Ecological Justice*. Devon: Willan Press.
- White, R. (2008b). Class Analysis and the Crime Problem. In T. Anthony and C. Cunneen (Eds.) *The Critical Criminology Companion*. Sydney: Federation Press.
- White, R. (forthcoming). Transnational Environmental Harm and Eco-Global Criminology. In S. Shoham, P. Knepper and M. Kett (Eds.) *International Handbook of Criminology*. New York: Taylor and Francis.

Rob White is Professor of Environmental Criminology in the School of Sociology and Social Work at the University of Tasmania, Australia. He is author of 'Crimes Against Nature: Environmental Criminology and Ecological Justice', and editor of 'Controversies in Environmental Sociology'. He has published widely in the fields of youth studies, criminology and sociology.