The Third Food Regime: Neoliberal Globalism and Agricultural Biotechnology in North America

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The agricultural sector is currently being shaped by two powerful dynamics as many nations reorganise their national agriculture according to free trade and other supranational agreements while new agricultural biotechnologies are increasingly adopted. This interrelationship between regulatory change and genetic engineering appears set to form the basis of a new food regime. In this article, we compare the role of national and international regulations relating to the technology, and the impact of local resistance to it, in the advanced capitalist countries of Canada and the USA and the developing country of Mexico. Similar to food regime perspectives, our study concludes that neoliberal regulatory reorganisation is an important component of the evolving food regime. Further, Mexico bore the brunt of the technology's negative social impacts, demonstrating how it exacerbates existing inequalities between developed and developing nations. Resistance movements in the country have been sufficient to call into question the inevitability of a homogenous reorganisation of agriculture, however. Evidence suggests that such resistance could modify, or even derail, this technology's role in individual nations, and consequently, in the unfolding food regime as a whole.

One of the chief features of post World War II agriculture was its nation-centredness. Yet agriculture has a strong history in global trade, despite the counter appearances raised by its contentiousness in WTO negotiations at the turn of the twenty-first century. A more novel aspect of agriculture's position in international

dynamic in the global political economy of food. It can be characterised by particular institutional structures, norms and unwritten rules in international food production and consumption that are geographically and historically specific. A key component of this geographical and historical specificity is the relative stability of the trade relations that develop between unequal nations. Essentially, these dynamics combine to create a qualitatively distinct regime of capital accumulation trends in agriculture and food. Frederick Buttel said that the Friedmann–McMichael regime-type theorisation has proved to be one of the most durable perspectives in agrarian studies since the 1980s, 'in large part because it is synthetic and nuanced' (Buttel 2001, p. 9). Hence, we take this as our starting point. Food regime scholars posit that, since the inception of neoliberal globalism as the dominant ideology in the mid-1980s, we are transitioning into a third regime. This transition follows the collapse of the 'surplus' regime of the post-war era that was based on the US model of highly regulated national agricultures.

While the anticipated third regime is still finding its point of stasis, supranational regulation and national neoregulation of the agricultural sector have already been identified as highly important features (McMichael 2004). Given that the state has been a key actor in promoting the set of new policies associated with neoliberal globalism, and consistent with Karl Polanyi's (1944) perspective, we use the term 'neoregulation' rather than 'deregulation', as is common in the food regime literature and other literature. We argue that the inter-relationship between regulatory change

and the neoregulatory restructuring in agriculture is likely to be greater in less developed countries, the potential for resistance in these countries is also greater, and consequently they represent an important component of the evolving food regime.

With respect to the above hypotheses, therefore, we compare and contrast the experiences of using agricultural biotechnology products in Canada and the USA as advanced capitalist countries and Mexico as a developing country. We do this through two main points of comparison: the role of national and international regulations and how they affect the development and adoption of the technology, and local resistance to the technology, and its effect.

In the first section we provide a brief overview of the global adoption of agricultural biotechnology and where our case-study nations fit in this schema, supplemented with a discussion of the supranational regulation context. We then outline biotechnology regulation and resistances in each of our three case-study countries. Lastly, we conclude with some considerations of what these cases reveal for the role of biotechnology in the evolution of the third food regime: how it differently affects the incorporation of nations into the regime and, consequently, how it affects this food regime more generally.

Agricultural biotechnology and its supranational regulatory context

North America provides a unique opportunity for an empirical study of the role of agricultural biotechnologies. Agricultural biotechnology is a US-dominated project and the USA has considerable influence on the global stage. Consequently, the way in which the technology unfolds in that country will determine its further global dissemination and adoption. Canada provides an example of the introduction of the technology into another developed country that has some interest in a domestic biotechnology sector, but whose level of involvement and international influence is far weaker than that of the USA. Canada, therefore, falls in the middle between being a 'taker' and 'promoter' of agricultural biotechnology. Lastly, Mexico is a developing country that can provide insight into how nations with little influence on the technology's development are affected by its dissemination. Through this three-country comparison, we investigate the differential impact of the new technology's introduction in nations with contrasting power relations. We further investigate how this impact has been received in these countries with respect to the extent and type of social resistances that have emerged. This comparison will provide valuable empirical insight into the technology's broader role in structuring the evolving food regime.

Agricultural biotechnologies were commercialised in the mid-1990s. Currently, the production of transgenic crops predominantly refers to two key traits – herbicide tolerance (HT) and insect resistance (IR) (with HT accounting for 68 per cent, IR 19 per cent and HT and IR combined, 13 per cent of global traits) – and four key agricultural crops: soybeans, maize, cotton and canola (with soybeans making up 57 per cent, maize, 25 per cent, cotton, 13 per cent and canola, 5 per cent of global biotechnology) (James 2006). While the number of transgenic agricultural crops is still relatively limited, adoption of these crops has been dramatic. It increased 60-fold since 1996 (James 2006) from 1.7 million ha in 1996 to 90 million ha in 2005 (James 2004, 2005).

Early adoption of the technology occurred primarily in developed countries. While adoption in these countries is still increasing, since approximately 2000 adoption in developing countries has been steadily catching up. In 1999, of the 12 countries that had adopted some form of genetically engineered crop, four were developing countries, and they accounted for 18 per cent of the global area of transgenic crops (James 2000). By 2006 22 countries had adopted the technology, and 11 of these were developing countries that accounted for 40 per cent of transgenic crop area (James 2006). Despite the growing number of countries, most of the production area actually occurs in just a handful of countries. Ninety-five per cent of the global transgenic crop area is in six countries: the USA (53.1 per cent), Argentina (17.5 per cent), Brazil (11.2 per cent), Canada (5.9 per cent), India (3.7 per cent) and China (3.4 per cent) (calculated from James 2006).

While the USA remains the undisputed leader with respect to the development and adoption of biotechnology, we can see that its dissemination is increasingly important in both developed and developing countries. The number of adopting countries and the amount of crop area dedicated to these crops are both on the increase. While certainly not proceeding free of impediments – the six year de facto moratorium in the EU is a case in point – adoption of the technology has nonetheless proceeded sufficiently rapidly for proponents to claim it to be 'the fastest adopted crop technology in recent history' (James 2006).

Given the capital intensity and the novelty of biotechnology, two regulatory factors feature prominently with respect to the technology's adoption in addition to those that affect agriculture and food more generally: the intellectual property regime in place to protect the technology developer's interests, and the regulatory regime that oversees any GE crops, once adopted. These legal and regulatory frameworks are found in both national and supranational laws.

While other international agreements relevant to agricultural biotechnologies exist, to date the most significant supranational regulatory body remains the WTO. Agriculture has featured prominently in WTO negotiations since it replaced the General Agreement on Tariffs and Trade (GATT) in 1994. The issue of reducing trade distortion in agriculture has become increasingly important in succeeding rounds of negotiation. Disagreement over the topic led to the ultimate failure of the 9th round of negotiations, the 'development round' in July of 2006. This round brought to a head tensions over agriculture between developed and developing countries, with developing countries arguing that agreements an(agric.3(over)-hat)-headsumporedg terprotecsiodi pfacicmes of developed countries, suh, the 'development22579(')-180.2goales to heptedcunt(overyd)-2.2(and)-22['thefailuretoof nxat of agriculturalradertegries, , of agreements rachped the GATr's of negotiations187–(193())-841.3(are)]TJT*[(l(raody)247038(in)-470.4(plac,y)2470 ogy are the andaslursy AgreementSPS())-425.8(and)]TJT*['the Agreement Trad-Relepted espece

those who have the most to lose from the equitable sharing of genetic resources. Consequently, the USA signed but never ratified the CBD and did not sign the Protocol on Biosafety. Canada and Mexico both signed and ratified the CBD and both signed the Protocol, with Mexico ratifying in 2002. In short, while there is evidence

undergoing a complementary success in agricultural biotechnology under a number of highly favourable WTO agreements, such as that related to intellectual property – the TRIPS agreement. Given the country's early involvement in the development of biotechnology, securing worldwide patent protection was critical. Once the TRIPS agreement was in place the USA adopted the most stringent version of intellectual property protection available under this agreement for its agricultural biotechnologies: patents. This approach is consistent with the country's long history of support for the patentability of life forms, as evidenced by court rulings through the last half of the twentieth century. As early as 1952 the Congressional approach to the Patent Act was that patentability could be extended to 'anything under the sun that is made by man' (Vaver 2004, p. 158). Not to overstate the case, the patentability of life forms was subjected to a number of challenges over the years, and only in 1980 – in the Supreme Court case of Diamond v. Chakrabarty, over an oil-eating bacterial culture – did it find unambiguous judicial support for the patentability of life. This support extended to multicellular organisms a few years later in subsequent court cases.

Specifically with respect to agricultural biotechnologies, the USA adopted UPOV 1991 as the framework for its intellectual property protection. This version of UPOV provides intellectual property protection on plants for 20 years, but it does not strictly require the use of patents, which would restrict seed saving. Rather, UPOV 1991 leaves it to national prerogative whether to adopt patents on plants or another system that would still allow for farmers and plant breeders to be exempted from restrictions on seed saving. The USA chose to adopt patents and forgo the continuation of these exemptions. Consequently, the traditional rights of farmers to save and reuse their seed from year to year are now voided where they adopt such patented agricultural biotechnologies, and they must purchase new seed for every crop.

The country's position on patents is consistent with its overall regulatory approach to the technology: both patents and regulation are to maximise the potential for growth in the sector. Despite the fact that citizen opposition had already risen in the 1980s against the first open release of a GE organism – 'ice minus' potatoes and strawberries – into the environment (Marchant 1988), the US administration ultimately decided against creating a separate regulatory agency to oversee agricultural biotechnology applications. Rather, the *C m* , was created in 1986 to designate the roles that different existing agencies – notably, the USA Department of Agriculture (USDA), the Food and Drug Administration (FDA) and the Environmental Protection Agency (EPA) – would play with respect to regulating the new technology.

The regulatory thrust with respect to the technology in all these agencies is based on the concept of 'substantial equivalence', which assumes the products of agricultural biotechnology to be substantially equivalent to conventionally bred products. Consequently, the products of biotechnology are given no special consideration for the process in which they were developed (and for any potential deviations that might arise specific to this process), but are essentially judged on the basis of their face value. The FDA, for example, requires that GE foods 'meet the same rigorous safety standards as is required of all other foods' (EPA 2003) and the agency does not require pre-market approval for most GE crops, which fall into their category of substances

that are 'generally recognised as safe'. This approach is consistent across the agencies under which biotechnology regulation occurs.

There have been clear indications of the regulatory weaknesses that have resulted from the highly pro-biotechnology development stance of the USA. In 2005 the USDA Office of the Inspector General cited the USDA's Animal and Plant Health Inspection Service's lax regulatory approach and overall failure to adequately regulate. Despite a previous audit over a decade before this, the Inspector General's report

With respect to intellectual property protection, the prohibition of seed saving that accompanies the patentability of agricultural biotechnologies has created a number of conflicts with farmers and with non-governmental organisations concerned about the traditional rights of farmers and concentration of ownership over the food supply. The latter essentially concerns food security. By 2004 the Monsanto Company had filed 90Centre
for Food Safety [CFS] 2005, p. 31). While many of these farmers have signed settlement agreements with the company, a number of them have chosen to fight their case in the court system, and in doing so have had some limited successes in curtailing the rights of biotechnology companies (Pechlaner 2007). Even when such cases have not

Greenpeace, the Sierra Club, Friends of the Earth International, Grain, CFS, the Organic Consumers Association and the Council of Canadians. Many campaigns have been organised by these and other organisations (see, for example, the homepages of The Campaign n.d. and the Organic Consumers Association n.d.).

Given the particular legal culture of the USA, lawsuits have provided another resistance venue for these groups. The CFS, for example, on its own behalf and that of a number of other organisations (Common Dreams Progressive Newswire 2006) filed a lawsuit requesting the court to rescind the USDA's approval of Roundup Ready (RR) Alfalfa. In March 2007 a US district court judge vacated the agency's 2005 approval of the alfalfa, agreeing that the agency 'failed to abide by federal environmental laws when it approved the crop without conducting a full Environmental Impact Assessment' (Heller 2007). While such suits may not ultimately prevent the further commercialisation of GE crops they could go some way to changing the rate and the manner in which they are commercialised.

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Canada does not have the same significant crop area dedicated to agricultural biotechnology production as does the USA (contrast its 6 per cent of total production area with the USA's of 53 per cent) and Canada is not as quick to adopt the range of transgenic crops that are increasingly commercially available in the USA. The main transgenic crops grown in Canada in 2005 were canola, maize and soybeans (James 2006), although GE alfalfa also received approval in Canada in that year (Canadian Food Inspection Agency n.d.). Relative to its international context, nonetheless, the country is still very important with respect to the technology. As noted earlier, Canada is the fourth highest producer by production area. It also has a significant stake in the development of its biotechnology sector. Eight per cent of publicly traded biotechnology companies are based in Canada (ETC Group 2005a).

Further, while the investment was nowhere near as high as the almost CA $45 billion the USA invested in 2002, Canada still invested a highly significant CA $695 million into biotechnology research and development (Munn-Venn . 2005, p. 4, with data from Statistics Canada). Canada therefore invests 1.5 per cent of what the USA does. Given that Canada's population and GDP are about 10 per cent the size of those in the USA, however, this level of investment is comparatively low. Consequently, while Canada comes nowhere near challenging the dominance of the USA, it is nonetheless a significant player in the sector, globally speaking, more for its adoption then for its development of biotechnology.

The regulatory context for agricultural biotechnologies in Canada has some distinct similarities with that of the USA, particularly in the most recent past. This applies to both its approach to IPR and to regulation more generally. In compliance with its WTO TRIPS obligations Canada has also chosen to become a member of UPOV, however it is a signatory to the 1978 version of the Act. This is consistent with the country's overall history of weaker IPR protection than the USA. UPOV 1978 retains exemptions for farmers and plant breeders to save seeds for their own use. While industry groups lobby for an upgrade to UPOV 1991, to date this has not yet occurred. Nonetheless, other methods of restricting seed saving are employed in

Canada, such as the use of contracts, that critics charge make a 'mockery' of the right to save seed (Beingessner 2004).

Further, Canada has had a long history of legal struggles over whether life forms are patentable. The chronology of patenting life forms is not as unambiguously pro-patenting as that of the USA. In 2002, for example, the Supreme Court of Canada denied a patent on a cancer-prone mouse (the 'Harvard mouse') on the basis that higher life forms were inappropriate subject matter for patents. This same mouse had already received a patent in the USA in 1988. In part due to the uncertainties around the strength of patents in Canada, and in part due to the drastically smaller size of its industry, the country has had nowhere near the incidence of litigation between farmers and biotechnology developers over seed saving that occurred in the USA. Nonetheless, one landmark case in Canada, Monsanto v. Schmeiser, changed the context for patenting life forms in the country. In this case the Supreme Court of Canada ruled that, while life forms were not patentable, the genes within a life form are patentable. The practical outcome for a farmer wanting to save his seeds does not differ from that in which life forms are patentable. Once again, as in the USA, the impact on farmers is that they must purchase seeds anew each year, which increases their overall input costs in those crops where biotechnologies have become the dominant input.

With respect to the regulation of agricultural biotechnologies in general, Canada again shows a number of similarities to the US system. The Canadian regulatory framework for biotechnology was slower to develop than the American one, ultimately being manifested in the 1993 Regulatory Framework for Biotechnology. As in the American system, this framework designated the regulation of biotechnology under existing agencies and legislation. The three main agencies responsible for biotechnology regulation in Canada are Health Canada, the Canadian Food Inspection Agency and Environment Canada. Despite claims by the Canadian Biotechnology Advisory Committee (CBAC) that regulatory oversight in Canada is triggered by 'novelty,' the policy approach to biotechnology in the various agencies reveals an implicit concurrence with the same concept of substantial equivalence that underwrites the US policy approach. Further, assessments of biotechnology are again conducted on the basis of a product, rather than a process. Hence, for example, Health Canada's assessment strategy is premised on comparing the biotechnology product with its conventional counterpart, in order to compare it with 'traditional foods that have an established history of safe use' (CBAC 2002).

Given the similarities between the American and the Canadian regulatory system it is not surprising that there is similar evidence in the Canadian system of regulatory

agricultural biotechnology. This fact is likely to be attributable to the substantial economic interests the country has had in developing its biotechnology sector. As in the USA this emphasis on development appears to be quite successful. According to the Hon. Maxime Bernier, Canada's Minister of Industry, Canada has one of the highest biotech S&T expenditures in the OECD. In addition, its global ranking is 'third in the number of biotechnology firms, third in biotechnology revenue and R&D spending, and fifth in inventions' (Bernier 2007).

Once again, however, this neoregulated biotechnology scenario has not gone unchallenged. While there are some differences in the resistance efforts between Canada and the USA – there appear to be less sub-national government initiatives Cth5atives

it 'Mexico's Monsanto', as it tries to push its seed and trees south of the central state of Puebla. Using the Plan Puebla Panamá, a free trade type of agreement with Central American countries, it also wants to tap the vast biological resources on indigenous communities' land (Carlsen 2004, p. 68).

While Mexico's intellectual property protection has evolved significantly towards convergence with the USA since the 1980s, it stops short of affording patent protection for biological processes, plants, animals and humans, yet microorganisms, proteins, genes, cellular lines, antibodies, pharmaceutical products and microbiological processes can be patented. Furthermore, property over plants may be protected through the 'Ley Federal de Variedades Vegetales' or 'Federal dloolants34lc.6(ovriedies'60.7(')-
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heels of this very specific and volatile context that the new agricultural biotechnologies

labelling rules and specifically mentioning that such products contain GMOs, their features and implications. In the case of GMO imports, the law leaves it up to the various secretaries involved as to labelling requirements, but these must include their final destination (e.g., human food or animal feed).

As in the USA and Canada, biotechnology adoption in Mexico has garnered significant resistance. While resistance in the USA and Canada has focused on legislative and judicial systems, however, in Mexico it has also spilled into the streets in the form of social movement protests and even armed insurrection. Two key reasons explain this difference. Firstly, as mentioned, biotechnology and neoliberal globalism have not had as grave an impact on the agrarian social structures of either Canada or the USA. In contrast, the neoliberal turn has been significantly more devastating for Mexico's agrarian social structure than for its northern neighbours. This has much to do with the sheer numbers of people whose livelihoods depended on agriculture in Mexico, and who have been made redundant since the mid-1980s when the country entered the GATT. This was the first major indication that Mexico was moving from an inward-looking country, focused on its internal market, to one newly attempting to focus its economic growth on exports. In 1990 when the then President, Carlos Salinas, proposed to start discussions towards building a NAFTA, close to 30 per cent of Mexico's labour force worked in farming. By NAFTA's 14th year in 2008 that proportion had decreased to less than 20 per cent.

A second reason that explains the different oppositional responses in Mexico regard its democratic institutions: they are much weaker and less well-developed than those in the north. The courts have a rather insignificant presence in adjudicating contentious issues and have shown little, if any, political independence from those who hold executive power. For its part, the legislative process has been readily dominated by pro-neoliberal, pro-agribusiness concerns or their lobby groups have exerted determining pressure when new laws are issued.

Corporate-friendly biotechnology regulation and agrarian reform detrimental to peasants have thus created a conspicuous double attack on peasant agriculture. Resistance movements in Mexico have consequently explicitly linked the issues of agricultural biotechnology and neoliberal agricultural restructuring to NAFTA's agricultural chapter and in their opposition statements demand that it is renegotiated. This has been the case since 1994, but this demand came to a head at the end of 2002, ju(of)-lmT.-389(vhru.2(frosf(of)-lmT.-cropsf)-lmT.-weref)-lmT.-abouoffrobeffrotofrofrehru.2(frot tryside can take no m(vhr46fro'.)-367.5(While)-367.5(this)-367.5(m(vement)-367.5(initially)-367. became fragmented as some organisation leaders accepted short-term promises 9(v)]TJT*[(thei

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modify neoliberal policies to any significant extent by 2006, Mexico's political system was shaken to its roots in that year's highly questioned presidential elections (Otero 2008). Illegal by President Fox and the Entrepreneurial

Council – the organisation of the capitalist class – against the left-of-centre candidate, and a series of communication errors by the Federal Electoral Institute, lent themselves to a widespread belief that electoral fraud had occurred. While there was hope that the Electoral Tribunal of the Federal Judicial Power would rectify the situation by ordering a recount or even nullifying the election, it ultimately only ordered a vote recount for a little over 9 per cent of the balloting boxes, setting off a tremendous amount of uncertainty in the entire institutional process. Despite considerable irregularities found, the Electoral Tribunal of the Federal Judicial Power decided that they had not significantly modified the final results. According to public opinion polls at the time, 46 per cent nonetheless believed that the elections were fraudulent.

Consequently, it is no surprise that substantial mobilisation has taken place since the 2006 elections. One significant issue in this mobilisation is the preservation of Mexico's food sovereignty around maize, which involves a keen opposition to the use of transgenic crops. The battle cry of these movements is: 'Sin maíz no hay país' (without corn, there's no country). (Otero, fieldnotes of the National Democratic Convention March 2007). This movement has been exacerbated with the end of NAFTA's phase of protection period for the last four agricultural commodities: maize, beans, sugar and milk. A massive demonstration of 200,000 peasants, workers and other sympathisers took place in Mexico City on 31 January 2008 to protest against NAFTA's full opening of agricultural trade. Whether this mounting resistance will successfully alter the current trajectory is uncertain, but this is certainly possible.

Conclusion: tying the case studies together

All in all, it is the less developed and less economically powerful country in this trio that suffers the brunt of negative social impacts with the introduction of this new technology. The policy expressions of neoliberal globalism – trade liberalisation, neoregulation and corporate-friendly IPR – have provided the means for important linkages between the neoliberal regulatory thrust and biotechnology. In sum, the 'third food regime' could aptly be named the 'neoliberal food regime,' centrally characterised by biotechnology and 'life science' transnational corporations as key economic actors operating in a neoregulated international context. The neoliberal food regime shows significant evidence of becoming entrenched. Yet it is still dependent on state support for trade liberalisation and new regulations important to the new technology, such as IPR. Resistance efforts directed specifically at biotechnology (as in the USA and Canada) or at the conjunction of biotechnology and the neoliberal paradigm (as in Mexico) will affect its future shape.

With specific respect to agricultural biotechnology, we can see how in Canada and the USA the drive to develop and disseminate the technology has taken precedence over more cautionary approaches. While this official pro-biotechnology stance has not been free of negative impacts, the development drive has clearly outweighed these considerations. In Mexico, which has a much weaker biotechnology sector, the indirect effects of biotechnology via trade liberalisation have been more devastating, and social resistance is much greater (Poitras 2008). While there is resistance to biotechnology in Canada and the USA, excepting the issue of IPR, it is not as explicitly linked to

neoliberal restructuring or international trade rules as it is in Mexico. There is a marked qualitative difference in the nature of resistance in these countries. No doubt this is in part due to the fact that, while livelihoods for some may indeed be in danger in the small percentage of the farming population in Canada and the USA – specifically considering the case of organic producers, for example – it is certainly not as detrimental as in Mexico, and the repercussions of these compromised livelihoods are not as dire.

The neoliberal food regime threatens to reinstate a form of neocolonialism by external economic agents – hence the more vigorous resistance to it in Latin America. While in Mexico social resistance has been confined mostly to civil society and to a more limited extent to the political challenge of the left coalition in the 2006 elections, the situation is markedly different in some Latin American countries. In these nations strong indigenous movements have been among the most vigorous opponents of the privatisation and commodification trends involved in neoliberal globalism, and they are also ones that have a considerable plant bampercuss4ua bamphe

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