Beyond political economy: actor networks and the globalization of agriculture

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ABSTRACT
This article provides a critical assessment of the traditional political economy approaches in analysis of agricultural globalization. The use of the actor network perspective is suggested to enhance our understanding of the globalization process. To illustrate the applicability of actor network theory to political economy studies, the globalization of the Canadian rapeseed (Brassica rapa and B. napus) industry is analyzed. It is shown that the globalization of the rapeseed industry proceeded through three simultaneously occurring developments: modification of relationships among people and plants; extension of rapeseed production networks; and redistribution of power, wealth and status among the actors engaged in global rapeseed production networks. Implications of the actor network approach for political economy studies are discussed.

KEYWORDS
Political economy; actor network theory; Canada; rapeseed; globalization; agriculture.

INTRODUCTION
Interest in the sociology of agriculture has grown dramatically over the last decade. At the same time agriculture has become more and more a global industry. This is not to say that agriculture has only recently become global in nature. Indeed, Columbus symbolically initiated its globalization in his quest for new routes for the spice trade. In the late nineteenth century, with the advent of steamships, global commerce in grains became commonplace. But only recently has globalization included large volumes of fresh fruits, vegetables, meats, dairy products, fish and flowers.

Furthermore, the food industry has become global in nature. Multinational corporations have come to dominate the food-processing
industry, turning out essentially identical food products (with some slight modifications for local tastes) from factories located throughout the world. Furthermore, the fast-food industry – initially a purely American phenomenon – has also become global in reach: McDonald’s in Moscow, Burger King in Bangkok, Kentucky Fried Chicken in Canton.

Not surprisingly, social scientists desirous of studying these profound changes in what we grow, what we eat, and who we are, have gravitated to political economy. Political economy, as a study of the relationship between politics and the economy, purports to demonstrate what developments have led to the globalization of the agriculture and food industry, and how these processes have proceeded, and to predict future trends.

Yet, at the same time, political economy has hardly been without its critics. It has been argued that while political economy delineates the broad conditions under which the process of globalization occurs, it tells us little about its specifics. In other words, traditional approaches concentrate on describing conditions that explain why globalization occurs, while telling little about how this process actually takes place. Thus, from the macro perspective, globalization is understood to be an extension of the immutable and potent logic of the capitalist ‘treadmill of production’ across the borders of the nation-states. As soon as the self-perpetuating logic of economic growth and capital accumulation is imposed upon the new localities, regions or nations, actors are forced to engage in a global process of production, distribution and consumption. Micro approaches similarly give few specifics about how the global division of labor emerges. They posit that globalization is an aggregate outcome of autonomous individuals acting in pursuit of their interests. In sum, both micro and macro approaches divide the world in a way that obscures the interactions among a wide variety of political, economic, social, cultural, technological and natural phenomena that extend across localities, regions and nations and that together define globalization.

Emerging network theories seek to address the weakness of traditional political economy in attempting to bridge the micro/macro divide in the analysis of globalization. They suggest investigating globalization as a process of network building and extension. Thus, instead of asking what conditions lead to globalization, the actor network approach asks how production, distribution and consumption networks are extended across localities, regions and nations to include new actors, products and technologies. Moreover, the notion of network includes the relationships between and among human as well as non-human elements (knowledge, technological artifacts, living organisms) that make production, processing and distribution of commodities possible. Yet, despite its focus on relationship building and extension, the actor network approach remains firmly within the realm of traditional political economy; it sees the
process of extension of production networks proceeding simultaneously with the process of production and distribution of wealth, status and power among actors engaged in the commodity production.

Therefore, the purpose of this article is not to debunk political economy, but to show how the actor network approach can be potentially incorporated into the framework of traditional political economy so as: (1) to improve our understanding of the globalization process; while (2) providing more avenues for action. First, some of the limitations of political economy are discussed. Then, some of the key propositions of actor network theory are described. Finally, using examples from a study of the Canadian rapeseed sub-sector, suggestions are made as to how actor network theory might be used to inform both research and practice.

THE POLITICAL ECONOMY APPROACH

From its inception, political economy has tended to divide the world into the micro and macro. The classical approach to political economy was developed by Smith (1976 [1776]) and other classical economists. Their version of political economy contained autonomous individuals whose aggregate behavior would somehow lead to social goods (i.e. Smith’s invisible hand) or social evils (i.e. Malthus’ dire predictions of population growth).

In contrast, Marx (1970) and his followers have tended to focus on macro-level processes, employing such terms as ‘the state’ and ‘class interest’ to explain social phenomena. At the most extreme is World Systems Theory in which individuals have little or no role to play, but are victims of an inexorable process of system change (e.g. Wallerstein, 1974). Yet both classical political economy and Marx’s critiques, as well as adherents to contemporary mainstream economics and critical political economy, while they have abandoned some of the theoretical particulars of their forebears, still staunchly maintain the macro–micro distinction. Indeed, it would not be unreasonable to argue that each position presupposes the existence of its opposite (see Boltanski and Thévenot, 1991). Microeconomics assumes a world in which organizations, states and classes exist, while critical political economy assumes the existence of atomistic individuals within those very groups.

In the sociology of agriculture the political economy approach is exemplified by work by Friedmann (1990), McMichael (1987) and Bonanno et al. (1994). Of particular interest are the various studies of commodity chains or sub-sectors such as those of Friedland and Barton (1975), Friedland et al. (1981), Heffernan (1984) and Busch et al. (1991). These studies examine the political economy of such commodities as lettuce, tomato, wheat and poultry.
The political economy of agriculture, however, has several major problems that limit its effectiveness as a critique of the existing order. First, it tends to reify the corporate actors in the commodity sub-sector. To some extent this is unavoidable because reification constitutes a part of any analytical process. It simplifies explanations, and provides possibilities to visualize and quantify complicated social processes. The major drawback of such analyses is that in them the subjects of those actions, people, tend to disappear. Instead structures, corporations, states, legislatures start to act, to function, to forbid, to promote, etc. However, such categories as ‘the state’ or ‘multinational corporation’ are metaphors, convenient shorthand, and cannot act ‘on their own’. What does it mean to say that state policies favor the growth of multinational corporations? Where did those policies come from? Who benefits from reifying the state, from turning it into an unstoppable behemoth that pushes everything in its way to the side?

Second, in the political economy of agriculture nature is usually seen as passive. It is the backdrop behind the stage on which the human drama is conducted. In true Baconian style, nature is recast as resources to be transformed, almost as if we were omnipotent. However, modern agriculture operates within genetic, physiological, biological and ecological limits. These limits can be extended only through creation of the massive mechanical, chemical, biological and scientific infrastructure. Thus, contemporary monocropping and monoculture-based agriculture cannot be sustained without the massive use of pesticides, herbicides, machinery, scientific labs and instruments, networks of roads and communications. Without such infrastructure, nature (i.e. weeds, diseases and pests) would destroy the fields of the high-yielding varieties in a very short period of time. Furthermore, nature’s reaction to monocropping and monoculture can also be indirect. Mass-scale monocrop cultivation can and does produce ‘domino effect’ changes through whole ecosystems of which modern agriculture is a part. It radically changes multiple relationships among micro-organisms, insects, birds and plants in the global ecosystem. The consequences of ecological disorganization created by humans are multiple and are coming back to haunt us. Loss of biodiversity, or diseases created by food, water and air pollution are most evident. We have barely begun to understand the impacts of radical disorganization of nature on our existence.

THE ACTOR NETWORK APPROACH

Having observed some of the problems of the political economy approach, let us turn now to actor network theory (e.g. Latour, 1987, 1993). Based on recent theoretical changes in the social studies of science, actor network theory challenges several of the fundamental distinctions.
upon which both classical and marxian political economy rest. On the one hand, it argues for the abolition of the distinction between macro and micro. On the other hand, it collapses the distinction between nature and society. In so doing it offers a way out of the modernist box and points us toward a new form of social science.

Deconstructing corporate actors

Consider the statement: ‘Cargill has put pressure on the legislature by threatening to leave if it does not receive tax breaks.’ This sentence, typical of those of political economy, contains no individual actors. Cargill, a corporate entity, influences the legislature, another corporate entity. Both are reified by the statement. Moreover, how can one fight Cargill, a faceless entity that is larger than life?

Yet Cargill can do nothing for itself. Indeed, it only has a physical existence in the form of stationery and signs on buildings. Clearly, someone must have the power to act in Cargill’s name. Someone must give voice to this voiceless entity. Someone must have the power to go to the legislature and lobby in its behalf. Someone must be the spokesperson for Cargill.

One might make a similar observation for the legislature. It, too, hardly exists except in the form of the name on a building and stationery. There, too, some persons are empowered to speak for it – in its name, so to speak.

But does this not lead us to a sort of absurd nominalism? Doesn’t it reduce sociology to psychology? Doesn’t it ignore the force of institutions? Not at all – unless it is assumed that those persons empowered to speak for Cargill and the legislature do so by themselves. That would be truly absurd. Instead, what allows an individual to act in the name of Cargill is his or her position at the center of a complex network of persons and things (more on the things below) that is known by the name ‘Cargill’. In short, the plea to deconstruct the institutional actors of political economy is not a plea for some sort of methodological individualism. It is a plea to begin to think of the globalization of agriculture in terms of the extension of actor networks.

Relations between institutions

This means that all relations between institutions in a commodity sub-sector must be mediated by someone (or perhaps some thing). When the state imposes size standards on apples, or requires that all persons applying pesticides be licensed, or extends intellectual property rights to plants and animals, it is not the state that acts. Someone must act in the name of the state – a bureaucrat, a judge, a legislator. And, more
likely than not, someone also acts in the name of apple growers, pesticide applicators or owners of intellectual property.

This suggests a point of entry for both research and action. Consider the people (institutions) involved in a typical agricultural commodity sub-sector: seed companies, research organizations, growers, transporters, processors, wholesalers, retailers, consumers. These institutions must interact with each other in order to fulfill the business of the sub-sector. The points of interaction are the weak links in the chain. They are the places where the networks are thinnest and where public records are most likely to be kept. For example, grades and standards reflect the relative power of each of the corporate actors in a sub-sector. But the history of the grades and standards is necessarily public. Similarly, consider the dramatic effect of two cyanide-laced grapes on the counter-seasonal market developed by Chile or of the effects of the Alar ‘exposé’ on US apple producers. Hence, research on the relative strength of the actors can be conducted at these locations.

Indeed, ironically, the longer the network, the more it is exposed to public scrutiny. The small food-processing company that sells in small quantities may go on for years producing shoddy goods and selling them to a continually changing set of buyers. In contrast, the large conglomerate cannot afford the negative publicity that would result from selling equally shoddy goods.

Including non-human actors

Another key feature of actor network theory is the inclusion of non-humans in the networks. Classical sociograms include only humans. When we think of institutions and organizations we tend to ignore the non-human actors. But those non-humans also act. They do not simply sit there while we do whatever we feel like with them. When farmers attempted to settle the North American plains in the latter part of the last century, they soon discovered that the indigenous population was not as enthusiastic about settlement as they were. Sad to say, those farmers were quite successful in wiping out or displacing most of the native Americans. In contrast, the wheat varieties they had were useless in the arid conditions there. Only when new varieties were developed, Marquis wheat for example, did it become possible to settle the prairies. Similarly, only after pineapples that shipped well were created could there be a cold chain to bring them from Hawaii and Africa to the USA and Europe, respectively. Making these technical changes was not merely a matter of finding the right people with the right technical training. It also involved the expenditure of funds, the equipping of laboratories, the painstaking work of sorting through thousands of cultivars, before nature yielded its bounty. And
THEME SECTION

there was a price to pay in terms of lower wheat yields and less tasty pineapples!

In short, in order to understand the globalization process it is necessary to go beyond people. The natural world must be also be included in the analysis. As Appadurai (1986) has suggested, we must understand the social life of things if we wish to understand exchange processes.

Action at a distance

What surely does distinguish contemporary western societies and their commodity chains from those of centuries ago is that they permit action at a distance. Marx talked eloquently of the shift from a society in which goods were produced for their use value to one in which goods were produced for their exchange value. Yet this transformation would not have occurred were it not for the extension of networks that had been largely local. Columbus' voyages to find a new way to the east marked the first major attempt to extend the European networks to the rest of the world. It required new technologies - maps, navigational equipment, ships - organized so as to permit Columbus to act for the king of Spain thousands of kilometers away. Moreover, those new technologies permitted the king of Spain and other European powers to control the actions of sea captains far from their home ports and to bring back to Europe the bounty of the rest of the world (Law, 1987).

The same ability to act at a distance made itself manifest in the creation of botanical gardens. As Brockway (1979) has noted, the gardens served to gather together in one place thousands of specimens, thereby making possible both the science of taxonomy and the identification of economically useful plants. Contemporary experiment stations serve in the same capacity (Busch and Sachs, 1981).

Contemporary advances in telecommunications and transportation make possible action at even greater distances. The multinational corporations that are increasingly dominating agriculture have been able to use these technologies to restructure production processes, to create channels for year-round delivery of fresh produce, to create new forms of competition among suppliers of primary products. Failure to understand how these technologies permit these new forms of action at a distance will limit our ability to propose alternatives as well.

Bringing justice back in

One of the major features of actor network theory is its ability to raise issues of distributive justice in places where neither the classical nor the critical version of political economy recognizes them. Agricultural
commodity sub-sectors are systems for distributing social goods such as income, status, power, wealth or prestige in addition to the economic goods that flow from the sub-sector (e.g. apples). The distributive character of commodity sub-sectors is twofold (Busch, 1993). Social goods are distributed among the different types of actors in a sub-sector as well as among actors of the same type. For example, income may be distributed among wheat producers, millers, bakers, retailers and other types of actors in the wheat commodity sub-sector. In addition, the sub-sector serves to distribute income within each of these actor groups, such that, for example, certain changes in the sub-sector may favor certain types of bakeries over others. Bertaux and Bertaux-Wiame (1981) show, for example, how petty-bourgeois French bakers have kept larger commercial bakeries from capturing the market as they have done in the USA.

Both classical and critical political economy may help us to identify the distribution of such goods, but they do little to help us understand how or why the goods are distributed in particular ways. In general, classical political economy would argue that unevenness in the distribution is largely due to imperfections in the market, while critical political economy would argue that certain corporate actors dominate the system and use it to their advantage. Both are glosses on what actually happens.

Classical political economy posits a largely mythical free market which exists independently of any given actor and measures all else as deviations from this ideal. Thus, since inequalities would be minimized in the world of the free market, we are told that the failure to achieve a free market (as a result of barriers put in place that prevent its free operation) is the source of the problem. Yet the differential access to capital as well as the relative immobility of labor is rarely mentioned by supporters of that tradition (e.g. Friedman, 1962).

In contrast, critical political economy never explains why it is that people and corporate actors often enthusiastically enroll in projects that lead to their ultimate dependence. Consider the case of the enthusiastic adoption of hybrid seed by farmers despite the necessity to purchase it every year (Griliches, 1958). In another context, Ruttan (1992) has rightly asked why it is that the alleged victims of dependency go so willingly to the gallows.

Consider the plight of the proverbial Juan Valdez, the Colombian coffee grower. After looking at the distribution of revenues in the coffee sub-sector, we might well argue that Juan is exploited. His share of the total value added is small compared to that of other actors. Yet, if you ask Juan why he grows coffee, more than likely he will tell you that it is because it gives him the greatest return on his investment.

The answer to this apparent puzzle lies in the concept of enrollment. As Latour (1987) suggests, actors are enrolled when the choice offered
to them is better than other choices available at a given moment. Thus, compared to the returns from growing corn or beans or other crops, coffee is better.

Of course, the range of choices open to anyone at any given time is a function of what other networks are available. Thus, when Juan chooses to grow coffee, growing vegetables for the New York counter-seasonal market is probably not a choice. Nor is moving from the village to Bogota and taking a factory job. Nor is withdrawing from the cash economy and living entirely from subsistence production.

There are two processes operating simultaneously here: on the one hand, Juan – like all the rest of us – has been born into a world in which his choices are limited and has at first accepted those limitations as somehow ‘natural’ (Husserl, 1970; Schutz, 1967). Not only are the rocks, trees, plants and other features of the landscape viewed that way; so are all the human–human and human–non-human relationships. That is apparently a part of the process of socialization in every society.

On the other hand, certain choices may be deliberately denied to him. The coffee company may have a local monopoly over purchasing the beans. The state may not have invested in adequate physical infrastructure for the area, thereby making transportation costs high. This state policy, in turn, may be due to the existence of other networks that insure that road-building funds are diverted elsewhere. The natural landscape may be an impediment to growing certain kinds of crops (because it is too hilly, too flat, too hot, too cold, too humid, too dry). In each case that we examine we are likely to find somewhat different reasons for the limitation on choice. Some limitations will be traceable largely to humans while others will be traceable largely to non-humans. Still others will be linked to human–non-human relationships.

For Juan to understand that he is exploited he has to realize, perhaps with the help of itinerant social scientists, that other choices might be open to him. He has to become aware of the way the socialization process works, of how things might be otherwise. This includes, as Horkheimer (1992) has argued, understanding of the world as a conflictual place where some possibilities are realized while others are denied. If one takes a position based on these denied interests, a whole field of possibilities can be opened – possibilities that can become the basis for new practical relations to the world.

ACTOR NETWORKS AND THE POLITICAL ECONOMY OF THE CANADIAN RAPESEED SUB-SECTOR

To illustrate the potential of the actor network approach in the analysis of an agricultural economy, consider the example of the rapeseed sub-sector in Canada. The development of the Canadian rapeseed sub-sector
is regarded as one of the most significant achievements of Canadian agriculture. Rapeseed was introduced in North America only recently. Initially the crop was used for industrial purposes – for production of hard-to-get marine lubricants during the Second World War. With the end of the war the rapeseed market collapsed. Yet Canadians were able to transform this virtually moribund industry into a thriving one in a relatively short period of time. Currently, Canada produces about 4.3 million metric tons of canola per year – about 15 percent of the world’s total (Cereals and Oilseeds Review, 1994).

The emergence and decline of the relationships in a network

The idea of changing industrial rapeseed into an edible oil had originated at the Canadian Defense Board (Figure 1, Section I). The Canadian military establishment was interested in insuring national self-sufficiency for the key ingredients of the diet (Busch et al., 1994). Yet very few oilseed crops, among them rapeseed, could be grown under Canada’s harsh climatic conditions.

The use of rapeseed oil for edible purposes had severe disadvantages. Rapeseed oil contains a high percentage (up to 40 percent) of erucic acid. Pharmacological studies showed that erucic acid fed to laboratory
rats caused the formation of adrenal cholesterol in their blood and slowed their growth (Figure 1, Section II). Therefore, before rapeseed could become suitable for human consumption, it needed to undergo a profound transformation.

In order to carry out the needed modification of the rape plant, the network that initially consisted of erucic acid, mice, adrenal cholesterol and the Defence Board was extended. The National Research Council and Agriculture Canada with their various subdivisions were added to it (Figure 1, Section III). Of note is that, with the extension of the network, the problem of rapeseed also underwent a significant modification. First, it was formulated as a strategic issue. Once rats and adrenal cholesterol were added, rapeseed also became a dietary and health problem. And, finally, with the inclusion of the National Research Council and Agriculture Canada, it became a plant breeding issue.

However, the breeding of low erucic acid rape (LEAR) quickly ran amok. Attempts to change the genetic architecture of the rape plant were hampered by the lack of an instrument that would allow measurement of the content of erucic acid in a seed without destroying it. Without such an instrument, breeding was a trial-and-error activity that might last for years and years. In other words, reduction of erucic acid could not be achieved within the framework of plant genetics alone. This meant that the networks needed to be extended further, this time into the field of organic chemistry (Figure 1, Section IV).

There were techniques in organic chemistry – such as gas-liquid chromatography (GLC) – that allowed the measurement of small quantities of gasified substances. However, GLC was unsuitable for analysis of saturated fats. To make GLC work, a substance needed to be found that would allow measurement of the amount of erucic acid in one-half a rapeseed.5 After some testing it was found that polyester had the desired qualities. Polyester-based GLC allowed reduction in the quantity of rapeseed oil needed for testing from several liters to a few grams and eventually to one-half a seed.

Once GLC became available, breeding proceeded very rapidly. In 1968 Downey of Agriculture Canada released the first LEAR variety, Oro. In 1974 Stefansson of the University of Manitoba eliminated the other toxic compound contained in rapeseed – glucosinolates6 – and registered the first double zero rapeseed variety (zero erucic acid and zero glucosinolates), Tower. The transformation of the rapeseed was complete. To indicate the suitability of the modified rapeseed for human consumption, the name of the crop was also changed from ‘rapeseed’ to ‘canola’.

In short, the erucic acid problem in rapeseed was solved by extension and modification of the relationships among institutions, people, things and symbols. For the lack of a better word, this network – the combination of things, people, institutions and knowledge – can be
called an ‘instrument’ constructed to reduce erucic acid in rapeseed. The word ‘instrument’ is used so as to emphasize the holistic nature of the network. To put it differently, the characteristics of the network (ability to eliminate erucic acid in rapeseed) cannot be deduced or derived from the characteristics of the elements from which the network is comprised.

Once the problem of erucic acid was solved, the scientific network which produced zero erucic acid rapeseed started to decline. The decline of the network is recorded in Figure 2. The figure compares the number of Canadian publications on erucic acid with erucic acid content of canola oil produced in Canada from 1972 to 1992.

According to Figure 2, in the early 1970s the Canadian rapeseed industry was producing canola oil with a very high percentage of erucic acid in it. Attempts to reduce erucic acid content required a significant research effort by Canadian scientists. Thus, up to 8 percent of the total number of publications on rapeseed in Canada in the early 1970s were on erucic acid. By the late 1970s the content of erucic acid in canola oil had been reduced significantly. As a result, the interest (and perhaps the funding) of Canadian scientists in this subject also was rapidly declining to the degree that in 1984, 1985 and 1986 they did not produce any publications on erucic acid at all.  

The decline of the network that allowed the development of zero erucic acid varieties, however, had spurred the extension and creation of relationships in other directions – directions that were not possible with the old, unmodified rapeseed. Take as an example the network created by breeding activities. Figure 3 presents simultaneously relationships between breeders, institutions and rapeseed varieties registered in Canada.

![Figure 2](image-url)  

*Figure 2* Canadian publications on erucic acid in rapeseed and erucic acid content of canola oil produced in Canada, selected years, 1972–92

*Sources:* *Agricola* (1970–92); Grain Research Laboratory (various years, a, b, c).
Figure 3 Agricultural research institutions, breeders and varieties of rapeseed registered in Canada, 1954–90
As Figure 3 shows, since the development of Tower, the first double zero variety, the intensity of breeding activities has increased manyfold. Before Tower was developed, only two institutions were engaged in rapeseed breeding. Since the development of Tower, three more institutions have joined them. Furthermore, one of them, the seed company Svalof AB, is located across the Atlantic Ocean, in Europe. Before Tower there were ten varieties of rapeseed registered by the Canadian government. Since Tower was developed, twenty-eight more varieties have been added to the rapeseed register. Moreover, as time went by, relationships between breeders, institutions and rapeseed varieties in the network intensified.

The political economy of networks

As the Canadian rapeseed sub-sector continues to grow, the stories of the development of new relationships, and modification and decline of the old ones, can go on and on. What would classical political economy say about the dynamic combination of people, things, institutions and ideas that is called the Canadian rapeseed sub-sector? Where is the polity, and where is the economy? Can they be separated? It is clear that the categorical apparatus of political economy in the analysis of the rapeseed network is inadequate. However, this does not mean that there are no political (mediated by power) or economic (mediated by money) relationships among actors in the network. The National Research Council is subordinated to the Defence Board, the Forage Research Laboratory is subordinated to Agriculture Canada, etc. Moreover, extension of the rapeseed networks across the boundaries of disciplines and fields required significant resources. Jolliff (1989) has estimated that the development of zero erucic acid varieties of canola cost the Canadian government 147 times as much as the USA spent to develop soybeans.

Under the network assumptions it is neither the economy that determines politics (marxism), nor politics that determines the economy (critical political economy). It is neither institutions that determine the behavior of individuals (macro approach), nor individuals' aggregate behavior that results in the emergence of institutions (micro perspective). Instead the relationships among people, things, institutions and ideas are created, maintained and changed through time. The political economy of networks then becomes centered on the question: Who or what, by using policies, inventing new technologies, modifying or creating institutions, is able to position him/her/itself in a strategic position so as to provide for his/her/its best interests?

Theoretically there are as many networks as there are points from which the relationships can be analyzed. However, relativism in terms
of analysis should not conceal the fact that positions in the network are far from equal in consequences for the actors participating in them. Usually there are large income, prestige and status inequalities among actors engaged in a sub-sector. Some actors are able to dominate the network by defining what form and character the commodity should take, and how the income earned should be distributed. Some actors, on the contrary, are dominated and because of their position in the network have very little power to articulate and defend their interests.

Furthermore, our research on rapeseed has shown that strategic positions in the network are negotiated and shift through time (Juska and Busch, 1994). Thus, from the end of the Second World War to the late 1960s, actors engaged in agricultural settings dominated the sub-sector. With introduction of the LEAR and double zero varieties in the early 1970s, the development of the sub-sector came to be defined by the rapeseed-processing industry. And, finally, in the late 1980s there was a significant growth of the influence of the scientific establishment on the rapeseed sub-sector.

Such shifts in the positions of actors occurred for a variety of reasons. Changes occurred as a result of implementation of new technologies. Other changes resulted from the creation of new institutions (such as the Canola Association of Canada in 1967). And, finally, positions of actors were changed by domestic as well as foreign policies for processing, transportation and trade in canola.

Consider the dramatic impact the change in Japanese rapeseed import policies had on globalization of the rapeseed industry (Kneen, 1992). Arguably, the opening of the Japanese domestic oilseed market for Canadian rapeseed by the early 1970s had occurred for reasons that were only indirectly caused by the Canadian government’s and Canadian canola producers’ lobbying. More important was a confluence of developments that evolved by that time in the USA and Japan.

By the early 1970s the USA had intensified its pressure on Japan to open its domestic oilseed market. In part this happened because of accumulation by the early 1970s of significant grain, including soybean, surpluses in the USA. It was also partially a consequence of the intensive lobbying of the US soybean industry. The US soybean industry had accounted for more than half of the world’s soybean production and its power domestically and internationally far exceeded that of Canadian rapeseed producers. Furthermore, in comparison with Canada, the USA was able to exercise far stronger political and economic muscle toward Japan. In many respects, Canada just jumped on the US government’s bandwagon in pursuit of tariff-free oilseed trade worldwide. Arguably, the Canadian government alone would not have been able to pressure Japan into opening its domestic oilseed market for Canadian rapeseed.
The opening of the Japanese domestic oilseed market was also connected to internal developments within Japan. By the early 1970s spectacular economic growth of the country had led to a dramatic decline in the rural population. Increasing costs of agricultural labor were pushing oilseed prices higher at a time when those prices on the world market were declining. Thus, by the early 1960s the price of domestically produced rapeseed in Japan was about 20 percent higher than the price of rapeseed on the world market (Shokury, 1963). Caught in the oilseed price squeeze and being under intense pressure from the American and Canadian governments, Japan made a decision to open its internal market. The multilateral trade agreements signed in the mid-1970s resulted in removal by the Japanese government of import quotas and tariffs on both rapeseed and soybeans.8 Such changes in Japanese import policies ushered in the era of globalization of rapeseed production. By the early 1990s about 90 per cent of rapeseed consumed in Japan was coming from Canada. On the other hand, exports to Japan account for more than 40 percent of Canadian rapeseed production (Cereals and Oilseeds Review, 1994).

Globalization of rapeseed production, however, proceeded hand in hand with restructuring of the processing industries in both Canada and Japan and redistribution of income among actors in different countries (Kneen, 1992). Although by the late 1960s Japan had practically abandoned its domestic rapeseed production, it continued to protect and support its oilseed-processing industry by setting tariff policies on imported rapeseed meal and rapeseed oil. Such import policies were beneficial to the very large Japanese crushers. Small Japanese crushers, however, were quickly driven out of business. The impact of Japanese import policy changes on the Canadian crushing industry was devastating. Canadian crushers almost overnight were left with only half the domestically produced seed to process. Significant overcapacity of Canadian crushers quickly created huge financial losses and led to the takeover of the industry by foreign multinationals. In short, globalization of the rapeseed industry left Canadians with the production of the lower added value (unprocessed) rapeseed. Japanese, on the other hand, captured a significant part of the most profitable stage in the global rapeseed commodity chain – oil and meal production.

CONCLUSIONS

In short, both classical political economy and its radical critique leave us wanting. Traditional approaches to political economy are at their best if they are applied to stable and well-established systems of agricultural production. However, they are much less satisfactory when it comes to explaining the expansion (e.g. globalization) or decline of agricultural
production. This is because they are based on the assumption that the changes in the relationships between the polity and economy (if they occur) are primarily quantitative and linear. Thus, corporations tend to expand their production into other countries and continents if they expect higher returns than in their host countries. In other words, decisions to relocate production facilities or to sell in foreign markets are primarily a matter of relative cost. In such interpretations technology as well as labor are just elements of input that can be added when returns increase and discarded when they decline.

Because of such quantitative assumptions, in traditional approaches there is very little attention paid to the analysis of the specifics of the process by which globalization of agricultural production proceeds. The macro approach postulates that given adequate macroeconomic conditions actors will be driven to search unceasingly for reduced production costs and increased market share. The micro perspective reduces the problem of change to the relationships among individuals alone and excludes networks as well as non-human actors.

However, as the rapeseed sub-sector story illustrates, the rapeseed industry’s establishment and, later, its globalization proceeded through radical modification of relationships among people, institutions, plants, technology and knowledge. Thus, the rapeseed sub-sector (by itself a structural phenomenon?) was created through a specific arrangement of human–human and human–thing relationships. These relationships that criss-crossed economy, biology, politics, the military, chemistry and nutrition modified the characteristics of the rape plant. Simultaneously, the same relationships determined the character of distribution of power and wealth in the emergent Canadian rapeseed sub-sector. As the rapeseed network was extended across the Pacific Ocean, some of these relationships withered away, some were deliberately broken and changed, while new ties were negotiated or imposed. The consequence was dramatic growth of the economic significance of rapeseed in world oilseed markets, as well as redistribution of wealth among actors engaged in what became a global rapeseed industry.

Given the complexity of networks, we would argue for a more ‘modest’, in Foucault’s terms, vision of political economy (Murdoch, 1995). This means abandoning the ‘tendency to explain social processes (including the globalization of agriculture) by reference to some pre-existing account of epoch-like change’ (Murdoch, 1995; italics in original). Instead he suggests constructing accounts from within the processes of change.

Network analysis, in comparison to political economy, is relatively ‘modest’. Its basic principle is simple: follow the changes a commodity undergoes as it moves through a sub-sector (Busch, 1990). Because it is empirically driven, the network approach is relatively ‘modest’ in its
scope (what is explained) as well as in its potential for generalization (what can be explained).

Symbolic interactionists for a long time have emphasized the negotiated nature of social life. However, they tended to limit the process of negotiation to face-to-face interaction among individuals. The network approach allows us to extend the notion of social interaction. Once the non-human actors (things, ideas), as well as action at a distance, are also included, the distinction between macro and micro, so basic to the traditional approaches in political economy, loses its validity. In short, we need to rethink our research on globalization in order to escape the limitations of political economy. In so doing we may rejoin the micro and the macro, and identify points of entry into networks and of political action as well.

NOTES

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1 The term 'treadmill of production' was coined by Schnaiberg and Gould (1994) and is used to indicate the fundamental self-reproducing logic of accelerating economic growth and capital accumulation under modern capitalism.

2 Note that the free market to which all classical economists aspire is a sort of 'institution in itself' apparently independent of any historical circumstances and certainly independent of the intentions and actions of individuals. Indeed, it is precisely the antithesis of the individuals who dwell in it!

3 This also explains why Juan so enthusiastically grows coca leaves. Coca cultivation is based on indigenous technology and fits preexisting, labor-intensive practices of rainforest agriculture; it grows where other cash crops do not grow – on depleted soils – and therefore does not require purchasing of expensive fertilizers or machinery; coca produces six harvests per year; and finally it has higher market prices than coffee or cacao (Wilson and Zambrano, 1994). Also see the informative article on the subject by Bois (1992).

4 One of the amazing features of doing commodity sub-sector analysis is the fact that actors rarely know much about actors beyond those from whom they purchase raw materials or to whom they sell their products.

5 Since the content of erucic acid varies from seed to seed, each seed was split, with one seedleat used for analysis and the other planted.

6 Glucosinolates are a substance contained in rapeseed meal that is goitrogenic to animals.

7 The difference between the peaks in the erucic acid content of the canola oil and the number of publications on erucic acid (about 2–3 years) can be accounted for by the time lag needed for scientists to publish the results of
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their studies in academic journals. If this time lag equals two years, the correlation coefficient between mean percent of erucic acid in canola oil and percent of publications on erucic acid for the years 1972–91 is equal \( r = 0.62 \). If the time lag equals three years, \( r = 0.89 \).

8 For a more detailed description of the Japanese rapeseed import policies see, for example, Carter and Mooney (1987).

9 By the term ‘structural phenomenon’ we mean a set of relatively stable patterns of interaction between people, institutions, things and symbols.

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