GATEKEEPER SERIES NO. 114

Food Industrialisation and Food Power: Implications for Food Governance

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2004

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International Institute for Environment and Development

Natural Resources Group and Sustainable Agriculture and Rural Livelihoods Programme

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EXECUTIVE SUMMARY

Food supply chains of developed countries industrialised in the second half of the twentieth century, with significant implications for developing countries over pursuit of policy, ensuing external costs and accompanying concentration of market power. Very powerful corporations dominate many sectors. Primary producers are locked into tight specifications and contracts. Consumers may benefit from cheaper food but are less enamoured of quality implications and health externalities.

As consumer confidence has been shaken, new quality agencies have been created. Tensions have emerged about the state's role as facilitator of industrial efficiencies. Food policy is thus torn between the pursuit of productivity and reduced prices and the demand for higher quality, with implications for both producers and consumers in the developing world.

FOOD INDUSTRIALISATION AND FOOD POWER: IMPLICATIONS FOR FOOD GOVERNANCE

Tim Lang

The twentieth century witnessed a revolution in the nature of the food supply chain, the implications of which are only now being worked through at policy and institutional levels. The period was characterised by unprecedented changes in how food is produced, distributed, consumed and controlled – and by high levels of concentration of market share. After a period in which the state in developed countries actively promoted the restructuring of supply chains in the name of efficiency and output maximisation, adverse public reaction to these changes in the West is now forcing governments to respond differently, taming rather than forcing the pace and scale of change. The state is caught on the horns of a policy dilemma: on the one hand, actively promoting the development of efficient modern food supply chains; on the other hand, having to develop processes of food governance which can respond to and retain public trust in food.

The struggle over the direction of the food supply chain now going on in many developed countries has lessons for the developing world, still heavily focused on trade issues such as market access, the subsidies of the European Union's Common Agricultural Policy and economic protectionism. Important though these issues are, the emergence of another discourse is potentially both more threatening and important for the developing world. A policy choice looms.

This article explores the conflict and the choice, drawing mainly on the European experience, and particularly on the British. The UK is interesting not just because it was the first industrial nation and thus the first to sever its people from the land in a systematic and mass manner, but because it has had to grapple with the peculiarities of a post-colonial political transition into a European Member State.

Changes in industrial and post-industrial food supply chains

The last half century ushered in a period of unprecedented and rapid change in the food system, whose impact is on a par with that of the so-called Columbian

exchange half a millennium ago, or the impact of British nineteenth-century colonialism which used foreign lands both to feed trade and to home populations on a massive scale; or the impact of the internal combustion engine, in particular the tractor, and its substitution for animal traction power; or that of the chemical revolution on soil management. The new era of food supply management has redrawn the spatial as well as the cultural food map.

Developed world consumers have been able to transcend the seasons, with a cornucopia of year-round fruit and vegetables arriving in tightly planned waves from Europe, the Americas, Africa, and Australasia. Although the new food system has new characteristics, explored below, it could not have been ushered in without previous technical and social transformations. In particular, the twentieth-century agricultural revolution drew on patient and much slower transformations in the understanding of chemistry, plants, animals and engineering. In the late nineteenth century, for example, there had been a shift from milling grains using hands, animals, wind and water to the faster steam or electric roller mills. But in the 1960s, another quantum leap was made with the 'Chorleywood process' which allowed bakers to emulate car manufacturers in the organisation of their throughput. The new process whipped bread to rise in a few minutes, where, for the previous four millennia, bakers had had to wait hours. Yeast was added purely for taste.

Among the core characteristics of the twentieth-century revolution in the food supply chain are its integration, control systems and astonishing leaps in productivity, as measured in labour and capital use. The resultant restructuring has included changes in:

- how food is grown – for example, mass use of agrochemicals, hybrid plant breeding;
- how animals are reared – for example, factory farms, intensive livestock rearing, prophylactic use of pharmaceuticals to increase weightgain;
- the emergence of bio-technology – as applied to plants, animals and processing;
- food sourcing – for example, a shift from local to regional and now global supply points, with a blurring of the notion of seasonality and a tendency to monoculture on the farm belying the biodiversity on the supermarket shelf;

- means of processing – for example, use of extrusion technology, fermentation, wholesale use of cosmetic additives to disguise products and yield consistency;

- use of technology to shape quality – the goal of mass production to deliver consistency and regularity (uniformity) is now focused on the development of niche products with 'difference';

- the workforce – for example, a dramatic shedding of labour on developed-world farms but a retention of pools of cheap labour (immigrants) to do the manual tasks such as grading and picking; also a strong push to 24-hour working;

- marketing – a new emphasis on product development, branding and selling has accompanied a dazzling display of apparent choice, with thousands of products vying for attention;

- retailers' role – they have emerged as the main gateways to consumers, using contracts and specifications to gate-keep between primary producers and consumers;

- distribution logistics – for example, use of airfreight, regional distribution systems, 'trunker' (heavy lorry) networks, satellite tracking;

- methods of supply chain management – for example, centralisation of ordering, application of computer technology, application of batch /niche production to mass lines ('flexible specialisation');

- moulding of consumer tastes and markets – for example, mass marketing of brands, the use of product placement methods, huge investments in advertising and marketing and the targeting of particular consumer types;

- level of control over markets – for example, rapid regionalisation and moves towards globalisation, and the emergence of cross-border concentration.

As the twentieth century unfolded, the industrial approach was applied from farm to retailing to food service/catering. A new human geography of food emerged. In developed countries such as the UK, more people now work in catering than in the entire rest of the food supply – though in catering, too, there is now pressure to shed labour and introduce pre-processed products into the kitchen.

Meat production is one sector with many advanced industrial characteristics. It has witnessed the application of factory methods of management, production and control, not just in the meat packing plants of Buenos Aires or Chicago, but in the rearing of animals themselves. This is illustrated by the emergence of huge feedlots where land was cheap (the Americas), or caged poultry and pig production and intensive dairy production units where land and/or weather demanded it. Productivity of animals, land and labour has risen to unprecedented levels. Dairy cattle have been bred to achieve a doubling and trebling of milk output, for instance. This industrial meat production regime is now being transferred to the developing world. The Indian broiler industry, for example, has grown from 31 million birds a year in 1981 to 800 million two decades later (Gold, 2003).

The role of Information Technology is another important new feature. Laser bar codes and Electronic Point of Sale (EPOS) systems in retailing are, to the consumer, the visible end of a sophisticated technological web covering the supply chain (Brown 1997). Computers enable the application of 'just-in-time' distribution systems (which minimise build-up of stocks and allow the application of an Efficient Consumer Response ethos to deliver business-to-business efficiencies), robotic warehouses, satellites for monitoring crops in distant places and the management of shipments and lorry delivery schedules. A retailer with annual sales of £17 billion cannot afford to run out of key food products or it will lose consumer credibility. Computers are central to this industrialised management approach.

By the late twentieth century, such was the tightness of control of the managerial revolution in the food sector, that it had replaced the motor industry as the benchmark for efficiency. Retail management was being offered to other service sectors as varied as hospitals and education as the ideal customer-oriented approach.

Redefining the market: the emergence of high levels of concentration

The food sector has been concentrating rapidly. The sectors vary in their dynamics. Land ownership is locked by the fact that land cannot move. Food manufacturers, by contrast, can relocate production outside their parent country, yet still have access to 'home' consumer markets. Thus, and following the creation of the Single European Market in the late 1980s, a company like European giant Unilever was able to rationalise its product mix, recipes and factories, to make maximum use of European scale and transport systems. In the United States, a similar regional market, the market share of the top 20 food manufacturers has doubled since 1967 (Connor, 2003); 100 firms now account for 80% of all value-added in the sector.

European levels are not dissimilar to those of the US. Globally, a group of global players with enormous purchasing power has emerged among manufacturers (Table 1) and retailers (Table 2).

Table 1: World top 10 food manufacturers, 2002

Sector rank	Global rank	Company	Country	Market value $m	Turnover ($m)
1	34	Nestle SA	Switzerland	88,112.0	50,615.8
2	62	Unilever	UK & Netherlands	56,394.0	48,505.0
3	201	Kraft Foods	US	21,450.8	33,875.0
4	240	General Mills	US	17,843.9	7,077.7
5	266	Danone	France	16,706.2	12,687.3
6	272	Sara Lee	US	16,304.7	17,747.0
7	305	Heinz (H J)	US	14,539.7	9,430.4
8	311	Cadbury Schweppes	UK	14,202.0	7,898.8
9	325	Kellogg	US	13,685.9	8,853.3
10	347	Conagra Foods	US	13,026.8	27,194.2

Source: Financial Times FT500 (2002).

The situation among retailers is changing particularly rapidly. In the period 1993-9, the aggregate concentration of the top 10 grocery retailers in the EU grew by 24.9%, whereas the market share of the bottom 10 companies in the EU Top 50 declined by 72.2%. The larger are getting larger and the small (even though large in relative historical terms) are being squeezed (Dobson, 2003). In Europe, retailers are now concentrating regionally, perhaps due to the fact that home markets were already concentrated.[1] There are some emerging European giants such as Carrefour, Aldi, Tesco and Ahold.[2] The UK's Tesco, for instance, is now structured into three divisions: UK and Ireland, Central Europe and the Far East.

These trends are likely to continue. The Institute of Grocery Distribution, a food sector research institute, predicts that, based on historical growth rates in European turnover for the last 5 years, the top ten retailers will increase market share from 37

1. The share held by the top three firms in EU countries ranges from 40% (Germany, UK) to over 80% (Finland and Ireland). But the largest countries are now poised to emulate the smaller ones (Grievink, 2003).
2. The last was hit by a crisis of fraudulent accounting after falsely claiming $880 m. higher earnings than had happened (Bickerton, 2003).

Table 2: World top 30 food retailers, 2002

Rank	Company	Country	Turnover ($m)	No. of Countries	Foreign Sales (%)	Ownership
1	Wal-Mart	US	180,787	10	17	Public
2	Carrefour	France	59,690	26	48	Public
3	Kroger	US	49,000	1	0	Public
4	Metro	Germany	42,733	22	42	Public/family
5	Ahold	NL	41,251	23	83	Public
6	Albertson's	US	36,762	1	0	Public
7	Rewe	Germany	34,685	10	19	Co-operative
8	Ito Yokado (incl. Seven Eleven)	Japan	32,713	19	33	Public
9	Safeway Inc.	US	31,977	3	11	Public
10	Tesco	UK	31,812	9	13	Public
11	Costco	US	31,621	7	19	Public
12	ITM (incl. Spar)	France	30,685	9	36	Co-operative
13	Aldi	Germany	28,796	11	37	Private
14	Edeka (incl. AVA)	Germany	28,775	7	2	Co-operative
15	Sainsbury	UK	25,683	2	16	Public/family
16	Tengelmann (incl. A&P)	Germany	25,148	12	49	Private/family
17	Auchan	France	21,642	14	39	Private/family
18	Leclerc	France	21,468	5	3	Co-operative
19	Daiei	Japan	18,373	1	0	Public
20	Casino	France	17,238	11	24	Public
21	Delhaize	Belgium	16,784	11	84	Public
22	Lidl &Schwartz	Germany	16,092	13	25	Private
23	AEON (formerly Jusco)	Japan	15,060	8	11	Public
24	Publix	US	14,575	1	0	Private
25	Coles Myer	Australia	14,061	2	1	Public
26	Winn Dixie	US	13,698	1	0	Public
27	Loblaws	Canada	13,548	1	0	Public
28	Safeway plc	UK	12,357	2	3	Public
29	Lawson	Japan	11,831	2	1	Public
30	Marks &Spencer	UK	11,692	22	18	Public
TOTAL			**930,537**			

Source: IGD (2002).

to 60% by 2010. Their combined European grocery turnover will grow from €337.1bn in 2000 to €461.7bn by 2005 and €669.7bn by 2010 (IGD, 2001).

Much current market concentration has occurred not by slow gains due to superiority of product or consumer appeal, but by buy-outs. Mergers and acquisitions have been rife from the 1980s on both sides of the Atlantic, as already large companies snapped up competitors. The results have changed both the architecture of the food supply chain and its public face. For example, a 'national' brand like Kit-Kat (once owned by former Quaker confectioner Rowntree's of York) could be bought by Swiss based Nestlé and turned into a global brand.

Similar trends occur in other sectors. Concentration is probably at its most advanced in agrochemicals, a key infrastructural sector. In the late 1980s, the top 20 firms worldwide accounted for around 90% of sales (Lang and Clutterbuck, 1991). By the late 1990s, this level was held by 10 firms. Today it is just seven (see Table 3).

Table 3: World top 7 agrochemical companies, 2001

Rank	Company	AgChem Sales 2001 (US$m)
1	Syngenta	5,385
2	Aventis	3,842
3	Monsanto	3,755
4	BASF	3,105
5	Dow	2,612
6	Bayer	2,418
7	DuPont	1,917

Source: Agrow (2002).

There are also strong links between sectors. Chemical companies have diversified into seeds and biotech. In the US, the top four beef packers already controlled around a quarter of the market in the mid-1970s. Today, just 20 feedlots feed half of the cattle in the US and these are directly connected to the four processing firms that control 81% of the beef processing either by direct ownership or through formal contracts (Connor, 2003; Hendrickson et al., 2001).

Concentration is strongly linked to power and the concentration of power over the food system is now remarkable, whether one looks nationally, regionally or globally. A web of contractual relationships turns the farmer into a contractor, provid-

Table 4: Concentration in the US food processing sectors

Sector	Concentration ratio (%)	Companies involved
Beef Packers	81	Tyson (IBP), ConAgra Beef Cos,Cargill (Excel), Farmland National Beef Pkg. Co
Pork Packers	59	Smithfield, Tyson (IBP), ConAgra (Swift), Cargill (Excel)
Pork Production	46	Smithfield Foods, Premium Standard Farms (ContiGroup), Seaboard Corp., Triumph Pork Group (Farmland Managed)
Broilers	50	Tyson Foods, Gold Kist, Pilgrim's Pride, ConAgra
Turkeys	45	Hormel (Jennie-O Turkeys), Butterball (ConAgra), Cargill's Turkeys, Pilgrim's Pride
Animal Feed Plants	25	Land O'Lakes Farmland Feed LLC\Purina Mills, Cargill Animal Nutrition (Nutrena), ADM (Moorman's), J.D., Heiskell & Co
Terminal Grain Handling Facilities	60	Cargill, Cenex Harvest States, ADM, General Mills
Corn Exports	81	Cargill-Continental Grain, ADM, Zen Noh
Soybean Exports	65	Cargill-Continental Grain, ADM, Zen Noh
Flour Milling	61	ADM Milling, ConAgra, Cargill, General Mills
Soybean Crushing	80	ADM, Cargill, Bunge, AGP
Ethanol Production	49	ADM, Minnesota Corn Producers (ADM has 50% Equity Stake), Williams Energy Services, Cargill
Dairy Processors	n/a	Dean Foods (Suiza Foods Corp.), Kraft Foods (Philip Morris), Dairy Farmers of America, Land O'Lakes
Food Retailing	38	Kroger Co., Albertson's, Safeway, Wal-Mart, Ahold

Source: Hendrickson et al. (2001)

ing the labour and often some capital, but never owning the product as it moves through the supply chain. Farmers never make the major management decisions. Table 4 gives the level of concentration in the US for each sector held by the top three or four firms in some key meat, cereal, processing and retail sectors.

Rapid concentration throughout the supply chain also has implications for how a 'market' is defined in competition policy. Should a market be defined by consumers' travel-to-shop time, as the UK's Competition Commission suggested when review-

ing the UK retail sector in 2000? Is a market national? Or is it a regional entity (for example, European/US)? Or global? Should consumers or regulators decide how to define a market? These questions illustrate policy dilemmas that will shape the governance of food policy in the twenty-first century – and to which developing countries will not be immune.

The role of the state

Government action has often lagged behind technological, managerial and industrial changes in food supply. Traditionally, food policy was addressed in discrete analytical boxes such as 'farming', 'fisheries', 'development', 'health', 'environment', 'transport', 'consumer affairs', etc. But a series of public crises have driven change. A new consciousness began first at the social fringes in the 1970s, with regard to concerns about quality (for example, contaminants, residues, pathogens) and among epidemiologists (for example, about the impact of diet on health). By the 1990s it was mainstream, aided by a series of crises and food scandals in Europe. Slack had been so cleverly taken out of the system that if something went wrong, it did so catastrophically, as was seen with the UK's BSE (1986-) and Foot and Mouth Disease (2001) outbreaks, and with the numerous food safety scandals from the late 1980s.

Governments and food scientists and technologists, as well as the now high-profile market leaders, were increasingly forced onto the defensive, having to justify why, when they had such power and spoke in terms of meeting consumer needs, consumer interests had apparently been somewhat marginalised in pursuit of industrial efficiencies. While companies introduced tougher specifications for suppliers and new traceability controls ('plough to plate'), governments introduced reforms ranging from the creation of food agencies to wholesale shake-ups of ministries. The UK, for instance, set up a Food Standards Agency in 2000, and effectively abolished its Ministry of Agriculture in 2001 (Barling and Lang, 2003). In 2003, the European Union launched a new multi-state European Food Safety Authority.

An important duality has emerged. On the one side, we find a state system of regulations, on the other a system of self-regulation, largely driven by the major forces in supply chain management, the food retailers in particular (Barling and Lang, 2003).

But this state-corporate duality has compounded policy incoherence, because it fails to address a central feature of food policy, its inter-connectedness. The UK has

not solved this problem. For example, in the wake of the Foot and Mouth Disease debacle that cost the taxpayer nearly £3 billion, the government set up a Commission into the Future of Farming and Food (Curry, 2002). But in the end, the problem was framed as primarily about cost and efficiency. The problem with UK farming, the report argued, was that it was not efficient enough. Better co-ordination and information flow was essential if the UK food supply chain was to compete with cheap imports. The Commission acknowledged that if consumers wanted improvements in the conservation and environmental aspects of farming (wildlife, biodiversity, land management, reduction of pesticide use, etc.), this had to be paid for. It recommended an increase of £500 million in subsidies to engineer the transition to this new policy package of efficiency with environmentalism.

Inter-connectedness means that trust is a central issue in food policy. This is perhaps most clearly seen in times of war or crisis, when food's multi-sectoral impact emerges from the analytical and practical shadows to take centre stage in political life (see for the UK: Beveridge, 1928; Le Gros Clark and Titmus, 1939; Hammond, 1950). Food can have a direct impact on morale. This has been acknowledged by the military for millennia, but with the severance of a majority of people from the land, this factor is now increasingly important in civil society too. The need for a multi-sectoral approach in food policy is also well appreciated in both the study and management of famine and hunger, and other deficiency situations in the development process.

The complexity of consumer sovereignty

Focus on the issue of trust reminds us that consumers have played an important part in the evolution of food policy (Marsden et al., 2000). The period of public crises (1980-2000) included concerns about unnecessary use of food additives, the impact of pesticides, weak microbiological standards (particularly for food-borne pathogens), limited labelling and the role of diet in degenerative diseases such as heart disease, diabetes and some cancers. Consumer scepticism is rife (Gabriel and Lang, 1995). By the end of the last century, the nature of production, distribution and consumption, even cooking, was being subjected to considerable scrutiny and was sparking debate in most developed economies (Lang, 1996).

The relationship between industry and consumers is complex, however. Rhetoric suggests that the food supply chain is consumer-led, but this phrase disguises more complex impetuses. Consumers, as most observers note, are at the heart of the battles not just for global brands (Grievink, 2003), but for minds. The top 20 food

brands in the UK spend over £105 million a year on marketing (Marketing, 2002). While the UK Government spends around £5 million on healthy eating advice, Coca-Cola alone spends £27 million in the UK yearly. It spends $1.4 bn on advertising worldwide, as does McDonalds (Ad-Brands, 2003).

Kinsey (2003) has argued that the old supply-demand chain is now a loop, where intelligence is gathered about consumers but shaped by supply requirements coming back up the supply chain. US and European food sectors have for a decade espoused a management goal known as 'Efficient Consumer Response', the purpose of which is improved co-ordination and waste reduction. The old policy framework which pursued regularity and risk reduction as farmers struggled against the vagaries of nature is now being replaced by a battle over marketing. The product innovation and quality controller for one of Britain's top five retailers informed this author: '…sometimes we have to do things before the customer even knows what they want'.

Advertising expenditure is not the only additional cost borne by consumers when purchasing. While the relative price of food might have dropped in many societies, health costs associated with diet have risen dramatically compared with the 1940s. Life expectancy has risen, of course, but so has evidence about the impact of diet-related diseases like cancers, heart disease and diabetes from which consumers die prematurely. Political attention for the last decade has been on food safety but the real crisis comes from food's role in degenerative diseases. The World Health Organization's Cancer Report (WHO, 2003) expects a steep rise in cancers in part due to poor diets – eating too much fat and not enough fruits and vegetables. There are no incentives for processors to sell only simple foods: for example, value-added fruit juices (lots of water plus a little fruit) make more money.

The health toll of diet-related disease is a very large financial problem for affluent countries. Table 5 gives a breakdown of the direct and indirect costs for a number of key diseases related to diet in the United States. These costs are immense, even for a rich society like the United States. Table 6 shows how general healthcare costs are rising rapidly in many developed economies. The growth of health expenditure is sometimes higher than the growth of GDP. The UK healthcare system, for instance, costs £68 billion for a population of just under 60 million people, costs that the Treasury expects will rise to between £154 bn ($231 bn) and £184 bn ($276 bn) by 2022-3 in 2002 prices (Wanless, 2002). At constant prices, the healthcare costs are doubling.

Table 5: Economic costs of diet- and exercise-related health problems, US

Disease	Direct costs US$ bn (medical expenditures)	Indirect costs US$ bn (productivity losses)	Total costs US$ bn
Heart disease	97.9	77.4	175.3
Stroke	28.3	15.0	43.3
Arthritis	20.9	62.9	83.8
Osteoporosis	n/a	14.9	14.9
Breast cancer	8.3	7.8	16.1
Colon cancer	8.1	n/a	8.1
Prostate cancer	5.9	n/a	5.9
Gall bladder disease	6.7	0.6	7.3
Diabetes	45.0	55.0	100.0
Obesity	55.7	51.4	107.1
Total			**561.8**

Note: Costs are expressed in constant 1998 US$, using the Consumer Price Index.
Source: Kenkel and Manning (1999)

The WHO has now stepped up its appeal to both developed and developing country governments to act to prevent the double burden of food-related ill-health problems associated with under- and over-consumption coinciding in the same countries. In effect, the WHO and the FAO are now in agreement that the productionist era in food policy has come to an end. Mere quantity is an inadequate policy goal. Quality, distribution and externalised social costs also have to be central to the policy framework (WHO/FAO 2003).

The enticing possibility is that realisation of the size of health and other external costs could change the politics of food. Concern about rising health costs could explain why many Finance Ministries are so concerned about diet-related ill-health. The insurance industry is also worried, one factor behind President George W. Bush's launch of a high-profile US initiative against rampant obesity.

Possible sources of change

The costs of diet-related ill health and the fiscal burden of healthcare may seem unlikely triggers for a re-think about the political economy of food and about the attractions of the industrial and intensive approach to the food supply. But fiscal

Table 6: Growth of expenditure on health, 1990-2000

	Real per capita growth rates, 1990-2000 (%)		Health spending as % of GDP		
	Health Spending	GDP	1990	1998	2000
Australia	3.1	2.4	7.8	8.5	8.3
Austria	3.1	1.8	7.1	8.0	8.0
Belgium	3.5	1.8	7.4	8.5	8.7
Canada	1.8	1.7	9.0	9.1	9.1
Czech Republic	3.9	0.1	5.0	7.1	7.2
Denmark	1.7	1.9	8.5	8.4	8.3
Finland	0.1	1.8	7.9	6.9	6.6
France	2.3	1.4	8.6	9.3	9.5
Germany	2.2	0.2	8.7	10.6	10.6
Greece	2.8	1.9	7.5	8.7	8.3
Hungary[a]	2.0	2.7	7.1	6.9	6.8
Iceland	2.9	1.6	7.9	8.3	8.9
Ireland	6.6	6.4	6.6	6.8	6.7
Italy	1.4	1.4	8.0	7.7	8.1
Japan	3.9	1.1	5.9	7.1	7.8
Korea	7.4	5.1	4.8	5.1	5.9
Luxembourg[b]	3.7	4.5	6.1	5.8	6.0
Mexico	3.7	1.6	4.4	5.3	5.4
Netherlands	2.4	2.3	8.0	8.1	8.1
New Zealand	2.9	1.5	6.9	7.9	8.0
Norway	3.5	2.8	7.8	8.5	7.5
Polandb	4.8	3.5	5.3	6.4	6.2
Portugal	5.3	2.4	6.2	8.3	8.2
Slovak Republic	..	4.0	..	5.9	5.9
Spain	3.9	2.4	6.6	7.6	7.7
Switzerland	2.5	0.2	8.5	10.6	10.7
United Kingdom	3.8	1.9	6.0	6.8	7.3
United States	3.2	2.3	11.9	12.9	13.0
OECD Average[c, d]	**3.3**	**2.2**	**7.2**	**8.0**	**8.0**
EU Average	**3.1**	**2.3**	**7.4**	**8.0**	**8.0**

Notes: a) 1991-2000; b) 1990-9; c) Excludes the Slovak Republic because of missing 1990 estimates; d) unweighted averages. No recent estimates available for Sweden and Turkey.
Source: OECD Health Data (2002: 1). Available at www.oecd.org/pdf/M00031000/M00031130.pdf.

pressure, driven in part by rising numbers of post-retirement elderly, is already proving a strong motivation for states to re-think pension systems and promises of old-age retirement, made in the great era of affluence of the late twentieth century when stock markets were booming and there seemed no end to the consumerist bargain. Framing the food supply chain to help reduce healthcare costs will become increasingly pressing as those costs rise in affluent societies, and as degenerative diet-related ill-health grows in societies without sufficient GDP to afford expensive healthcare and health insurance systems.

Another potential source of change is public pressure, the preparedness of consumers to act, not just think, like citizens with long-term commitments beyond the checkout counter/point of sale. The appeal to consumers to act differently and to see beyond cheapness can come from various sources. It ranges from individual survival ('your or your family's health') to ecological sustainability ('the planet'). To take one example, the rapid rise in meat consumption that accompanies rising disposable income has implications for land use and grain production to feed the demand for meat. Meat production is an industry already under some consumer scrutiny for factory farming, associations with burger culture (cheap products, high fat, poor ecological impact), and for public health problems (for example, prophylactic use of antibiotics weakening their viability for real human health need).

Public pressure can be highly effective. If food power is concentrating, even large corporations are vulnerable and exposed to sudden changes in public sympathy. When European food safety procedures were found wanting in the 1990s, arguments from consumer campaigners for more ecological systems of food production found popular resonance and moved from the fringe to centre-stage in public policy (Lang, 1996). Politicians intervened in the supply chain because consumers realised that they had little control at the point of sale. The consumerist bargain (cornucopia without consequences) looked momentarily shaky. In the EU, this culminated in the crisis over BSE (mad cow disease) which forced the President and Council onto the defensive (Santer, 1997; Lobstein et al., 2001). Other crises, for example, over contaminated feed in Belgium and a wave of food safety scandals in the UK, for instance, highlighted the vulnerability of the industrial food system. The policy question was raised that prices might be cheap, but at what social, health and environmental cost? The implications of this question are still being struggled over within the supply chain, with companies investing hugely in traceability systems while consumer and health analysts argue that the externalised costs are

not just microbiological. Indeed, these represent a small fraction of the total burden (Pretty et al., 2003).

Environmental pressures such as climate change and global water shortages could also pose direct and real threats to affluent countries. Water becomes highly sensitive not just for direct human consumption but for use in intensive irrigation and cropping systems (UNEP, 2002; Barlow and Clarke, 2002). The implications of climate change are still unclear but some academic prognoses suggest that cash crops such as tea and coffee – central to the development agenda, let alone the taste buds of affluent consumers – could fall by significant amounts; a one degree rise in temperature can lead to 10% yield reductions in tropical crops (UNEP, 2001). The impact on the economies of countries like Uganda or Kenya, already vulnerable to mono-commodity production downturns, could be serious.

In conclusion, although this article has argued that industrialisation and concentration have developed in a mutual cycle of development, it has also argued that some fragility is discernible in the fabric of efficiency that has been woven throughout the food supply chain. It would be foolish (and historically myopic) to pronounce an end to the industrialised system. Indicators suggest continued rural depopulation, capital investment, application of technology, intensification – all the features of industrialisation summarised earlier in this article. And yet, the crises in rich countries suggest the need to give more attention to the potential impact of currently marginal policy issues such as public health, ecological strains and consumer reaction. It would be unwise for developing countries to dismiss these concerns as the luxuries of the affluent.

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June 2004
Design by Smith+Bell: andymss@aol.com
Printed by Russell Press, Nottingham, UK

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The NR group receives funding from the Swedish International Development Cooperation Agency.

ISSN 1357-9258