

Redirecting the Diet Transition: What Can Food Policy Do?

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The diets of consumers in the developing world – rich and poor, rural and urban – are changing. More calories, saturated fats, added sugars and added salts are being consumed, resulting in ‘over-nutrition’. Combined with lower physical activity levels these changes are causing increased levels of chronic diseases such as heart disease and diabetes. However, the shifts are taking place in the presence of persistent under-nutrition problems, creating a co-existence of under- and over-nutrition. This article identifies the drivers of these changes, and asks what food policy (including policies directed to production, marketing, retailing and consumption) can do to re-direct the changes towards better health. The policy trade-offs inherent in the co-existence of under- and over-nutrition are highlighted.

Where good data on food consumption are available they show that the availability and intake of foods that are risk factors for chronic diseases – such as cardiovascular disease, diabetes, and some forms of cancer – are increasing rapidly in both urban and rural areas and across all income groups in developing countries. Increases in overweight and obesity rates in the developing world show similar patterns (see Popkin 1998, 2001; Guo et al., 2000a). The co-existence of a double burden¹ of under-nutrition and ‘over-nutrition’² adds to human suffering and economic costs (see Popkin et al., 2001 for estimates of these costs for some Asian countries). It also complicates the design of food policy.

What can food policy do to redirect the transition in diets towards healthier outcomes? This article reviews the drivers of changes in diet and then reviews the potential of both demand- and supply-side food policy options to influence the drivers.

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1. See WHO website (www.who.int/nut/db_bmi.htm) for data on the population co-existence of underweight and overweight and see Garrett and Ruel (2003) for the co-existence in the same household.
2. In a scientific sense the term ‘over-nutrition’ lacks consensus. In this article we use the term as useful shorthand for excess consumption of added sugar, processed meats, red meats, starch from refined grains and potatoes, dairy products, trans isomers of fatty acids (found in partially hydrogenated vegetable oils found in some margarines and shortening), saturated fat, cholesterol, and overall calories – no matter the source – which leads to overweight and obesity. The term over-nutrition is problematic in that it focuses on excess consumption of some diet components, but what is displaced from the diet by these unhealthy foods matters as well. In particular, the consumption of fruits and vegetables, nuts and pulses, poultry and fish, healthy oils and fats, and whole grains are thought to be health-promoting and increased intakes should be encouraged (see WHO/FAO, 2002; Willett and Stampfer 2002; McCullough, 2002).

The article ends by highlighting the difficult challenges posed to food policy design by the co-existence, linkages and trade-offs between under- and over-nutrition.

Drivers of diet and nutrition trends

The drivers of consumption trends include (a) income growth, (b) changes in relative prices caused by technological, institutional and policy change and (c) the socio-economic and activity changes associated with urbanisation.

Income growth

We know that as income grows, consumers want to diversify out of cereals and other starchy staples. Data from USDA (Regmi, 2001) on how food expenditure responds to increases in income (food expenditure-income elasticities) across a number of developing countries show that the poorest countries have the highest elasticities. Fish, then dairy and then meats have the highest values followed by fruit and vegetables, oils and fats and lastly cereals. Elasticities may increase in the short term; for example, data from China (Guo et al., 2000b) show that the income elasticities for pork and oil increased between 1989 and 1993, more so at the lowest income levels, especially for edible oil.

Relative prices

Basic economics tells us that if the relative price of a foodstuff increases, demand for it will decrease. How have the relative prices of different foodstuffs changed over time?³ In the United States, the relative prices of dairy products, fats and oils, eggs, meat, poultry and fish, and sugar and sweets have dropped dramatically over the period 1982-97, as has the price of non-alcoholic beverages (dominated by carbonated sweetened soft drinks) (Putnam and Allshouse, 1999). Future projections of the internationally traded prices for non-staple non-fruit and non-vegetable goods, whenever available, indicate a further decline in their prices relative to cereals (Delgado et al., 1999).⁴

More analyses need to be undertaken from a health perspective of past trends in producer and retail food prices. For example, we do not have consumer food price trends by fat content or, even better, by type of fat content. Such trends would help identify the main sources of any decline or increase in the price of fat or added sugar – obviously important for policy formulation. In addition, there need to be more studies linking price trends to health outcomes. There are many linking under-nutrition outcomes to price changes (for example Pitt and Rosenzweig, 1986), but few linking

3. One price that we do not examine here is the wage rate, which has risen for occupations that tend to be less physically demanding. This, of course, is the other side of the coin, but one which, for now, we ignore with respect to what food policy can do.

4. Preliminary simple regression analysis of FAOSTAT's producer price series (no retail prices were available) for Nigeria, South Africa, India and China did not demonstrate any significant systematic differences in relative price increases by food category, with the exception of China where oils low in saturated fats (soybean, sunflower, rapeseed, and sesame seed) posted significantly higher price increases over the 1976-95 period compared to palm oil which showed one of the lowest price increases over that period.

rates of chronic disease or levels of obesity to relative price changes, controlling for a range of other factors. One of the few such studies to do so, using US data, suggests that 40% of the growth in weight of the US population between 1976 and 1994 was due to technology-based reductions in food prices (see Lakdawalla and Philipson, 2002; Philipson and Posner, 1999).

Technology may be one important source of change in the relative prices of foods that pose a chronic health risk; institutional change is another. Examples of the latter include (a) trade policy governance and (b) changing food distribution mechanisms. An illustration of the first is the entry of China into the World Trade Organization, expected by many (for example, Fang and Beghin, 2000) to lead to a 20% decline in the prices paid by consumers in China for soybean oil and related products. More research is needed from a health perspective on how trade liberalisation will affect the prices of different foods that represent different health risks.

An illustration of institutional policy changes, fuelled in part by technology changes, is the rapid transformation of food retailing in Latin America. Reardon and Berdegué (2002) report that the percentage of food distributed by supermarkets in retail outlets in the region grew from 10-20% in 1990 to 50-60% in 2000, driven by liberalisation of financial flows and developments in inventory management technology. These changes are also happening in Asia and Africa (Reardon et al., 2003). Do these supermarkets provide poorer consumers with increased access to more unhealthy processed foods (for example, those with high levels of trans fatty acids)? Do they also provide increased access to fresh fruit and vegetable products and other healthy diet components? What happens to the choice sets of those who do not use supermarkets? These issues have not been investigated yet. More research is needed to identify the trade-offs between healthy foods and healthy profits.⁵

Urbanisation

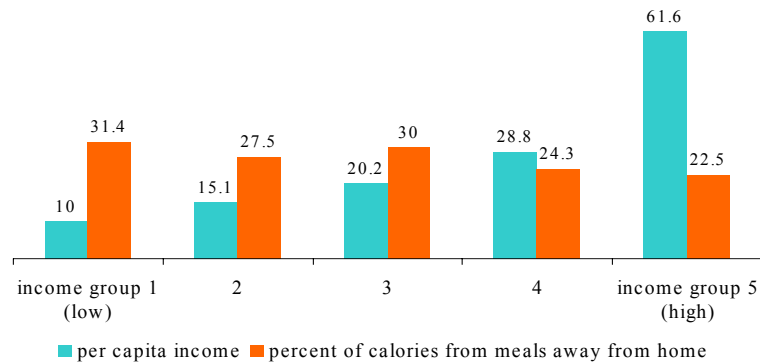
Urbanisation is proceeding rapidly in the developing world. Urbanisation is marked by a reduction in physical activity for the majority of the labour force. The density of residence of urban populations also lowers the per person cost of mass-media advertising, where the spending power of food manufacturers and processors certainly outweighs that of public health authorities. The urban environment is also marked by a greater physical distance between places of work and of residence, and by smaller household sizes. In this environment, where time is scarcer, at least for those gainfully employed, and where the fixed costs of food preparation are higher in smaller families, more food tends to be purchased outside the home, even for poor households.

Good data from the developing world are hard to obtain but foods purchased outside the home tend to be more processed and prepared. If so, they will tend to be higher in salt and fat and will often be fried, sometimes using oil that has been refried – a particularly unhealthy diet component because of the high concentration of trans fat. These foods are often purchased from street vendors, so-called ‘street foods’. Street foods are a significant source of food (and income generation) for many urban dwellers, both in terms of energy intake and food expenditure. In some settings, this may be

5. Reardon and Berdegué (2002) note that profit margins are highest on fresh fruit and vegetables, but are also high on dairy and processed foods.

particularly true for poorer urban dwellers compared to the more wealthy group. A recent Accra-wide study (Maxwell et al., 2000) finds that households in the poorest expenditure quintile obtain on average 31% of their total calories away from home, compared to 22% for the top quintile (see Figure 1).

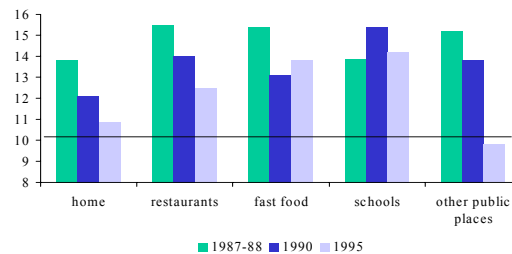
Figure 1: Calories from food away from home (% of total), Accra 1997



Source: Maxwell et al. (2000).

Tinker, in her study of street foods in seven countries of Asia and Africa, shows expenditures on street foods ranging from 16% in Manikgani (Bangladesh) to 50% in Ile-Ife (Nigeria), and higher street foods expenditures among the poorest quartiles in both Bangladesh and the Philippines (Iloilo) (Tinker, 1997). Very little information is available on the contribution of street foods to the daily nutrient intake of consumers. In the Philippines, commercially prepared foods were found to contribute 25% of the energy intake of urban working women and 45% of their fat intake (Bisgrove and Popkin, 1996). In the US, data from the Department of Agriculture (Lin et al., 2000) show that the saturated fat content of foods consumed at home has dropped steadily over the 1980s and 1990s, whereas the fat content in fast food restaurants and in schools has remained high (see Figure 2).

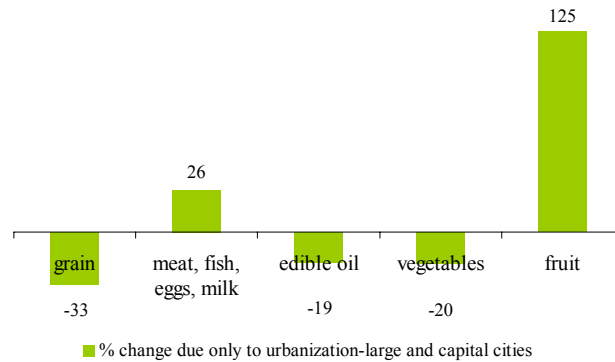
Figure 2: % of calories from saturated fats by location of consumption, US



Source: Lin et al. (2000).

Location clearly matters, but does it matter when price and income are controlled for? That it does is clearly shown by a modelling exercise for China, where food consumption shifts due to rural-to-urban migration were modelled, controlling for prices and income levels (Huang and Bouis, 1996). The results are presented in Figure 3. Interestingly, in this case, urbanisation seems to have led to a large increase, all things being equal, in the consumption of fruit, a moderate increase in the consumption of meat, fish, milk and eggs, and a moderate decline in the consumption of all other foods. Clearly, one cannot generalise too much about the urban experience before more studies of this type are undertaken.

Figure 3: % change in consumption caused by rural-to-urban shift, controlling for income and prices, China, 1991



Source: Huang and Bouis (1996).

What can food policy do?

The rationale for public action

Table 1 summarises the rationale for public action to influence the diet transition towards a healthier outcome. Perhaps the most obvious rationale is information asymmetry between producers and consumers about what is healthy and what is not. There may also be negative externality effects if health care resources are directed away from infants to middle-aged individuals, and in terms of the intergenerational transmission of obesity from mother to baby (see Parsons et al, 2002). There will also be a case for public intervention if private sector incentives result in poorer consumers being priced out of access to healthier food options, especially basic processed foods.

Table 1: The case for public policy intervention to improve diet quality

Rationale for public action	Example of broad areas in which public intervention may be justified
Underprovision of 'public goods'	If generation of affordable healthy food is not available to poorer consumers
Externalities not captured	Negative externality if obesity of mothers is risk factor for child obesity. Health care costs diverted from prevention
Information asymmetries	Case for providing healthy alternatives. Case for labelling; nutrition education
Capital market failure	Investing in anti-low birth weight interventions
Universal access and equity concerns	Obesity is linked to more marginal groups in US, UK
Health insurance market failure	Prevention and treatment of chronic diseases

Food policy options

Options emanate from the supply side and the demand side, although success will obviously be enhanced via the effective interaction of both. Table 2 summarises the food policy options available to moderate dietary fat intake, based on US experience (see Sims, 1998; Ralston, 2000). Although focused only on dietary fat and only on US policy instruments, the table highlights several points. First, there are many stages in the food system where policy can act – both on the supply side and on the demand side. Second, many of the instruments may have small effects – either because behaviour is hard to change in the desired direction or because there are off-setting effects (for example, moving to lower-calorie foods, but consuming additional portions: Sims, 1998). This is a rather sobering conclusion and one that should be kept in mind during the process of policy formulation throughout the developing world. Third, several instruments have ambiguous effects on fat intake – either because they have not been evaluated (for example, harmonisation of fat descriptors between regulatory agencies) or because their direct effects may be overwhelmed by their indirect effects (for example, restrictions on beef imports may result in a reaction from domestic beef producers and a search for new outlets for beef products). The table represents a menu of options that need to be evaluated if their impacts are to be maximised in the desired direction.

Table 2: Food policy instruments for influencing dietary fat

Stage of the food system	Types of policy instrument	Examples used in the dietary fat issue	Effectiveness in controlling fat intake
Food production	Commodity price subsidies/ supports	Feed grain subsidies for feedlot animals Dairy price supports	Negative Negative
	Import/export quotas	Export incentives for US vegetable oil Restrictions on beef imports	Uncertain Uncertain
Food processing	Meat grading standards	Beef grading (changes from choice to select)	Positive
	'Standards of identity'	'Standards of identity' changed for low-fat milk and yoghurt	Positive
	Food labelling	Food label descriptors (e.g. 'low fat', etc.) changed for fluid milk, ice cream	Quite positive
Food distribution and marketing	Marketing orders for dairy	Changes in milk marketing orders	Negative
	Food labelling	Use of '% lean' claims on ground beef	Slightly negative
		Restaurant labelling of menu items with 'low fat' claims	Slightly positive
	Food advertising	Harmonisation between the FTC and FDA on ads using fat 'discriptors'	Uncertain
Food consumption	Food labelling	Fat descriptor information on food label	Positive
	Dietary information	Dietary guidelines Food Guide Pyramid	Positive Quite positive
	Commodity promotion boards	Promotion of cheese, ice cream, milk, beef, pork	Negative

Source: Adapted from Sims (1998).

Supply-side interventions

- (i) *More public investment in technology to deliver high-productivity, low-cost vegetables and fruits and low-fat livestock products to poorer consumers.* The bulk of agricultural technology development in high-value commodities such as livestock and fruits and vegetables tends to be undertaken by the private sector for larger farms. The high cost of cold chain systems reduces access by small farmers. Increasing the productivity of fruits and vegetables and lower-fat livestock products and reducing the transactions costs of delivering them to growing markets are an important area in which agricultural research and development can have a larger health impact.
- (ii) *Eliminate price incentives on growing high-fat foods and relax quantity restrictions on growing healthier foods.* The commodity composition of these kinds of price

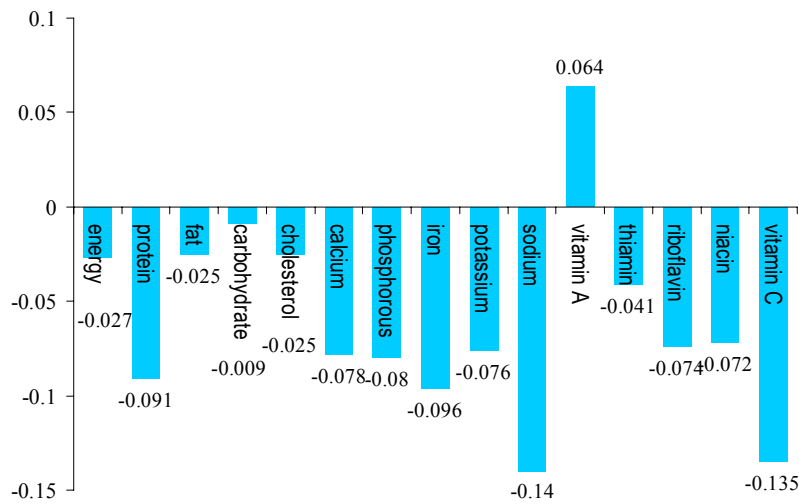
and quantity instruments reflects the economic, social and political importance of the various crops and growers' associations and the small and large industries that rely on them. Whenever the welfare of small sub-groups is weighed against the broader interest, the politics of hurting a small but powerful group will usually outweigh the smaller negative impacts on a much vaster set of individuals (Nestle, 2002). When small welfare losses result, over time, in a large cumulative disease burden, the economics of such trade-offs needs to be revisited.

- (ii) *Evaluate food trade policy from a health perspective.* GATT and the World Trade Organization use a number of agreements to navigate health issues, including the Sanitary and Phytosanitary (SPS) Agreement and the Trade Related Intellectual Property Rights (TRIPs) Agreement. Can these Agreements be used to regulate the health content of food imports? Past experience suggests 'yes', if scientific risk assessments show the danger (Millstone and van Zwanenberg in this volume). Beyond obvious health-related trade instruments, can the health community influence the trade community in much the same way as the labour and environment communities have done? Do we know whether the commodity-protection profiles of different countries are pro- or anti-health? If we did, would the health community be able to influence trade policy? If it could (which must, at this point in time, be considered improbable), are there non-health downsides for poor farmers and consumers from an altered pattern of trade? These issues have not been explored to date, and this is surely an area for future research as the percentage of food consumed from trade increases.
- (iv) *Impose tougher standards on the fat content of food away from home and in schools.* In the US, for example, the menus in many public schools fail to meet US Department of Agriculture dietary guidelines (Brownell, 2002a, b).
- (v) *Reduce malnutrition in utero.* The so-called 'Barker Hypothesis' posits that maternal dietary imbalances at critical periods of development in the womb can trigger an adaptive redistribution of foetal resources (including growth retardation). Such adaptations affect foetal structure and metabolism in ways that predispose the individual to later cardiovascular and endocrine diseases (Barker, 1998). The correlation between low birth weight or early childhood stunting and later cardiovascular disease and diabetes may arise from the fact that nutritional deprivation in utero, or in early childhood, 'programmes' a newborn for a life of scarcity. The problems arise when the child's system is later confronted by a higher-fat, higher-sugar diet, in combination with lowered activity patterns. If this hypothesis is borne out (and evidence is accumulating both for and against) it will serve to remind us that one food policy option for attenuating the impacts of the diet transition is to reduce intra-uterine growth retardation. For example, based on a balanced review of the evidence as of 2000, Popkin et al. (2001) conclude that in China approximately one-third of diabetes can be traced back to low birth weight and stunting in infancy, with this percentage declining in 2020, on the assumption that low birth weight and stunting will decline. There are a number of interventions to address low birth weight at term, ranging from the immediate (for example, improving the food intake quantity and quality of adolescent girls and expectant mothers and improving the quality of pre-natal care) to the underlying (for example, improving women's status relative to men's in terms of resource allocation decisions).

Demand-side interventions

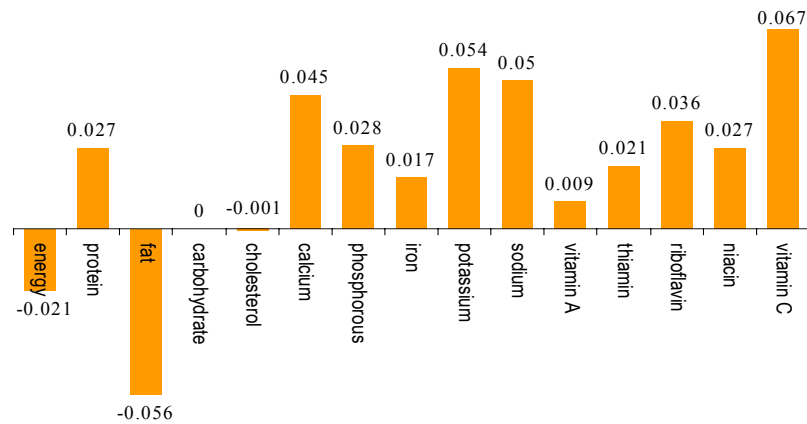
- (i) *Increase the relative price of unhealthy choices.* This is an option that those familiar with anti-smoking campaigns might find appealing. It often underlies discussions of what food policy can do to increase the healthiness of the diet transition (for example, Guo et al., 1999). However, it is difficult in practice to identify a food for which an increase in price will not reduce access to healthy components of a diet – components that in a developing country context may be in short supply. Examples in Figures 4 and 5 illustrate this for US data on meat and edible oil consumption. As Figure 4 shows, an increase in the price of meat does have a negative impact on fat and cholesterol intake, but it also has a negative impact on a wide range of diet components that are crucial to diets, especially those of infants and women, such as iron and calcium, which are not found in high densities in non-animal source foods (Huang, 1996). For the same demand system estimates, Figure 5 shows that an increase in edible oil prices does decrease fat consumption and increase the consumption of nearly every other diet component because of a substitution towards other foods. This is more in line with the kind of results we might be seeking. However, in a developing country context, edible oil is often used to increase the energy density of infant diets.

Figure 4: Responsiveness of nutrients (%) to a 1% increase in price of meat, US price elasticities



Source: Huang (1996).

Figure 5: Responsiveness of nutrients (%) to a 1% increase in price of oil, US price elasticities



Source: *ibid.*

- (ii) *Clearer information about product contents.* Food labelling can help in reducing information asymmetries, but it can often be confusing, it is obviously of limited value in areas where literacy is weak, and it may be better at discouraging certain types of behaviours perceived as risky than encouraging healthy behaviour (for example, Verbeke and Ward, 2001 on BSE in Belgian beef).
- (iii) *Better awareness about consequences of poor diet.* A number of initiatives have been employed in developing countries to raise awareness of the causes and consequences of poor diet. These include a mass media campaign to reduce overweight in Brazil; dietary guidelines for nutritional well-being in China; and school-based training for improving diet and activity levels in Singapore (Doak, 2002). Evaluations of the effectiveness and cost-effectiveness of these attempts to change behaviour are badly needed.

Policy trade-offs accentuated in a developing country context

Policy formulation on diet change in the developing world must build on the evidence accumulated in the industrialised world. However, the developing country context is very different and policy-makers must remember that:

- Food consumption deficits are still widespread. When looking for foods to discourage the consumption of, remember that many groups require the *other* nutrients contained in the food (for example, the micronutrients in livestock).
- Certain groups of individuals, for example infants, will need to consume even foods that might otherwise be discouraged, for example, edible oils.
- The capacity to influence preferences via the public sector is likely to be lower than in the industrialised world. Whether the imbalance between public and

private sector power to communicate nutrition messages is growing in the developing world is an open question, but with multinationals backing much of the nutrition messaging, one would not be surprised to see the public sector caught on the back foot (Hawkes, 2002).

- On the supply side, anything done to discourage the consumption of a locally produced food considered harmful to health above some cut-off will harm the income-generating ability of many smallholder farmers. They may not have the political strength of industrialised country farmers, but the economic impact on the rural economy of an attempt to alter consumption could be large.
- Many developing countries are desperate to increase foreign direct investment, not to discourage it. Attempts to discourage foreign supplies of foods that are designated 'less healthy' will have employment and livelihood consequences that need to inform any decision taken.

The uniqueness of food

Finally, it is important to note that food represents a class of commodities that is difficult to influence in a predictable manner. In particular, the temptation to apply the model that was so successful in curbing tobacco consumption (World Bank, 1999) to food should be resisted. Comparisons may be more valid in some countries with powerful judicial systems for those who can take advantage of them (for example, the US and the recent lawsuits taken out against fast-food retailers). But even in the industrialised countries there are some important differences between the two situations – i.e. poor diets are not the same as a smoking habit. First, there is a difficulty in identifying the 'offending product'. Second, with tobacco, there are no obvious consumption trade-offs with positive outcomes as outlined above. Third, there are fewer obvious private externalities (there is no such thing as 'secondary eating'). Finally, there is a broader constituency for food farmers than for tobacco farmers.

Because of these and other differences, the 'triggers' for strong public action are not yet in place (Kersh and Morone, 2002). Table 3 is adapted from Kersh and Morone (2002) and it lists the 'triggers' for public action in health and assesses their strength in the US as applied to the obesity problem there. The authors conclude that only the first three of seven triggers have been tripped: social disapproval, evidence from medical science and the evidence of self-help groups. Such constructs help us to remember that evidence is only one ingredient in the formulation and implementation of public health policy.

Table 3: 'Triggers' for successful government regulation of private behaviour when a 'political window' opens

Trigger	Comments	Power of obesity triggers in US
Social disapproval	Recognition by society as a 'bad thing'	There is a popular disapproval of obesity
Medical science	Role is to challenge myths	There is strong evidence linking diet to obesity and obesity to chronic disease
Self-help	For example, Alcoholics Anonymous	Overeaters Anonymous, Weight Watchers
Demonise the user	Fearing the drug culture	Obesity does not play on fears. No evidence of trigger yet
Demonise the provider	For example, Big Tobacco	No 'Big Chocolate' yet. 'Fast Food Nation' gaining consciousness. No evidence of trigger yet
Mass movement	Protests, rallies	No evidence of anti-obesity campaigns (possibly the opposite, re: accepting body image). No trigger yet
Interest-group action	Lawyers and lobbyists	Yet to be achieved. No trigger yet

Source: Adapted from Kersh and Morone (2002).

Information and analysis gaps

Research in the area of the diet and nutrition transition in developing countries is in its infancy. Most of the work has been spent documenting it and analysing its causes, and much of it has had to make do with crude food data (national supply, not household-level availability or individual intake). Very little research has focused on policy analysis. The following areas deserve much more attention from the research community.

- There is a need to use *existing* nationally representative household survey data systematically to chart trends in the availability of 'bad' food components. These datasets are available for a large number of countries, but are solely used to estimate poverty rates.
- The location of consumption and the health content of that consumption need to be better connected, with more data collected on the characteristics of the points of sale, whether they are street-food vendors or supermarkets.
- Food price elasticities need to be generated that are disaggregated enough to be policy-relevant (for example, 'meat' is not useful, but 'high saturated fat beef products' might be).
- The trade-offs in terms of the consumption changes of different diet components of different population subgroups resulting from the change in the price of a single community need to be spelled out, as do the implications for smallholder income generation.

- There need to be more evaluations of non-price interventions to change diets, both in terms of quality and quantity.
- There has to be more research on the investments and institutional innovations that smallholder farmers need to link up with growing domestic and international markets for healthy foods.
- More research needs to be done that links trade policy with health outcomes, perhaps via the linkage of computable general equilibrium models (CGEs) and micromodels of individual welfare outcomes (for example, Cogneau and Robilliard, 2000).
- Research on the policy process and the role of information will be useful to help us to understand why the public health response to chronic disease has varied in terms of effectiveness.
- More research needs to be done on identifying institutional mechanisms for win-win public-private partnerships (for example Buse and Walt, 2000) to reduce the amount of unhealthy fat and added sugar entering into the developing country food supply.
- Too much of the evidence cited in this article has come from one country, China. A similarly concerted effort needs to be undertaken in other large countries for which there are indications that the diet transition is accelerating – for example, India, Brazil, Indonesia, South Africa and Nigeria.

Conclusion

The diet transition in the developing world seems to be accelerating. It seems to be a transition towards an increased burden of chronic disease. It is increasing human costs in terms of mortality and the disease burdens. It is increasing economic costs in terms of lower productivity. It is driven by changing preferences fuelled by growing incomes, changing relative prices, urbanisation, changing food choice options fuelled by changes in food technology, and changes in the food distribution systems; and by a legacy of low birth weights from the previous generation. Is there a case for public investment in efforts to influence the transition towards increasingly healthy outcomes? The existence of information asymmetries and negative externalities suggests that this is so.

What can food policy do? We have identified a number of options from the food supply and food demand sides. These options have had mixed success in the industrialised countries. The policy trade-offs in the developing world are even more complicated. For example, efforts to overcome over-nutrition might well undermine efforts to overcome under-nutrition. The public health anti-smoking policy model offers some insights, but it should not be leaned on too heavily; food is not tobacco. There are plenty of areas in which additional technical research is needed to assess competing risks and to help develop policy options, and we have outlined some. But there is also a very great need for research to engage actors in the policy process underlying the diet transition. In a debate where so much is at stake – market shares, profits, livelihoods, and life itself – there is a potentially powerful role for the generators of balanced evidence to bring different actors to the table. This may help to improve the decision-making processes underlying the attempts of food policy to redirect the diet transition towards healthier outcomes.

References

- Alderman, H. (1986) *The Effect of Food Price and Income Changes on the Acquisition of Food by Low-income Households*. Washington, DC: International Food Policy Research Institute.
- Barker, D. J. (1998) 'In Utero Programming of Chronic Disease', *Clinical Science* 95 (2): 115-28.
- Bisgrove, E. Z. and Popkin, B. M. (1996) 'Does Women's Work Improve their Nutrition? Evidence from the Urban Philippines', *Social Sciences and Medicine* 43 (10): 1475-88.
- Brownell, K. D. (2002a) 'Public Policy and the Prevention of Obesity', in C. Fairburn and K. D. Brownell (eds), *Eating Disorders and Obesity: A Comprehensive Handbook*, 2nd edn. New York: Guilford.
- Brownell, K. D. (2002b) 'The Environment and Obesity', in C. Fairburn and K. D. Brownell (eds), *Eating Disorders and Obesity: A Comprehensive Handbook*, 2nd edn. New York: Guilford.
- Buse, K. and Walt, G. (2000a) 'Global Public-private Partnerships: Part 1 – A New Development in Health?', *Bulletin of the World Health Organization* 78 (4): 549-61.
- Cogneau, D. and Robilliard, A. (2000) *Growth, Distribution and Poverty in Madagascar: Learning from a Microsimulation Model in a General Equilibrium Framework*. Trade and Macroeconomics Division Discussion Paper No. 61. Washington, DC: International Food Policy Research Institute.
- Delgado, C., Rosegrant, M., Steinfeld, H., Ehui, S. and Courbois, C. (1999) *Livestock to 2020. The Next Food Revolution*. Food, Agriculture, and the Environment Discussion Paper No. 28. Washington, DC: International Food Policy Research Institute.
- Doak, C. M. (2002) 'Large-scale Interventions and Programmes Addressing Nutrition-related Chronic Diseases and Obesity: Examples from 14 Countries', *Public Health Nutrition* 5 (1A): 275-7.
- Fang, C. and Beghin, J. C. (2000) *Urban Demand for Edible Oils and Fats in China: Evidence from Household Survey Data*. Working Paper 00-WP-245. Ames, IA: Iowa State University.
- FAOSTAT. www.fao.org.
- Garrett, J. and Ruel, M. (2003) *Stunted Child-overweight Mother Pairs: An Emerging Policy Concern?* Food Consumption and Nutrition Division Discussion Paper No. 148. Washington, DC: International Food Policy Research Institute.
- Guo, X., Popkin, B. M., Mroz, T. A., and Zhai, F. (1999) 'Food Price Policy Can Favorably Alter Macronutrient Intake in China', *Journal of Nutrition* 129: 994-1001.
- Guo, X., Popkin, B. M. and Zhai, F. (2000a) 'Patterns of Change in Food Consumption and Dietary Fat Intake in Chinese Adults, 1989-93', *Food and Nutrition Bulletin* 20 (3): 344-53.
- Guo, X., Mroz, T. A., Popkin, B. M. and Zhai, F. (2000b) 'Structural Change in the Impact of Income on Food Consumption in China, 1989-1993', *Economic Development and Cultural Change* 48 (4): 737-60.

- Hawkes, C. (2002) 'Marketing Activities of Global Soft Drink and Fast Food Companies in Emerging Markets: A Review', in *Globalization, Diets and Noncommunicable Diseases*. Geneva: World Health Organization.
- Huang, K. S. (1996) 'Nutrient Elasticities in a Complete Food Demand System', *American Journal of Agricultural Economics* 78 (February): 21-9.
- Huang, J. and Bouis, H. (1996) *Structural Changes in the Demand for Food in Asia*. Food, Agriculture, and the Environment Discussion Paper No. 11. Washington, DC: International Food Policy Research Institute.
- Kersch, R. and Morone, J. (2002) 'When the Personal Becomes Political: The Case of Obesity', Syracuse, NY: Syracuse University (mimeo).
- Lakdawalla, D. and Philipson, T. J. (2002) *The Growth of Obesity and Technological Change: A Theoretical and Empirical Examination*. Working Paper No. 8946. Cambridge, MA: National Bureau of Economic Research.
- Lin, B.-H., Guthrie, J. and Frazão, E. (2000) 'Nutrient Contribution of Food Away From Home', in *Nutrients Away From Home*. Washington, DC: Economic Research Service, US Department of Agriculture.
- McCullough, M. L., Feskanich, D., Stampfer, M. J., Giovannucci, E. L., Rimm, E. B., Hu, F. B., Spiegelman, D., Hunter, D. J., Colditz, G. A. and Willett, W. C. (2002) 'Diet Quality and Major Chronic Disease Risk in Men and Women: Moving Toward Improved Dietary Guidance', *American Journal of Clinical Nutrition* 76: 1261-71.
- Maxwell, D., Levin, C., Armar-Klemesu, M., Ruel, M., Morris, S. and Ahiadeke, C. (2000) *Urban Livelihoods and Food and Nutrition Security in Greater Accra, Ghana*. Research Report No. 112. Washington, DC: International Food Policy Research Institute in collaboration with the Noguchi Memorial Institute for Medical Research, Ghana, and the World Health Organization.
- Nestle, M. (2002) *Food Politics*. Berkeley, CA: University of California Press.
- Parsons, T. J., Power, C. and Manor, O. (2002) 'Fetal and Early Life Growth and Body Mass Index from Birth to Early Adulthood in 1958 British Cohort: Longitudinal Study', *British Medical Journal* 18 (1), March.
- Philipson, T. J. and Posner, R. A. (1999) *The Long-run Growth in Obesity as a Function of Technological Change*. Working Paper No. 7423. Cambridge, MA: National Bureau of Economic Research.
- Pitt, M. and Rosenzweig, M. (1986) 'Agricultural Prices, Food Consumption and the Health and Productivity of Indonesian Farmers', in I. Singh, L. Squire and J. Strauss, *Agricultural Household Models: Extensions, Applications and Policy*. Baltimore, MD: Johns Hopkins University Press for the World Bank.
- Popkin, B. M. (1998) 'The Nutrition Transition and its Health Implications in Lower-income Countries', *Public Health Nutrition* 1 (1): 5-21.
- Popkin, B. M. (2001) 'Nutrition in Transition: The Changing Global Nutrition Challenge', *Asia Pacific Journal of Clinical Nutrition* 10 (Supplement1): S13-S18.
- Popkin, B. M., Horton, S. and Kim, S. (2001) 'The Nutrition Transition and Prevention of Diet-Related Chronic Diseases in Asia and the Pacific', *Nutrition and Development Series* 6: 58. Manila: Asian Development Bank.
- Putnam, J. J. and Allshouse, J. E. (1999) 'Food Consumption, Prices, and Expenditures, 1970-97', *Statistical Bulletin* 965, Food and Rural Economics Division, Economic Research Services, US Department of Agriculture.

- Ralston, K. (2000) 'How Government Policies and Regulations Can Affect Dietary Choices', in *Government Regulation and Food Choices*. Washington, DC: Economic Research Services, US Department of Agriculture.
- Reardon, T. and Berdegúé, J. A. (2002) 'The Rapid Rise of Supermarkets in Latin America: Challenges and Opportunities for Development', *Development Policy Review* 20 (4): 371-88.
- Reardon, T. C., Timmer, P. Barrett, C. and Berdegúé, J. (2003) 'The Rise of Supermarkets in Africa, Asia and Latin America', *American Journal of Agricultural Economics* 85 (5).
- Regmi, A. (ed.) (2001) *Changing Structure of Global Food Consumption and Trade*. Agriculture and Trade Reports, WRS-01-1. Washington, DC: Market and Trade Economics Division, Economic Research Service, US Department of Agriculture.
- Sims, L. S. (1998) *The Politics of Fat*. Armonk, NY: M. E. Sharpe Inc.
- Tinker, I. (1997) *Street Foods: Urban Food and Employment in Developing Countries*. New York: Oxford University Press.
- Verbeke, W. and Ward, R. (2001) 'A Fresh Meat Almost Ideal System Incorporating Negative TV Press and Advertising Impact', *Agricultural Economics* 25: 359-74.
- Willett, W. and Stampfer, M. (2002) 'Rebuilding the Food Pyramid'. *Scientific American*, 17 December.
- World Bank (1999) *Curbing the Epidemic: Governments and the Economics of Tobacco Control*. Washington, DC: World Bank.
- WHO/FAO (2002) Expert Consultation on Diet, Nutrition and the Prevention of Chronic Diseases, 28 January-1 February, Geneva.