

The Concept of Food Security and the Future of World Food Prices

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Centre for Rural Economy Discussion Paper Series No. 37

October 2016

1: Origins in post-war Europe 1950-1970

The dictionary definition of security is:

"A state or feeling of being secure, something that gives this. The safety of a country or organisation against espionage or theft or other danger"

(The Oxford Paperback Dictionary, 1983)

The concept of specifically **food** security appears to have originated in Western Europe in the aftermath of the Second World War. Typically it was couched at the national level and, in the UK, was founded on the experience of a country for which the supply of food imports had been threatened by hostile naval action during two world wars. The response was epitomised by the exhortation to households with gardens to "Dig for Victory". Food security therefore became associated with national self-sufficiency in food supplies.

Severe food shortage was experienced in Western Europe during the early post-war period and this was reflected when, in 1957, the Treaty of Rome, which established the European Economic Community (between France, Western Germany, Italy, Belgium, Holland and Luxembourg- popularly known as the "Common Market") included as its Article 39 a set of objectives for its Common Agricultural Policy (CAP) as follows:

1. To increase agricultural productivity by promoting technical progress and by ensuring the rational development of agricultural production and the optimum utilisation of the factors of production, particularly labour;
2. Thus, to ensure a fair standard of living for the agricultural community, in particular by increasing the individual earnings of persons engaged in agriculture;

3. To stabilise markets;
4. To assure the availability of supplies;
5. To ensure that supplies reach consumers at reasonable prices.

(Quoted in Ritson, 1997)

With the benefit of hindsight, these objectives can be seen to have been dominated by food security. Objective 1 reflects a belief that there was an overriding need to increase food supplies from domestic sources as the means of achieving objective 4. Objectives 3 and 4 were understood as necessary for the achievement of Objective 5. Thus, at its onset, the main pre-occupation of the CAP was anticipated to be the need to ensure an adequate supply of food for the people of Western Europe. It is noteworthy that there is no reference at that time to food quality, food safety, the environment or sustainability. "Adequate" was understood to refer to basic nutritional needs and "supplies" to refer to basic food commodities.

Three "Principles" were also specified for the Common Agricultural Policy (Ritson 1997), the second of which was "Community Preference" – supplies from within the Community were to be given preference in the market over those from outside the EEC. Again, this can be seen as a way of encouraging national self-sufficiency in food supplies – as the Community level, as the first Principle was "free intra-community trade in farm products."

In practice, the post-war world turned out to be very different from that anticipated by the architects of the CAP. Partly because of the success in achieving objective 1 (though arguably in spite of, rather than because of CAP policies,) domestic supplies rapidly increased and market prices declined. Objectives 4 and 5 disappeared below the radar and objective 3 became in practice "supporting" rather than stabilising prices. The development of agricultural policy was dominated by objective 2 and the "farm income problem". Community Preference became a means of achieving objective 2 rather than objective 4.

At the international level world food prices declined in real terms. The UK remained a large food importer and arguments favouring increased self-sufficiency were now usually justified as a means of alleviating the country's chronic balance of payments problem, by then usually referred to as "import saving" (Ritson, 1970). Food security remained associated with the risks to a food importing nation of international conflict causing interruption of supplies. The attitude of successive UK Governments to food importing was ambiguous. Agricultural policy announcements usually stated that the objectives of UK agricultural Policy remained those specified in the 1947 agricultural act:

"Promoting and maintaining a stable and efficient agricultural industry capable of producing **such part of the nation's food and other agricultural produce as in the national interest it is desirable to produce in the United Kingdom**, and of producing it at minimum prices consistently

with proper remuneration and living conditions for farmers and workers in agriculture and an adequate return on capital invested in the industry."

(Quoted in Ritson 1977)

This is a wonderful piece of British civil service language, enabling just about any agricultural policy development: "as in the national interest it is desirable to produce in the United Kingdom" could be interpreted as consistent with either free trade or import saving policies.

However, the 1970s brought a dramatic change to the international background to agricultural policy in Western Europe, during a period which became known as "The World Food Crisis".

2. Impact of the 1970s Commodity Boom

The diagram below shows the FAO Food Price Index in real terms. This is a composite index of five basic food commodities traded on world markets – cereals, dairy products, sugar, meat and oilseeds. Concentrate on the right hand side of the chart. Prices were high in the early 1950s prior to the signing of the Treaty of Rome, but then progressively declined until the price explosion of 1974. There were a number of causes for this including a link with the oil price; but another major factor was the failure of the Russian grain harvest and the purchase by the Soviet Union of virtually the entire USA grain reserve.



Source: http://maps.grida.no/library/files/fafo-food-price-index-ffpi_005.jpg

These developments had two significant impacts on how the concept of food security was interpreted. First, it was now the inability of a country to afford to buy enough food from world markets to sustain the population that threatened food security. In particular the vulnerability

of low income food importing countries was highlighted. Increasing national food self-sufficiency was now characterised as foregoing the benefits of cheap food in normal years to avoid the consequences of paying high prices in times of world food shortage (and in the case of importing low income countries, possibly not being able to afford to buy enough food to feed the nation.)

Second, it was recognised that food security could be threatened by events in the domestic economy, as well as in the international market, as had applied in the case of Russia. However, food security was still seen as exclusively a supply issue. The world food conference in 1974, convened to address the "world food crises" defined food security as:

"assuring the availability and price stability of basic food stuffs at the international and national level"

In the UK, there was a spontaneous re-awakening of interest in national self-sufficiency in food supplies, led by distinguished agricultural scientists such as Sir Kenneth Blaxter and Kenneth Mellanby; the latter wrote a book (Mellanby, 1975) entitled "Can Britain Feed Itself", and the Government's response was yet another white paper from MAFF (1975) "Food From Our Own Resources". Associated with this was the development of the view that a longer-term, more "strategic" approach to agricultural policy in the UK was required. One example of this was the establishment of the Centre for Agricultural Strategy at Reading University, and the Centre commissioned a study (Ritson, 1980) to explore the issues involved in Self-sufficiency and food security. The overall conclusions of the study can be summarised as follows:

- There was a strong case for a country to develop the capacity to meet basic food needs from domestic sources in times of emergency.
- This does not necessarily mean increasing current agricultural self-sufficiency, but to sustain a resource base to provide the capacity to do so.
- To the extent that increasing domestic agricultural production is involved in establishing this resource base, then this can be described as an insurance policy – you pay a bit more for your food each year to avoid the consequences of having to import when international food prices explode, as they had in 1974.
- However, if all countries aim for increased self-sufficiency in food supplies, paradoxically this would increase food insecurity, as international trade in agricultural commodities would diminish and there would be no world market to fall back on in the event of domestic harvest failure (as Russia had done in 1974.)

Although the word itself was not used, the reference to **capacity** to increase domestic production if required can be seen as an early endorsement of the merits of "sustainability" in agricultural production. The Study also noted that, for the UK, the issue was complicated by

the recent adoption of the (then) EEC's Common Agricultural Policy. As an aside, it is interesting to note that another event in 1975 was a referendum on continued membership of the EEC. One of the main arguments from those advocating withdrawal was that adopting the CAP would push up British food prices (which indeed it did- but not in 1975!) It was possible for the Federal Trust (1975) to show that in 1973 and 1974, food imports were a bit cheaper than they would have been, had the country not joined the European Community in 1973.

Another response of the UK Government was to introduce a programme of food subsidies. The products selected were bread, milk, flour, butter, tea and cheese. While not quite a modern nutritionist's nightmare, the objective was not of course to alter diets but to offset the impact on consumer budgets of high food prices, and in this context, the products chosen possessed (whether by accident or design) two important characteristics (Ritson, 1975). First they were mainly products in which amount purchased was biased towards low-income consumers; second, they were products with inelastic demand – if food prices are pushed up by supply constraints, then it is not a sensible policy to encourage consumers to buy more of the products in short supply.

3. 1980-2005: From Supply Shortage to Consumer Entitlement.

As can be seen from the chart, international food prices soon recommenced their progressive decline. In the now enlarged EEC, Community Preference became more associated with "provenance" in food supplies – the notion that it was in a country's interest to favour supplies from domestic, often small and even "craft" producers, rather than food commodities from international markets. Advocates for freer trade in GATT, and then the WTO, criticised this philosophy as damaging the capacity of an efficient and fluent international market to provide food security. So, oddly, what had been the source of insecurity- relying on the world market- now becomes food security, whereas the previous policy- encouraging self-sufficiency- is now criticised as a source of insecurity.

A period of 30 years of "cheap food", with the international market characterised by a tendency to oversupply, together with depressed and falling prices, seems to have been partly responsible for a quite different approach to the concept of food security. The FAO became focussed on "food access" and the definition was revised to include the individual and household level, as well as the regional and national level of aggregation.

"Ensuring that all people at all times have physical and economic access to the basic food that they need" (FAO 1983)

This complete shift towards a demand orientated definition was probably not just the consequence of the experience of cheap food and plentiful supplies, but also influenced by the mould-breaking work of Sen in his Theory of Famine (1981) in which he concentrated on people having the resources (which he called "entitlement") to obtain food (thus "physical and economic access") rather than supply shortage.

It is oversimplifying Sen's Theory of Famine itself to describe it as exclusively demand orientated. He characterised four kinds of entitlement – "production-based"; "employment-based"; "trade-based"; and "transfer". Of these, the first, focussed on subsistence agriculture, is linked to supply failure; and trade-based, although referring mainly to internal markets, alludes to disruption of supply channels as in the traditional supply-orientated interpretations of food security. Nevertheless:

"Perhaps the most valuable contribution of the entitlement approach to famine theorising is that it shifts the analytical focus away from a fixation on food supplies – the Malthusian logic of "too many people, too little food" – and on to the ability of groups of people to acquire food. Food insecurity affects people who cannot access adequate food (e.g. because of poverty) irrespective of food availability." (Devereux, 2001)

"All people at all times" also led the World Bank (1986) to introduce a distinction between "chronic food insecurity", associated with continuing structural poverty and low incomes; and "transitory food insecurity" the traditional supply orientated concept associated with natural disasters, conflict and economic collapse. The current widely accepted definition of food security comes from the 1996 World Food Summit:

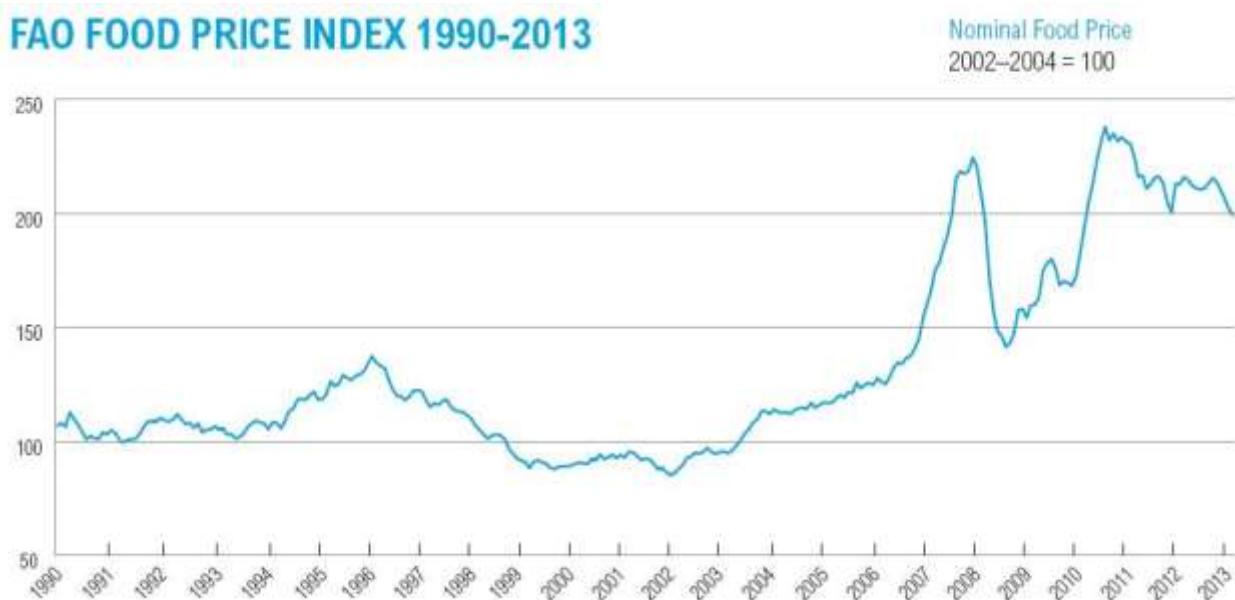
"Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life"

This represents a second major development in the concept of food security. It is now not just "basic needs" which are to be met, but a healthy lifestyle and freedom of consumer choice. Recently this has developed an ethical and human rights dimension –at the 1996 World Food Summit, governments reaffirmed the "Right to Food", although the "right to adequate food" had been incorporated in the "International Covenant on Education, Social and Cultural Rights (ICESC)", first adopted in 1976.

4. 2005-2015: Sustainable Food Security

As can be seen from the chart the progressive decline in real food prices on world markets lasted 30 years, but that prices around 2005 began a second steep climb. A second chart (below) shows what happened then. Unlike the experience in the 1970s relatively high prices

were sustained for nearly 10 years. This has been associated with another shift in thinking about food security



Source: Dinshan, H (2013).

"The World Food Crisis" of the mid-1970s followed shortly after the publication of the very influential "Club of Rome" report "The Limits to Growth" (Meadows et al 1972) which drew attention to the potential cataclysmic outcomes of continued population growth in the face of limits to the earth's resources. Many regarded the developments on international markets in the 1970s as evidence that this Malthusian vision of the future had already arrived, but this view soon evaporated. Malnutrition in low income countries was again seen as primarily a problem of economic "underdevelopment" which could be solved by stimulating economic growth. The recent sustained period of high international prices has not only re-awakened interest in the problems of relying on the world market for food supplies but has also led food security now being viewed in the context of limits to the future capacity of the planet to feed its growing population. As a consequence people now frequently refer to "Sustainable Food Security". In 2010, the British Sustainable Development Commission published a report "Food security and sustainability: The perfect fit":

"Sustainability has to be the basis on which the world produces food". "Food security can only be achieved if food systems become sustainable."

It pointed out that:

"Strains ahead include: population rising to nine billion by 2050; climate change looking certain; water stress; pressure on land use; finite fossil fuel sources; requirements to increase fertiliser use dramatically or to build soil fertility."

"The UK Government should adopt a new definition of food security in terms of genuinely sustainable food systems where the core goal is to feed everyone sustainably, equitably and healthily."

Another development in the UK was the label "food security" being adopted as a way of describing the alleviation of poor diets and nutrition among low-income British households, alternatively, and arguably more accurately, referred to as "food poverty". The Report of the Fabian Commission "Hungry for Change" (2015) defines Household Food (In)Security as:

"The inability to acquire or consume an adequate quality or sufficient quantity of food in socially acceptable ways."

The reference to "socially acceptable ways" reflects an antipathy by the Commission to the social stigma associated with the proliferation of Food Banks and the procedures for giving people access to them. Although originally stimulated by the rise in food prices in 2008, the problem being addressed is arguably much more to do with poverty than it is with food.

5. The dimensions of Food Security

In order to try and capture the full range of modern interpretations of the concept of food security, I suggest they can be characterised by their location according to four dimensions:

Who is being secured – from the population of a country down to the individual household and up to the world population, with achieving food security sometimes now a synonym for the entire world population being well-fed;

What is being secured – originally the basic needs of people ("adequate food") through to a varied, healthy, nutritious diet meeting consumer preferences;

How is it secured- varying at one extreme by securing supplies; at the other by providing people with the capacity to secure food (entitlement);

When is it secured – from guarding against short term supply shortfall to relieving prolonged malnutrition due to chronic poverty.

The FAO (2006) also used the idea of "dimensions" to elaborate on its definition of 1996:

"This widely accepted definition points to the following dimensions of food security:

Food availability: The availability of sufficient quantities of food of appropriate quality, supplied through domestic production or imports (including food aid).

Food access: Access by individuals to adequate resources (entitlements) for acquiring appropriate foods for a nutritious diet. Entitlements are defined as the set of all commodity bundles over which a person can establish command given the legal, political, economic and social arrangements

of the community in which they live (including traditional rights such as access to common resources).

Utilization: Utilization of food through adequate diet, clean water, sanitation and health care to reach a state of nutritional well-being where all physiological needs are met. This brings out the importance of non-food inputs in food security.

Stability: To be food secure, a population, household or individual must have access to adequate food at all times. They should not risk losing access to food as a consequence of sudden shocks (e.g. an economic or climatic crisis) or cyclical events (e.g. seasonal food insecurity). The concept of stability can therefore refer to both the availability and access dimensions of food security“.

6. Measuring Food Security

This broad characterisation of food security led the FAO to add an annual report “The State of Food Insecurity in the World” (FAO 2015) to its long established “The State of Food and Agriculture”. This attempts to rank countries according to a food security index, calculated from a set of Indicators grouped under the four dimensions of Availability, Access, Utilization and Stability. Of these, only the list under “Stability” reflects the traditional view of vulnerability to supply shortage. They are:

Cereal import dependency ratio;

Percent of arable land equipped for irrigation;

Value of food imports over total merchandise exports;

Political stability and absence of violence/terrorism;

Domestic food price volatility;

Per capita food production variability;

Per capita food supply variability.

The indicators under the other dimensions typically reflect more a description of the current state of malnutrition in the country concerned.

An even more elaborate annual exercise is now also undertaken by the Economist Intelligence Unit (2015) with its “Global food security index” – “An annual measure of the state of global food security.” This involves aggregation of 40 security indicators, again grouped under four headings, in this case labelled 1) Affordability; 2) Availability; 3) Quality and Safety; and 4) Output Variability.

7. Framing Food Security

The above attempts to capture all aspects of the way the concept of Food Security is, and has been, interpreted and how it might be measured. Another approach is to consider different “frames” of the concept – that is alternative ways in which people understand food security in terms of their own value systems, embracing both causes and solutions. The following frames have been identified from a very wide range of sources, too numerous to merit referencing.

- 1) **National Security** This is the traditional frame – associated with vulnerability to fluctuating international commodity prices and sometimes civil unrest. The conventional solution has been to increase national self-sufficiency, but a more recent (alarming) policy is what has become known as “Land Grabs”, such as Chinese investment in agricultural land in Africa.
- 2) **Green Agriculture** Embracing organic production methods and often with a research orientation (e.g. the Newcastle University farm at Nafferton), this has a strong environmental focus arguing that agriculture should concentrate on often small scale, traditional, low input and mixed farming systems to protect the capacity of land to feed future generations.
- 3) **Productivism** This approach sees rising world food consumption as inevitable, and with little more land that can be brought into production, food security can only be attained by increasing crop yields. achieved by spreading modern agricultural practices to less efficient parts of the globe, aided by the application of biotechnology solutions.
- 4) **Sustainable Intensification.** This is a kind of hybrid of 2) and 3), following the ethos of 3), but recognising that techniques to increase yields must not threaten the capacity of agriculture to be able to continue to supply increasing quantities of food in the future
- 5) **Innovative Technologies and Novel Solutions.** A range of new supply sources, including methods of overcoming land shortage (e.g. tower farms, urban farming), new foods (e.g. insects, in vitro meat) and utilisation of “big data” to improve agricultural performance.
- 6) **Genetic Modification** Often included in 3), and sometimes 4), but worth a frame of its own because of the extent to which it has sometimes been advocated as **the** way of overcoming constraints on increasing food production (e.g. pesticide resistant crops, adaption to allow crops to be planted in saline areas; faster maturing farmed fish.)
- 7) **Sustainable Consumption.** This is an increasingly fashionable approach based on the view that Western diets represent an inefficient way of utilising the worlds food – and that it is change in diets which can achieve food security for all, Central to this approach is the “eat less meat” campaigns which emphasise that three or four times

more grain is required for consumption of animal protein compared to plant based diets. Increasing meat consumption in Asia, particularly China, as one explanation of the explosion of grain prices in 2007 has added strength to this argument.

- 8) **Food Waste.** This frame, which is often linked to 7) argues that primary food production is more than adequate to meet current and future needs but that vast quantities of what is produced is wasted (40% is a typical figure) because of food waste. This ranges from inefficient local supply chains in low income countries through to food being thrown away in supermarkets and the home in wealthy countries because of "use" and "best before" dates.
- 9) **Free International Trade and the WTO.** This approach resurrects the arguments on the merits of free trade which emerged in the 1970s to counter the belief that national self-sufficiency was required. Advocates claim that trade helps to balance supply and demand across the globe, ensures that food is produced in the most productive areas, thus reducing and stabilising prices.
- 10) **Food Sovereignty.** This is the antithesis of 9) and extends the merits of "Provenance" to embrace food security. International trade and industrial agriculture are rejected in favour of localised, traditional, small scale agriculture. It adopts the ethical dimension of the "right to food" achieved by localities having democratic control over their locally produced food supply.
- 11) **Food Security in Business.** This frame sees the drive for more efficient and secure supply chains by food businesses as contributing to food security of consumers in wealthy countries and, to the extent that this sometimes involves programs to deliver social and economic benefits to primary producers, may also provide food security in supplying countries via ensuring "entitlement" to small farmers and estate workers.
- 12) **Friends of the Earth.** I have labelled this after the name of the British Charity because it sees achieving food security as just one component of "looking after the Planet". So it embraces bio-diversity and farming systems consistent with it, sustainable forests, water stewardship, conservation of fish stocks, carbon emissions, and so on.
- 13) **Food Distribution.** Simply draws attention to the fact that more than enough food is produced in the world; the problem is a lack of an equitable distribution of what is produced. It is light on mechanisms for achieving this, though will probably reference 7) and 8) and reject production orientated solutions, such as 3) and 4), and claim that 9) fails to deliver a fairer distribution because of power relationships in international trade.

This range of food security interpretations indicates that, behind the apparent "consensus frame" epitomised by the almost universal adoption of the 1996 FAO definition, in fact lies a

clear lack of consensus; the concept of food security has now fragmented as well as evolved. Mooney and Hunt (2009) argue that:

"Ironically, the very potency of consensus frames may generate contested claims to the ownership of a social problem. Food security is a potent consensus frame that has generated at least three distinct collective action frames: food security as hunger; food security as a component of a community's developmental whole; and food security as minimising risks with respect to an industrial food system's vulnerability to both "normal accidents" as well as the "international accidents" associated with agriterrorism."

Most of the 13 frames listed above can be allocated to one of these action frames, although there are other ways of grouping them.

8. Was it Different this time?

The chart below shows the FAO Food Price Index in real and money terms, covering both 1970s and recent price explosion.



Source: <http://www.fao.org/worldfoodsituation/foodpricesindex/en/>

After 2008, parallels were quickly drawn with 1974, particularly as in 2009 prices seemed to be on their way down as rapidly as in 1976 – and the term “price spike” became popular as a description of the phenomena. However, this fall was quickly reversed and the period of high prices was sustained for much longer this time, only falling back in 2015. There are parallels – particularly the link with the oil price and other non-food commodities. There was also another major harvest failure in Russia which contributed to the second “spike” shown in the chart.

However, showing the FAO food price index in both nominal and real terms immediately draws attention to one important difference. The 1970s was a period of historically high general inflation worldwide and the price "spike" is only pronounced in the real index, whereas in 2005-15 the same pattern is evident in both. This leads to an important distinction. In media coverage, the term "food price inflation" is used to describe two quite different phenomena. The first is simply that food prices are an important and conspicuous component of general inflation in an economy. The second is where food price increases are primarily the consequence of events specific to agricultural commodity markets, as appears to have been the case in 2005-15. Commentators have drawn attention to a number of agricultural commodity specific developments, of which the three most significant are as follows.

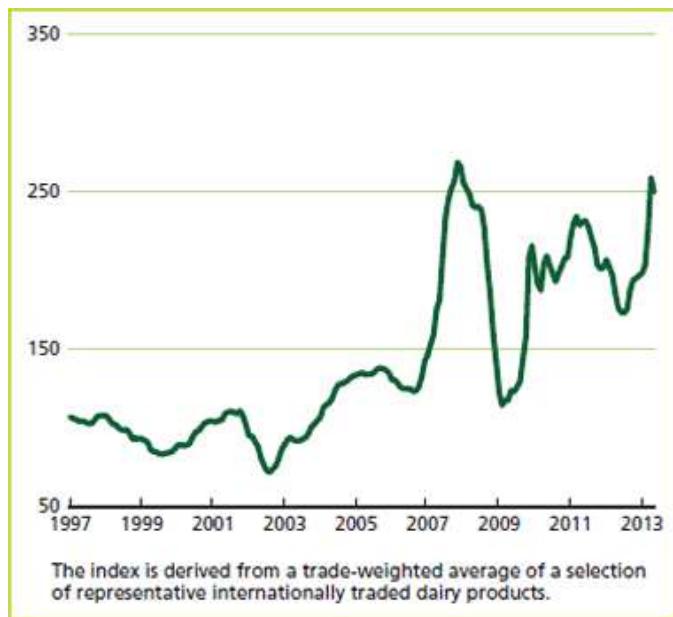
A) Bio-fuel.

From the turn of the millennium there has been a progressive growth of bio-fuel production, with in particular more than half of the US corn crop being diverted from food and feed use. Perversely, this represents a reversal of the post-war trend in which fossil fuel products were substituting for agricultural crops – e.g. artificial fibres and petrol for tractors, rather than oats for horses.

B) Rising personal incomes in East Asia.

Of crucial importance has been the rapid growth in the demand for grain-fed livestock, particularly in China. The traditional view of agricultural economists was that rising personal incomes would lead to an increase in demand for livestock products relative to vegetable protein. However, this pre-dated the adoption worldwide of intensive, mainly grain-fed, livestock systems. Rising personal incomes now result in an individual requiring perhaps four times as much grain to achieve a particular dietary outcome as a consequence of choosing to consume it via livestock.

Thus it is grain markets which have been most effected by a surge in demand because of rising incomes in Asia. Dairy product markets also participated in the agricultural commodities boom. (See below). In the early 1970s there was also a boom in international dairy product prices—but there the parallel ends. As with grain, in the 1970s, this was caused by supply



Source: H:\AFood Security\Food Price Index Sources\FAO Outlook Milk and Milk Products - The Dairy Site.mht

shortage due in this case to the coincidence of drought in both Northern and Southern production areas. This time the consensus is that the predominant cause was not a supply shock, but the growth in demand for dairy products in South East Asia.

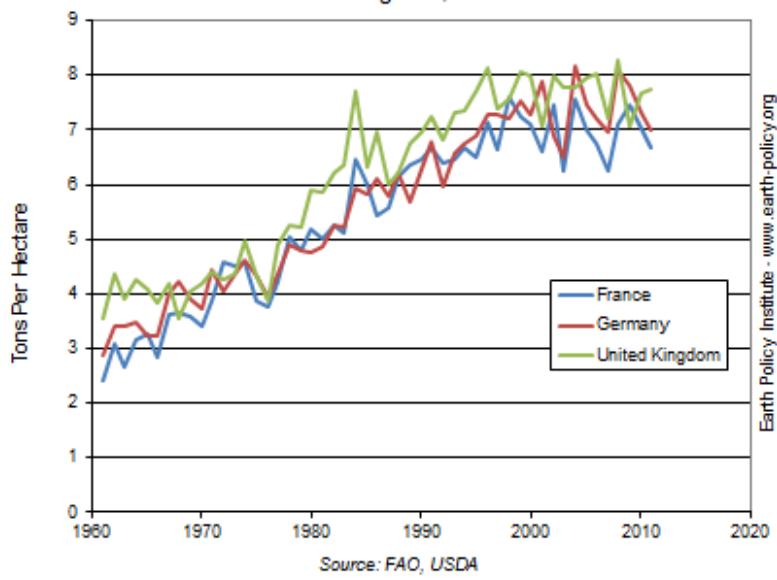
C) Cereal yields

Probably least noted, but potentially most alarming, is the apparent end to the post-war experience of rising cereal yields. In his book for the Earth Policy Institute at Rutgers University (2012) Lester Brown notes that:

"From the beginning of agriculture until the mid-twentieth century, growth in the world grain harvest came almost entirely from expanding the cultivated area." "It is only within the last 60 years or so that rising yields have replaced area expansion as the principal source of growth in world grain production." "Since 1950, over 93 percent of world grain harvest growth has come from raising yields. Expanding area accounts for the remaining 7 percent."

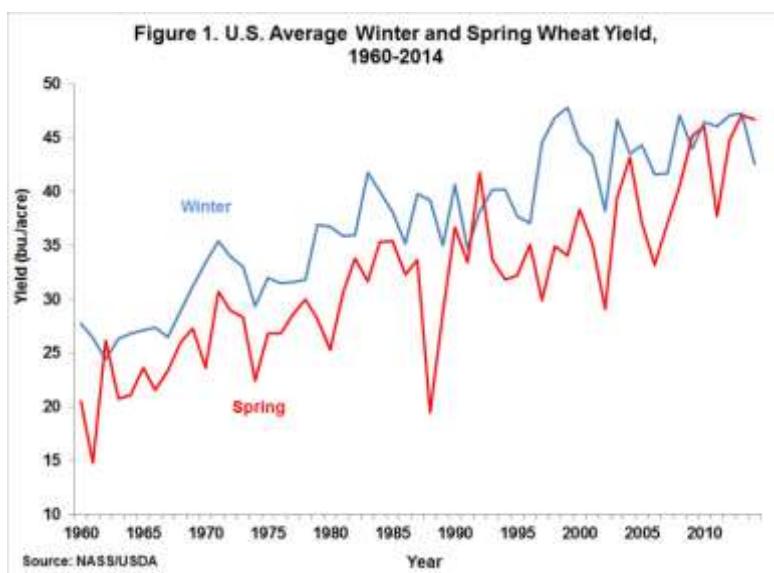
However, around the mid-1990s this growth in yield appears to have been almost entirely arrested, as is illustrated for France, Germany and the UK in the chart below.

Figure 7-1. Wheat Yields in France, Germany, and the United Kingdom, 1961-2011



Source: Brown (2012)

There is a variety of explanations for this, but most revolve around either a commercial or a biological cause. The former cites the impact of the sustained period of low prices acting as a disincentive to investment, particularly in plant breeding. In the case of the European countries, the plateauing of grain yields coincides with the time when the Common Agricultural Policy began to reduce the level of price support for cereals, EU producers having previously been insulated from the decline in international grain prices. However, as can be seen in the chart below, winter wheat yields in the US have also plateaued (as have rice yields in Japan and China.)



Source: Irwin and Good (2015)

The alternative explanation is summarised by Brown (2012):

"One thing that has become clear is that grain yield per hectare, like any biological growth process, cannot continue rising indefinitely. It has its limits.

9. A Simple Model of World Food Prices.

The outstanding feature of this contrast between suggested causes of the recent world food price explosion with that of the 1970s is that the three new factors discussed above are all forces which would be expected to progressively influence the underlying trend in demand (A and B) or supply (C). The fundamental error of much of the market analysis of international food price developments is to assume implicitly that price instability must be caused by short term shocks (usually supply) to the system; whereas the forces influencing the underlying trends in supply and demand are solely associated with the longer term (historically downward) trend in world food prices. Between 1950 and 2005 this may well have been the case; but there is a strong argument to say this time it was different.

To illustrate this assume a very simple model of world food prices in which, first, only one agricultural commodity is traded – "food". This is represented by the FAO food price index, and would be broadly realistic if the five commodities incorporated into it were good substitutes for one another in consumption. Second, assume there are no short term shocks to the system, only the longer term forces underlying the development of world supply and demand for food – technological advance and public sector investment in the case of supply; income and population growth for demand.

It would be extremely unlikely for these two underlying forces exactly to balance out year to year – one would tend to outpace the other and the evidence suggests that this has been technology driven supply for most of the post war period.

Under this scenario, prices would be forced down to a floor, supported by stock accumulation, Government agricultural price support policies and agricultural disinvestment. Prices would tend to bounce along this floor as demand intermittently caught up with supply.

But what if the impact of income and population growth, and a slowdown in the pace of technological advance, propelled the market into a period in which demand tended to outpace supply? The consequence would not be a gradual reversal of declining prices but, once stocks have been depleted, demand only has to outpace supply by a small amount for the known extreme price inelasticity of demand for the commodity "food" to cause prices to explode, as occurred in 2008. Some sort of ceiling is reached- in particular we would expect a

reversal in the switch from vegetable to animal protein (and bio-fuel becomes uneconomic), and there will be some positive reaction from agricultural output to high prices. But it is quite feasible that the world then moves into a period in which it is supply which is trying to catch up with demand and price spikes (the stalactites) become stalagmites, now hanging from this ceiling.

10. Conclusion

- The concept of food security has not only evolved over the past 60 years, but also fractured, to the extent that it is arguable that it has lost its potency as a characterisation of an aspect of human wellbeing.
- In particular, the increasing adoption of entitlement at its core in low-income countries, and household food security in rich countries, has diverted it into aspects of inadequate diet which are more due to poverty than a failure in the food system. Poverty becomes food poverty because an inadequate diet is the most visible symptom of inadequate incomes.
- There is substantial evidence to suggest that the world may be moving into a phase in which internationally traded food commodity prices are much higher in real terms, and less stable, and the vulnerability of a food importing nation to its exposure to the world market may once again come to dominate the food security dialogue.

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