

It should be apparent from this models that sustainable development can only be realized if all the major factors that impact on drought and food security are addressed appropriately and timely. Policy changes will be inevitable in order to mainstream, incorporate and integrate drought and food security with other factors of development HIV/AIDS, gender, governance land tenure, water management and others at local, national, regional and international level and through established planning and prioritization mechanism such as PRSP's.

4.0 Drought and society: Towards policy options

This section examines some of the societal responses to drought. It explores some of the ways in which societies and groups address the risk of drought, such as drawing upon coping strategies and social adaptive capacity and how policy decision can either reinforce or undermine adaptive responses to risk. In particular, the impacts of agricultural policy on water and food security are examined. Similarly, the context for agricultural policy, the international political economy of food, clearly illustrates how some societies have overcome water shortages and manage drought risk by engaging in trade in virtual water. This section, also examines how the concept of virtual water is generally understood and applied and how it can be used to 'insure' a population against the worst effects of drought impacts.

4.1 Societal responses to drought

Different communities have different approaches and capacities to manage risk. In the past communities in drylands typically controlled, managed, conserved and protected their resources communally. They had accumulated a wealth of knowledge, ideas and experience of managing and coping with disaster risk, even in the face of severe droughts. Today much of these responsibilities have been conferred to governments, which in turn have established institutions and mechanisms through which drought issues are addressed either directly or indirectly. These institutions are charged with the responsibility of reducing and managing drought risk, alerting communities of drought events and assisting in coping with them. However pastoralist and other communities who live in marginal areas which have been neglected by central authorities are still primarily relying upon their own social adaptive capacity in order to cope with drought.

4.2 Social adaptive capacity

A quick survey of history, or indeed just examining a cross section of drought-prone societies today reveals that different societies manage the risk of drought impact in different ways. This is partly a function of different levels of economic development, which partly determines a society's options, as illustrated by the UNDP study, which found a very high inverse correlation between GNP and human mortality in the face of drought.

One way of explaining differences in drought vulnerability between societies or policy environments is to think of the 'drought exposure – drought impact' relationship as being mediated through *social adaptive capacity*. This term is employed in this paper to mean the ability of a system or a society to accommodate, adjust and adapt to a stress, specifically a drought-induced stress (Figure 5). We distinguish between social adaptive capacity and coping strategies by considering the former to be an attribute or potential resource while the latter are particular expressions of resilience's in a particular situation, and typically at the household or community level.

Where the society under consideration comprises citizens of a nation state, their large and relatively complex society often transcends the spatial extent of a drought and may be able to allocate resources from a non-drought-affected area or compensate through a less drought affected sector. For example, exchanging goods and services for 'virtual water' a concept defined and elaborated upon below. At the level of household or community on the other hand, society is typically entirely subject to a particular drought event. Much has been written about coping strategies but less about the social adaptive capacity to drought, though the climate change debate is starting to change.

Societies in the past which were incapable of adapting to climate risk and/or climate shocks, perhaps through mismanagement of water, often simply disappeared. For example, there is intriguing archaeological evidence that mismanaged irrigation water resulted in massive salinization around some Mesopotamian city-states, precipitating their rapid demise. Similarly, the mismanagement of the Aral Sea, while not endangering the existence of a nation-state, has undermined large segments of the populations on behalf of whom these policy decisions were made. Figure 5 demonstrates that for the same level of water scarcity there can be very different levels of human development of a society, as measured by the UNDP Human Development Index (HDI). This can be interpreted to mean that societies which are better able to overcome water shortages manifest higher levels of social adaptive capacity, in this figure termed "social resources". If this is accurate then it means that there is little environmental or climatic determinism in terms of the relationship between a society's natural resource endowment and how they use their capabilities and their ingenuity to turn it into development. Development, in turn can act as insurance against the worst impacts of vagaries of nature, as revealed by the UNDP study, which shows strongly inverse relationship between *per capita* GNP and drought mortality.

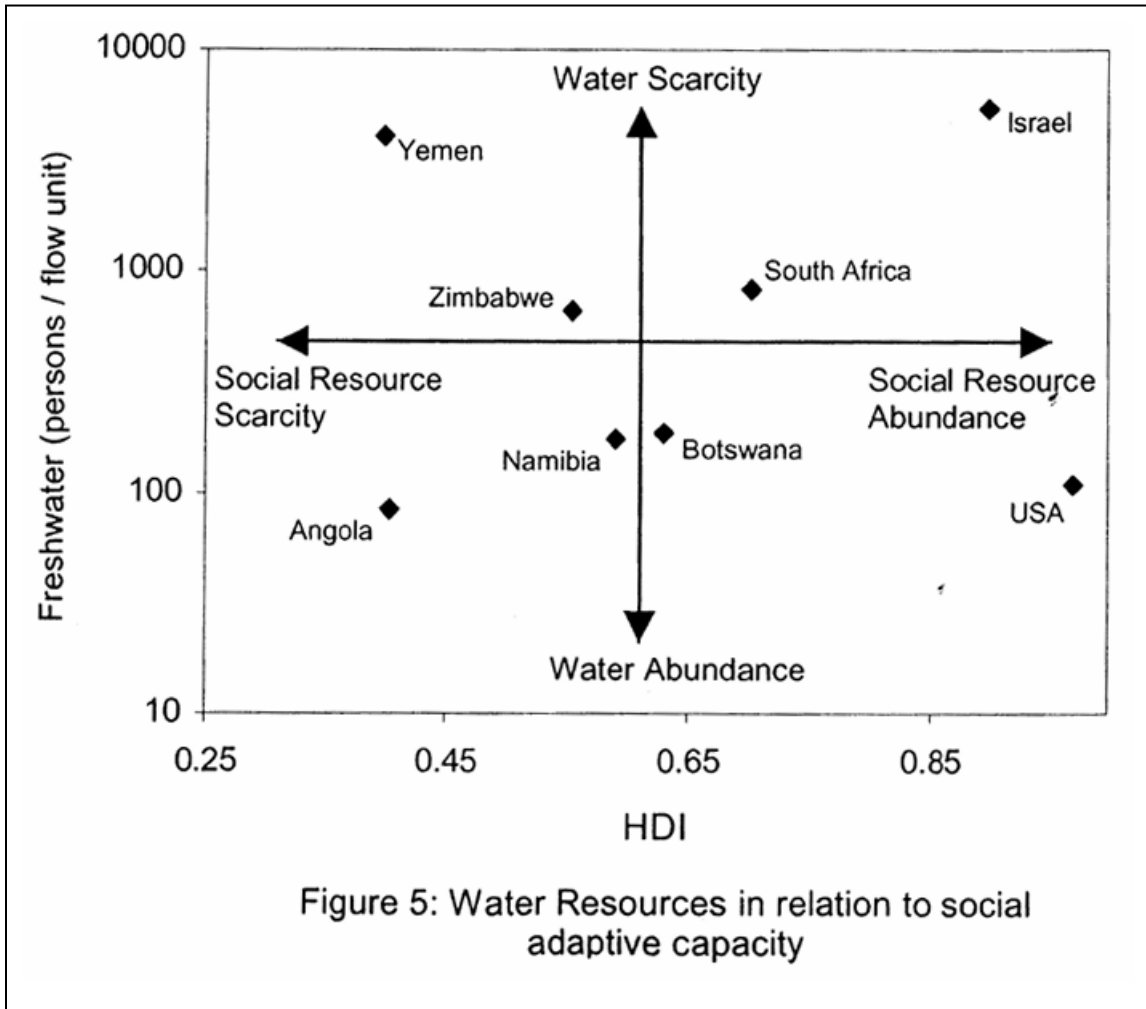
From a policy perspective, which normally corresponds to the nation state as the unit of decision making, policy makers need to recognize that their decisions can enhance or undermine assets such as adaptive capacity. It is important to note in this context that a decision may result in a total or average decrease in drought vulnerability but still increase the vulnerability of a particular group(s). On the other hand, a society may choose to collectively subsidize a particularly exposed or vulnerable group or sub-system, in the spirit of pro-poor policy, even at the cost of an increase in the average impact of drought, but one which is more evenly distributed. Therefore and importantly, when talking about vulnerability to drought, we must also ask ourselves 'vulnerability for whom'?

Finally, it should be emphasized at the end of the day any attempt to influence national level policy making can only achieve just that: influence. The actual outcomes in a society ultimately represent the net effect of numerous, perhaps apparently insignificant decisions made units of various scales which collectively comprise a society. Therefore policy makers need to define their policy room-to-manoeuvre within a given situation. This would take into account resources, constraints and opportunities in order to identify the highest leverage instruments and avenues through which to create an enabling environment for society itself – to achieve change. This will maximize the value of their own adaptive management strategies and energies and priorities in order to achieve more sensible water allocation, greater food security and enhance drought resilience while simultaneously advancing other development objectives.

Figure 5

Water resource in relation to social adaptive capacity

(Earle 2001)



4.3

Policy options:

The special case of agricultural policy on water and food security

Agriculture still uses some 80% of the freshwater employed by humans, and hence agricultural policies have a strong influence on water management. Food is a very emotive issue, as is the idea of a nation-state being self-sufficient in food for reasons of national security. This has often led to often perverse incentives, which in turn lead to an irrational allocation of water, normally through market distortions like unrealistically low prices. This in turn leads to excessive demand, and as it is normally politically unpalatable to try to decrease water consumption, to a drive to increase supply. All of which involve issues of intergenerational equity and environmental externalities. In short, a fundamentally 'political' question, one of allocation of a scarce and essential resource, is depoliticized by being portrayed as a technical question of increasing supply.

Agricultural policy may override or amplify purely weather related factors. For example, in Malawi maize production declined by 20% in 1986/87, but weather was only one factor; other important constraint were pricing and availability of inputs and the policies of the ADMARC, responsible for marketing and managing national food security stocks (Clay *et al* 2003). Similarly, in Zimbabwe policies have influenced the structural change in agriculture through land redistribution and political developments and related economic changes. This resulted in increasing volatility in maize yields associated with a shift in production to smallholders and a decline in large-scale commercial output (Clay *et al* 2003).

4.4

The context for agricultural policy and food security options; The international political economy of food and virtual water

Societies like Singapore, Hong Kong and Macau grow nothing yet never suffer from food insecurity, though of course disadvantaged individuals or groups may. They indirectly and perhaps unwittingly ensure general food security by engaging in the international system to exchange labour, ideas and organization - in the form of the goods and services they sell - for the water required to grow the rice and other food stuffs they import. Of course, with city-states there is insufficient land to ensure food security by growing food themselves. But even in countries which are known as the breadbaskets of the world one notes a similar phenomenon. In fact only about 3% of the population of developed countries is directly engaged in agriculture, which rises to perhaps 15% in some of these countries if associated activities are taken into account. These countries produce more food than they know what to do with because of price distortions - principally production subsidies - which encourage more production than the domestic market would demand. On the other side of the world a country such as Jordan, one of the most water scarce in the world, imports large quantities of 'virtual water' in the form of grain from developed countries, which together with other forms of imported water accounts for 60-90% of water used by Jordanians, depending on the year (Hoekstra 2003). 'Virtual' water is defined as the water (rainfall or groundwater) required to grow one kilogram of a dry cereal; one to two cubic meters, depending on the crop. Using this logic, it has been estimated that every year Egypt imports more water- 'embedded' with grain - than the annual flow of the Nile, which historically assured Egypt's food security (Alan 2001).

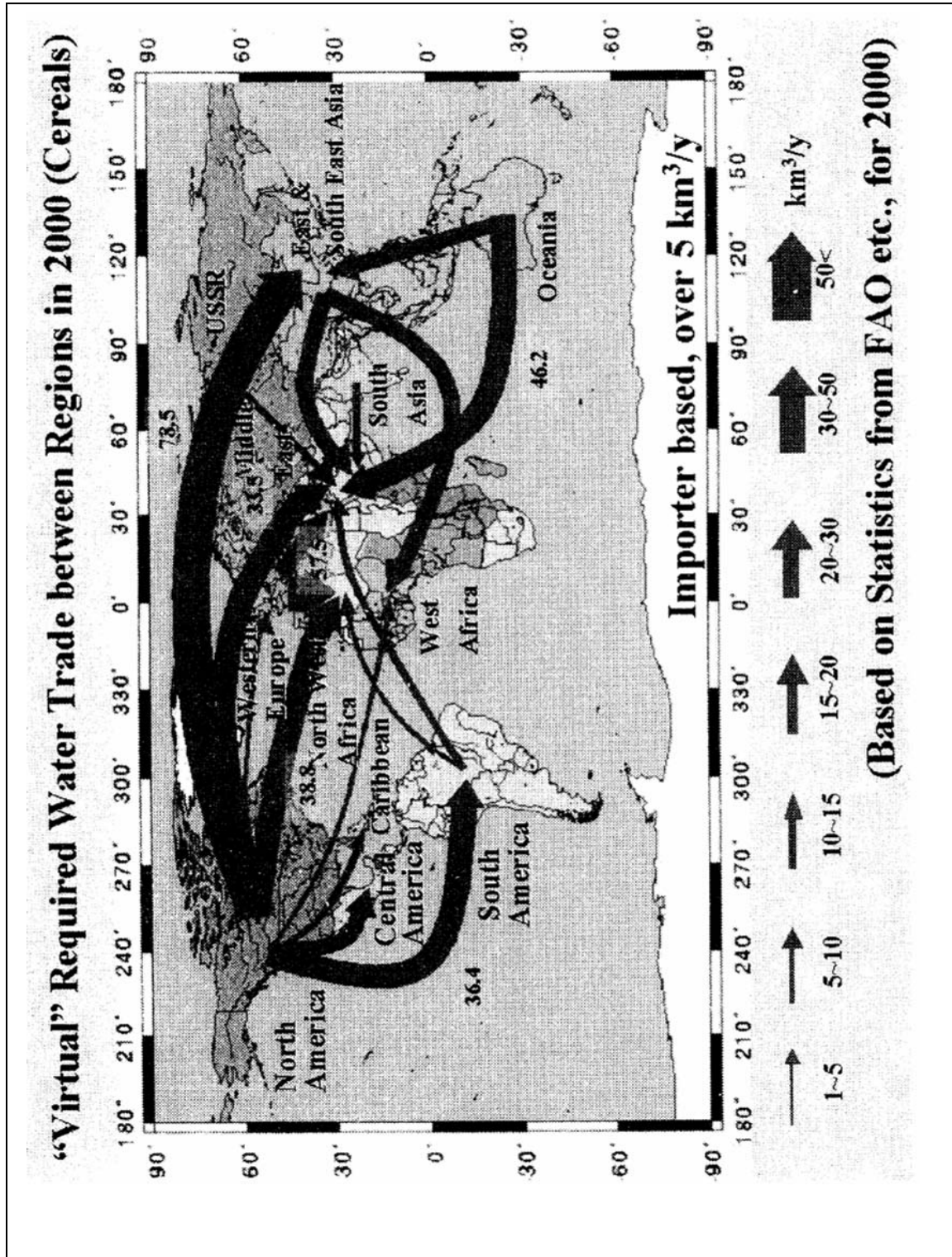
Globally, the trade in virtual water represents some 15% of the water used by humanity. Regions which are net exporters of virtual water are the Americas, Southeast Asia and Australia, the rest of the world being net importers (Hoekstra 2003) (See Figure 6). Perhaps surprisingly, some chronically drought-affected countries, such as Sudan, Niger and Burkina Faso are revealed to be net exporters of water when virtual water is taken into account. This is probably explained by the

influence of livestock exports on the calculations and the relatively low level of food imports into poor countries. In a virtual water calculation the water used to grow the grains and grasses they consume would be the water associated with the meat exported. Water challenged countries exporting water does not necessarily represent an irrational policy choice. Indeed, it may be the most appropriate way of turning rainfall into livelihoods, food security and pay for imports, as it may be the most efficient use in terms of cash – per - drop or employment– per - drop or food– security- per- drop

Finally, if water – or reliability thereof - is the most limiting factor of production, then policies need to be rationalized in term of return to water rather than return to land; the traditional measure of agricultural productivity, as the science of agricultural economics developed in an area of land scarcity but reliable rainfall. To take it a step further, one could think in terms of policy criteria of, for example, the number of jobs generated per unit of water. Yet again, a careful analysis of food and water security demonstrates that viewing the same problem in a new light may reveal policy options which may have always been there but which simply went unrecognized.

There are many examples of societies which re-organized their limited capacities in a new way to successfully address a threat. Boserup (1981) calls this expression of social adaptive capacity 'induced innovation' One must therefore ponder why in many areas of Africa there have been significant flows of food relief for decades on end. Has the international system for humanitarian dumping of surplus grains insured Africa against the consequences of climate risk but at the same time perpetuated bad policy by alleviating its consequences? If so, what are the alternatives?

Figure 6
Annual virtual water trade in 2000
 (Oki and Kanae 2000)



The international trade in grains and hence of virtual water is driven in part by the fact that it is much cheaper to send one kilogram of grain in dry form from, say, the USA to Egypt than to send the 1,000 to 2,000 kilograms of water which would be required for the Egyptians to grow that one kilogram of grain themselves. It is also driven by price distortions which mean that producers are looking for opportunities to essentially dump food. Naturally this might have powerful effects in the recipient countries, an emotive debate but the evidence for which is sometimes contradictory and rarely straightforward. In Africa there is no evidence at the level of the entire continent that food aid has suppressed food production.

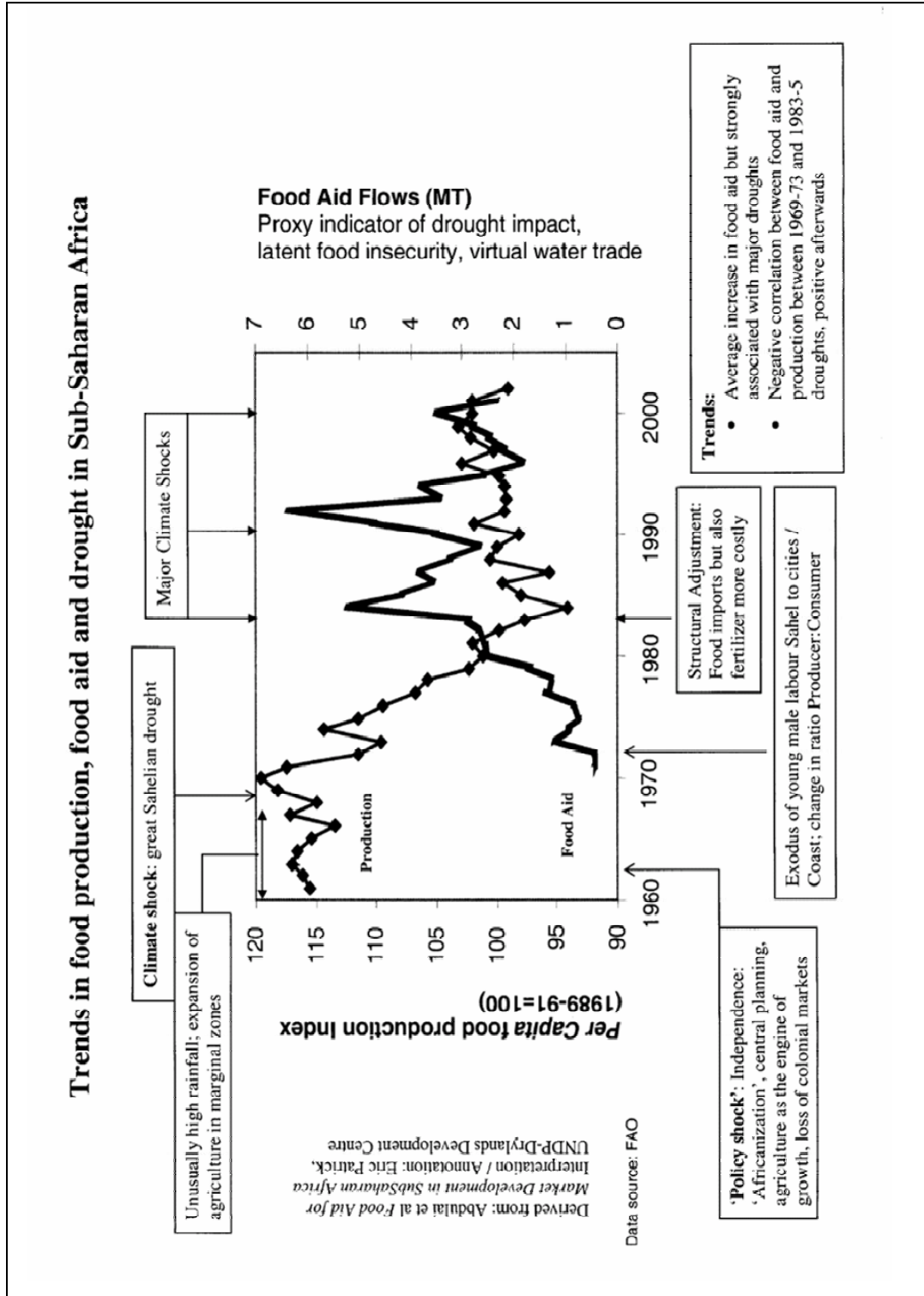
Interestingly, from the beginning of food aid to Africa in about 1973 with the great Sahelian drought and famine until 1984, another major famine year and also the beginning of Structural Adjustment in many African countries, there was an inverse relationship between food aid and food production (Figure 7). Yet from 1984 food production has steadily increased in both absolute and *per capita* terms, even as food aid has increased, again as can be seen from Figure 7. This may be due to the fact that structural adjustment made foreign exchange expensive, which may have reduced food imports and/or made them more expensive, stimulating local production. On the other hand it would also have made fertilizer imports more expensive. In any case, at the local level, there is abundant evidence that regular food aid at least temporarily suppresses production and – more importantly - creates a dependency mentality. Furthermore, its distribution has often been politicized, either within the structure of patron-client relations or even as a weapon. Food aid, like other aid, essentially equates to dropping a very valued, free and extra-budgetary resource into a given set of power relations, with predictable results.

The problem, therefore, may not be food aid *per se* but its context. The results of schemes based on giving assets-for-work, cash instead of food, vouchers for local food purchases and other experiments demonstrate that there is no immediate alternative to internationally sourced food aid or purchases as short term relief from a major drought event. When this assistance, however, becomes institutionalized, as in some countries in the Greater Horn for one or two decades (Figure 7 illustrate this), it raises fundamental questions.

In general, however, as can be seen from Figure 7, although average food aid quantities for Africa have been steadily rising, the temporal distribution largely corresponds to major drought events (note spikes in 1984, 2001). This indicates that, whatever its faults, the international political economy of surplus production through perverse incentives in Western countries (though the same could be said of many developing countries), driven by domestic politics, is neatly wed to post-War prosperity and the associated humanitarian imperative. This in turn operates through aid institutions and is made possible by quick and relatively cheap communications and transportation, the often unrecognized phenomenon of transfers of virtual water in the form of grains and failed policy in many developing countries. In short, it is a manifestation of globalization and contrasts greatly with, say, the political economy in place during the Great Potato Famine in Ireland in the mid nineteenth century.

It is essentially a system of Western taxpayers acting as the re-insurer of last resort when countries are overwhelmed by a major drought event or other natural hazard. The only difference from insurance is that the insured may not pay any premiums, and like any free good or service may be applied inefficiently. On the other hand, payment may be in the form of political services rendered to grain-surplus nations, particularly in the case of a strategic region such as the Middle East, or for having the good or poor fortune of having been colonized by a particular country. Indeed, even with conditionality now being the norm with aid, a World Bank study found that the single best predictor of from whom and how much a country receives in aid is simply whether it was a former colony of a donor and is quite unrelated to whether its policies were considered to be 'good' (World Bank 1998).

Figure 7
Trends in food production, food aid and drought in Sub-Saharan Africa



In short, the current international marriage of convenience is an attractive system in terms of reducing human mortality due to drought, but in practice may subsidize the effects of bad policy or stave off necessary changes to structural power relations within the recipient countries and encourage dependency. Where even massive external assistance has been inadequate to prevent widespread famine, the basic political order may be questioned and lead to the government being overthrown, as happened in Ethiopia on several occasions shortly after major drought/famine events (Gignoux 1995). On the other hand, where the political system is sufficiently powerful, even a major famine - even if induced primarily through policy failure such as China's Great Leap Forward in the 1950's - the system may survive but the policy or even the ideology behind that policy may come into question. Cannon (1994) calls such drought-related but policy-induced food insecurity events 'policy famines'. Such droughts - operating through a particular mode by which society chooses to organize itself - can also be thought of as 'revelatory droughts' (Solway, 1994); in other words, reveal structural or other inadequacies by way of the vulnerabilities they create or exacerbate.

Whether or not it is effective or wise - indeed knowingly or not - many societies in Africa and elsewhere have made a strategic 'choice' to insure themselves against drought impacts by importing water in exchange for commodities or political favors, rather than to encouraging *in situ* food production. Yet rarely would a strategic debate such as which development pathway should be pursued to ensure national food security occur within, for example, the Ministry of Agriculture or Ministry of Water, even though many may assume that these very Ministries have responsibility for national food security. This highlights the fact that national trade policies and international trade regimes cannot be de-linked from the questions of drought, food security and water management. Indeed, countries which attempt autarkic development, cutting themselves off from the international system, also rob themselves of food security options. The difference in drought impact between the two Koreas in recent years (see Figures 8) is testimony of this, though of course there may also be other factors.

Ironically, the source area for much of the global food security insurance system is itself a water-challenged, semi-arid area, the Great Plains of North America and to a lesser degree Australia (Figure 7). This indicates (reinforcing the point made in the discussion of social adaptive capacity) that - within reason - a society need not be hostage to its natural resource endowment, including water. Indeed, Non environmental factors may very well be more significant in turning a society's various capabilities into food security than the degree of water scarcity. Ironically, this often results in water-scarce countries such as Israel or South Africa exporting water-intense but high value-added products such as tomatoes or melons. At the same time, however they may import high bulk but low value staples which are essentially subsidized by the exporter. This is a logical strategy, facilitating food security whilst moving up the value added chain.

To take this logic a step further, if one were to calculate the amount of water used on an agricultural field and then rezoned that area as a high-tech industrial park and the same amount of water were used for its plumbing, one would find an exponential increase in the value efficiency of that water, which could also be thought of as the jobs-per-drop (Alan 2001). Of course the missing ingredients in such a scenario are capital and specialized technical knowledge and the other elements of development, all of which takes us back to the fact that water and food policies and security must be seen as integral to national development strategic objectives.

Figure 8
Countries facing food emergencies in 2003

