

Caux Dialogue on Land and Security

addressing the human connections between poverty, conflict and
environmental degradation

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Tony Allan

Prof. TONY ALLAN. Emeritus Professor, Department of Geography, King's College, London. Awarded the 2008 Stockholm Water Prize for his work on the links between water, food and international trade. He developed the concept of “virtual water” to explain how a countries water security and food security are linked. Books include *The Middle East water question: hydro-politics and the global economy* (2001), *Virtual Water: Tackling the Threat to Our Planet's Most Precious Resource* (2011).

(Prof Allan's text should ideally be read alongside his power point illustrations, below.)

Who manages water? Farmers manage water is my answer.

Will there be enough water? More people, 7 billion now, 9 billion by 2050? More food production will be needed. By 2050 optimists say 40%, others say 100%; I am a 40% person but I am not going to stay long enough to know. More water for food via sustainable intensification is certainly what we need.

The theme of this morning's session is water, and why it is a potential constraint unless we help farmers to manage it sustainably. The pessimists are wrong, but useful; the optimists are right, but dangerous because people relax when feeling optimistic.

The foundation idea of the meeting is relationships, and the composition of relationships. When I looked at my presentation I found that it fits perfectly five

stage relational process identified yesterday by Michael. The first is about communication, the next about a story, the next about knowledge and complexity, and the next about power and parity and purpose.

To give a bit of background now in types of water and energy and the role of supply chains. A major theme of what I am going to talk about is supply chains. Food supply chains will be a focus, but at this point in history you can never go to a meeting without energy supply chains being talked about at the same time.

One of the things we don't seem to get right in our conceptualisation of the world we live in is that in the food supply chains there is *non-renewable water*, that's water that's been around for thousands of years under the Sahara for example, or under the Saudi Arabian desert, but there is only two types of renewable water.

But for energy we have at least 6 non-renewables, with coal, oil and gas being the main ones. Nuclear I have put in as non-renewable but it could be regarded as renewable. If you look at the renewable water, we have green and blue. Green is the water in the soil profile which stays there after rainfall, Blue water is the water you can move and pump around and use for different things. We also have manufactured – that is desalinated water, and recycled water, but they are very small volumes. They are, however, very significant in a few areas; but in volume terms are very tiny.

So we basically have two types of renewable water. But on the energy supply side we have at least 6 sources of renewable energy – everything from wood, through to wind and tide and animal power. If you are an economist this is very important as economists get very excited about substitutability. There is very limited substitution on the water side.

An important issue I need to emphasise is that we need to understand the private sector and the role it plays in using and consuming water in providing us with food. I am an unusual scientist/academic. In the past 10 years I have realised that the knowledge in the private sector exceeds knowledge in the academy, particularly in the working of supply chains. We need to understand the role of the demand for cheap food, and whether society can manage sustainably water resources on which food production depends. I am going to emphasise the fact that farmers manage water, and we food consumers determine demand. If we can get those two groups to operate sensibly we can get a lot of things in place which are sustainable. We also need to distinguish blue water and green water, and food water from non-food water.

In this part of the talk I shall show of how we have changed our assumptions about water and how best to manage it. This diagram shows the period from the mid-19th century to 2000. It is the story of blue water in irrigation. Hydraulic engineers solved the increasing demand for food because of increasing population by mobilising more water to grow more food. It started back in the early 19th century and before that at least in what we call the North or the industrialised economies. This is a neo-liberal world diagram. You can see we have come out of the Enlightenment with capitalism and with the belief that Nature could be controlled rather than lived with and this is unfortunately still the collective mindset of the majority.

The era before about 1980 was a period of certainty. The engineers helped the politicians responsible for making sure we had enough food to solve the problem. Engineers put in infrastructures which allowed us to be food secure. There was an absolute certainty that this was the right thing to do. It took the Green Movement to establish itself in the 1960s and say that the sense of certainty was unsafe. Jimmy Carter was in power for the 4 years before 1980 and he was persuaded by the Green Movement. He wanted to stop mis-allocating water, to stop building dams and to put water back into the environment. But he found that the politics in Washington were very tough and he his water policy failed. It has to be said that he also had a bad time with Iranian hostages. He lost power because he wanted to do the right thing. But, as often happens in Washington, the right thing was opposed.

By the time Jimmy Carter lost power in 1980, the water resource discourse had moved on, and the idea that we were living in a period of uncertainty, a post-hydraulic mission period and in a period of reflexive thinking had gained acceptance. I have lived through the 80s, the 90s and the 2000s. In the 80s I can remember that the dominant idea was that we should care about the environment. In the 90s we managed to get the idea that water should be valued. This decade was a period of water pricing, water values, water markets and so on. These ideas did not get into the food production and consumption discourse but it did have some impact on the water supply side. The period after 2000 has been a period encouraging *cooperation* and of *public and private partnerships*. We are still in this period now. Another important thing to point out on the diagram is that although the OECD countries, there are roughly 35 of them, are putting water back in the environment, the developing countries are still tending to want to develop and consume more water. So if you are an international finance institution with funding coming from these OECD economies, you are in conflict with what is happening on

the ground in the poor economy. There have been conflictual discourses going on in the corridors of International Financial Institutions for the past 30 years.

In relating our focus on water to this background political economy we need to distinguish between green and blue water. You have come into the room, apart from one or two farmers, with the idea that all we need to think about is blue water because that is the water you can drink and pump and move around, and even see. Blue water is the only water that has been talked about by engineers and economists. Green water is the water in the soil profile that stays there long enough after the rainfall for a crop to be grown. Obviously it requires different farming skills from those of an irrigator. Green water is, however, the majority water, as is shown on the diagram. Also shown is the proportion of embedded water, which is the water embedded in the production of a tonne of wheat or a tonne of beef. In a tonne of beef it is 16 x as much as that needed to produce a tonne of wheat. A tonne of wheat requires 1000 cubic metres. So you can see the difference it makes if you consume as a vegetarian compared with the impact of the consumption of a non-vegetarian. I wanted to call this water embedded water, but to communicate the idea effectively this embedded water has to be called *virtual water*.

Blue water and green water are identified and quantified in this next diagram for Kenya. The rainfall is 100%, but it can be seen that green water is the destination of the majority of water which keeps the savannahs in place. There is a little irrigation water for a tiny irrigated area. But you can see how important green water is in supporting natural vegetation and farming in Kenya.

So how do we allocate, use, consume and deplete water and energy? We must remember that the water-energy nexus in supply chains is important as well as in the water and food nexus which we have discussed so far.

In the food and fibre supply chain about 90% of the water is green – soil profile – water. A very large proportion of water consumption is in our food supply chains. Comparatively little in energy supply chains. So farmers manage most of the 90%.

Less than 10% of our water consumption is in non-food supply chains. That is in domestic and industrial uses, in the water used in the shower and drunk the glass for example as well as in our industries. Please remember these 90% and 10% proportions of water related to food and non-food consumption. And please go away remembering that what you do in the shower is trivial compared with what you do at lunchtime.

Half a billion or more farmers world-wide are the people who manage the vast majority of our water consumption. We need to care about them and give them a chance to do what they would like to do, which is what they need to do, namely to manage the environment, including water ecosystems on which we all depend.

The numbers for the energy side are also striking in that the asymmetry is quite the reverse with 80% of energy consumption in industry, transport and domestic use. Domestic users alone account for about the same amount of energy as all the energy used on farms.

So will there be enough water? The global system has done has provided the water we have needed apparently quite well. It is helpful to know that one litre of water produces about one calorie of food. The diagram shows the trend in food consumption in various geographies between 1961 and 2006/7. The situation in the developed/OECD countries is good with calories available being above the level needed for good health. The world situation has been steadily improving mainly because Asian farmers have been increasing production. But in Africa, although its production has been going up, it has not been performing at its potential during this period. The other thing that has happened is that yields have increased. This diagram shows how maize/corn yields have been increasing since the 1950s. They have also been increasing in China and in Latin America. But not in Sub-Saharan Africa at the bottom. Intuitively there is a potential for increases in Sub-Saharan Africa. As a result of having participated in this Caux-Dialogue I shall leave this meeting with a new optimistic perspective on agriculture and farming because of the ideas that have been shared here.

This next slide shows a global map showing that the Americas – North and South – are the places from which a lot of virtual water is being ‘exported’. In other words, Canada, the US and Brazil and Argentina are apparently happy to export their environments in order to make sure that people in Europe and other regions are kept safe with secure food supplies. There are lots of economies, especially in the EU with 28 economies and the Middle East area with 21 economies – that is nearly 50 countries out of the about 210 in the world – which have been kept fed by the very small number of economies which enjoy significant water resources surpluses.

It is in practice normal to be a net food importer. The countries of northern Europe – apart from France – slipped into this position in the mid 19th century. The UK especially has been keeping itself food secure by importing food from the Americas, Australia and New Zealand for over 150 years. It is normal. It is now so normal that

about 150 or 160 the world's economies – out of the 210 or so – are net food importers. The people in these countries do not know it. In the UK, where I live, people certainly don't realise how much they owe their water and food security to the rest of the world and for how long.

These next diagrams are key. You provide a different perspective on essential issues. What we can see here is that there is another group of economies which have been exporting their environments to other countries, which are needful of these food exports. You can see that North America – the US and Canada, have done heroic things in providing food for the world. But the exports from them are starting to level off, and perhaps in the next 20 years they will begin to go down. Note these data are by volume and not by value.

You can also see that South America has seen a dramatic increase in food exports in the past half century – which is a trend we hope can continue. At the same time we hope that farmers will farm in a sustainable way in terms of soil and water resources. We can see that Australia has been doing great things considering it does not have a lot of water, but it does have relatively few people so it has also been exporting its environment. Eastern Europe is the other big story, and the former Soviet Union, where there has been major increases in farm productivity in the past two decades. The right hand side of the diagram shows the net food importers where Central America is evidently in trouble with respect to food and water security. Also Europe with the UK amongst them, which I didn't realise until I saw this diagram, published in the Economist in 2013. These economies reduced their net food imports between 1950 and 1990 but since then food imports have been increasing. Did anyone notice?

Asia you can see is a big issue. Unfortunately this diagram lumps the Middle East and Africa together. We need these to be separate because whereas the Middle East is always going to be importing more and more because its population will double, Africa could in fact be supplying the Middle East with food as well as possibly the rest of the world by the second half of the century. The African population will also more than double from about a billion now to over 2 billion. Africans would like to feed themselves. The rest of us hope they can feed themselves, and we would also like them to have the capacity to feed another billion people outside of Africa. This is one possible African scenario.

I would also like to say loudly – bless Asia. But especially bless China. If I was to answer the question – What has been the greatest water demand management

measure in all of history? – it would be the **one child family policy in China**. That policy decreased what would have been the population of China by 25%. About 350 million people not there. That is a population equivalent to that of the Middle East, or of the US, or of Old Europe. These are significant numbers of people not there, not needing food. A breath-taking thought.

So there are some good stories and some bad stories.

There is another theme that I would like to help you grasp. At this meeting we are attempting to highlight the vulnerability of the essential ecosystems that are stewarded or not by farmers. Farmers produce food and can steward ecosystems. But they operate in a market system that does not reward them for the services they provide. There is meanwhile a political imperative to make cheap food available for poor consumers. The provision of this cheap food is not seen as a contradiction by consumers and by most politicians. But we cannot have cheap food if it means that farmers cannot have livelihoods that enable them to steward Nature's water, atmosphere and biodiversity ecosystems.

We either need to change the price of food, which is politically impossible because no one will elect a politician campaigning for more expensive food. Or we need to focus payments on farmers to enable them to provide these environmental services. Let's see where we have been in the period from 1960 to 2010.

The next diagrams show the downward trend in food prices which reflects the forces that have been driving food prices down – possibly for a thousand years, certainly for the last 60 years. These driving forces are still there. I argue that they could bring about similar conditions that existed in the 1980 to 2003 period back again. I am in a minority supporting such an argument in the middle of this period of global commodity prices volatility.

Those of us who recall the commodity prices spikes of 1974 and 1979 lived through a similar period of volatility, which was succeeded by a price collapse and three decades of falling prices. The current high prices and price volatility has been interpreted by some second rate economists as determining of long term prices. They publish diagrams like this is one starting in 2000 saying they predict the future. We are in practice some way into the other side of a price spike and coming down. If the forces which were there before the occurrence of the price spike are still in play, which I would argue they are, it is quite likely that the food prices will continue fall in the rest of this decade and beyond. Since September 2014 this has been happening.

I have shown that we are living a contradiction. We are addicted to cheap food. But we do not realise that asking farmers to produce under-priced food means they cannot provide the ecosystem services which we also need them to provide. If low food prices make it impossible for farmers to attend to the environment, then we as consumers must reflect. We must give the politicians space to do something about it. We must help change the debate and put messages out there so that politicians can stand up and say what we need to do is price food properly. There is no time soon that they are going to be saying this. But we need to understand that, whether we are part of a democratic system or not, the message needs to be in play so that food prices can help bring about sustainable food provision.

The next theme is that there is a very helpful concept that there are four ways of life – in which we exist – at least in a neo liberal world. Mary Douglas came up with this idea in the 1980s. I introduce in talks such as this because it helps us understand and communicate about how society and political economies operate. The diagram shows us at breakfast time – top left – in civil society mode. Top right is the state, bottom left is the market and bottom right are civil movements in other words NGOs, unions and religions. 45% of us go each day – from civil society – and work for the state. That is in the .GOV quadrant. And 45% go and work in markets. That is the .COM quadrant. In the US I have heard of research that confirms that about 10% work in .ORG activities. The reason that I draw your attention to this is that the .ORG, .COM, and .GOV terminology maps perfectly on to the four ways of life framework. This four ways idea has been around a long time, but modern IT and email systems since 1990 can be seen to be totally aligned with the idea.

We can also map the recent timely and powerful contributions of the Pope to the discourse on society's responsibility for the stewardship of Nature's ecosystems. His 2015 New Year message and the just published Encyclical, take a very principled position on the need to protect ecosystems. He has certainly taken a more principled position than those adopted in Washington, Brussels or Beijing. He can do this because he does not need to say anything about cheap food, the provision of which contradicts the adoption of the high environmental principles. Temporal politicians are locked into the 'contradiction' and cannot say that expensive food or even properly priced food is good because they would lose power. We need to understand these politics.

The point I am trying to make is that the food supply chain is all located on the left hand side of this next diagram, in the *private sector*. Public policies do have an impact in most economies. But it is the private sector that everywhere produces and

in most places markets food in subsistence systems all the way through to the markets that serve urban food consumers.

This is the big question I would like you to take away. Who will save the world in these food supply chains where nearly 90% of the water that keeps us alive is managed and mismanaged by farmers? I argue that there are a number of key players. This list certainly includes *farmers*. It also includes *investors* and especially responsible investors, the big **corporates** and how they operate, the **professionals** who make and operate **reporting and accounting rules** but mainly ourselves, the food **consumers**. How we do our food choosing and whether we waste food account for over 30% of the water in our food supply chains.

The next slides list first the 20 or so main players who operate food supply chains. The second distinguishes the relative power of the players. The third, is an attempt to show a scenario that would enable those operating food supply chains to steward water, atmosphere and biodiversity ecosystems.

First diagram – who has power in current supply chains? Farmers clearly don't have power. A lot of power lies with the corporates and the State is very important. In research over the past 5 years, I have noted the things that some governments have judged they have had put in place – with good intent, such as food stamps in the United States which do the opposite of helping farmers to steward ecosystems. Governments are not good at nurturing public discourse that encourages consumer awareness of environmental priorities. The contradiction again. A better direction will not be easy to bring about but we do need to establish a public discourse to ensure that all players from producers to consumers can play their part. The third slide shows a version of the supply chain suggesting how power should be allocated to bring about sustainable food supply chains. A very important element of this scenario related to consumer behaviour. We consumers must not waste food that is associated with so much embedded water and ecosystem costs and we must choose to eat food that is sound nutritionally and environmentally.

Finally, we need to play our part in changing the public discourse to make sure that consumers stop doing ill-informed and dangerous things. And we must give politicians space to do the right things instead of the politically feasible remedies that lock them into doing the opposite. Thank you.

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