Bulletin

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Measure for measure

DO ESTIMATES OF VIRTUAL WATER AND FOOD MILES REALLY HELP CONSUMERS TO MAKE ENVIRONMENTALLY FRIENDLY CHOICES?

The catchcry "think globally, act locally" has encouraged individuals to actively respond to global challenges through their personal choices. The ideas of virtual water and food miles are currently popular as means to guide consumers to make environmentally-aware choices. But are they actually effective measures of environmental friendliness? Do they promote the public good in the form of better environmental outcomes? This bulletin considers these questions.

The catchcry "think globally, act locally" has encouraged individuals to actively respond to global challenges through their personal consumption choices. The belief being that if enough people follow a strategy of making environmentally friendly choices, then individuals can actually make a difference because the effect of their choices will influence patterns of investment towards goods and services that have less of an adverse impact on the environment.

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The effectiveness of this strategy depends, in part at least, on how well individuals make these environmentally friendly choices.

A number of organisations, and some governments, have promoted decision criteria to help guide consumers towards "sustainable" consumption choices. These criteria have proved extremely popular, and have been used to argue in favour (or against) certain production or consumption options. Chief among these concepts are:

- **virtual water** calculations - which focus on the water notionally embodied in our food.
- **food miles** - which draws attention to the energy cost of delivering food to our doorstep.

Although the basis of each of these measures differs, both are predicated on identifying and quantifying the environmental harm associated with our consumption choices.

The question is: *do these measures actually provide a useful guide towards meeting our environmental objectives?*

VIRTUAL WATER

Australia's water use has been under intense scrutiny following the recent prolonged drought. The ongoing debate about the importance of environmental water flows has further highlighted the competing demands on this resource. There are a range of national and state level programs aimed at improving water management and influencing the allocation of water to competing uses. In addition, some consumers and advocacy groups have identified the concept of virtual water to highlight examples of "water waste", particularly in certain forms of agricultural production.

Virtual water measures estimate the total amount of water used in producing a specified good or service (including water from surface and groundwater resources and from rainfall). Some virtual water calculations also attempt to estimate the water content of inputs used in production.

The idea is that, guided by virtual water estimates, consumers may assist in alleviating water scarcity by selecting products with low virtual water content. For example, it is claimed that producing 1 kilogram of beef requires 15,000 litres of water. In contrast, producing one kilogram of wheat requires about 1000 litres of water.

So does this stark comparison suggest consumers should be leaning towards a vegetarian diet if they are concerned about water scarcity?

THE REALITY...

Unfortunately the fact is that the virtual water concept tells us very little about how a consumer's choice will impact on water scarcity. This is because of four major shortcomings.

First, what matters from an environmental impact and resource management point of view is the actual opportunity cost of the water that is used for a particular end. Using the example referred to above, the implicit assumption is that if water had not been allocated to beef, then it could have been allocated to cereals or to sustaining environmental assets. But this assumption is unlikely to be true for many agricultural systems. Much of the water used for beef production comes from rainfall, which supports pasture growth. The timing and quantity of rain may suit livestock production, but not grain production. Similarly this saved water may not be capable of meeting an environmental objective, such as an enhanced river or stream flow.

A second issue is that choices made at the point of end-use *consumption* on the basis of virtual water do not compare favourably with approaches that mediate between competing uses of water at the point of *production*. In Australia, for example, a robust system of water allocation based on property rights and water trading has been developed to reconcile competing water uses, including environmental flows. The water that is not used to grow the crop in question is unlikely to be 'unused' and left to flow down the river; instead it would be extracted for an alternative use, perhaps at a different time or location. The reality is that if water is not applied to the high virtual water product (chosen by profit-maximising irrigators) then it will end up being applied to another production choice that is considered less valuable socially, even after water scarcity has been factored in. This is a waste of resources.

Third, it is possible that choices made on the basis of virtual water estimates could actually lead to increased environmental harm. For example, rice production in countries that use monsoonal rains assists in managing and moderating water flow, in addition to the benefits for rice production. If rice production was reduced on the basis of high virtual water calculations, the risk of flooding and erosion in such areas may increase.

Finally, it is important to take into account the fact that water is one input into the production of goods and services. Even if there is substitution from more water intensive products to less water intensive products, there is no guarantee that environmental outcomes will be superior. This is because the environmental impact of inputs that are used more intensively as a result of the substitution away from water will not be captured through the virtual water metric, and not communicated to the consumer.

The lack of direct connection to environmental outcomes means these measures can be quite misleading and cannot reliably be used to argue that certain production choices should be reduced in favour of others.

MILES TO GO

Food miles – the measure of the distance products are transported from the point of production to the point of consumption – have sprung from a myriad of social and environmental concerns. Principle among these is the desire to lower the implied energy content, and greenhouse gas emissions associated with this, by purchasing foods grown locally.

However, there are limitations to using food miles as a gauge of environmental impact. This is because these measures focus only on the energy used in transport, and ignore the possibility that producers in other regions may have more energy efficient practises involved in the production of the particular commodity.

In fact, the food miles concept appears at odds with a wider consideration of resource costs. Several recent studies have shown that local production can be more energy-intensive than production of the same good further away, even factoring in the energy use involved in transportation. This should come as no surprise when we learn that the transport task is a minor cost component of total production, measured in either dollar or energy terms. As a result it is not possible to draw reliable conclusions from food miles about the total energy used in producing and supplying a product to the consumer's plate.

In addition, we learn nothing from food miles about the agronomic practices used in production. For example, how the landscape was managed, whether biodiversity was threatened, how much fertiliser or pesticide was required, whether soil was eroded, whether water quality was threatened or whether salinity was increased.

While food miles can help consumers make buying decisions that support their local producers, if the aim is to improve the sustainability of their decisions their palate and wallet may be a better guide.

SOME BY VIRTUE FALL

There is a clear and laudable desire on the part of many individuals and communities to preserve the environment, or at least to minimise environmental harm. The best way of doing this remains to address at source the market failures that create environmental damages through policy measures.

Metrics such as virtual water and food miles that are intended to guide "virtuous" consumption decisions are unlikely to be useful, even as rough rules of thumb. This is because of their incomplete nature, and their uncertain relationship to direct environmental harms. Indeed, they have the potential to aggravate such harms. Moreover, the fact that these concepts have received the greatest amount of attention in circles that have historically been hostile to international trade should raise questions as to whether proposals based on these metrics genuinely seek to promote the public interest, or whether in fact they are not frequently used to provide a green gloss on old-fashioned protectionism.

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