



SEARCH



Much scientific effort is devoted to decompressing identified objects or phenomena into component pieces.

This has given rise to technologies that act on quite small parts of a whole to produce significant changes within it. GM technology, revered or hated, provides a growing contemporary example.

Such insights are immensely important but they only become effective within systems of which they are a part. There are multiple systems but two of them form the basis for the paper by Zhao, ecological and economic.

Ecological systems plot interdependence among existing physical activities, some being obvious – like the necessity of sunlight and available water for plant growth. Others may be hidden, the impact of pest control methods in changing soil structures or the impact of invasive species on the ability of livestock to cope with disease threats.

The greater the degree of our understanding the more fragile do existing systems seem. We now recognise that a major system change in climate threatens the capacity of the world to meet the food requirements of its people.

Ecological footprint is an important concept used in Zhao's paper. It embodies the recognition that human activity changes the resources accessible to later generations. In so far as these are made up of finite assets, the sign is always negative.

However human activity also generates new levels of understanding that change the potential of any given set of natural resources. By enabling new resources or new uses of existing resources humanity has been able to sustain a higher level of real income over time.

This ecological systems approach needs to be seen alongside approaches that explore economic systems. These attempt to understand the forces that control human choices. These systems recognise that choices in one area made by one group of people, or person, that will condition the choices available to others within the system.

We see, for example, how the diets of people who use a large amount of cereals in feeding animals condition the world price of grains and the amount that poorer people can afford to buy.

There exists dissonance between the two systems. The economic system may make short run choices about the use of resources that are incapable of being maintained in the long term because they are ecologically unsustainable.

Such concerns are not new but three factors have given a sharp edge to this debate in the 21st Century, population growth, the expectation of rising real income and the impact of climate change.

Nowhere is this mismatch between ecological reality and economic pressure more obvious than in China. Zhao Guishen's paper attempts to summarise and compare the extent to which different nations economic activity impacts on these finite resources using the concept 'Ecological Footprint'.

The outcome is summarised in a single figure expressed as 'gha' per person. This can then be used to express the capacity of a nation to fund its own consumption from the natural resources within its area, known as bio-capacity per person. This process is intuitively attractive.

It yields the expected result that rich countries make a much larger per capita demand on resources. This appears to put the emphasis on rich countries to restrain consumption within the boundaries of ecological sustainability.

There is much more that we need to know before we can base policy on this outcome. For example, how is 'gha' calculated. It focuses on food systems but there are many other systems that interact, energy, defence, health, the rate of technological innovation.

Zhao's paper about ecology and farming that does not fall into the trap of suggesting that all that is wrong with the planet is the human species – if they were not present we could revert to a natural state that would be self-sustaining. Realistically it accepts the priority of feeding people, in greater numbers and more healthily.

The suggestions it makes are practical and directed to the better use of technology, structural change to facilitate low impact farming, ecological restoration products and greater imports to ensure supplies of products such as grain.

The paper is a valuable starting point. Food is essential and an understandable priority in China but the issues are global, the interaction between economic and ecological systems poorly understood and the ways in which policies labelled 'sustainability' can contain more than pious wishes explored.

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 [Professor Sir John Marsh](#)

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Comments

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