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From The Times

June 23, 2008

# Scientists warn of lack of vital phosphorus as biofuels raise demand

Leo Lewis, Asia Business Correspondent

Battered by soaring fertiliser prices and rioting rice farmers, the global food industry may also have to deal with a potentially catastrophic future shortage of phosphorus, scientists say.

Researchers in Australia, Europe and the United States have given warning that the element, which is essential to all living things, is at the heart of modern farming and has no synthetic alternative, is being mined, used and wasted as never before.

Massive inefficiencies in the "farm-to-fork" processing of food and the soaring appetite for meat and dairy produce across Asia is stoking demand for phosphorus faster and further than anyone had predicted. "Peak phosphorus", say scientists, could hit the world in just 30 years. Crop-based biofuels, whose production methods and usage suck phosphorus out of the agricultural system in unprecedented volumes, have, researchers in Brazil say, made the problem many times worse. Already, India is running low on matches as factories run short of phosphorus; the Brazilian Government has spoken of a need to nationalise privately held mines that supply the fertiliser industry and Swedish scientists are busily redesigning toilets to separate and collect urine in an attempt to conserve the precious element.

Dana Cordell, a senior researcher at the Institute for Sustainable Futures at the University of Technology in Sydney, said: "Quite simply, without phosphorus we cannot produce food. At current rates, reserves will be depleted in the next 50 to 100 years."

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She added: "Phosphorus is as critical for all modern economies as water. If global water supply were as concentrated as global phosphorus supply, there would be much, much deeper concern. It is amazing that more attention is not being paid to ensuring phosphorus security."

In the past 14 months, the price of the raw material - phosphate rock - has surged by more than 700 per cent to more than \$367 (£185) per tonne. As well as putting pressure on food prices, some researchers believe that the risk of a future phosphorus shortage blows a hole in the concept of biofuels as a "renewable" source of energy. Ethanol is not truly renewable if the essential fundamental element is, in reality, growing more scarce, researchers say. Within a few decades, according to forecasts used by scientists at Linköping University in Sweden, a "peak phosphorus" crunch could represent a serious threat to agriculture as global reserves of high-quality phosphate rock go into terminal decline.

Because supplies of phosphates suitable for mining are so limited, a new geopolitical map may be drawn around the remaining reserves - a dynamic that would give a sudden boost to the global importance of Morocco, which holds 32 per cent of the world's proven reserves. Beyond Morocco, the world's chief phosphorus reserves for export are concentrated in Western Sahara, South Africa, Jordan, Syria and Russia.

Natural distribution of phosphorus could create a small number of new "resource superpowers" with a pricing control over fertilisers that some suspect could end up rivalling Opec's control over crude oil. The economic battle to secure phosphorus supply may already have begun. China, according to US Geological Survey estimates, has 13 billion tonnes of phosphate rock reserves and has started to guard them more carefully. Beijing has just imposed a 135 per cent tariff on phosphate rock exports to try to secure enough for its own farmers, alarming the fertiliser industry, as well as Western Europe and India, which are both entirely reliant on phosphorus imports. With America's own phosphorus production down 20 per cent over the past three years, it has begun to ship phosphorus in from Morocco.

American projections suggest that global phosphorus demand could grow at 2.3 per cent annually just to feed the growing world population, an estimate that was made before the growth of biofuels.

Few observers hold out hope of a discovery of phosphorus large enough to meet the continued growth in demand. The ore itself takes

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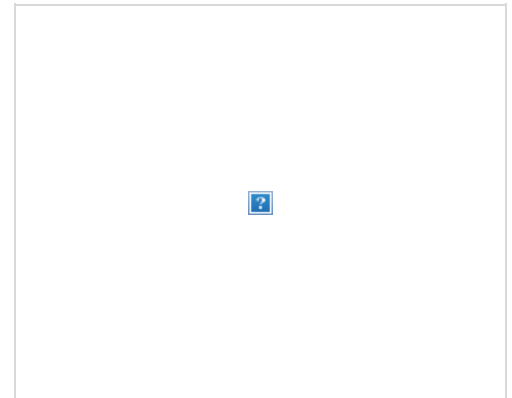
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millions of years to form, and the prospect of extracting phosphorus from the sea bed presents massive technological and financial challenges.

The answer, say crop scientists, lies in better husbandry of phosphorus reserves: an effort that may require the creation of an international body to monitor the use and recycling of phosphorus.

HAVE YOUR SAY

this article uncovering real truth, which is going to be a possible treat soon as later. bio-fuels-food security combined with climate change; we may face unpredictable problems. As prevent is better than cure, we need to react for the possible treat as a common global community with common policies.

Ravi Kumar Angirekula, Nottingham, United Kingdom

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