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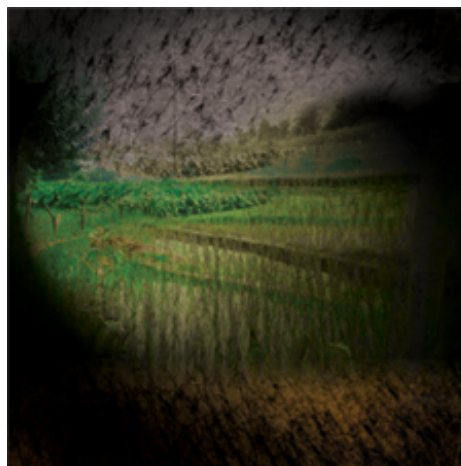

## Science &amp; Technology




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## Rise in biofuel demand could trigger food, water crisis

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the growing demand for biofuels could lead to a shortage of food. Studies show biofuel plantations will eat up cropland, and trigger food and water crisis in many parts of the globe, especially in India and China.

There is also evidence to show biofuels will not help in carbon emission reduction, instead it will cause detrimental environmental impacts. The impacts of the growing biofuel demand will be apparent on a local level.

**Carbon offsetting**

Many experts argue carbon emissions can be significantly reduced if biofuels replace fossil fuel in automobiles. Others argue greenhouse

gases released during the production of biofuel crops can undermine the putative gains.

They say that instead of promoting biofuel, conserving and growing forests will be more effective in slowing down climate change and its effects.

A paper in the August 17, 2007, issue of *Science* estimates carbon emissions offset by biofuel are lower than those achieved through afforestation. Renton Righelato and Dominick V Spracklen, researchers from the World Land Trust and University of Leeds, the UK, say biofuel plantations will end up emitting more carbon than they will help save (see figure: *No gain*).

To find out if biofuels will significantly help cut carbon emissions, the researchers calculated how much total emissions biofuels could save, comparing it to the carbon emissions which alternative land-use strategies like afforestation could save. This estimation was done for the coming three decades, a time likely to be taken to introduce carbon-free technologies to the world. It has been found that the carbon a natural forest can capture is about nine times more than what biofuels can save during this period.

For example, conversion of sugarcane to ethanol saves only about 1.78-1.98 mg (1 mg=1 tonne) carbon per hectare (ha) per year. Similarly, converting rapeseed to diesel will avoid only a range of emissions—0.34-0.51 mg carbon per ha per year. This is very low compared to the average emissions of 199 mg of carbon per ha given out when a tropical forest is converted into cropland. On the other hand, when abandoned tropical cropland gets naturally converted to a forest about 4-8 mg carbon per ha is sequestered.

The scientists say even if only 10 per cent of the fossil fuels in the US and Europe is replaced by biofuel, the demand will eat up about 43 and 38 per cent of cultivated area in the regions.



### Food and water crisis

The impacts of a shift to biofuels would be more pronounced in the developing countries. A paper 'Biofuels: Implications for agricultural water use by researchers from the International Water Management Institute (iwmi) in Sri Lanka, under the Consultative Group on International Agricultural Research, predicts China will face shortage of land while India is likely to have severe water crisis. The study was released on October 11, 2007.

The researchers, Charlotte de Fraiture, Mark Giordano and Liao Yongsong, say globally biofuels use up one per cent of the available irrigation water and cover up 0.8 per cent of the cropped land at present. India and China will account for almost 70 per cent of the projected global growth in fuel requirement, between now and 2030. If the governments continue to promote biofuels with the current tempo, it is likely to replace 7.5 per cent of fuels. This will also require 30 million ha more of cropland and 180 km<sup>3</sup> of irrigation water.

"Even without increased biofuel production, water scarcity in these countries will be worse, as rising incomes and growing populations boost food demand," says de Fraiture. She adds that crop production for biofuels in China and India will threaten sustainable water use and affect irrigated production of food crops, including cereals and vegetables, which would then need to be imported in larger quantities to meet the demand.

China is already facing severe shortage of land and water. Considering the current demand for biofuel, the country will have to import 20 million tonnes maize, the chief biofuel crop, to meet domestic demand.

The paper by iwmi researchers says irrigation water in India will be impacted and additional 30 km<sup>3</sup> of water will be required to produce the 100 million tonne of sugarcane to meet the demand. This will affect food crops, necessitating their import. Over 40 million ha was set apart to grow the oilseed plant jatropha in the country in 2005.



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