
Accelerating biodiversity loss and the energy, food, land nexus

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Abstract

Expansion of agricultural land is the main driver of global biodiversity loss. Humanity's per capita footprint on the planet has decreased since the green revolution as agricultural intensity increased, but as we are reaching global oil production limits this trend could be reversing, accelerating the threat to biodiversity. We have experienced three global phenomena since 2007 which have been linked to limits to the global oil supply: the global financial crisis, the global land grab and a series of global food crises. These have all also been associated with growing demand for land. Together these factors indicate that this is a critical time to investigate any potential repercussions for biodiversity of agricultural expansion. Modelling has predicted that resource constraints, especially restrictions to the oil supply, would result in economic downturn. This is because an increasing proportion of global capital is required to extract ever more expensive oil. This transition was predicted to occur in the second decade of the 21st century. In 2005 global oil production levelled off after decades of growth and in a context of ever increasing demand. This caused rapid increases in the price of fuel, and is thought to have been the root cause of the global financial crisis (GFC). Food and oil prices are often coupled because fuel constitutes about 50% of the cost of producing food. This led to the escalating price of food during the period 2007-8, which became known as 'The Global Food Crisis'. The insecurity in the supply of food and fuel associated with these crises led countries which are reliant on imports to seek their security by acquiring agricultural land for their production, frequently for 'flex-crops' which can be used to produce either. Additionally, the insecurity of traditional investments during the GFC and rising commodity prices caused capital flight to agricultural land. It is these processes which have become known as 'the global land grab'. Fuel and fertiliser prices are also coupled due to the fuel-intensity of production. As fertiliser becomes increasingly unaffordable to marginal farmers, land is substituted for fertilisers to produce sufficient food. The move to energy alternatives, such as wind and solar power and coal seam gas, require orders of magnitude more land than conventional oil. All of these pressures on the supply of land increase the threat to biodiversity due to land conversion. This study investigates how much additional land conversion has occurred, where there is increased threat to biodiversity since the levelling off of oil production in 2005, and whether international land acquisitions are a contributing factor.

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