

Feeding the world without further deforestation is possible

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Deforestation is necessary to feed the growing global population – this is a common belief that has now been disproved by researchers of the Institute of Social *Ecology*, Vienna. In a study published in *Nature Communications* they present results that reveal that it is possible to produce sufficient food for the world in 2050 and at the same time maintain the current forests of the world.

"The preservation of the world's remaining forest areas represents a central goal of climate and biodiversity protection", explains Karlheinz Erb (Institute of Social *Ecology*), one of the study's authors, "but deforestation is frequently justified by the need for more agricultural land." Erb and his colleagues have conducted comprehensive calculations in order to assess the options for feeding the global population in the year 2050 in a hypothetical world of zero-deforestation. Taking a variety of key factors into consideration - including agricultural technology (e.g. yields, land-use intensity), various livestock systems, the extent of land as cropland or as grazing land, as well as human diets (vegan, vegetarian, modest consumption of meat, etc.) - the researchers discovered that around 60 per cent of the 500 calculated scenarios would be feasible options.

Karlheinz Erb summarizes the results: "According to our analysis, human nutritional behaviour is the most important component. If the world's population followed a vegan diet, all combinations of parameters, even those with lowest yield levels and low cropland expansion, would be feasible. With a vegetarian diet, 94 per cent of all of our calculated

scenarios would be feasible." While a full change towards such diets of the entire world population is of course not realistic, it illustrates the massive impacts diets have on the future options space for development.

The results clearly indicate that the preservation of forests becomes more difficult, the more animal products are consumed. In the case of a diet that involves a high percentage of meat, only 15 per cent of the 500 original options would permit the preservation of the forest areas. And these scenarios are based on intensive levels of agricultural management as well as massive expansion of cropland into areas now used for grazing. However, livestock farming and the use of land as grazing land can also produce positive effects: For instance, livestock allows to use areas that cannot be used as arable land, and can so contribute to food availability – this effect, however, is lost if animals are predominantly fed with cropland products such as concentrate feed.

Erb points to a one vital component of the study: "The aim to provide sufficient food for the entire global population – an aim that has yet to be achieved – leads to an important trade-off: this either means that land use will have to be ramped up and extended to areas such as natural grasslands – areas that are currently used, e.g. for subsistence agriculture, and host a considerable fraction of the global biodiversity. Alternatively, this might result in a massive rise in global food trade flows, as many regions will not be able to feed their population domestically, even in a world where global production would be sufficient on the average." This is a potential thread for food security for regions with low purchasing power that already today rely on food imports, such as large parts of Sub-Saharan Africa. Shaping these global trade interrelations in a sustainable manner poses a considerable challenge, however, because institutions that would be able to govern the balance between supply and demand at the global level are currently absent or only barely developed.

These research results are particularly significant in the light of the

UNO's Sustainable Development Goals: They illustrate that the aims developed to protect the forests, central for climate protection or biodiversity conservation, do not necessarily conflict with the achievement of food security for the [global population](#).

More information: Erb, K.-H., Lauk, C., Kastner, T., Mayer, A., Theurl, M.C. & Haberl, H. (2016). Exploring the biophysical option space for feeding the world without deforestation. *Nature Communications*, 10.1038/10.1038/NCOMMS11382

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