We can sustainably feed 3.4 billion people. Study shows 4 eco-friendly farming practices will help produce food for 10 billion

Global agriculture puts heavy pressure on planetary boundaries, posing the challenge to achieve future food security without compromising Earth system resilience.

On the basis of process-detailed, spatially explicit representation of four interlinked planetary boundaries (biosphere integrity, land-system change, freshwater use, nitrogen flows) and agricultural systems in an internally consistent model framework, we here show that almost half of current global food production depends on planetary boundary transgressions …. If these boundaries were strictly respected, the present food system could provide a balanced diet (2,355 kcal per capita per day) for 3.4 billion people only.

However, as we also demonstrate, transformation towards more sustainable production and consumption patterns could support 10.2 billion people within the planetary boundaries analyzed. Key prerequisites are spatially redistributed cropland, improved water–nutrient management, food waste reduction and dietary changes.

…

Our further simulations suggest that the global ~49% 'loss' of food production due to PB constraints can be re-established through transitions to more sustainable food production systems and demand patterns, eventually leading to a global net increase of ~53% above the current level.

Specifically, reallocation of cropland and its irrigated and [nitrogen-fertilized] fractions within the diverse PB [planetary boundary] constraints could compensate for more than half of the losses incurred as such measures would increase kcal production by 29.3 percentage points.

…

This potential results from agricultural land expansion as far as allowed within the PBs for biosphere integrity and land-system change, from irrigation expansion into rainfed cropland within the freshwater PB and from increased fertilizer use on areas where allowed within the [nitrogen] PB.

…

An additional, even larger (35.4%), increase in kcal production appears practicable if sustainable water and nutrient management (upgraded irrigation systems, water harvesting, partially alleviated soil evaporation, restoration of degraded land, increased N-use efficiency were realized on all (newly distributed) agricultural land.

…

This study suggests that transitions towards more-sustainable food production and consumption would enable food supply for ~10 billion people (or somewhat more or less depending on target diet and

ambition level of solutions) without compromising multiple PBs as is currently the case.

This positive prospect is remarkable in light of the fact that our analysis follows a rather strict precautionary approach, assuming that subglobal boundaries be respected everywhere in contrast to former studies suggesting that (global) boundary transgressions appear to be unavoidable in the future.

Read the original post here (Behind paywall)