Feeding climate and biodiversity goals with novel plant-based meat and milk alternatives
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Top Findings:

- 50% substitution: "Instead of growing by 15% in the REF scenario, agriculture and land use emissions decline by 31%" (so a net savings of 3.1 Gt/year).
- In the 50% substitution scenario:
    - "Without accounting for any carbon sequestration on spared land, GHG emissions decline by 2.1 Gt CO2eq year (31%)"
        - In the REF scenario, they grow by 15%, so this is a net savings of 3.0 Gt.
    - "Carbon sequestration grows by 3.3 Gt CO2/year — [more than] doubling the benefits already achieved through the reduction of land use emissions without such restoration."
    - "This gives 6.3 Gt CO2eq/year of all agriculture and land use emissions reduction compared to REF in 2050."
    - Global agricultural area, instead of expanding, declines by 12% (653 Mha of land is released from use as a result).
    - Water use declines by 10% (−291 km3) instead of increasing.
- Agriculture and land use emissions reduction in 2050 in the 90% scenario are 11.9 Gt CO2eq reduction.
- All these numbers are extremely conservative: "The results presented above assume inefficient processing in which the totality of a plant is assigned to an input for a novel alternatives' recipe…. An efficient scenario is more economically likely and assumes a market for co-products (as occurs in agricultural processing today)... This means that our main results are based on conservative assumptions about processing and hence the benefits could be even higher if a more efficient processing scenario is realized."

Also:

- If globally 50% of the main animal products (pork, chicken, beef and milk) are substituted [with plant-based meat & milk], net reduction of forest and natural land is almost fully halted.
- If spared agricultural land within forest ecosystems is restored to forest, climate benefits could double, reaching 92% of the previously estimated land sector mitigation potential.
- Furthermore, the restored area could contribute to 13-25% of the estimated global land restoration needs under target 2 from the Kunming Montreal Global Biodiversity Framework by 2030, and future declines in ecosystem integrity by 2050 would be more than halved.

Source: Nature Communications 2023 (press release & web page; coverage: CarbonBrief; Grist)