



The
**Food and Land Use
Coalition**
FABLE Consortium

Sustainable Food Transformations

FABLE India Policy Brief

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Pathways and Realization Strategies

Key Points

An integrated assessment modeling approach is used to create pathways for sustainable food and land-use systems in India for the period 2030-2050

One pathway extends the current trends in India's food production, demographic, economic and climate mitigation parameters. The other pathway adds a set of scenarios whereby EAT-Lancet recommended healthy diets could be achieved

Meeting the healthy diet recommendations by diversifying the food basket away from cereals to include more fruits, vegetables, nuts, and pulses will lead to reduction in GHG emissions

Switching to healthy diets is critical to feed a growing population with minimum land use change and high climate mitigation potential

Filling the gap between current and healthy diets call for integrated agricultural, nutritional and environmental policies



About

The Food, Agriculture, Biodiversity, Land-Use, and Energy (FABLE) Consortium is convened as part of the Food and Land-Use Coalition (FOLU). It aims to understand how countries can transition towards sustainable land-use and food systems.

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Summary

Like other developing countries, India faces the challenges of a growing population and food security. Feeding the growing population requires fast paced economic development and cropland expansion. This necessitates land-use changes that lead to losses in forestry and ecosystem services, depletion of groundwater resources, and increased livestock production.

The land-use, forestry, and agriculture sectors already contribute nearly 23.4% of India's total greenhouse gas (GHG) emissions. On the other hand, India falls short in nutritional outcomes and security as well. It is not just about feeding the population but also ensuring a composition that matches healthy diet requirements. In this context, balancing between increased food production, healthy nutritional outcomes, and negative environmental outcomes will become increasingly challenging.

This policy brief discusses some potential pathways to achieve these outcomes in a sustainable manner.

Food Systems and Challenges for India

The UN Food Systems Summit (UNFSS) will be convened on the 23rd of September, 2021. Throughout the year, experts on food systems have been sharing knowledge and expanding efforts to achieve one of the main Sustainable Development Goals (SDGs) i.e., Zero Hunger.

To ensure Zero Hunger, it is necessary to achieve food security. India's focus on preventing hunger has been through various policy mechanisms such as the Public Distribution System (PDS), and more recently, the Pradhan Mantri Garib Kalyan Anna Yojana (PM-GKAY).

Zero Hunger in India, however, is yet to be achieved. Challenges in ensuring food as well as nutrition security remain. The disease burden due to dietary risks is alarmingly high [1]. Nearly, 14.5% of the Indian population is malnourished amidst worsening trends in children's anthropometric outcomes [2,3].



Meeting food volumes and nutritional security not only requires a tremendous increase in food production but also of the right kind that can deliver healthy diets.

20.8% of deaths are attributed to dietary risks, or 152.77 deaths per year per 100,000 people

Planning the Pathways to Sustainability

- Increased food production, however, comes at its own costs. According to the United Nations Forum on Sustainability Standards, the food system is a massive contributor to global warming and negatively impacts biodiversity. It is one of the largest factors affecting land-use change and use of freshwater resources.
- To evaluate the role of food production systems within India and to assess the feasibility of healthy diets within the country, a team of researchers at the Indian Institute of Management Ahmedabad (IIMA) have been undertaking an analysis using integrated assessment modeling tools as part of the Food, Agriculture, Biodiversity, Land-Use, and Energy (FABLE) Consortium.
- In a first of its kind exercise for India, this integrated assessment studied the interactions between targets for healthy diets, crop, and non-crop land-use changes and GHG emissions, at the overall country level.
- A global recursive dynamic land-use optimization Model of Agricultural Production and its Impacts on the Environment MAGPIE [4,5] is being used. The MAGPIE model integrates spatially explicit biophysical factors such as land availability, potential crop yields, and water availability into an economic decision-making process with population, economic growth, and climate change scenarios as exogenous drivers. Representative Concentration Pathways (RCPs) are used which are a set of alternative trajectories for the atmospheric concentration of GHGs [6].
- When coupled with a set of Shared Socio-economic Pathways (SSPs), these RCPs provide an opportunity to include scenarios of future societal development. The MAGPIE model optimizes agricultural produce, land-use configurations, irrigation water use, and variations in carbon stock (e.g. under a mitigation policy) at a spatially explicit level. It operates most of the economic constraints (e.g. trade, investments in technological

EAT-Lancet Recommended Diets



The EAT-Lancet reference diet is made up of 8 food groups—whole grains, tubers and starchy vegetables, fruits, other vegetables, dairy foods, protein sources, added fats, and added sugars. Caloric intake (kcal/day) limits for each food group are given and add up to a 2500 kcal daily diet.

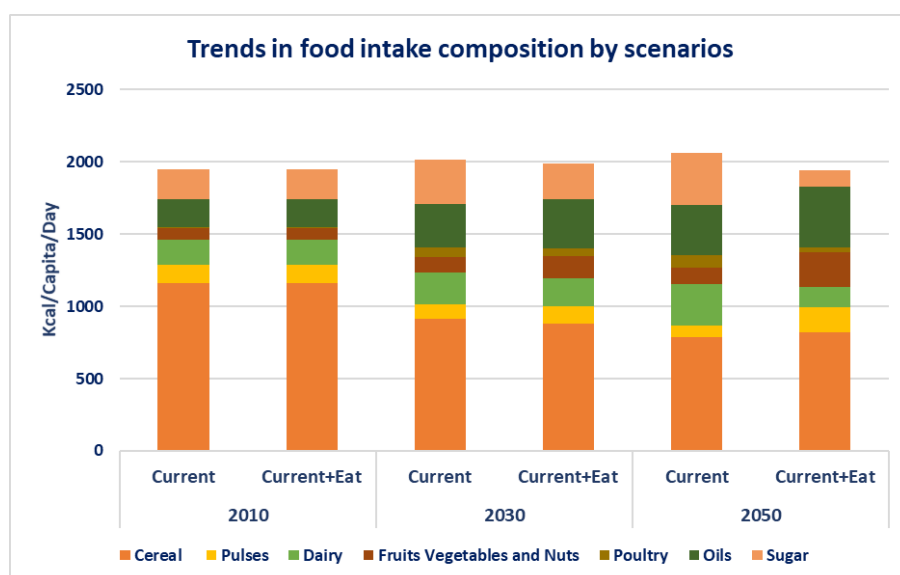
change, cost structures, etc.) on a level of 12 world regions. India is modeled as a separate world region.

- Two pathways for food and land-use systems for the period 2020-2050 have been assessed: Current Trends which represents the Business as Usual (BAU) scenario and Current Trends+EAT with a healthy diet scenario incorporating the EAT-Lancet Commission [7] recommendations. For more details on this, one can refer the FABLE Global Report, 2020 [8].

Results

- If the current trends continue, by 2050, cereals and pulses consumption would decrease, whereas dairy, oil, sugar and poultry would increase for India as a whole. The shifts in demand-led consumption are caused by population and income growth [Ref. Fig. 1]

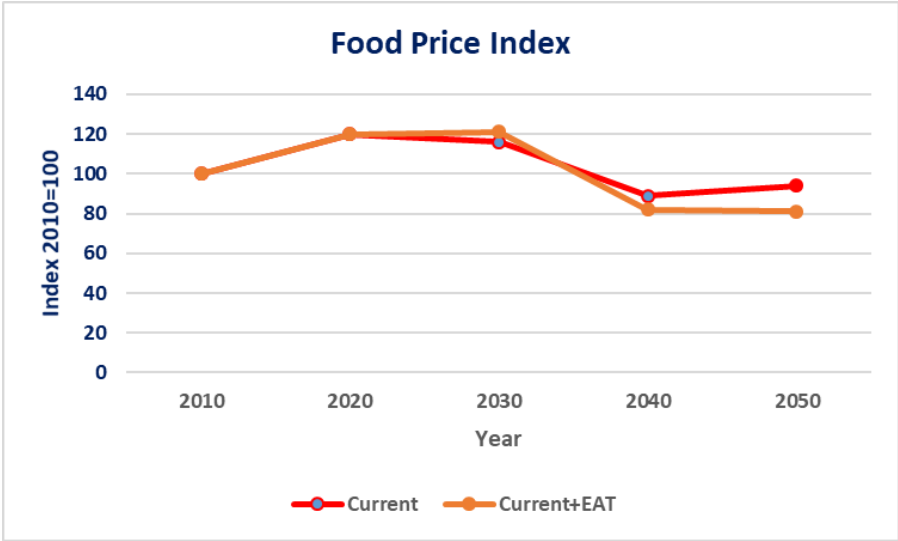
Figure 1 | Per capita consumption of various food groups over the years



Note: Figure shows kcal consumption of major items only and does not include all food groups

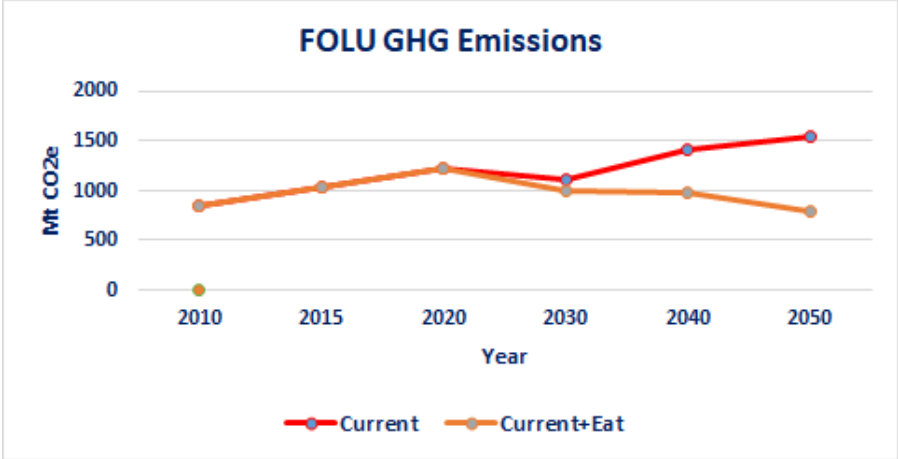
- If a healthy diets pathway is adopted, the share of pulses along with fruits, nuts and vegetables (FNV) would increase by 2050
- On the road to healthy diets, food prices would rise in the short-term as a shift is made towards healthier food items that are also expensive. However, with a shift in demand and increase in supply, this rise in prices could be reversed in the long-run [Ref. Fig. 2]

Figure 2 | Food Price Index across scenarios for India



- On the climate mitigation side, if the current trends continue, GHG emissions from food and land use sector would increase by 28% in 2050 in comparison to 2030
- This increase in emission would be driven primarily by greater demand for livestock products
- However, if healthy diets are aspired for, GHG emissions from food and land use sector could reduce by 51% in the year 2050 as compared to where we are headed currently [Ref. Fig. 3]

Figure 3 | Projected GHG emissions from FOLU between 2010 and 2050



Conclusions

- In order to achieve sustainable food and land use transformations, that also aims for high climate mitigation, there is a need to reduce the over-dependence on certain food groups such as sugars, cereals, and livestock products
- This would require a shift towards diversifying the food basket to include more fruits, vegetables, nuts, and pulses
- Switching to healthy diets could turn out to be critical to feed a growing population without destructive land use and climatic changes
- Currently, the analyses are at the national level. To derive targeted policies, one would need to delve into region specific production and consumption systems.

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Engagement

FABLE India representation at the UN Food Systems Summit 2021 – Science Days

- Prof. Ranjan Kumar Ghosh, Team Lead, FABLE India, discussed how India could meet its sustainability targets depicting the results from integrated assessment using MAgPIE and the subsequent engagement gaps with policymakers that need to be filled in order to foster the process.



UN FOOD SYSTEMS SUMMIT 2021 SCIENCE DAYS – SIDE EVENT

Learnings from country-level pathways to the global food policy debate

Monday 5th July 2021 / 15.00-16.30 CET

How can scientists support policymakers in adopting long-term food system transformation goals?

Join us for an interactive discussion on how scientists could bridge the science-policy gap, increase the level of ambition, and build a shared vision to transform our food systems.

Register at: <https://cutt.ly/dn7NzFJ>

#foodsystems #globalgoals



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