Measuring Economic-Environmental consequences of the evolving Dietary Patterns and Nutritional landscape in Urban India

Topic: Environmental Input-Output Modelling (3)
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Background
Indiaâ€™s public health status poses an alarming situation. The Non-Communicable Diseases are responsible for 5.87 million deaths annually while India ranks second in number of diabetic patients and around 135 million are affected by obesity. This phenomenon is largely prevalent amongst younger population in urban India with direct link to sedentary lifestyle, consumption of high calories food intake. The lifestyle-related nutritional disorders are expected to translate to net-economic loss to the country. Along with the economic implications of the changing food consumption pattern, the sustainability of the food systems needs to be ensured. The agriculture sector constitutes 14% of the GHG emissions and 78% of the countryâ€™s freshwater resources being directed towards agriculture. The urban Indiaâ€™s dietary preferences will play a pivotal role in Indiaâ€™s pursuit of SDG 2 and 12.
Research Question
Given this backdrop, the objectives of the study are listed below:
i)To assess Indiaâ€™s changing dietary patterns over the past decade, between 2011-12 and 2022-23 across different urban income fractile classification.
ii)To measure the gap between actual and required nutritional intake amongst urban population across different age groups and evaluate the economy-wide impact of adopting a healthy dietary guidelines by 2030.
iii)To estimate the environmental footprint â€“ total GHG and water footprint by following the healthy diet guidelines in different scenarios, combining different food habits.
Methodology
To this end, the study adopts a General Equilibrium framework, using the latest Supply Use Table 2019-20, published by the Government of India. The 140 commodity classification of products constitutes among other sectors, 20 foodgrains, cash crops, fruits and vegetables, 4 livestock products, and marine and inland fish. Additionally 14 food processing sectors include meat, fish, fruits and vegetables, dairy, grain mill, sugar, bakery products, tea and coffee. Based on the commodity-wise growth rates estimated using the National Accounts Statistics between 2019-23, the Input-Output (I-O) table is updated to the year 2030. The estimated expenditure, required to bridge the gap between actual and recommended nutritional intake by 2030 will be simulated using the I-O model and the economic and environmental impact (GHG and water footprint) will be measured.
Data construction and sources
The government of Indiaâ€™s Household Consumer Expenditure surveys for the year 2011-12 and 2022-23 for different urban fractile classes is used to measure Indiaâ€™s evolving dietary pattern. The Indian Council of Medical research (ICMR) 2024 report on â€˜Dietary Guidelines for Indiansâ€™ will be used as a reference case to estimate the optimal nutrition intake requirement in Urban India for different age groups. The population forecasts is compiled from the Governmentâ€™s report on â€˜Population Projections for India and states 2011-2036â€™.
Novelty of the research
India is already the most populous country in the world with a large â€˜demographic dividendâ€™. The general status of the public health and societal well-being is paramount for Indiaâ€™s aim of becoming $10 trillion economy by 2030. To the best knowledge of the authors, this study proposes for the first time, a comprehensive nexus approach, between nutrition, economic gains and environmental impact, addressing the overall welfare of the country.

Preliminary results

Indiaâ€™s dietary preferences are converging towards the developed country consumption patterns, with per capita intake (kcal/day) of â€˜Meat and Eggsâ€™ and â€˜Dairy productsâ€™ increasing by 68% and 5%, respectively while â€˜Cereals and Milletsâ€™ decreased by 10% on average, between 2011-12 and 2022-23. Contrarily, there is a significant gap of 28.5% in per capita intake between the highest and the lowest income category urban households as per the latest survey and the urban average is 15.8% lower than the recommended 2,010 kcal/day. Comparing scenarios wherein the incremental nutritional intake is met through a) meat and dairy based diet or b) fruits, vegetables, nuts and seeds-based diet, the higher Total output, GDP and Employment increase in the latter case, of 2.5%, 1.8% and 2.7%, respectively, while the total GHG (67,850 kgCO2eq.) and water footprint (22.1 thousand cubic meters) is higher in the case of the former. The age-wise empirical analysis of dietary requirements indicates that the working age group 19-59 which are the drivers of Indiaâ€™s economy will account for 56% of the total population by 2030 and preliminary estimates suggest that in order to meet the required nutritional intake, approximately US$10,536.6/capita/annum expenditure on food items is required led by dairy products, meat and eggs, cereals and millets, while age group 10-18 account for US$11,420/capita/annum that will lead to exponential economic and environment footprint multiplier effect.