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## From Cereals to High-Value Foods

### Realigning Agricultural Policies to Evolving Consumer Preferences

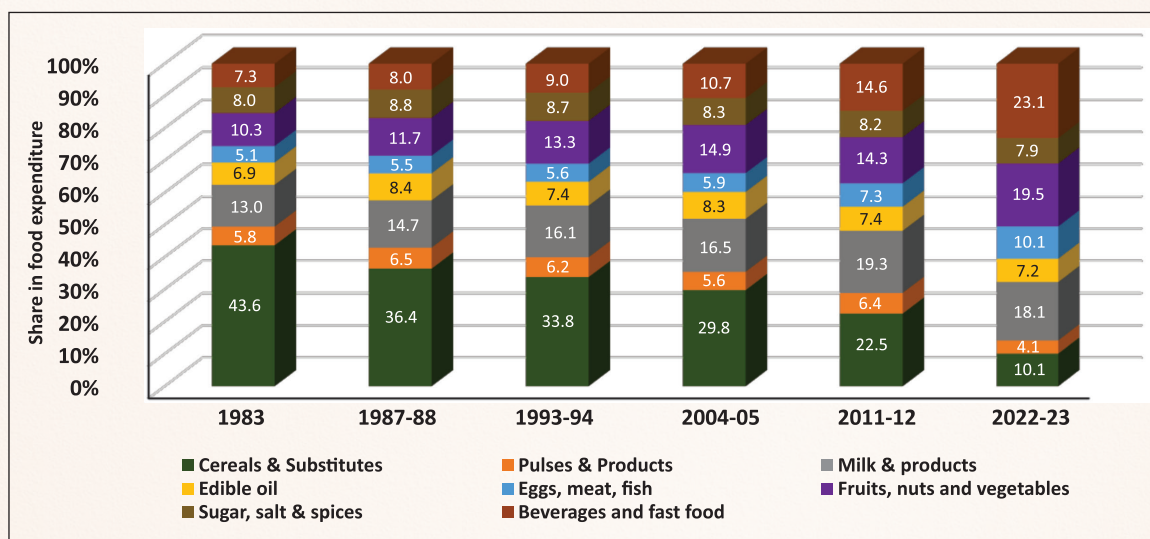
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Changes in consumer food preferences have significant implications for agri-food systems, triggering a cascade of adaptations throughout the value chain, from downstream to upstream. As disposable income increases, consumers demand more nutritious and safer foods, signalling producers, processors, and distributors to recalibrate their activities. Such adjustments often require investment in new technologies, sustainable farming practices, food processing, supply chains, and logistics. The implications of changing consumer preferences extend beyond immediate market dynamics, encompassing policies and regulations to balance food demand and supply, and promote responsible consumption and production.

#### Changes in dietary patterns

Over the past four decades, India's food consumption patterns have undergone a significant transformation, characterized by a shift away from predominantly staple cereals towards nutrient-dense commodities such as fruits, vegetables, dairy products, meat, eggs, and fish (Figure 1). The share of cereals in food expenditure declined from about 44% in 1983 to 10% in 2022-23, while that of nutrient-dense foods increased from 28% to 48%. Further examination of the food consumer expenditure patterns by commodity shows a noticeable increase in the share of animal-source foods from 18% to 28% and of horticultural products from 10% to 20%. Notably, the share of beverages and fast foods has increased more than three times from 7% in 1983 to 23% in 2022-23.

Figure 1. Changes in household food consumption pattern in India



Source: Authors' estimates based on National Sample Survey - Consumption Expenditure Surveys data.

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**Table 1. Trend in household consumption of food commodities in India (kg/capita/month)**

Commodity	1983	1993-94	2004-05	2011-12	2022-23
Cereals and substitutes	13.98	12.77	11.61	10.72	9.19
Rice	6.24	6.59	6.12	5.71	5.03
Wheat	4.51	4.48	4.38	4.41	3.87
Coarse cereals <sup>#</sup>	3.23	1.70	1.11	0.60	0.29
Pulses and products	0.94	0.83	0.74	0.82	0.78
Fruits and vegetables	4.01	5.31	5.93	5.49	9.15
Edible oils	0.33	0.42	0.53	0.66	0.91
Sugar	1.26	1.40	1.23	1.33	1.45
Milk	2.98	4.26	4.29	4.78	5.50
Eggs, meat, fish	0.31	0.38	0.42	0.47	0.96

<sup>#</sup> includes nutri-cereals, maize and barley

Source: Authors' estimates based on National Sample Survey - Consumption Expenditure Surveys data.

Changes in food consumption patterns are reflected in changes in the intake of different food commodities too (Table 1). Expectedly, there is a steady downward trend in cereal consumption, whereas the consumption of nutrient-dense foods shows an upward trend, albeit at different rates across commodities. However, pulse consumption, the main source of protein for the majority Indian population, remains relatively static.

This shift in dietary patterns is not confined to any specific consumer segment but is prevalent across socio-economic strata and geographical locations, encompassing both poor and rich, as well as rural and urban consumers. Indeed, the changes have been more pronounced for poor and rural consumers, suggesting a narrowing of inter-personal disparities in consumption<sup>1</sup>.

This transformation in dietary patterns is influenced by several economic, demographic, and technological factors. From 1983-84 to 2022-23, the Indian economy grew at an annual rate of 6.2%, resulting in a substantial increase in per capita net national income from Rs. 21962 to 99404 (at 2011-12 prices), enabling consumers to access a diverse range of food products. During this period, the share of urban population in the total population increased from 23.8% to 36.4%. Furthermore, this transformation has been facilitated by advancements in storage, transportation infrastructure, and distribution systems including supermarkets and e-commerce platforms.

Consumption of nutrient-dense and processed foods

is more responsive to changes in income and lifestyle factors. In the recent past (2012-13 to 2022-23), India's per capita income has experienced a robust growth of 4.3% per annum, and given the government's goal to attain the status of a developed nation by 2047, the centennial year of India's independence, this trend is likely to accelerate. Also, the country's population will reach 1.6 billion by 2047, half of which will live in cities and towns. These trends suggest a progressive shift in dietary patterns towards foods rich in proteins, vitamins, and minerals. Under a business-as-usual scenario (continuation of 6.34% growth in net national income experienced during 2011-12 to 2019-20), by 2047, the demand for fruits and vegetables is projected to be 1.95 times, for milk 2.58 times, and for other animal source foods (i.e., eggs, meat, and fish) 3.08 times their current demand (in 2019-20), as compared to 1.41 times increase in cereal demand (Table 2). The demand for nutrient-dense foods will increase further if income growth accelerates. The overall demand for food commodities is projected to increase at an annual rate of 2.44% to 3.07%.

This dietary transformation creates new opportunities for farmers and other stakeholders on the food value chain. The production of nutrient-dense foods is more profitable and labour-intensive than that of staple food and non-food crops. Thus, smallholder farmers with a relatively high endowment of family labour will benefit from the transition from staple crops to high-value crops, animal husbandry, and fisheries<sup>2</sup>. However, this transition requires a relook into current agricultural

<sup>1</sup>Kapoor, M., Ravi, S., Rajan, S., Dhamija, G., and Sareen, N. (2024). *Changes in India's Food Consumption and Policy Implications: A Comprehensive Analysis of Household Consumption Expenditure Survey 2022-23 and 2011-12*. EAC-PM Working Paper Series EAC-PM/WP/30/2024, Economic Advisory Council to the Prime Minister. Government of India.

<sup>2</sup>Birthal, P.S., Roy, D. and Negi, D.S. (2015). Assessing the impact of crop diversification on farm poverty in India. *World Development* 72: 70-92.

**Table 2. Demand for food commodities by 2047-48 (million tonnes)**

Food commodities	2019-20	2047-48	
		BAU*	HIG*
Cereals	251	353	363-381
Rice	103	114	114-113
Wheat	100	119	119-120
Coarse cereals	46	115	125-142
Pulses	26	49	52-57
Fruits and vegetables	307	598	637-700
Edible oils	22	31	32-33
Sugar	34	44	45-45
Milk	186	480	527-606
Eggs, meat, fish	24	74	83-98

Note: Demand includes household food demand and demand for other purposes. \*Business As Usual scenario (6.34% growth in income during 2011-12 to 2019-20). \*High Income Growth Scenario (7-8% growth in income during 2011-12 to 2019-20). Source: NITI Aayog (2024)<sup>3</sup>.

policies and realigning them with evolving dietary patterns while ensuring the long-term sustainability of agri-food production systems.

### Realigning agricultural policies

Since the beginning of the Green Revolution in the 1960s, India's agricultural policies and incentives have prioritized the rice and wheat. Although this strategy has successfully transformed India from a food deficit nation to a food surplus nation, it has resulted in unintended consequences. The persistent policy emphasis on rice and wheat has resulted in the neglect of nutritionally significant crops such as pulses and millets. Furthermore, intensive cultivation of rice and wheat has begun to adversely affect natural resources, biodiversity, the environment, and human health. Excessive water requirement of rice and sugarcane has led to a decline in groundwater levels, with some regions (e.g., Punjab and Haryana) experiencing significant reductions<sup>4</sup>. Furthermore, unbalanced application of chemical fertilizers has resulted in soil acidification, reduction in organic matter content,

and disruption of microbial activities. These crops have experienced a substantial deceleration in their productivity growth and contribution to agricultural expansion. In contrast, horticultural crops, animal husbandry, and fisheries have emerged as the main drivers of agricultural growth despite these not benefiting much from government incentives<sup>5</sup>.

The fast-growing demand for nutrient-dense foods and the increasing negative externalities reinforce the need to realign policies to accelerate agricultural growth, augment farmers' income, alleviate poverty, and combat malnutrition. This may require the reallocation of existing incentives to facilitate the transition from low-value calorie-rich cereals to high-value nutrient-dense labour-intensive food commodities and to promote the adoption of sustainable agricultural practices.

However, this transition is unlikely to be smooth. High-value agriculture requires more initial investment beyond the reach of smallholders. Thus, easier access to credit from formal financial institutions will alleviate liquidity constraints to invest in seeds, fertilizers, and modern farming machines and equipment, potentially leading to improved productivity and resilience in agriculture. Furthermore, the importance of risk management in agriculture cannot be understated, particularly for smallholder farmers who are more vulnerable to external shocks such as extreme weather conditions. Easy and affordable access to insurance products can protect them from such hazards. Importantly, bundling credit and insurance can create a more favourable environment for smallholder farmers when deciding on crop choices and adopting sustainable agricultural practices.

Agricultural research can address multiple challenges: enhancing productivity and resilience, improving the sustainability of natural resources, and combating malnutrition. Hence, investment in agricultural research and extension services is crucial. Each rupee invested in agricultural research and extension services yields a return of at least 13 and seven times, respectively<sup>6</sup>. Nevertheless, agricultural research has remained underfunded and has concentrated on staple food crops, neglecting pulses, millets, oilseeds, horticultural crops, animal husbandry, and natural resources. Redefining the research agenda can

<sup>3</sup>NITI Aayog. (2024). *Working Group Report on Crop Husbandry, Agriculture Inputs, Demand & Supply*, NITI Aayog, Government of India. <https://www.niti.gov.in/whats-new/working-group-report-crop-husbandry-agriculture-inputs-demand-supply>

<sup>4</sup>Kishore, P., Birthal, P.S., Roy, D. and Srivastava, S.K. (2024). *Regulation and Policy Response to Groundwater Preservation in India*. Policy Paper 43, ICAR-National Institute of Agricultural Economics and Policy Research, New Delhi.

<sup>5</sup>Chand, R. and Singh, J. (2023). *From Green Revolution to Amrit Kaal: Lessons and Way Forward for Indian Agriculture*. NITI Working Paper 02/2023, NITI Aayog, Government of India, New Delhi.

<sup>6</sup>Kandpal, A., Birthal, P.S. and Mishra, S. (2024). *From Research to Impact: Pay-offs to Investment in Agricultural Research and Extension in India*. Policy Paper 44, ICAR-National Institute of Agricultural Economics and Policy Research, New Delhi.

significantly contribute to the efficiency of research and its social, economic, and environmental outcomes. Notably, animal science research yields greater returns than crop science. Given the increasing demand for animal-source foods and the concentration of their production among smallholders, investment in animal science research would have a substantial impact on reducing poverty and malnutrition.

Markets are significant catalysts in agri-food system transformation. Nevertheless, agricultural markets remain predominantly controlled by intermediaries and are characterized by inadequate infrastructure and asymmetric information on commodity flows and prices. Reforms in agricultural markets are therefore imperative to enhance farmers' access to markets, reduce intermediaries and transaction costs, and ensure fair prices for farmers to benefit from transitioning to high-value commodities that are perishable. Strengthening linkages among producers, processors, and markets through Farmer Producer Organizations (FPOs), cooperatives, and contract farming can help farmers negotiate better terms with buyers.

The rapid shift in food consumption patterns towards processed foods and beverages requires policies that encourage food processing industries to invest in value addition to primary produce, while ensuring food safety and quality. This may include investments in food processing, cold chain, storage, and logistics to reduce postharvest losses. To ensure food quality and safety, it is imperative to implement traceability systems from production to consumption. Policies should emphasize the utilization of surplus produce for manufacturing biofuels and other natural products. Furthermore, promoting bio-based industries, including those that produce biodegradable plastics, textiles, biofertilizers, biogas, and compressed natural gas from agricultural waste, could create additional avenues for income generation for farmers and reduce environmental pollution.

Trade policies should also be aligned with emerging opportunities in international markets while safeguarding domestic producers and consumers.

For instance, India has a surplus in rice and sugar but faces a huge deficit in edible oils and, to a certain extent, in pulses. This is an opportunity to incentivize production of these commodities. Furthermore, the creation of a market and trade intelligence system is essential to facilitate the identification of global market trends, consumer preferences, import regulations, tariffs, and sanitary and phytosanitary requirements of various countries.

Notwithstanding the significant income and nutritional benefits, high-value agriculture can pose a challenge to the sustainability of agricultural systems. The high-water footprint of high-value food commodities, especially animal-source foods, is a significant concern. Therefore, a comprehensive integrated approach for management of natural resources, including land, water, and energy, is essential. Pricing and regulating groundwater use, along with incentives for promotion of aquifer recharge through rainwater harvesting, are crucial for preventing overexploitation. The promotion of automated pressurized irrigation systems, such as drips and sprinklers, can optimize water use and reduce waste. Investment in maintenance of canal irrigation systems is equally important.

The integration of nutritional considerations into agricultural planning is a holistic and sustainable approach to food system transformation. This approach considers consumers' food choices and responsible production by strengthening the connection between production and consumption. Additionally, it can facilitate resource optimization by prioritizing crops and livestock species. More importantly, integrating nutritional requirements into agricultural research is a cost-effective option to combat malnutrition.

Evolving consumer preferences for food underscore the necessity of a dynamic approach to policymaking to effectively address emerging challenges and opportunities. This necessitates targeted approaches and collaboration between public and private sectors to develop and implement innovative solutions along the food value chain and to ensure responsible food production and consumption.

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