

Ecological Footprints of Food Systems



Actionable Area

Realign India's public food system to the principles of decentralisation, diversification, and agroecology to reduce its negative ecological and economic footprints, potentially inducing economic growth with diversity.

Issues

- India's public food system played an important role in the historical evolution of its agriculture, the support systems around it, and the food grain consumption patterns across the country.
- The government of India spends Rs. 1,15,240 crores (2019-20), about 4% of its annual budget on the 'food security programs; this has increased from Rs. 63,844 crore rupees spent in 2010-11. Food subsidy is the largest component of expenditure of the Food and Public Distribution Department accounting for 95% of this budget. The National Food Security Act (NFSA) (2013) mandates coverage of 75% of the population in rural areas and 50% in urban areas under the targeted public distribution systems; currently, 81 crore people in the country, i.e., 59% of the population are covered.
- Current Challenges of Public Distribution System (Economic and Ecological Footprints)

Displacement of Rainfed Food Systems

a. Over 60% of the food grains procured at MSP comprises Paddy and Wheat. Millets, renamed recently as Nutri-cereals, constitute only 0.38% of the annual allocation of food grains for various food, nutrition, and relief schemes by the Government of India.

Public Food Systems in India



Production of food grains

Farmers do produce food grains and sell them at MSP



Procurement

Agencies like FCI, NAFED and state level agencies procure the food grains at MSP and store it as and when needed



Distribution

Government through fair price shops, Aaganbadies etc. distribute the food grains through schemes like

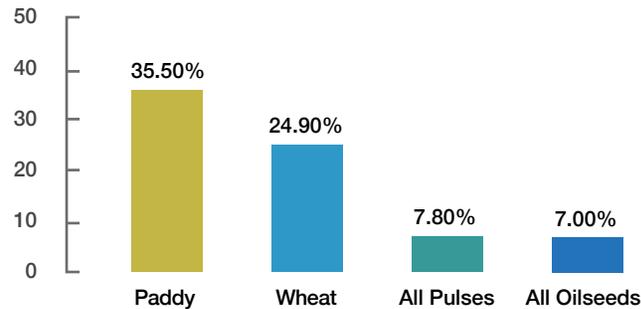
- Antodaya yojana
- Targeted public distribution system
- Take home ration
- Mid day meal



Beneficiaries

Ensuring food security of the vulnerable sections of the society

Percent of crop production procured at MSP (2016-17)



About 48% and 33% of the annual production of rice and wheat, respectively, were allocated for various food distribution programs in contrast to a meagre allocation of 0.74% for millets. The nutrition-rich Millets did not find any place in the state nutrition programs – despite the serious malnutrition across several areas in the country and despite their availability in the central pool.

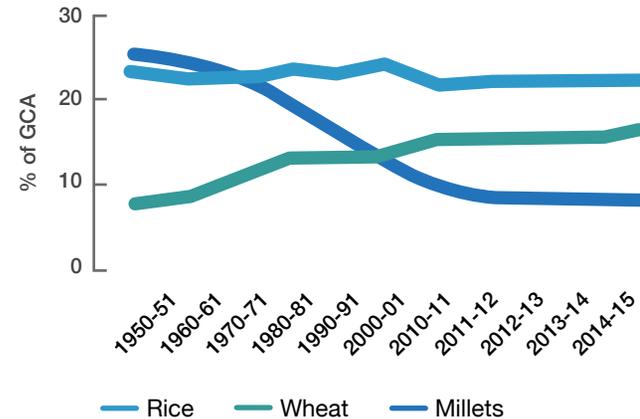
Changing Food Habits, Shrinking food diversity

a. The diverse crop-systems mix that used to include cereals, millets, pulses, and oilseeds adapted to the local agroecology has largely shifted to cultivating paddy and wheat. Monocropping of these crops over the last couple of decades has led to devastating effects in some areas, such as acute groundwater scarcity, pesticide poisoning, and low net returns even after propping up with all subsidies. Concentrated production in a few areas, procurement, transport, milling, storage, and distribution through the PDS – has a very large ecological footprint.

Reduced Agri-Biodiversity leading to monocropping

a. The multi-crop systems used to cover soil for longer periods are replaced by single-crop systems that leave soil barren from October-November, exposing the soil to high temperatures and desiccation of whatever soil organic matter is left! The varietal diversity in food systems also collapsed with the public seed systems established to ensure the proliferation of few High Yielding Varieties.

Trends in crop area (All India)



b. The Public Food Systems architecture – brilliantly conceived to meet specific policy objectives has altered the country's food landscape – shifted the food geography from rainfed areas to irrigated areas, and created an eternal dependency on irrigation, chemicals, and energy, MSP, and subsidies. This has also altered the 'food economy- skewing the benefits of public investments/ expenditure and markets heavily favoring irrigated areas, leaving the rainfed areas to misery, poverty, and distress arising out of climate vulnerabilities.

Rice and Wheat are consuming a large chunk of food and fertilizers subsidy

a. Rice and wheat consume about 53% of the total fertiliser consumption in India; of this, these crops under irrigation consume 42% of the fertilisers.

b. The two crops are great guzzlers of subsidies. Together with food subsidies, they consume 72% to 85% of the total subsidies in agriculture.

Investment in irrigation and electricity subsidy too benefited the Rice-Wheat cropping system

a. Groundwater-based irrigation using tube wells surpassed the percentage of irrigation by gravity (canals). Electricity for groundwater extraction is subsidised in several states.

b. Investments in expanding irrigation largely benefitted wheat and rice. Much of the produce of these crops go into public procurement for distribution under food security programs.

Massive subsidisation of soil pollution

a. The per hectare use of fertilisers increased from 1.99 kg in 1960 to 135.33 kg in 2009–10 and furthermore in later years. The average crop response to fertiliser use declined drastically from 25 kg grain per kg of complex fertilizers (NPK) during 1960s to only 6 kg grain per kg NPK fertiliser during the 11th Plan (2007–2012) as the diminishing returns set in. The poor and declining trends in soil carbon across the key food ecosystems in the country are worrisome. Experts call the flood of excess nitrogen one of the most severe pollution threats facing humanity today.

b. Considering that only about one-third of fertilisers employed is used by crops, the country is incentivising pollution of groundwater and soils with nitrogen compounds by spending Rs.44,649 crore rupees annually (2021). This amount is almost at par with 40 years of government expenditure on watershed development in India till 2017-18 which stands at Rs. 47,229 Crore.

Failing aquifers

a. Groundwater as a source of irrigation provided by deep tube wells has become the single largest source of irrigation. It is estimated that over the last four decades, around 84% of total addition to the net irrigated area has come from groundwater; with this trend, the energy footprint of irrigation has expanded substantially. There is a growing evidence of steady decline in water tables and water quality. At least 60% of India's districts are either facing a problem of over-exploitation or severe contamination of groundwater. Ironically much of the rice and wheat produced with such ecological footprint languishes in the FCI godowns with stocks many folds higher than the required buffer stocks.

Carbonfootprints in supply chain

a. The public distribution supply chain requires the transportation of 40 million metric tonnes of food grains from the FCI stock point to the different states. 85% of this is done by rail, covering an estimated 1,500 km each year, and the rest by road and ferries; the transport requirements of the centralised procurement till the stock reaches FCI stock points are additional. The hidden environmental costs of this long and voluminous supply chain have not yet been calculated.

b. The current footprints of GHG emissions of food grain are 1212, 15.65, and 45.51 million metric tons of CO₂, N₂O, and CH₄ respectively which are projected to increase by 1.8%, 23.92% and 2.35%, respectively if production increases in the current structure to meet the NFSA requirements.

Vision 2030

 **Establish a public food system that integrates the principles of decentralisation & diversity and promotes remunerative and resilient agroecology-based practices for food and nutrition security and natural resources conservation at the household and national level.**

Pathways

POLICY



Decentralise choices and decision making on the food-menus in all the state nutrition programmes including PDS with norms of compliance with nutritional standards laid out, 'achieving local food security as against or in addition to the 'national food security'. Procurement at the Local level – as much as possible – most preferably at the present last-mile Stock Points from where the stocks are supplied to various food and nutrition programs.

Mandate the Department of Agriculture to promote adequate area under chosen crop systems to meet the estimates on procurement.

Insistence and incentivising grains production to be procured with organic or non-chemical methods, following good agricultural practices such as water use efficiency, etc., can promote de-chemicalisation of the food system.

A major game-changing policy could be 'processing at the last mile'. Processing can also be promoted under public distribution systems through appropriate policy measures.

IMPLEMENTATION



Embed food-menus into local agroecology, food cultures, and traditions. The synergy between what food is used/ promoted locally and with the local agroecosystem ensures 'healthy souls and soils'.

Set up systems, processes, and redefined (decentralised) hierarchies to institute the 'decentralisation decisions' on the composition of PDS supplies (and others). Anganwadis can potentially induce nutritive and ecologically sensitive food cultures among the new generation.

Link-up with the Farmers' Producer Organisations for local production and supply of the chosen commodities; organise procurement around the last-mile stock points from where the supplies to fair price shops, Anganwadis, and others are presently organised. The catchment of these stock points can be the lowest planning unit. It does not entail any major changes in the organisation of the present system.

District and state-level procurement can be planned for the central pool stocks required to buffer the food system for the three purposes mentioned earlier.

Pathways



Estimate demand for various commodities based on the chosen food menus required for various state nutrition programs at the last leg of decentralisation i.e., 'Stock Points' or Blocks.

Arrive at appropriate pricing mechanisms indexed to central MSP to promote and incentivise the local production.

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