

# INDIA SYNTHESIS REPORT

2024

 **SHEFS**  
Sustainable & Healthy Food Systems

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## WITH THANKS TO



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## EXECUTIVE SUMMARY

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This report presents a food systems perspective on the production, distribution, and consumption of food in India. The report is a result of five years of research conducted under the Sustainable and Healthy Food Systems (SHEFS) programme. The SHEFS programme consists of a consortium of institutions in India, South Africa, and the United Kingdom, that conduct research on food systems, with the aim of providing policymakers and practitioners with current and novel evidence. This report presents five insights from SHEFS research, and five policy actions to address the social and environmental sustainability of food systems. The insights are oriented to answering two urgent questions that face policymakers, namely:

**1 How to ensure equitable nutrition and health in the face of rapid urbanisation?**

**2 How to meet food demands in the face of climate change and limited land and water?**

Research under the SHEFS programme was conducted by various collaborating institutes across different sites in India, using different methodological approaches, from economics to ecology. The five insights include:

- i. **socioeconomic inequality is limiting people's access to healthy and nutritious foods;**
- ii. **urbanising lifestyles are changing people's aspirations and choice of food to purchase and consume;**
- iii. **producing and consuming locally adapted crops, can improve farm sustainability and the health of farmers;**
- iv. **educating consumers on food footprints, safety, and wastage can curb negative impacts and inequity of food systems; and**
- v. **empowering localised food systems and sharing best practice across regions can accelerate innovation in food systems.**

Based on the research insights above, the current report recommends that:

- i. **environmental sustainability is more explicitly and synergistically tied to policy objectives across all food policy areas: from agricultural production to nutritional health and social welfare;**
- ii. **nutrition awareness and education is mainstreamed to reduce food and nutritional inequalities across socioeconomic gradients and gender;**
- iii. **farmers are supported by extension services to develop capacity to produce food sustainably;**
- iv. **fiscal and market instruments are used to incentivise sustainable food production and reduce a reliance on unsustainable agricultural inputs; and**
- v. **land use policies are adapted to enable sustainable food production and protect livelihoods.**

Throughout this report ongoing policies and programmes have been highlighted that can channel these recommended actions to promote sustainable and healthy food systems in India.

## INTRODUCTION

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Food systems encompass the food production and supply chain, as well as the associated economic, environmental, political, and social drivers associated with it. A food systems approach accounts for the complexity of interconnected elements of food production, distribution, and consumption. This system-wide understanding can help to identify efficient, impactful, and co-beneficial pathways to making food equitably accessible and environmentally sustainable. Food systems the world over are fast-changing, due to economic and political factors. These socioeconomic changes influence what people eat, and consequently, their nutrition and health. At the same time, environmental change is challenging the capacity of food systems to produce enough nutritious food in a sustainable and socially equitable manner. Food systems are also under significant pressure from factors like urbanisation, demographic shifts, changing diets, and land-use transitions. As a result, malnutrition and non-communicable diseases are on the rise and food production is causing damage to the very environmental ecosystems it depends on (water resources, biodiversity, climate, soil, etc.).

Policy makers face substantial challenges when developing policies to meet the Sustainable Development Goals (SDGs) that relate to food systems. Food underpins and links many SDGs and, although food policy primarily focuses on food production and national food security, many other policy domains are also relevant to food systems. For example, policies regarding food production and trade (SDG 12 responsible consumption & production), nutrition (SDG 2 zero hunger) and health (SDG 3 good health), land and environmental management (SDG 15 life on land) etc. all affect food systems outcomes. Given these interlinkages, making changes and achieving results with respect to shifts to more sustainable and health food systems can be complex and slow. Food systems include diverse stakeholders, with different priorities, including farmers, agribusinesses, market actors, policymakers, and consumers. In addition, any change in one part of the food system has to be cautious of unintended consequences in another part of the system. For example, policy targeting dietary changes should be cognisant of the needs of populations transitioning from agrarian to urban livelihoods.



**Sustainable & Healthy Food Systems**

The Sustainable and Healthy Food Systems (SHEFS) consortium is an interdisciplinary research partnership forming part of the Wellcome Trust's Our Planet, Our Health programme. The aim of the SHEFS research consortium is to provide new research evidence for policy makers to shape future food systems that will provide healthy and nutritious food that is sustainable and accessible to all. The research has been conducted by multiple partners across several disciplines, based in India, South Africa, and the UK, investigating food systems in these three countries. This report is the compilation of four years of research on the links between food systems, health, and the environment, conducted by SHEFS, focusing on food systems in India.

The India component of SHEFS is housed at the Centre for Chronic Disease Control (CCDC) New Delhi and the Ashoka Trust for Research in Ecology and the Environment (ATREE) Bangalore, with contributions from the London School of Hygiene & Tropical Medicine, City, >>

University of London, the University of Aberdeen, the University of Edinburgh, the University of Sheffield, and the School of Oriental and African Studies University of London. Research by SHEFS India has engaged with two thematic questions that are a priority for policymakers in the region, namely:

1 **How to ensure equitable nutrition and health in the face of rapid urbanisation?**

2 **How to meet food demands in the face of climate change and limited land and water?**



## The policy context in India

In India, agricultural policies have long promoted staple crop production to match the basic needs of the population, as well as support agricultural livelihoods and national GDP. National and state governments, cognisant of the pressure on land and water resources, have taken steps to promote a shift away from the Green Revolution paradigm of agriculture to more localised, circular, and environmentally safe farming. Food production is also linked to the health and welfare system in India. Smallholder farmers make a significant contribution to the Public Distribution System (PDS), which provisions much of the rural population with subsidised food. On the other hand, urbanisation is changing diets and lifestyles on an unprecedented scale. A number of interlinked grassroots initiatives such as Accredited Social Health Activists (ASHAs) and Anganwadi (child care centres) promote awareness and nutrition in rural and urban areas. Legislation to improve accessibility, equity, and sustainability in food systems needs to be informed by quality evidence on current trends and possible scenarios of change. This SHEFS India synthesis report brings together evidence from agriculture, ecology, health, nutrition, and economics to present a systems perspective on these trends and potential scenarios. Based on these insights, it offers some recommendations on how different policies and programmes can perform synergistically to improve accessibility, equity, and sustainability in food systems in India.





# KEY QUESTION 1:

## How to ensure equitable nutrition and health in the face of rapid urbanisation?

Dietary patterns in India are changing rapidly. Whilst purchases of processed foods and beverages in India still remain lower than the world average (with the exception of packaged milk, processed wheat, and edible oils), purchases of sweet snacks (+17%), salty snacks (+8%), and other processed foods (9%) have gone up considerably between 2013 and 2017. This increasing intake of sugar, salt and fats varies across states, but is generally of concern from a public health perspective (Law et al., 2019). Projections indicate that cereal and pulse consumption is expected to remain relatively constant, but the consumption of sugar, dairy, meat, fruit, and vegetables is expected to increase. An increase in incomes is likely to drive increased purchase of dairy and vegetables. Notably, urban populations are consuming less cereals and more fruit than rural populations (Alae-Carew et al., 2019).

## INSIGHT 1:

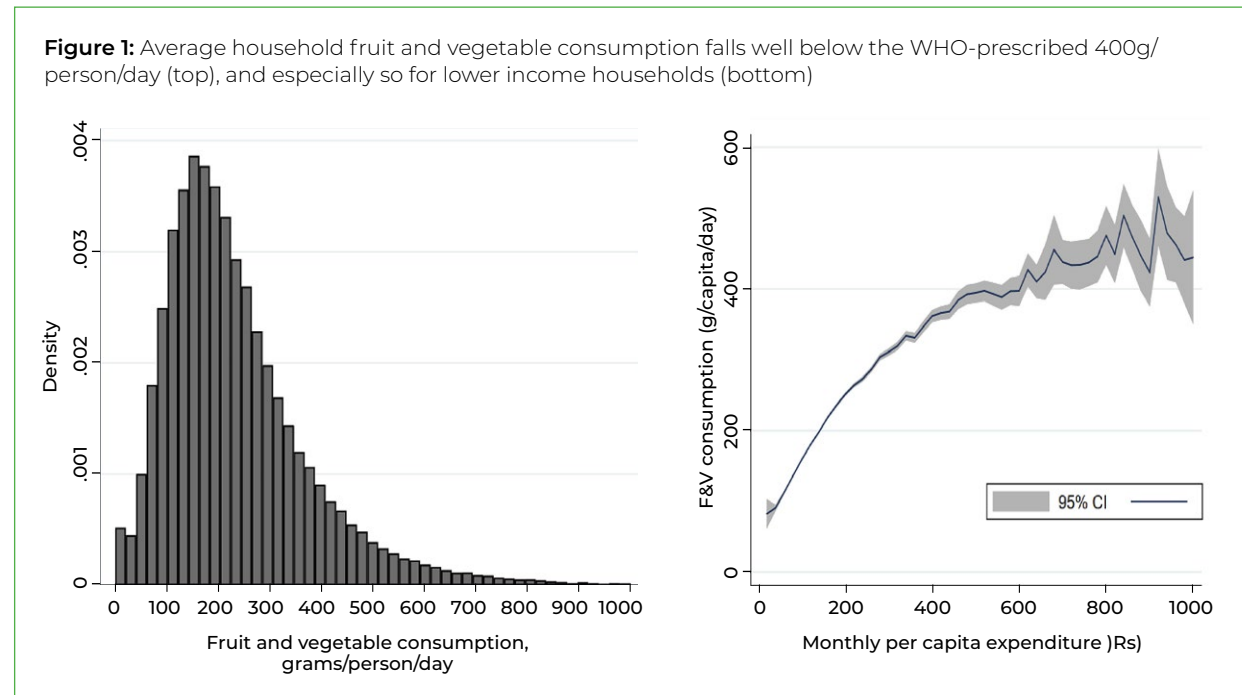
**Access to nutritious and healthy diets is constrained by location, gender, and caste**



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In India, consumption of fruit and vegetables is both low and unequal, with large proportions of households displaying worryingly poor consumption levels (Figure 1). Caste may be an influencing factor, with Scheduled Tribes consuming less fruit and vegetables than other sections of the population. Income is another factor, as many people cannot afford adequate fruits and vegetables. Penetration of agricultural market infrastructure emerges as a positive influence on fruit and vegetable consumption. The presence of cold chains and formal stores ostensibly improves longevity and quality of fresh produce, making it more accessible and appealing to people (Choudhury et al., 2020). Such infrastructure however tends to be lacking in many rural areas.

Local economies transitioning from predominantly rural and agrarian to urban and industrial (including food processing) may impose a challenging environment for healthy and sustainable dietary choices. Access to and affordability of fresh food stands limited, and convenience of processed and packaged



SOURCE: CHOUDHURY ET AL (2020), CC BY 4.0

food may be preferred, resulting in a shift to less healthy diets. Often, economic shifts also involve women's engagement in the workforce, thereby increasing the burden of work on women, and disproportionately impacting their role as providers and consumers in the household. (Biswas et al., 2022).

SHEFS studies across rural and urban households have found that, when compared to the dietary guidelines issued by the Indian

medical Research Council, Indian diets lack adequate nutrient-rich food groups such as vegetables, fruits, and protein foods (legumes, eggs, fish, chicken, meat, etc.). Women and those belonging to low income households often have lower quality diets and higher food insecurity, and lower body mass index (Ganpule-Rao et al. 2023a, c). Women in peri-urban areas also find themselves at a greater disadvantage because of reduced access to farm produce, markets, and social support (Biswas et al. 2022).

## INSIGHT 2:

**Urbanising lifestyles are changing attitudes to local and nutritious food**



Improved market access and increased income enable easier access to and options for nutritious foods. However, this may not necessarily translate into improvement in dietary quality and diversity. For example, dairy intensification in Gujarat and agricultural modernisation in Sikkim has prompted dietary transitions into the mainstream market economy. There has been an increase in consumption of processed foods and staple grains, especially among children and the youth. Food sourced through the Public Distribution System and grocery shops often replaces homemade foods utilising local dairy and grains. This could be a reflection of community aspirations for a settler, urban, affluent lifestyle. With these changes in lifestyle, non-communicable diseases are rapidly rising while communicable diseases still continue to affect these communities (Hariya et al., 2022, Yangden et al., 2022). In another example, only 7 to 9% of farmers in peri-urban areas in Sonipat and



**Increased incomes can favour processed food consumption**

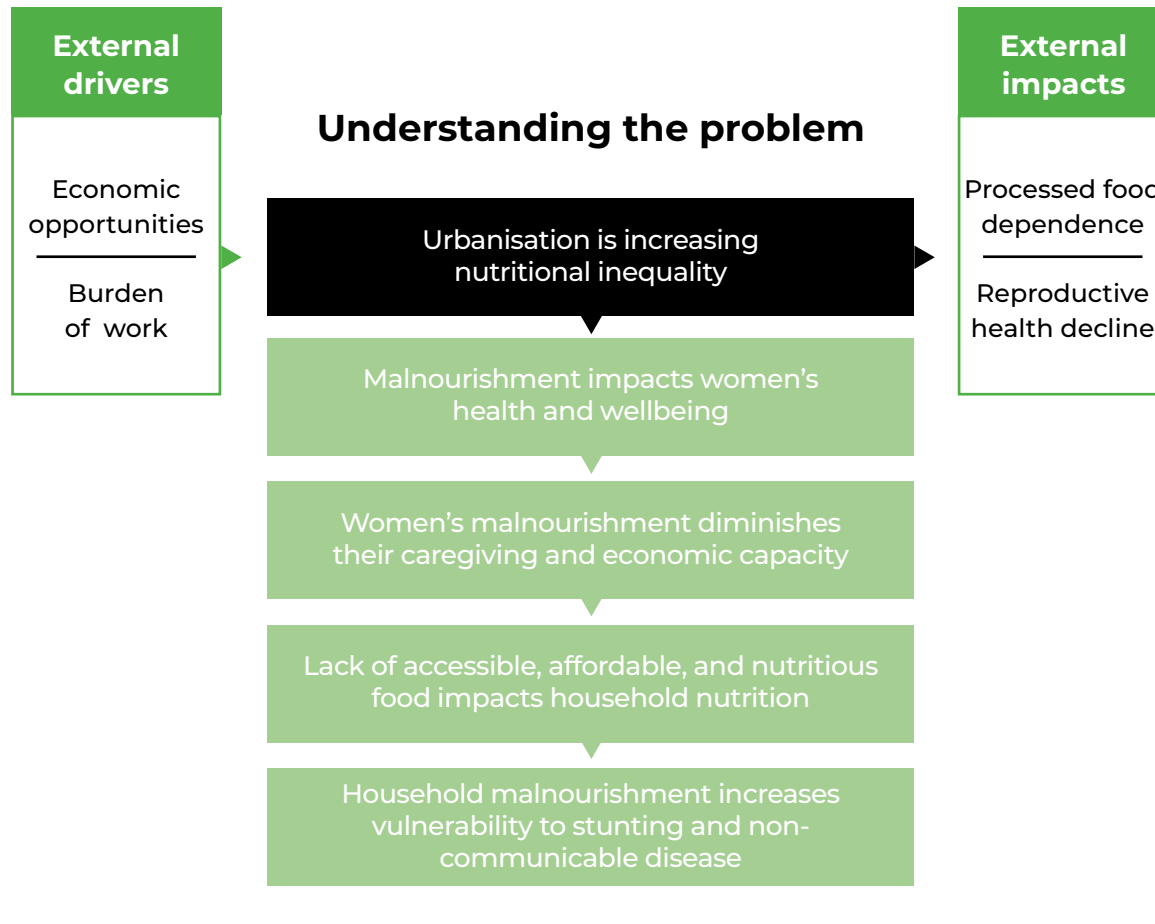
Vishakhapatnam have kitchen gardens despite having land, water, and expertise to grow food. This may reflect on urbanizing lifestyles where farmers favour income generation over food production in their urban farms (Singh et al., 2023).

Urbanising lifestyles can influence household food choices towards affordability and convenience to reduce expenditure and work burden, leading to greater consumption of processed foods (Biswas et al., 2022, Figure 2). In urban areas, out-of-home prepared snacks like beverages, and fried and savoury snacks

is part of the everyday diet of a majority of residents. Higher snacking frequency has been observed among women, the more educated, employed, and wealthy urban residents. This in turn is associated with higher Body Mass Index, waist circumference, fat percentage and glycemia irrespective of age, gender, wealth index, education, employment, daily calorie intake and daily physical activity. (Ganpule-Rao et al. 2023b, c). There has been a three-fold increase in purchases of ultra-processed foods in the middle and upper classes, especially in large towns (Tak et al., 2022).



**Figure 2:** An example of cascade effects of urbanisation on dietary choices and health outcomes



SOURCE: BISWAS ET AL. (2022)

Increasing urbanisation may lead to negative population health outcomes beyond diet. For example, a study found that rural agriculture workers had a lower prevalence of hypertension, overweight and obesity (but greater underweight and smoking propensity) compared to their urban, non-agriculture worker counterparts (Sorenson et al. 2020a). Another study found consistent associations of moderate increases in urbanisation level with cardiovascular disease risk factors. Increasing night time light exposure (NTLI) was positively associated with mean systolic blood pressure (SBP), body mass index (BMI), and fasting serum low-density lipoprotein (LDL), but not fasting plasma glucose (FPG). Associations with BMI and SBP were stronger in older age groups (Sorenson et al., 2020b).





## KEY QUESTION 2

### How to meet food demands in the face of climate change and limited land and water?

Shifts in dietary and lifestyle choices alter demands for certain types of foods. If this would influence and change the current food production systems and/or import and export patterns, this will also have an impact on environment footprints of the food system as a whole. For example, the increased domestic demand for poultry-derived foods has led to expansion and unchecked use of antibiotics in poultry farming. This in turn may contaminate soil and water with waste products, including antibiotic-resistant microbes (Ashwini et al., 2022). As another example, increased demand for milk and milk products may induce pastoralists to intensify production with larger herd sizes, increasing pressure on local resources such as grasses and water in arid ecosystems (Hariya et al., 2022). In Andhra Pradesh, despite awareness and initiatives to reduce use of chemical fertilizer and pesticide, very few farmers reported reduction or cessation of such use due to the high demand for their products and uncertainty associated with chemical cessation (Jaacks et al. 2022, 2023).

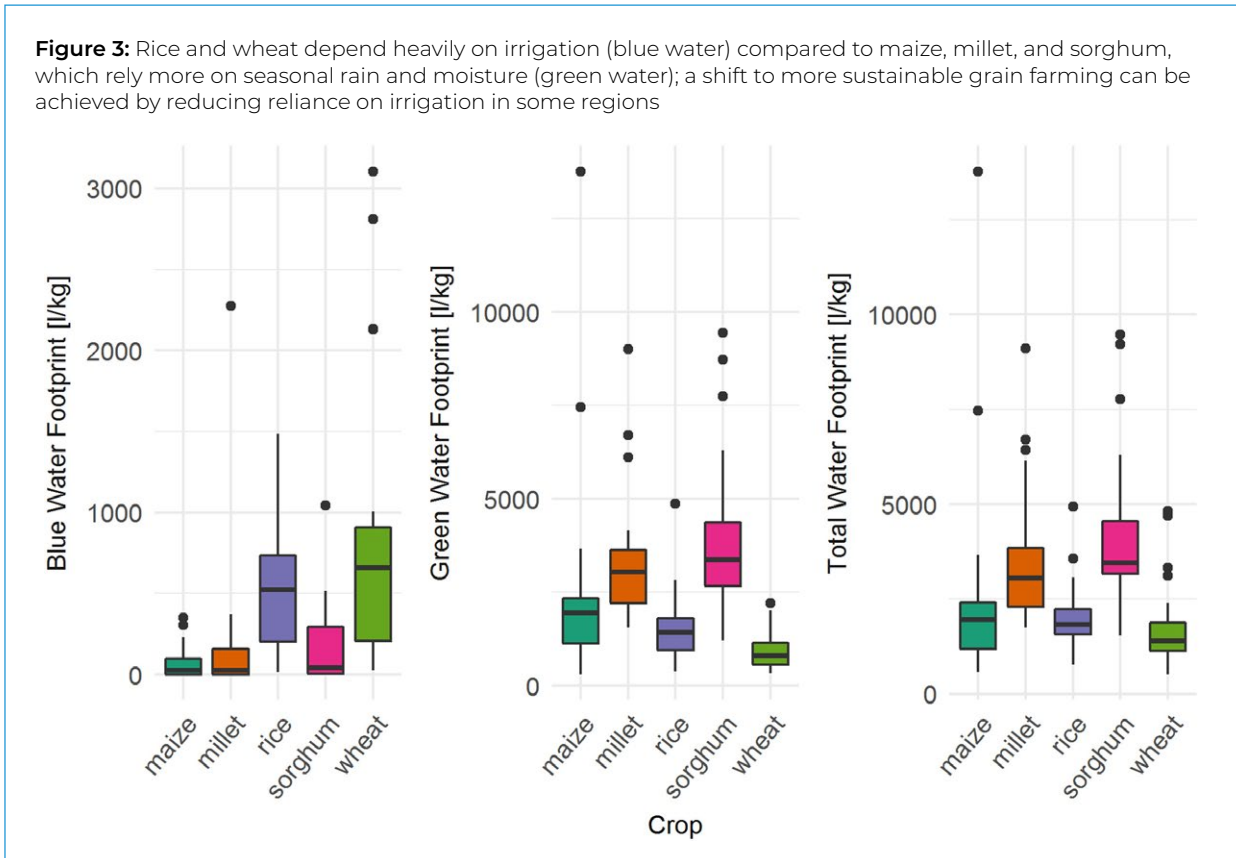
**INSIGHT 3:**



**Trade-offs and innovations can help balance environmental resources and food production**

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Agricultural production in India is dependent on both rainfall (green) and irrigation (blue) water resources. Water supply in some regions is dwindling due to climate change, increasing water demand for production and consumption, unsustainable groundwater-based irrigation, and Green Revolution policies that focused on increasing crop yields in states such as Punjab and Haryana. Cereals are a major component of the Indian diet, but they also consume a large volume of green and blue water for their production. When produced cereals are not consumed in the local area, the water used in its production (and that is now virtually embedded in the cereal crop) is “lost” to the importing state or country. An analysis found that nearly 40% of total cereal food supply was traded between Indian states in 2011-2012, corresponding to 54 km<sup>3</sup> of embedded blue water and 99.5 km<sup>3</sup> of embedded green water. Of the 40% of national food supply that is traded, more than half (64%) were produced in states with over-exploited or critically depleting groundwater reserves (Harris et al., 2020). This is a concern for national food supply, as if the groundwater runs out then



SOURCE: KAYATZ ET AL. (2019), CC BY 4.0

these crops can no longer be produced. Climate change is also accelerating groundwater use, as rainfall in the Kharif season (monsoon) is more unreliable so farmers are shifting crop production to the Rabi season when they use

irrigation (Kayatz et al., 2019). Furthermore, climate change will increase the frequency and intensity of climate related hazards (e.g. fires) to which many of the major agricultural states are at risk (Harris et al., 2022). >>

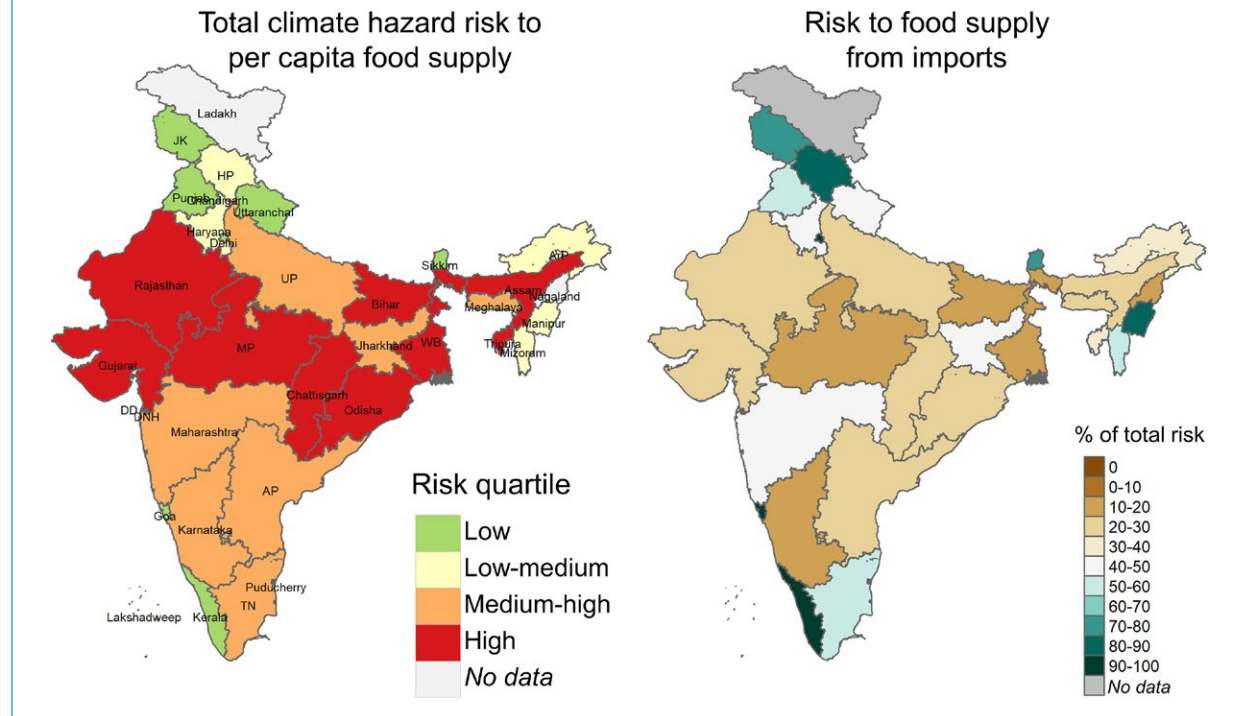
There are several possible changes to Indian agricultural production that could enhance food production while reducing environmental resource use and risks. For example, diversifying the types of crops grown and their location of production. In general, wheat and rice production use the most irrigation to be produced, therefore these crops have a high blue water footprint. The production of rice and wheat has increased since the Green Revolution, and they now account for the vast majority of cereal consumption. The production of coarser grains, such as millet and sorghum, is less dependent on irrigation although they can use more rainfall water (green). Maize is also produced in India, mainly for animal feed, and relies on a low volume of both blue and green water (Kayatz et al., 2019). Swapping high water footprint crops to those that have a lower water footprint could reduce water demand while maintaining cereal availability.

However, these crop swaps are location specific, as there are variations in the water used to produce crops across states as the climate and agricultural practices vary (Figure 4). A location specific analysis for

some states identified optimal crop swaps for water use (Shah et al., 2021). Improving yields by selecting locally appropriate crops, varieties, and

**Selecting locally adapted food crops can reduce risk from climate disruptions**

**Figure 4:** State-wise mapping of risk to food systems from climate hazards (such as drought, extreme rain and temperature, flood, fire, etc.) and from food imports (dependence on other states for supply); states with lower risks can consider crop swapping for sustainability



SOURCE: HARRIS ET AL. (2022), CC BY 4.0

cropping seasons could promote efficient water use. In fact, recent improvements in crop yields in India, as a result of crop diversification and rotation, meant that between 2005 and 2014, cereal production increased by 26.4%, while water use decreased by 6.6%, and land

use increased only by 1.8% (Kayatz et al., 2019). Finally, increasing production of some crops in states that have safe groundwater reserves and are at lower risk to climate-related hazards could ensure that national food production is less exposed to these environmental risks >>

(Harris et al., 2022). If the distribution of food production changes across India, investments in infrastructure and cold chains will ensure that inter-state food trade can distribute food items across the country.

Regenerative agricultural practices such as zero budget natural farming (ZBNF) have the potential to create environmental benefits in soil health and improve productivity and viability of low-income farms. However, the impacts on yield need to be carefully managed. If ZBNF is strongly promoted on high-income farms, an immediate decline in national food production is likely in the short term. But because soil organic matter will increase, food production is likely to immediately recover when high-income farmers restore nutrient supplies to their crops (Smith et al., 2020). Regenerative practices such as no-till cover cropping are also associated with better soil bacterial diversity, improved nutrient composition, and enriched Soil Organic Carbon (SOC) levels (Singh et al., 2022).

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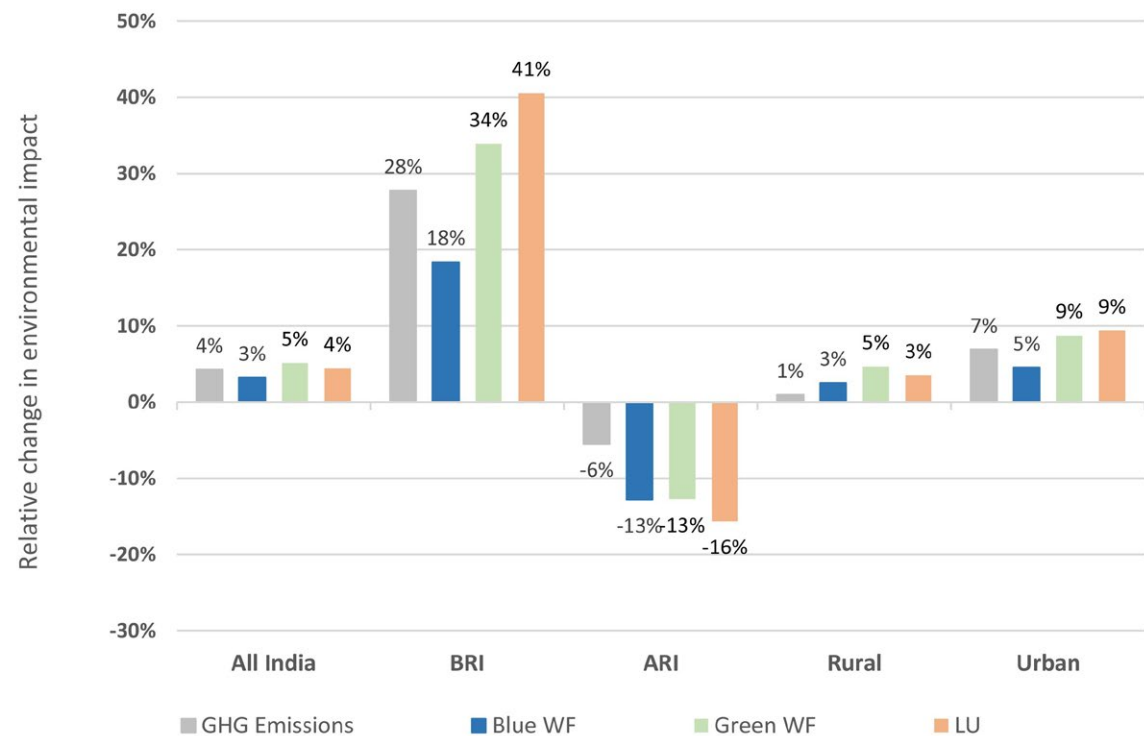
### INSIGHT 4:



**Educating consumers on food footprints, safety, and wastage can curb negative impacts and inequity of food systems**

A scenario analysis of the environmental impact of different diets in India using nationally representative data showed that shifting average diets to those consumed by the most affluent sections of the population would lead to increases in per-capita environmental footprints (Figure 5). These would amount to 36% for GHG emissions, 19% for blue water footprint, 22% for green water footprint and 23% for land use, largely driven by increases in meat and dairy consumption. However, shifting to diets that would comply with National Institute of Nutrition (NIN) nutritional guidelines across the whole population would result in only small increases of 3-5% in environmental footprints (Aleksandrowicz et al., 2019). In addition to demand-side approaches such as encouraging adoption of food-based dietary guidelines, supporting the transition to more sustainable diets could also be achieved through supply-side measures such as tackling food loss, closing the yield gap, >>

**Figure 5:** Expected changes in food footprints in bringing different Indian populations to the national recommended intake; footprint increase in below recommended intake (BRI) populations is countered by footprint reduction in those above recommended intake (ARI)



SOURCE: ALEKSANDROWICZ ET AL. (2019), CC BY 4.0

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improving efficiency in livestock production, and supporting the wider adoption of multiple cropping.

Educating consumers about food footprints can be an effective way of reducing food waste. A household food assessment conducted in Vishakhapatnam and Sonipat found that the quantity of wasted fruits and vegetables was high (~300 to 400 g/week/household), followed by cereals and pulses, whereas meat and milk and milk products were the least wasted. On average, food waste leads to 140 litres of water wasted per person per month which accounts for approximately 4.5 litres of drinkable water wasted per person per day. Improving household awareness and behaviours relating to food purchasing and storage to reduce food waste can help reduce the pressure on food production (Ganpule-Rao et al. 2023a).

Supply chain transparency could shed light on to what extend food safety standards are adhered to in a particular supply chain. Livestock supply chains can be made more transparent by monitoring protocols for food safety and waste disposal. For example,

**Sustainable  
wild extraction  
and urban  
food production  
contribute  
equitable  
nutritious  
food**

although poultry and meat production have prescribed quality control for consumer-end products, they often use antibiotics that can leave potent residues in the environment, such as soil and water around livestock farms (Ashwini et al., 2022). These residues can induce antimicrobial resistance, jeopardising

farm and human health. Audits for waste disposal and environmental and health safety in livestock farms can improve food safety. Consumer awareness through broadcasts and labelling can also have significant impacts. For example, the Maggi noodle scandal in 2015 resulted in persistent changes in consumption of the product in favour of more transparently safe alternatives (Law and Cornelsen, 2022).



## INSIGHT 5:

**Non-farm systems can produce sustainable and healthy foods**



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Forests and grasslands have supported some of the food needs of communities for generations (Figure 6), and these relationships are now recognised in some cases by the Forest Rights Act. For example, collection of honey, edible gum, berries, vegetables, fungi, etc., in small subsistence quantities provides sustainable and healthy food options in forest-dwelling communities in Karnataka (Setty et al. 2024) and agroecological systems in Sikkim (Yangden et al., 2022). Lack of adequate resource monitoring in non-farm systems can hinder the sustainability of such extraction of food resources. On the other hand, complete prohibition of extraction by way of environmental protection legislation can have detrimental effects on local agrobiodiversity and its stewardship. For example, grassland commons in Gujarat have the ability to support livestock for production of dairy and meat. However, intensification of production (as a result of market linkages) can lead to excessive use of resources, thereby increasing the dependence on external inputs, such as fodder. In the case of the Banni grasslands,

**Figure 6:** Policy briefs presenting research on food systems contributions of mountainous and urban ecosystems, and targeted recommendations at local, state, and national level



removal of *Prosopis*, an invasive tree that has replaced about 50% of former grasslands, could enable grassland restoration. This could reduce dependence on external fodder and also be better for livestock health (Hariya et al., 2022).

Animals such as bees, flies, beetles and birds pollinate a more than 80% of food plants. Crops dependent on animal pollinators are rich sources of vitamins and antioxidants. As pollinator populations face drastic decline, it is important to not only promote safe farming practices (e.g. low-chemical, organic), but also to create pollinator-friendly habitats. Urban agriculture and gardens are an effective means of sustaining pollinators. Pollinator-dependent crops have a lower space requirement and are more amenable to growing in cities, either in farms, or home gardens. An online survey revealed that about half to 2/3rds of diets in Bengaluru were dependent on pollinator-mediated foods. It was found that certain pulses, vegetables and most spices were highly pollinator dependent and most frequently consumed. With increasing urbanization, the demand for pollinator-mediated foods is also expected to increase. (Casiker et al. 2023). Alongside home and public gardens, field and lake margins, rooftops, and balconies also serve as pollinator habitat.







# POLICY IMPLICATIONS

Improving population nutrition while sustainably managing environmental resources will require new models of governance and new policy initiatives. Based on the research presented above, we make some recommendations for policymakers to bring about changes to make food systems more ecologically sustainable and healthy by making nutritious food accessible across the population. Considering the variations in food production and consumption patterns across and within Indian states, future policies that aim to improve household dietary diversity among farmer households in rural India would benefit by being targeted to a given location and context (Singh et al., 2023).



### POLICY ACTION 1:

**Integrate food policy and environmental sustainability across government departments, regions, and programmes**

National food policy in India is developed and implemented across 19 Departments/Divisions and 15 Ministries of the central government which cover agricultural production, trade, farmer livelihoods, food security, and nutrition (Brown et al., 2021). These departments function in siloes, with different priorities and objectives and food policy in India, like most countries, is disparate and fragmented. For example, environmental sustainability is not consistently integrated into food policy: it is typically only considered in relation to food production and infrequently referenced in food consumption policies (Brown et al., 2021). Providing infrastructure or programmes to facilitate co-ordination across government departments can help to integrate environmental sustainability across food policy. This would make policy more integrated and potentially more efficient and effective by avoiding conflicts with well-established health, societal, and economic-focused policies.



### POLICY ACTION 2:

**Co-develop programmes with consumers and producers to improve nutrition and reduce nutritional inequalities**

Food and nutrition schemes such as school meals, Anganwadi services, and the public distribution system can help incorporate more fruits, vegetables, and dairy products to increase consumption among those who struggle with access and affordability. Mainstreaming nutrition education in schools and public health centres through innovative methods like games, workshops, and public broadcasts can also raise awareness and understanding of the role of fruits, vegetables, and dairy in the diet, and the role of good nutrition in preventing diet-related lifestyle and non-communicable diseases (Srinivasapura Venkateshmurthy et al. 2021; Brown et al 2022). Awareness and education related to food footprints, food safety, and food wastage can also drive consumer choices and therefore market demand for more sustainable, safe, and healthy food (Aleksandrowicz et al. 2019, Tak et al., 2022, Ashwini et al., 2022).



### **POLICY ACTION 3:**

**Support farmers in diversifying their crops and adopting farming methods that limit negative environmental impacts**

Diversifying production from staple rice and wheat to maize, sorghum and millet (currently promoted by Government of India) could substantially reduce blue water requirements (Harris et al., 2020; Kayatz et al., 2019). Similarly, encouraging low-income farmers to transition to zero budget natural farming could lead to important improvements in soil health without drastic decreases in yield (Smith et al., 2020). Educating and supporting farmers in this transition will be important to carefully managing water and land resources in the future. To make diversification from wheat and rice viable, national and state governments need pragmatic policies and programs that facilitate comparable economic returns from alternative crops. The suggested crop mix should be economically viable, environmentally sustainable, and socially accepted (Singh et al. 2023). Fledgling government schemes to facilitate finance and infrastructure such as digestors, seed banks, soil testing labs, can be extended to cover wider geographies and smallholder farmers (Singh et al., 2022, Yagden et al., 2022, Ashwini et al., 2022).



#### POLICY ACTION 4:

**Reorientate economic incentives to negotiate social and environmental impacts of food production**

Economic instruments such as taxes, subsidies, and price guarantees may have unintended consequences for people and the environment. For example, subsidies on water and electricity have enabled farmers to undertake water-intensive farming in areas with low water tables, which is unsustainable on the long run (Harris et al. 2020, Brown et al. 2021). Market instruments such as organic labelling may also induce a shift from local food crops to monocultures and commercial farming such as spices and superfoods; such crops often do not form part of local diets, and may be unsustainable in arid or biodiverse ecosystems (Yangden et al., 2022, Hariya et al., 2022). In concordance with government initiatives to promote alternative crops and natural farming methods, incentives could now be redirected towards related agricultural infrastructure such as seed banks, farm-based soil enhancements, and supply chain linkages (Singh et al. 2022, Jaacks et al. 2022, 2023).



#### POLICY ACTION 5:

**Reconsider laws and regulations to promote optimal land management for local food production and biodiversity conservation**

Wildlife protection laws can prohibit community use and management of natural resources, such as the case of shifting cultivation and grazing in Sikkim (Yangden et al., 2022). Devolving management rights, however, requires that resource monitoring capacity is also developed within communities (Setty et al. 2024). Similarly, when legislating to transition towards organic farming, due consideration and support must be extended to farmers to enable uptake of suitable alternatives and practices (Jaacks et al. 2022, 2023). In urban areas, policy nudges in the form of zoning of land for urban agriculture in urban development master plans, providing tax incentives for housing societies that take up urban agriculture and imposing tax for vacant plots would go a long way in scaling up urban agriculture and improving green infrastructure in the city (Casiker et al. 2023).



## How to move to more sustainable and healthy food systems?



### INTEGRATE:

**Coordinate food policy and programmes across environment and health domains:**

- Create platforms to achieve high-level cross-cutting programmatic impact
- Align agrobiodiversity, environmental and food safety, and nutritional security with agriculture priorities



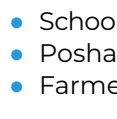
### CO-DEVELOP:

**Mainstream equitable nutrition by providing local quality food through:**

- Public Distribution System
- Integrated Child Development Scheme
- Anganwadi Workers
- Women's Nutrition Programme

**Educate and engage on food quality, safety, sustainability, and wastage through:**

- Accredited Social Health Activists
- Public Health Centres and public broadcasts



### SUPPORT:

**Facilitate farmers to diversify crops for improved yields through:**

- Paramparagat Krishi Yojana
- Indian Council for Agricultural Research
- Farmer Producer Organisations
- Minimum Support Price

**Build farmer capacity to reduce environmental impact through:**

- Zero-Budget Natural Farming and Regenerative Agriculture
- Integrated crop-livestock and pollinator-friendly farming
- Facilities and finance for agroecology infrastructure (e.g. biodigestors, seed banks, testing labs)
- National Mission on Sustainable Agriculture
- Krishi Vigyan Kendras



### RE-ORIENTATE:

**Incentivise sustainable farming and nutritious food consumption by:**

- Redirecting agricultural subsidies from irrigation and staple crops to more sustainable crops and farming infrastructure
- Diversifying supply of subsidised food grains and nutritious meals through local procurement



### RECONSIDER:

**Enable sustainable shared land use for food production through:**

- Strengthening resource monitoring and sustainable extraction in wild landscapes
- Collaboration between Biodiversity Monitoring Committees, local communities, and State Forest Departments
- Facilitating urban food production through appropriate urban planning for agriculture, gardens, and horticulture

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