

**Comparative Study of Food Policies of Brazil and Bangladesh
Using an Evolutionary Lens for Promoting Nutrition Security in
India Through the Cultivation of Millets**

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The year 2023 began with a passionate promotion of millets by the Union Government at a huge scale. This was amplified by the declaration of the year 2023 as the “International Year of Millet” (IYM) by the United Nations at the request of the Government of India’s proposal tabled via the Food and Agriculture Organization (FAO). The State’s urgency in boosting millet production as well as its trade has been staged consistently in various political circles and official announcements - from the External Minister, Dr. S. Jaishankar, calling for a collaborative, focused push worldwide for millets as the world grapples with the three complex challenges of climate, conflict and COVID-19 to our Finance Minister, Nirmala Sitharaman coronating millets as “Shri Anna” translating to as the greatest of all grains at the Union Budget for FY 2023. Envisioning the IYM as a global phenomenon that needs to be promoted on a large scale as a ‘People’s Movement’, the government has been promoting India as the “Global Hub of Millets.” Rebranded as the nutri-cereal in the list of domestically grown items in the Indian agri-bucket, the government estimates a CAGR of ~4.5% for the global millets market during the years 2021 through 2026 (Ministry of Agriculture & Farmers Welfare; PIB, 2023).

As a food class that can bring in diversity and help attain nutrition security for the nation as a whole, the policy urgency is ripe. There is a need for bringing in an integrated policy that can work comprehensively to attain optimum levels of nutrition for all. The US Department of Agriculture sees nutrition security as “all Americans have consistent and equitable access to healthy, safe, affordable foods essential to optimal health and well-being” (US Department of Agriculture, n.d.); NABARD assesses food security through the prism of

‘availability, accessibility, utilization, and stability,’ with nutrition indicators of stunting, wasting, underweight, obesity, and anemia forming the *utilization* paradigm (Department of Economic Analysis and Research, 2022). The cost of malnutrition is very high- between 2-3% of GDP and as high as 16% in severely affected economies. Research estimate indicates that all forms of malnutrition can cost the global economy up to USD 3.5 trillion per year, with obesity contributing to USD 500 billion annually (Global Panel on Agriculture and Food Systems for Nutrition, 2016). The public distribution system (PDS) and subsidized cereal availability have led to problems of malnutrition, obesity, diabetes, and essential nutrient deficiencies- evidenced by the disappointing rank of 107 out of 121 in the latest Global Hunger Index (GHI) and stunting (31.7%) and wasting (18.7%) statistics among children (WHO, 2023). The ongoing Russia-Ukraine war, COVID-19, and erratic climate behavior have reiterated the importance of food security from the geopolitical lens as well, necessitating a shift in policy focus to millets that are nutritious, sustainable, low input, and underutilized in terms of research and innovation.

Background

Looking at the renewed boost to this historical food segment that has been well-rooted in the Indian diet profile, it is pertinent to look at the reasons behind the promotion the State has set out for. To put things into perspective, millet- a kind of grain from the grass family has been native to the Indian subcontinent and is evidenced to have been produced and consumed as early as the Indus Valley civilization. Cultivated in more than 130 countries across the world, millets are native to Asia and Africa, with India topping the charts in the world production at 41%, followed by Niger and China at 12% and 8%, respectively. Originally grown as a primary ‘*kharif*’ crop in India, millets serve as both food and fodder and are widely popular for intercropping and improving diversity in the agri-basket. Widely cultivated in Maharashtra, Karnataka, Gujrat, Rajasthan, Madhya Pradesh, Uttar Pradesh,

Andhra Pradesh, and Tamil Nadu, there has been a steady decline in the area under cultivation of millets since the 1970s (India Development Review, 2023). Inherently, millets are sturdy crops that do not need excessive irrigation, have low input requirements for fertilizers and chemicals, and can thrive in rainfall-fed regions. Food policies post the Green Revolution focused on bringing out the government's welfare initiatives that could never be decoupled from farmer protection schemes. In addition, food security to the present date, has concentrated on having adequate food in warehouses and calorie uptake per person, instead of "nutrition security" over the long run (Pingali et al., 2017).

Taking cognizance of the nutritional value that millets can bring about along with the characteristic sustainability, the IYM program is a welcome move. Currently, India does not have a national policy to support the growth and uptake of millets, nor is there a national guideline mandating "nutrition security" for each person. However, India has been at the forefront of pushing millets across the world, especially on the G20 platform, the IYM is an example of voicing that mission at the international scale. A comprehensive government promotion through the "Initiative for Nutritional Security through Intensive Millet Promotion" (INSIMP), embedded under the "Rashtriya Krishi Vikas Yojana" (RKVY) has started gaining some momentum under the National Food Security Mission (NFSM). However, it remains to be seen how the government supports millet production and trade through supportive policies without threatening the existing food security we have achieved post the Green Revolution.

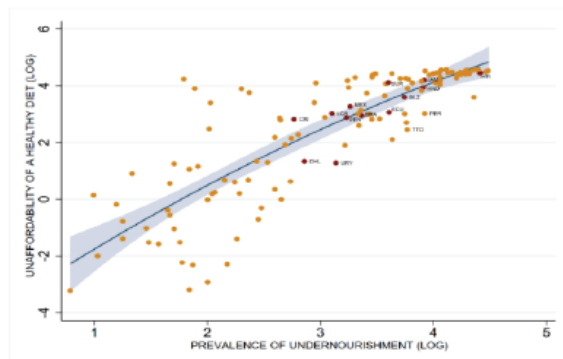
The situation at hand begs the question as to why is there a need to link local food structures and agriculture with the community's health indicators over the long term. Way before the GHI came into the picture, there has been some ground-level research to prove these linkages. One of them is from the United States (US) by Gail Feenstra in 1997, where he reviews the prevailing food systems across the different regions of the US and proposes to

bring in strategies of agriculture and nutrition aligning with the local food practices, and environmental conditions and justifies them since these pose out to be the financially viable solutions in the longer term. For the sake of building sustainable and nutritional food systems, the author suggests beginning with understanding the cultural and historical foods that have been grown in the region which will help understand the evolution of agriculture locally and the evolutionary reasons for changes. This is useful for understanding the financial viability as well since marketing and trading strategies can be drawn from this. Understanding the dependencies of the local population on the regional food systems and the degree of reliance will help gauge the crops that can as well as need to be grown so that the local community and the ones on the periphery continue to thrive. Finally, the urban agricultural systems need to collaborate with these local setups in terms of markets and knowledge access so that the economic viability of this stays intact. Strategies like that encourage small and marginal agricultural farmers and food cooperatives and help preserve the local communities will be helpful in achieving sustainable and healthy food systems (Feenstra, 1997). The transformation is broadly community-driven and entails linking up rural and urban food systems where the smallholders remain as powerful and elementary to the larger value chain as the large producers and the cooperatives. It is also very critical to understand the empirical relationship between unaffordability and nutrition indicators (Figure 1), thereby having greater implications upon inequality, poverty, and overall health of a region, and advocating for local low-cost food systems that bring sustainability to the food value chains (FAO et al., 2023).

Figure 1

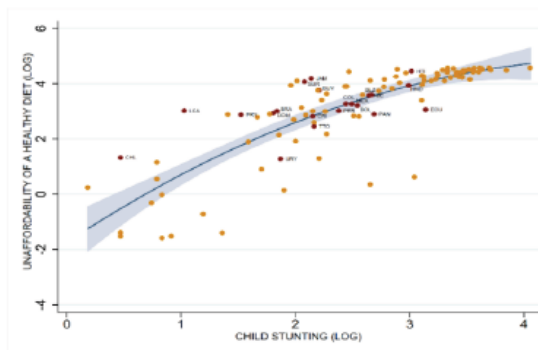
Relationship between nutrition sub-indicators and unaffordability of a healthy diet

A) ASSOCIATION BETWEEN THE UNAFFORDABILITY OF A HEALTHY DIET AND THE PREVALENCE OF UNDERNOURISHMENT IN THE WORLD, 2020



$R^2 = 0.743$

B) ASSOCIATION BETWEEN THE UNAFFORDABILITY OF A HEALTHY DIET AND STUNTING AMONG CHILDREN UNDER 5 IN THE WORLD, 2020



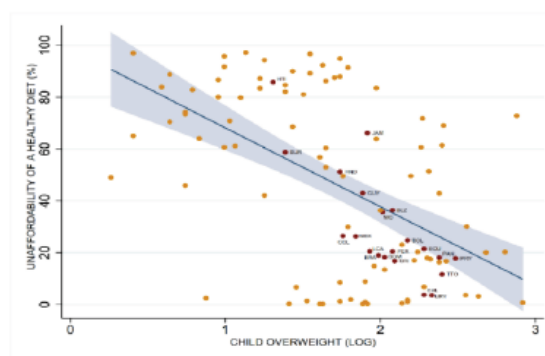
$R^2 = 0.72$

C) ASSOCIATION BETWEEN THE UNAFFORDABILITY OF A HEALTHY DIET AND ANAEMIA IN WOMEN AGED 15 TO 49 YEARS IN THE WORLD, 2020



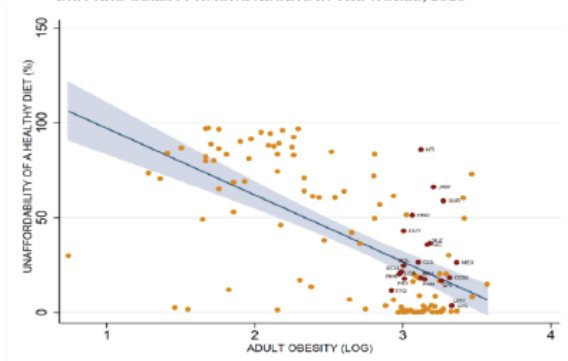
$R^2 = 0.539$

D) ASSOCIATION BETWEEN THE UNAFFORDABILITY OF A HEALTHY DIET AND OVERWEIGHT AMONG CHILDREN UNDER 5 YEARS IN THE WORLD, 2020



$R^2 = 0.315$

E) ASSOCIATION BETWEEN THE UNAFFORDABILITY OF A HEALTHY DIET AND OBESITY AMONG ADULTS IN THE WORLD, 2020



$R^2 = 0.316$

Source: FAO et al., 2023, p.73

This paper will review the context of the emergence of the importance of millets cultivation in India, the socio-economic horizon that has brought it into the limelight, and the nutritional diversity and security that millet aspires to bring about. After comparing with a

few emerging economies that have institutionalized programs and brought about national policy changes to promote nutritional security in their national food programs, this paper will look at broad guidelines from the learnings that will achieve the goal of bringing millets back into our diet gradually, as an effort towards attaining nutrition security, while keeping producer and market considerations in mind.

Methodology

Theoretical Framework

The systematic study of food and nutritional security policies by way of comparison has been carried out through the application of evolution theory. The theory poses critical questions and opens up the possibility of hypotheses that are tested and proven through data or observations (Langton, 1984). We try to look for causal relationships through the said framework, i.e., try to establish the direct reason behind the change in selected indicators. The policy frameworks have evolved in the countries picked up for comparison purposes over time as a result of gradual awareness of the national authorities, with the collaboration of international organizations as a result of the difficulties that they have faced with the earlier systems. International mandates like complying with the Millennium Development Goals (MDGs) and the Sustainable Development Goals (SDGs) have also contributed to a change in policies. The gradual evolution of the policy change in India and these countries, occurring critically as certain '*punctuated change*' either through existing political, natural, or economic conditions or through influence by ways of advocacy, has been looked at. The alternative driving factor for policy change that has been considered is the need for aligning with international commitment, SDGs, for example, have been kept in view. An understanding of the policy environment and subsequent policy changes can help in our policy recommendation for India.

Method and Tools

We look at government programs and/or policies that have been used in other countries from emerging economies for the attainment of nutrition security and whether they have transformed outcomes. We review the work that has been done in Brazil, Latin America (LatAm), and Caribbean at large, and Bangladesh, to see the rising importance of nutrition security over and above food security over time. These countries qualify as parallel case studies in one or multiple terms - stages of the country's economic growth within the emerging economies, climate vulnerabilities due to the geographical placement, average to poor GHI, and poverty. For each country in our case study analysis for this paper, we follow indicators in a global index- the GHI and focus our attention on the *utilization* parameter of food security measurement. We use a set of core indicators as per the Ministry of Statistics and Public Information (MoSPI) that are globally accepted and comparable and feature in the publicly available index of the GHI as listed in Table 1. Broadly, we would want to see an

Table 1

S.N.	Indicator Details
1	Overweight (Weight to age ratio) in children under the age of 5
2	Stunting in children under the age of 5
3	Wasting in children under the age of 5
4	Anaemia amongst women in the age bracket (15-49 years)

improvement in the core indicators over a period of time. The comparative analysis is also carried out, acknowledging that there could be other underlying factors that could influence improvement in the core indicators, viz., sanitation, water access, fertilizer use, wages, incomes, inflation, and irrigation provisions, to name a few (Food and Nutrition Security Analysis, India, 2019).

Comparative Case Studies

The LatAm and the Caribbean

The region is inflicted with high undernourishment, obesity, stunting, and wasting-critical indicators that indicate nutrition levels in the individuals. The year 2021 reported that more than 40% of the region faced food insecurity issues as against the world average of 29.3%. This was specifically exacerbated due to income inequalities rising out of the COVID-19 pandemic and the after effects of it in terms of food value chains. Severe food insecurity was faced by 30% more people in Latin America and the Caribbean in 2021 than in 2019. Though there has been a decline when compared to the year 2000, undernourishment has increased for the region from 6.7% in 2019 to 8.6% in 2021. Food insecurity, as shown in the figure below, has been rampant in the entire region, especially rising between 2019 to 2021. However, it is interesting to see the strides the countries have

Figure 2

Food insecurity

	Moderate food insecurity				Severe food insecurity				Moderate or severe food insecurity			
	2014	2019	2020	2021	2014	2019	2020	2021	2014	2019	2020	2021
World	13.5	16.1	18.6	17.6	7.7	9.3	10.9	11.7	21.2	25.4	29.5	29.3
Latin America and the Caribbean	17.1	21.8	26.7	26.4	7.5	9.9	12.8	14.2	24.6	31.7	39.5	40.6
Caribbean			31.8	33.5			36.6	30.5			68.4	64.0
Mesoamerica	23.7	20.9	26.8	26.1	6.5	7.3	7.3	8.0	30.2	28.2	34.1	34.1
South America	13.0	21.5	26.1	25.8	5.4	8.5	12.7	15.1	18.4	30.0	38.8	40.9

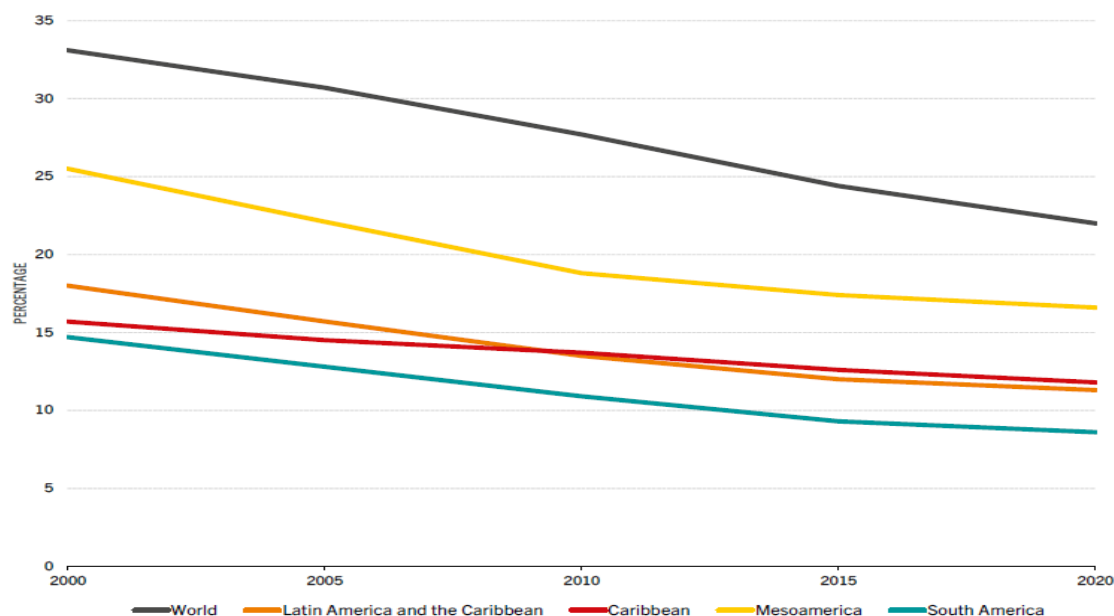
SOURCE: FAO. 2022. FAOSTAT: Suite of Food Security Indicators. In: FAO. Rome. Cited 7 November 2022. <https://www.fao.org/faostat/en/#data/FS>

Source: FAO et al., 2023

made to address some specific nutrition indicators- stunting (Figure 3) has been reduced by more than 40% between the years 2000 to 2021 and the share of below five years of stunting in the LatAm and the Caribbean is 10pp below the world average. The prevalence of wasting in the region, a critical nutritional deficiency indicator, is at 1.3%, below the world average of about 7% (FAO et al., 2023).

Figure 3

Stunting in children below the age of 5 years

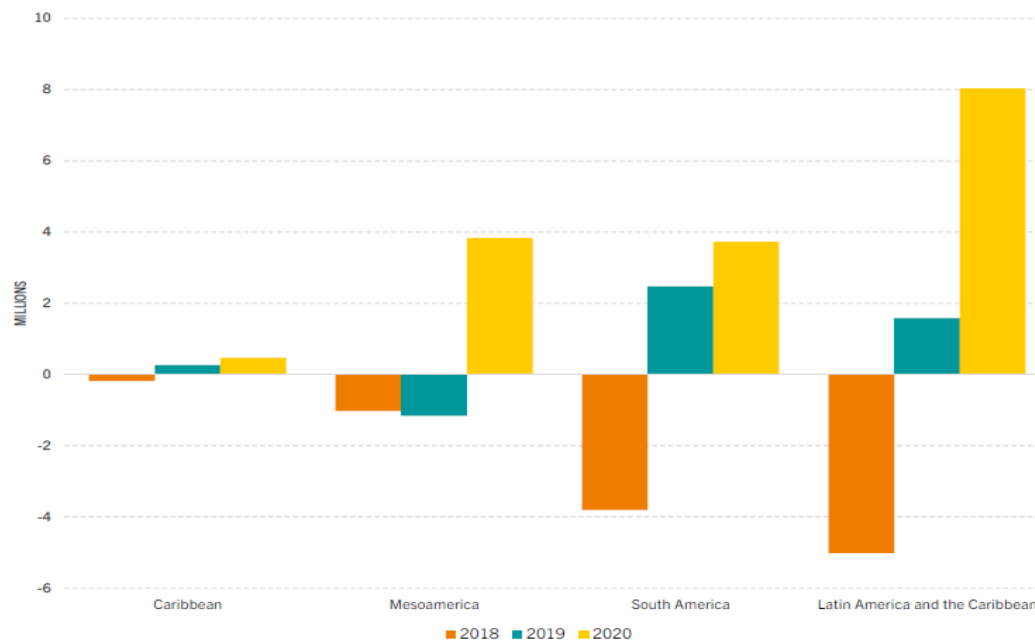


Source: FAO et al., 2023, p.21

The condition of overweight in children below the age of 5 years is 7.5%, which is 2pp above the world average and is a concerning issue. Similarly, obesity among adults has been steeply rising in the region between the years 2000 to 2016. WHO associates the rise of being overweight with the rise of limited physical activities and consumption of meals that are fatty and non-nutritious. Cases of anaemia in women in the bracket of 15-49 years of age in the region have been about 17% in 2019 which is way below the world average of 30%. Brazil achieved a reduction of 40% and Guatemala decreased the prevalence by more than 65% between 2000 and 2019. A nutrition-sensitive food policy needs to be affordable and sustainable for all its citizens, especially the marginalized and the poor. The average cost of a healthy in the region is very high, at USD 3.8 per day vs the global average of USD 3.5, steeply increasing between 2019 and 2021 by 3.4%. Based on food-based dietary guidelines (FBDG), a “healthy diet” is said to have a balance of calories and other nutrients taking into account diversity in food groups. Figure 4 below shows the unaffordability of a healthy diet and the increasing number of people who have not been able to afford one.

Figure 4

Change in the total number of people being unable to afford a healthy diet (vs. the previous year)



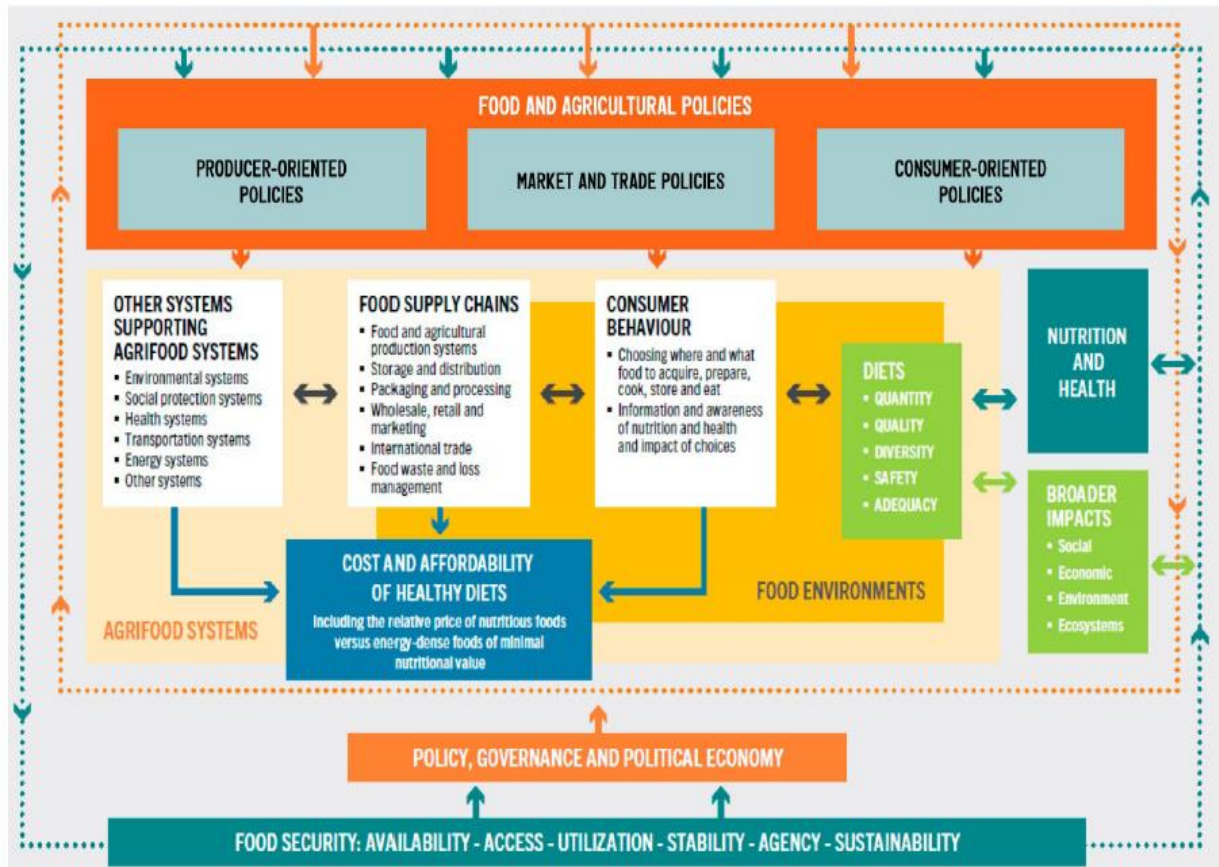
Source: FAO et al., 2023, p.41

Brazil

Comprehensive policy interventions at the overarching level of the food value chains, encompassing all the actors and the stakeholders in the systems – producers, customers, traders, markets, and the environment go a long way in ensuring a healthy and nutritious diet that is sustainable for all. Policies that incentivize the production of only specific food items, and do not promote diversity and local food systems are detrimental, affecting nutrition indicators. The following diagram (Figure 5) is indicative of a wholesome approach towards agri-food systems that Brazil, in particular, has implemented for the sake of its food and nutrition security.

Figure 5

Policy approach towards comprehensive agri-food systems



Source: FAO et al., 2023, p.76

An integrated approach that involves the participation of all stakeholders with active inputs from civil society and the government has been elementary to the approach. The linking of nutrition and agriculture in the 1970s with collaboration from all sectors with regular evaluation and monitoring have been the anchors of food and nutrition sovereignty and security (FNSS). The establishment of the “National System for Food and Nutrition Security” (SISAN) as a national policy reiterated the right to food and democratic access to affordable nutritious food for all. Social dialogs are regularly conducted at an intersectoral level. The 2003 Food Procurement Program (FPA) has been revolutionary for Brazil, focusing on empowering smallholder farmers and cooperatives with active market access and public stocks, diversity in local and traditional produce, acquiring and promoting food

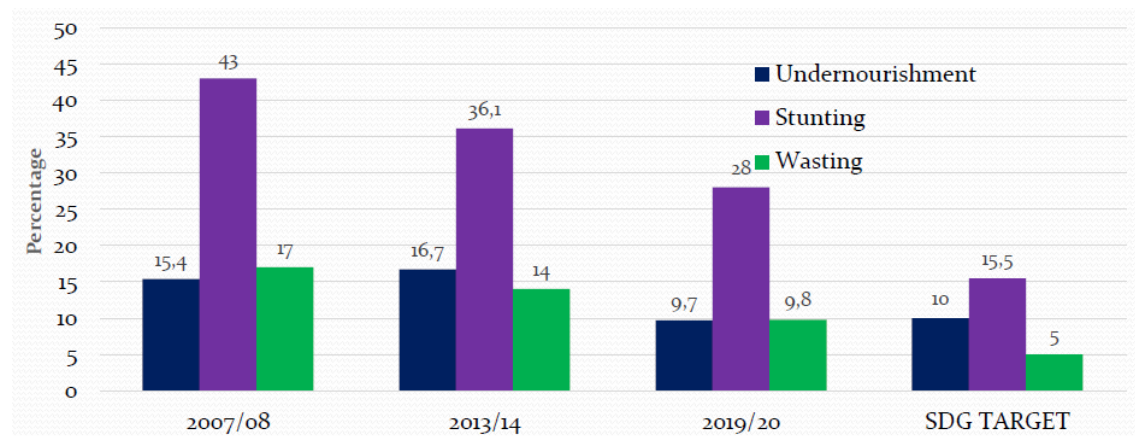
varieties by the government that are threatened due to climate and innovation on monocultures, the importance of traditional and local food systems for better health, availability of nutritious food all the year round and biodiversity. Government acquisition of stocks from small farmers through a decentralized approach and linking market cooperatives for public stocks have revolutionized agriculture in Brazil. Strategic interventions for raising awareness about local foods and nutrition through women lead organizations have been employed. The National Policy on Agroecology and Organic Production (PNAPO), 2012 has also been instrumental in integrating markets and producers for organic production and revival of local foods (Maluf et al., 2015).

Bangladesh

The nutrition indicators of Bangladesh have shown a steady improvement between 2015 to 2020 by declining more than 5% in malnourishment, 8% in stunting 5% in wasting, completely achieving the SDG targets as mandated (Figure 6). The National Food Security and Nutrition Policy (NFSNP) was approved in 2020 and adopts a food systems approach, ensuring a food supply that is adequate, nutritious, and diverse. It stresses intersectoral and inter-ministerial collaboration right down to the local farmer level along with economic

Figure 6

Bangladesh-Nutrition indicators



Source: Hosaini, 2022

connectivity. The policy proposes to incentivize and help develop climate-resilient diverse crops, enhance fisheries and animal husbandry, increase outreach to poor farmers and women in agriculture, bring in civil society associations in food systems, increase investments in related MSMEs, invest in technology for improving knowledge for farmers online, develop alternate efficient irrigation methods, and simplify and widen credit access to small farmers.

Discussion

In India, with the advent of the Green Revolution, government policy centered around ensuring food security and maneuvered agricultural advancements for overall economic prosperity. As a result, mass high-yielding crops like rice, wheat, and maize gained wider traction through technological innovation and grew manifold throughout Asia, marginalizing the micronutrient-dense traditional ‘coarse crops’ like pulses and millets which slowly turned unprofitable (Pingali & Sunder, 2017). The current impetus to millets is also a result of a reduction in water tables and irrigation getting difficult across the country. The issue of lack of modernization in irrigation has been exacerbated by climate change as well.

A closer look at the food and nutrition security policies from the aforementioned case studies of Bangladesh and Brazil exposes a completely different approach to a policy framework. Their evolution has been a result of realizing the demerits of questionable nutrition indicators, poverty, and climate change. International mandates like the SDGs also have a role to play. Though there has not been any research to establish the causal relationship of positive change in nutrition levels seen in both countries as a result of these policies, the practices proposed and employed in these countries are slated to move the needle. As a result of the cross-sectoral approach in a food systems approach as employed by both Bangladesh and Brazil, the regulatory and compliance burden gets distributed. All actors have a stake that is commensurate with the responsibility they have. Moreover, local-level empowerment doesn’t create power structures, in theory. Primary research would help to

prove this and provide deeper insights. The top learnings are (1) a participatory decentralized approach towards governance and implementation of food and nutrition security (2) involvement of civil society and regular cross-sectoral dialogs (3) Incentivizing and helping the smallholder and marginalized farmers to be a part of this transformation (4) Creating supportive economic forward and backward linkages for this to work (5) Strengthening MSMEs and SMEs to be a part of the agro-food ecosystem (6) Community involvement, especially women in sensitization (7) Incentivizing home farming (8) Focus on diverse, local, and traditional food systems for sustainability.

A set of guidelines for incorporating nutrition security in the Indian context should be able to build on these learnings while addressing the current challenges of monoculture subsidies and trade asymmetries.

Conclusion

The sustained focus on pushing calorie intakes and addressing hunger has been the central premise of the food security policies, undermining the importance of nutrition as a life cycle challenge. With a change in the dietary practices of the population that entails a reduction in calories, adding millets would bring diversity and sustainability to our diets, while preserving local food systems and conserving water. The study has limitations owing to the paucity of data that directly shows an improvement in nutrition indicators as a result of reformed food policies in Brazil and Bangladesh. Moreover, the political narrative plays a role in agriculture and the commercialization of it, which has not been considered in this study. Nevertheless, an understanding of the policy interventions in other countries will surely help navigate the scope better.

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