

Improving Food and Nutrition Security in West Bengal: Examining the Case of Public Private Partnership

Thesis Submitted to Jadavpur University, West Bengal for the Degree
of Doctor of Philosophy in Arts (Economics)

By

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**Dedicated to
My Mother**

Certified that the Thesis entitled

“Improving Food and Nutrition Security in West Bengal: Examining the Case of Public Private Partnership” submitted by me for the award of the Degree of Doctor of Philosophy in Arts at Jadavpur University is based upon my work carried out under the Supervision of **Dr. Vikas Dixit, Associate Professor, Dept. of Economics, Jadavpur University**. And that neither this thesis nor any part of it has been submitted before for any degree or diploma anywhere/elsewhere.

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Preface

Although India has made significant strides towards improving the food and nutritional status of its citizens over last one-and-a-half decades through a large number of programmes and legislative provisions, the progress still remains a matter of serious concern. This is more so when it comes to achieving the Sustainable Development Goals (SDG2 in this case) by 2030. Various national and international agencies put India among poor performing nations in terms of food and nutritional achievements. The wide spread disparities across different Indian States in this respect add further to the concern of food insecurity and malnutrition in the country. West Bengal, which is generally known for its fiscally indisciplined behaviour, is also one of the poor performing States in terms of malnutrition. Towards improving the food and nutrition situation in the country, both government as well as civil societies/non-governmental organisations play their respective roles. While government (both Central and State) runs a number of programmes for this purpose, private entities, like NGOs complement government's efforts towards this end by providing quality food to the needy.

In light of the above background, the present study is an attempt to conduct a subnational level analysis of food and nutrition situation in India, thereby exploring the role of both public as well as private stakeholders (though in a comparative perspective) in improving the outcomes. West Bengal has been considered as the case of an in-depth investigation in the present study. Specifically, this study seeks to find answers to the following questions:

- I. Did Government of West Bengal make quality spending for food and nutrition?
- II. What is the current scenario of private participation (through CSOs/NGOs, etc.) in financing and providing for food and nutrition services to the needy in West Bengal and how efficiently have these entities performed with and without government support?
- III. How cost-effective are related projects under PPP mode as compared to those under traditional mode?
- IV. What are some general and specific challenges in implementing PPP for food and nutrition in the state?

The methodology employed in the present study comprises of a survey of the available widely scattered literature on the subject, exploratory statistical tools for data analysis, tables and graphs for representation purposes and sophisticated econometric techniques for further empirical investigations. Notwithstanding the timely contribution of this study to the existing

knowledge base on the subject, it suffers from lack of secondary data on various important aspects, like district level government expenditure, comprehensive database on activities and parameters of NGOs, all relevant information on PPP projects, etc. The time and resource constraints in hand did not allow this study to conduct the required field surveys and interviews with various stakeholders involved in the process of improving food and nutrition security.

Given the need and purpose of the present analysis, this study has been divided into six chapters. Chapter 1 is introductory in nature and sets out necessary background for this study. It provides a historical overview of the evolution of the concept of food and nutrition security, presents global scenario and traces India's relative situation with wide interstate disparities in this respect. The second chapter of the thesis surveys the relevant literature in the area of food and nutrition. It first discusses the theoretical underpinnings of the issue from demand-side as well as supply-side perspectives, along with some common factors, such as pandemic which affect the food and nutrition situation and shape policies for it. This is followed by a discussion of the relevant empirical contributions, covering studies from India and abroad. Literature has also been explored for examining the collaborative efforts to improve food and nutrition situation in India and elsewhere.

In Chapter 3 of the thesis, the broad trend and pattern of government expenditure of States is analysed so as to have an idea of fund allocation for social sector, in general, and for food and nutrition (and related services), in particular. This is followed by empirical investigation of the effectiveness and efficiency of government expenditure towards food and nutrition. While the analysis conducted in this chapter took into account all Indian States, the primary focus has been on West Bengal.

The fourth chapter of the study examined the role of non-governmental organisations in improving the food and nutrition outcomes and also assesses their resource-use efficiency. Through a structured interviews with a handful of NGOs as well as schools, the chapter also enumerates various challenges being faced by NGOs in performing their operations smoothly. In the fifth chapter of the study, the relative cost-efficiency of projects on water supply sanctioned under the traditional and PPP modes has been assessed. Finally, Chapter 6 concludes the present study by summarising the findings and highlighting the limitations of the study, discussing some policy suggestions and identifying the future research agenda.

Chapter 1

Introduction

1.1. General Background

1.1.1. The Concept of Food and Nutrition Security

As per the 1996 World Food Summit (also cited in Food and Agriculture Organisation [FAO] (2000)), food security is defined as the state when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. Food is here defined as any substance that people eat and drink to maintain life and growth. As a result, safe and clean water is an essential part of food commodities. The nutrition focus adds the aspects of caring practices and health services & healthy environments to this definition and concept. This aims at what is more precisely called ‘nutrition security’, which can be defined as adequate nutritional status in terms of protein, energy, vitamins, and minerals for all household members at all times (Weingärtner, 2004). This generally accepted and widely used definition of food and nutrition security involves four dimensions, and for food security objectives to be realised, all four dimensions must be fulfilled simultaneously. These four dimensions are:

- Physical availability of food: Food availability addresses the “supply side” of food security and is determined by the level of food production, stock levels and net trade.
- Economic and physical access to food: An adequate supply of food at the national or international level does not in itself guarantee household level food security. Concerns about insufficient food access have resulted in a greater policy focus on incomes, expenditure, markets and prices in achieving food security objectives.
- Food utilization: Utilization is commonly understood as the way the body makes the most of various nutrients in the food. Sufficient energy and nutrient intake by individuals are the result of good care and feeding practices, food preparation, diversity of the diet and intra-household distribution of food. Combined with good biological utilization of food consumed, this determines the nutritional status of individuals.
- Stability of the other three dimensions over time: Even if your food intake is adequate today, you are still considered to be food insecure if you have inadequate access to food on a periodic basis, risking a deterioration of your nutritional status. Adverse weather

conditions, political instability, or economic factors (unemployment, rising food prices) may have an impact on your food security status.

Various international organisations, including the World Health Organisation (WHO), the World Bank, the United Nations International Children's Emergency Fund (UNICEF), the Food and Agriculture Organisation (FAO), etc. work actively with countries to make them achieve food and nutrition security.¹ Prolonged lack of food and nutrients leads to various physical and mental impairments of human beings. It prevents children from growing into productive members of the society and be adults who are fully able to participate in the economic and social development of their countries. Sustainable food and nutrition security is life saving for people today and beneficial for future generations. It is for this reason that food insecurity and malnutrition are viewed as a violation of human rights. The International Covenant on Economic, Social and Cultural Rights adopted by the United Nations General Assembly in 1966 defined and formalised the right to food as a basic human right, which had already been mentioned in the Universal Declaration of Human Rights of the United Nations in 1948, and was re-affirmed in 1974.²

The concept of food security actually evolved with the recognition of the need for a secure, adequate and suitable supply of food for everyone during early 1940s, and the same received international acceptance in terms of bilateral aid flowing from countries having agricultural surplus commodities to countries needing it. Viewing food aid as a challenge in achieving self-sufficiency by developing nations, the concept of 'food for development' was introduced and institutionalised, leading to various interventions, such as the World Food Programme (WFP) in 1963. Events like food crisis and the resultant deteriorating situation in the world market during early 1970s, success of green revolution and its uneven adoption and/or unequal benefits in different regions, declining purchasing power of specific social groups, increasing adoption of economic liberalisation and globalisation by several nations, etc. broadened the concept of food security to include both physical and economic access to food supply. Gradually, countries started putting in place an added emphasis (or exclusive plans) for eradicating hunger and malnutrition as a part of their development strategies towards crisis management and prevention. Human right to Adequate food and nutrition was internationally reaffirmed calling for a strong commitment and proactive role of national governments. Reducing hunger and

¹ Accessed at <https://www.worldbank.org/en/topic/agriculture/brief/food-security-update/what-is-food-security> on 24.12.2023.

² Accessed at <https://www.manage.gov.in/studymaterial/FNS-E.pdf> on 24.12.2023.

malnutrition was exclusively targeted in the Millennium Development Goals (MDGs) from 2000 to 2015, and now in Sustainable Development Goals (SDGs) (SDG2 in particular) to be achieved by 2030. For this purpose, governments around the world have implemented a number of initiatives to combat malnutrition and improve the nutritional status of their populations. These initiatives can encompass a wide range of strategies and interventions, such as the following:

- (I) **Nutritional Education Programs:** Governments may launch campaigns to raise awareness about the importance of a balanced diet, proper nutrition during pregnancy and infancy, and the value of breastfeeding. These programs often target communities, schools, and healthcare facilities.
- (II) **Food Fortification Programs:** Governments may implement policies to fortify commonly consumed foods with essential vitamins and minerals. For example, fortifying staple foods like flour with iron or folic acid can help address micronutrient deficiencies.
- (III) **Supplementation Programs:** Governments may provide nutritional supplements, such as vitamin and mineral supplements, especially to vulnerable groups like pregnant women, infants, and young children. This helps ensure they receive adequate nutrition.
- (IV) **Public Distribution Systems:** Governments may establish systems to distribute subsidized or free nutritious food to vulnerable populations. This can include school feeding programs, food assistance for low-income families, and support for pregnant and lactating women.
- (V) **Agricultural and Food Security Initiatives:** Efforts to improve agricultural practices and food security contribute to combating malnutrition. This includes supporting small-scale farmers, promoting diverse and nutrient-rich crops, and implementing sustainable agriculture practices.
- (VI) **Healthcare and Maternal Care Services:** Ensuring access to quality healthcare, especially for mothers and young children, is crucial. Prenatal and postnatal care, immunizations, and other healthcare services can contribute to better maternal and child nutrition.
- (VII) **Water, Sanitation, and Hygiene (WASH) Programs:** Access to clean water and proper sanitation is essential for preventing waterborne diseases that can contribute

to malnutrition. WASH initiatives can improve overall health and nutritional outcomes.

- (VIII) **Monitoring and Evaluation Systems:** Establishing systems to monitor and evaluate nutritional status on a regular basis helps governments track progress and adjust interventions as needed. This includes collecting data on malnutrition rates, micronutrient deficiencies, and related health indicators.
- (IX) **Poverty Alleviation Programs:** Addressing the root causes of malnutrition often involves broader efforts to alleviate poverty. Economic empowerment and social safety nets can contribute to improved access to food and healthcare.

These initiatives are often part of a comprehensive, multi-sectoral approach to combat malnutrition, recognizing the complex interplay of factors that contribute to nutritional wellbeing. Collaboration with international organizations, non-governmental organizations (NGOs), and local communities is also crucial for the success of these initiatives.

1.1.2. Present Global Scenario of Food and Nutrition Security

According to the estimates of the State of Food Security and Nutrition in the World 2023, the proportion of the world population facing chronic hunger in 2022 was about 9.2 percent (roughly 735 million people), compared with 7.9 percent (about 613 million people) in 2019 (pre-pandemic period) (FAO, International Fund for Agricultural Development [IFAD], United Nations International Children’s Emergency Fund [UNICEF], World Food Programme [WFP] and World Health Organization [WHO], 2023). Chronic hunger is not the only cause of concern, even more worrisome aspect is The lack of nutritious, safe and sufficient food to as many as 2.4 billion people, comprising relatively more women and people living in rural areas throughout the year in 2022. The report (cited above) asserts, “The persisting impact of the pandemic on people’s disposable income, the rising cost of a healthy diet and the overall rise in inflation also continued to leave billions without access to an affordable healthy diet. Millions of children under five years of age continue to suffer from stunting (148 million), wasting (45 million) and overweight (37 million). Despite progress in reducing child undernutrition – both stunting and wasting – the world is not on track to achieve the associated 2030 targets, and neither is any region on track to attain the 2030 target for low birthweight, so closely linked to the nutrition of women before and during pregnancy. Steady progress is only seen on levels of exclusive breastfeeding. Indeed, it is projected that almost 600 million people will still be chronically undernourished in 2030, pointing to the immense challenge of

achieving the SDG target to eradicate hunger. This is 119 million more people than in a scenario in which neither the COVID-19 pandemic nor the war in Ukraine had occurred, and around 23 million people more than in a scenario where the war had not happened.”

The Asia and the Pacific region account for the half (with 370.7 million) of the global total undernourished people as well as half of the world’s severe food insecurity, with more women than men being food insecure (Food and Agriculture Organization, 2023). Prevalence rates on stunting, wasting and overweight among children under 5 years of age, as well as anaemia among women of reproductive age, are still off the marks in terms of World Health Assembly global nutrition targets. Southern Asia accounts for almost 314 million of the region’s undernourished people. This represents 85 percent of undernourished people in the Asia and the Pacific region. There are more severely food insecure individuals in Southern Asia than any other subregions. Women across the subregions, except for Eastern Asia, tend to be more food insecure than men. These problems are compounded by the rising cost of a healthy diet, which rose on average to 5.3 purchasing power parity (PPP) dollars per person per day in 2021 – higher than the world’s average of 4.3 PPP dollars per person per day. It is estimated that in 2021, 232.8 million people in the region could not afford the cost of a healthy diet (op.cit.).

1.2. Food and Nutrition Security in India: Evolution and Present Status

1.2.1. Evolution of the Concept of Food and Nutrition Security in India

At the time of Independence in 1947, India had no proper food distribution system in place, and the country was at the verge of acute starvation following the aftermath of famine during 1943-44 and low agricultural production. Furthermore, there was chronic energy deficiency due to low dietary intake because of poverty and low purchasing power; high prevalence of infection because of poor access to safe-drinking water, sanitation and health care; and poor utilisation of available facilities due to low literacy and lack of awareness. The major public health problems were chronic energy deficiency (CED), kwashiorkor, marasmus and micronutrient deficiencies such as goitre, beriberi, blindness due to Vitamin-A deficiency and anaemia.³ Recognising these challenges, the framers of the Indian Constitution as well as planners gave special emphasis on provisions and policies related to food and nutrition. For example, under the Directive Principles of State Policy (Part-IV) of the Indian Constitution, Article 47 is concerned with the duty of the State to raise the level of nutrition and the standard

³ Tenth Five-Year Plan Document, Volume 2, Chapter 3, accessed on 25.12.2023 at <https://www.niti.gov.in/planning-commission-archive>.

of living and to improve public health. It states, "The State shall regard the raising of the level of nutrition and the standard of living of its people and the improvement of public health as among its primary duties and, in particular, the State shall endeavour to bring about prohibition of the consumption except for medicinal purposes of intoxicating drinks and of drugs which are injurious to health."⁴ Likewise, the fundamental right to life enshrined in Article 21 of the Constitution may be interpreted to include right to live with human dignity, which may include the right to food and other basic necessities. Inspired by the Constitutional provisions and the then existing situation of mass starvation, achieving self-sufficiency in food grains production became one of the long-term objectives of India's economic planning.

The then successive Five-Year Plans thus laid down the policies and strategies for achieving goals of improving foodgrain production, enhancing agricultural productivity, modernization of agricultural practices and improving irrigation, putting in place a robust food distribution system, etc. The Green Revolution, adopted in mid 1960s, ensured that the increase in food production stayed ahead of the increase in population. The country gradually achieved its goal of self-sufficiency in food grain production, and moved from chronic shortages to an era of surplus and export in most food items. Along with ensuring the adequacy of food through increased production, steps were also undertaken to ensure the following:

*Food availability – through building buffer stocks;

*Food accessibility – through an improvement in the food distribution by building up the public distribution system (PDS), and later the targeted public distribution system (TPDS)⁵;

*Food affordability – improving household food security as well as making food affordable to them by improving purchasing power, Food for Work Programme and direct or indirect food subsidy by way of schemes like Annapurna Scheme (since 1998)⁶ and Antyodaya Anna Yojana (since 2000)⁷;

*Raising the nutrition level – by not only providing quality food and food supplementation to address special needs of the vulnerable groups through schemes such as Integrated Child

⁴ Constitution of India, Legislative Department, Government of India. Accessed at <https://cdnbbsr.s3waas.gov.in/s380537a945c7aaa788ccfcdf1b99b5d8f/uploads/2023/05/2023050195.pdf>.

⁵ TPDS was put in place in June 1997 so as to limit the rising cost of food subsidy and also to cover the population below poverty line.

⁶ <https://nsap.nic.in/Guidelines/Annapurna%20scheme%20guidelines%202000.pdf>.

⁷ <https://eparlib.nic.in/bitstream/123456789/642522/1/142024.pdf>.

Development Services (ICDS)⁸ and Mid-Day Meals (MDM)⁹, but also through nutrition education, especially through Food and Nutrition Board (FNB) and ICDS; and

*Public health – efforts of the health sector to tackle adverse health consequences of undernutrition, adverse effects of infection and unwanted fertility on the nutritional status and micronutrient deficiencies and their health consequences through national level programmes for tackling anaemia, iodine deficiency disorders and Vitamin-A deficiency.

The measures stated above helped in increasing the availability and access of food at an affordable cost to the intended beneficiaries, even covering vulnerable out-of-work segment of the population. Table 1.1 give a snapshot of per capita availability of major food crops in India.

Table 1.1: Per Capita Availability of Different Food Grains in India

Per capita net availability (Kg per year)						
Year	Rice	Wheat	Other cereals	Cereals	Pulses	Foodgrains
2015-16	67.2	72.9	26.1	162	15.7	177.7
2016-17	66.8	66.7	29.4	158.4	20	178.4
2017-18	69.2	61.5	30.6	161.3	18.7	180.1
2018-19	69.1	65.2	27.8	162.1	17.5	179.6
2019-20	72	64.2	30.9	167.2	16	183.1

Source: Economic Survey (various years) (Statistical Appendix), Ministry of Finance, Government of India.

Recognising the need for a safe clean drinking water and proper sanitation facility, more especially in rural areas, several schemes at national and subnational levels were started, relating to water supply¹⁰ and sanitation¹¹. Programmes, like ICDS and MDM have been exemplary towards improving dietary intake in women and children and some improvement in their nutritional status by providing food supplementation to pregnant and lactating women and children. To an extent, MDM has also helped in reducing dropout rate in primary school. Similarly, access to healthcare has also improved thereby eliminating the prevalence of Kwashiorkor, marasmus, pellagra, lathyrism, beriberi and blindness due to severe Vitamin-A deficiency (erstwhile Tenth Five-Year Plan Document, Volume 2, Chapter 3). With the

⁸ <https://wcd.nic.in/integrated-child-development-services-icds-scheme>.

⁹ <https://www.education.gov.in/mid-day-meal>.

¹⁰ https://jalshakti-ddws.gov.in/sites/default/files/JJM_note.pdf.

¹¹ <https://megphed.gov.in/tsc.htm>.

introduction of National Rural Health Mission (NRHM) in 2005¹², more emphasis has been given on reproductive and child healthcare component.

Notwithstanding the partial success of earlier food and nutrition programmes, they have grappled with numerous challenges, including underfunding of these programmes, their poor design and weak implementation, and above all, hardly any orientation to output/outcome in a holistic manner. In view of these and other difficulties, the last decade (2010-2020) witnessed a shift in the focus of the Government towards achieving food and nutritional security in the country from a segmented view to a holistic view. The first major development in this respect came in the form of National Food Security Act (NFSA), 2013. This Act, enacted on July 5, 2013, marks a paradigm shift in the approach to food security from welfare to rights based approach.¹³ It provides highly subsidised foodgrains to about two-thirds of the population. Further, in order to improve nutritional outcomes for children, pregnant women and lactating mothers, Government of India started a flagship Centrally Sponsored Scheme (CSS), called National Nutrition Mission (Poshan Abhiyan) in March 2018.¹⁴ The scheme strives to reduce the levels of stunting, undernutrition, anaemia and low birth weight babies and address the problem of malnutrition in a mission-mode.

The Anaemia Mukht Bharat (AMB) strategy, launched in 2018 by the Government of India aims at reducing anaemia in the vulnerable age groups such as women, children and adolescents in life cycle approach providing preventive and curative mechanisms through a 6X6X6 strategy including six target beneficiaries, six interventions and six institutional mechanisms for all stakeholders to implement the strategy.¹⁵

For many years now, much emphasis has also been given on fortification of food crops, such as rice to improve their nutrition value. Fortification of rice with vitamin A may be used as a public health strategy to improve the iron status and vitamin A nutrition of populations. Some countries, which have adopted rice fortification strategy to address nutrient deficiencies, particularly in populations where rice is a staple food include Philippines, Bangladesh, Vietnam, Indonesia, India, etc. The Cabinet Committee on Economic Affairs, chaired by the Prime Minister, Shri Narendra Modi, accorded its approval for supply of fortified rice throughout the Targeted Public Distribution System (TPDS) under the National Food Security

¹² <https://nhm.gov.in/index1.php?lang=1&level=1&lid=49&sublinkid=969>.

¹³ Accessed at <https://nfsa.gov.in/portal/nfsa-act>

¹⁴ <https://pib.gov.in/PressReleasePage.aspx?PRID=1910409>

¹⁵ See <https://pib.gov.in/PressReleasePage.aspx?PRID=1795421> for details.

Act (NFSA), Integrated Child Development Services (ICDS), Pradhan Mantri Poshan Shakti Nirman-PM POSHAN [erstwhile Mid-Day Meal Scheme (MDM)] and Other Welfare Schemes (OWS) of Government of India in all States and Union Territories (UTs) by 2024 in a phased manner.¹⁶

Apart from rice fortification, growing coarse cereals and pulses, with particular emphasis on millets. India is the world's largest millet producer. In 2020, India's Pearl Millet output accounted for 40.51 % of global Millet production, with Sorghum accounting for 8.09 %. Rajasthan, Karnataka, Maharashtra, Uttar Pradesh, Haryana, Gujarat, Madhya Pradesh, Tamil Nadu, Andhra Pradesh, and Uttarakhand are the major millet-producing states in India. These ten states account for around 98 % of millet output in India throughout the 2020-21 decade. Six states contribute more than 83 % of total millet production: Rajasthan, Karnataka, Maharashtra, Uttar Pradesh, Haryana, and Gujarat. The Union Ministry of Food Processing and the West Bengal Food Processing Industries and Horticulture Department are jointly planning to develop millet processing units in the State under the “Production Linked Incentive” (PLI) scheme. The State is also exploring the possibility of cultivating millets – crops for arid regions – in the fertile soil. The Food Processing Industry got an approval of Rs.10900 crore from the Government for assisting the units. Out of this, Rs.800 crore has been allocated for millets based products.¹⁷

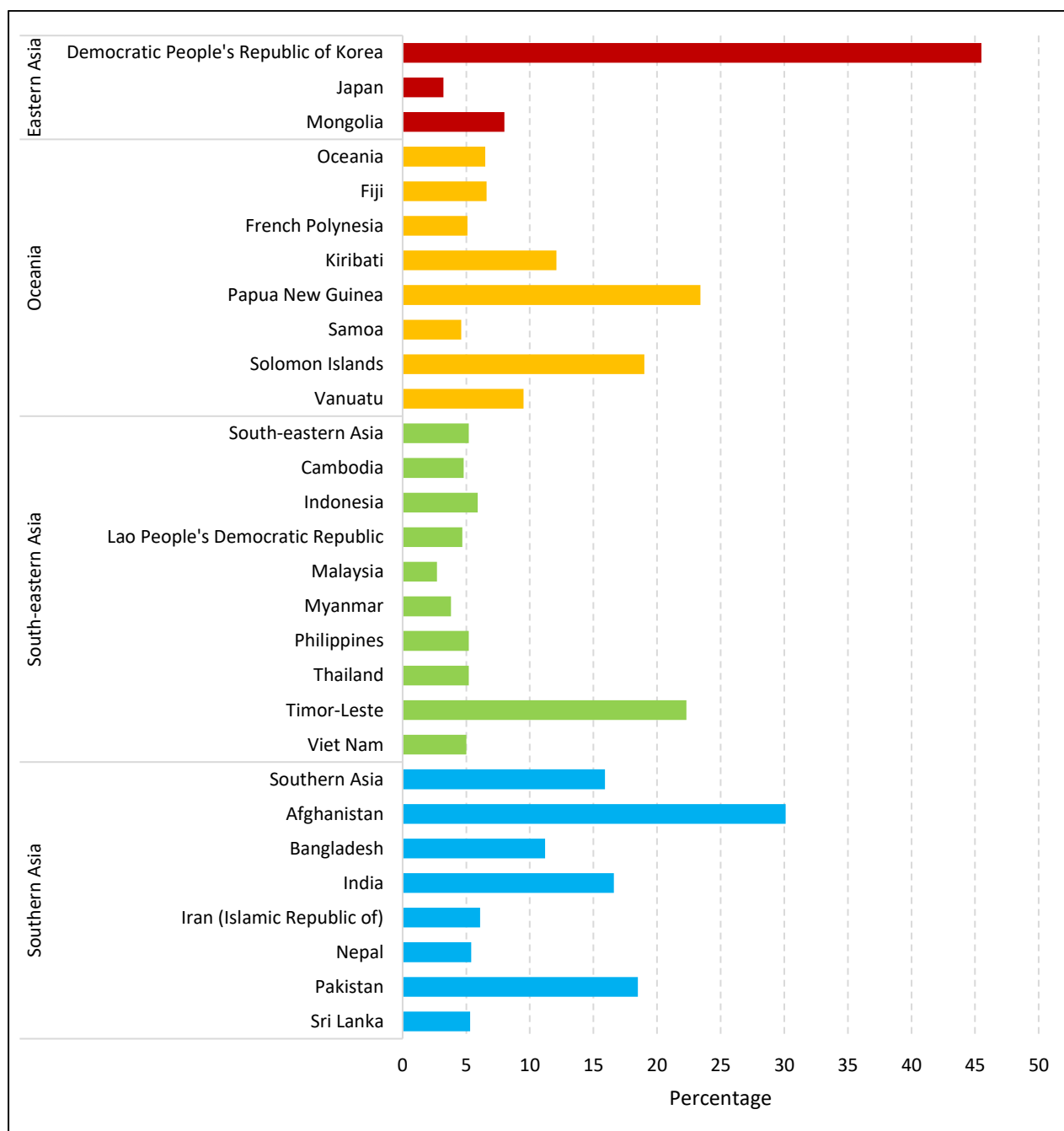
1.2.2. India’s Position on Food and Nutrition Security

Despite a long journey towards fight for food and nutrition security motivated by the nation’s Constitutional provisions, India’s position continues to remain a matter of concern, both in absolute terms as well as relative to other nations in the world. As per the State of Food Security and Nutrition in the World (regional overview of the Asia and the Pacific) (FAO, 2023), India is one of the nations (along with Pakistan and Afghanistan) in South Asia having high percentage of undernourishment (Figure 1.1).

¹⁶<https://haryanafood.gov.in/rice-fortification/>

¹⁷ <https://timesofindia.indiatimes.com/city/kolkata/centre-state-mull-millet-processing-units-in-bengal/articleshow/103449006.cms>

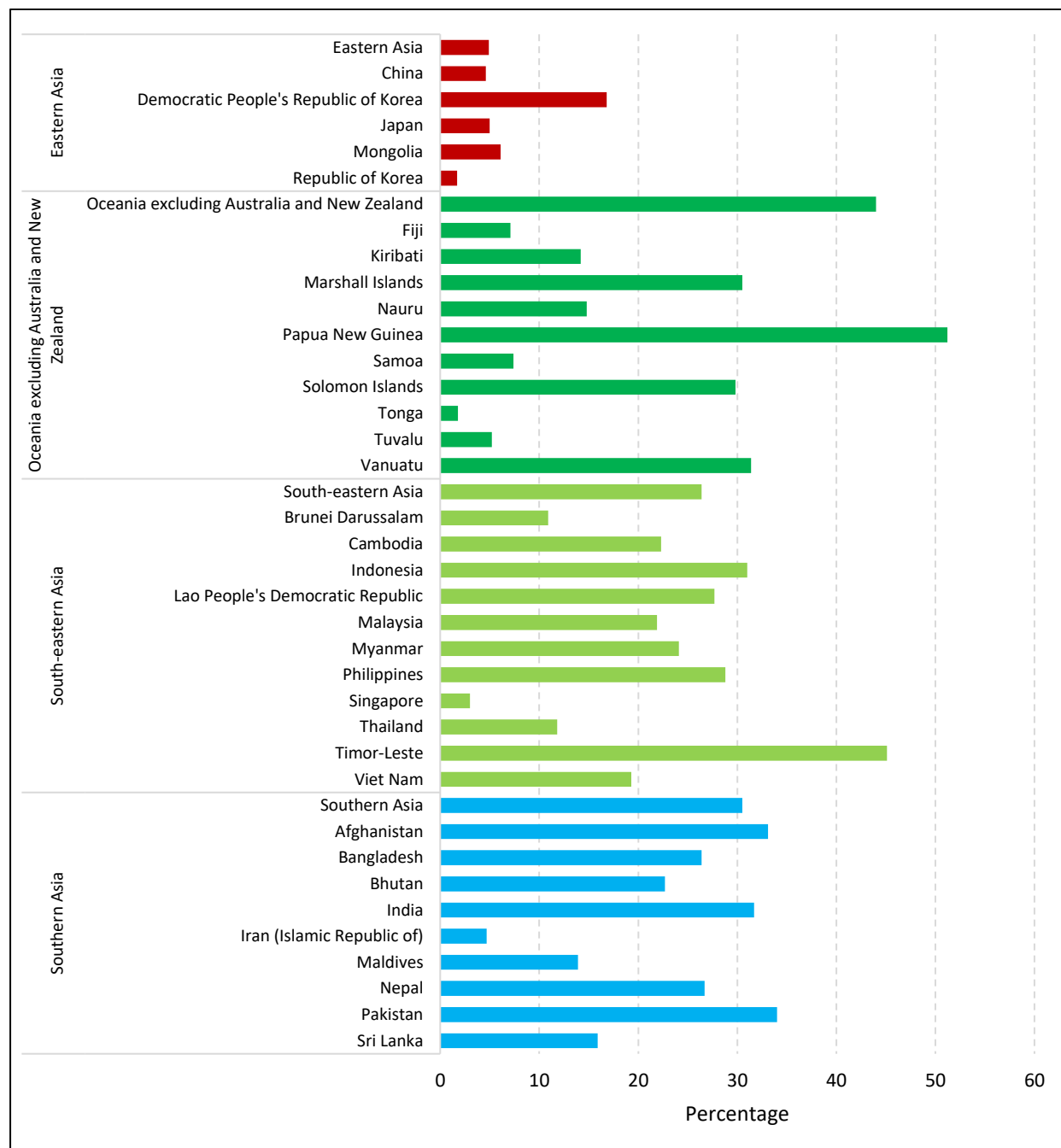
Figure 1.1. Prevalence of Undernourishment in Asia and the Pacific by Country and Subregion (2020–2022)



Source: FAO (2023).

These three countries (Afghanistan, India and Pakistan) from South Asia have also recorded high prevalence of stunting (a sign of chronic undernourishment) among children under five years of age between 32 and 34 percent (Figure 1.2).

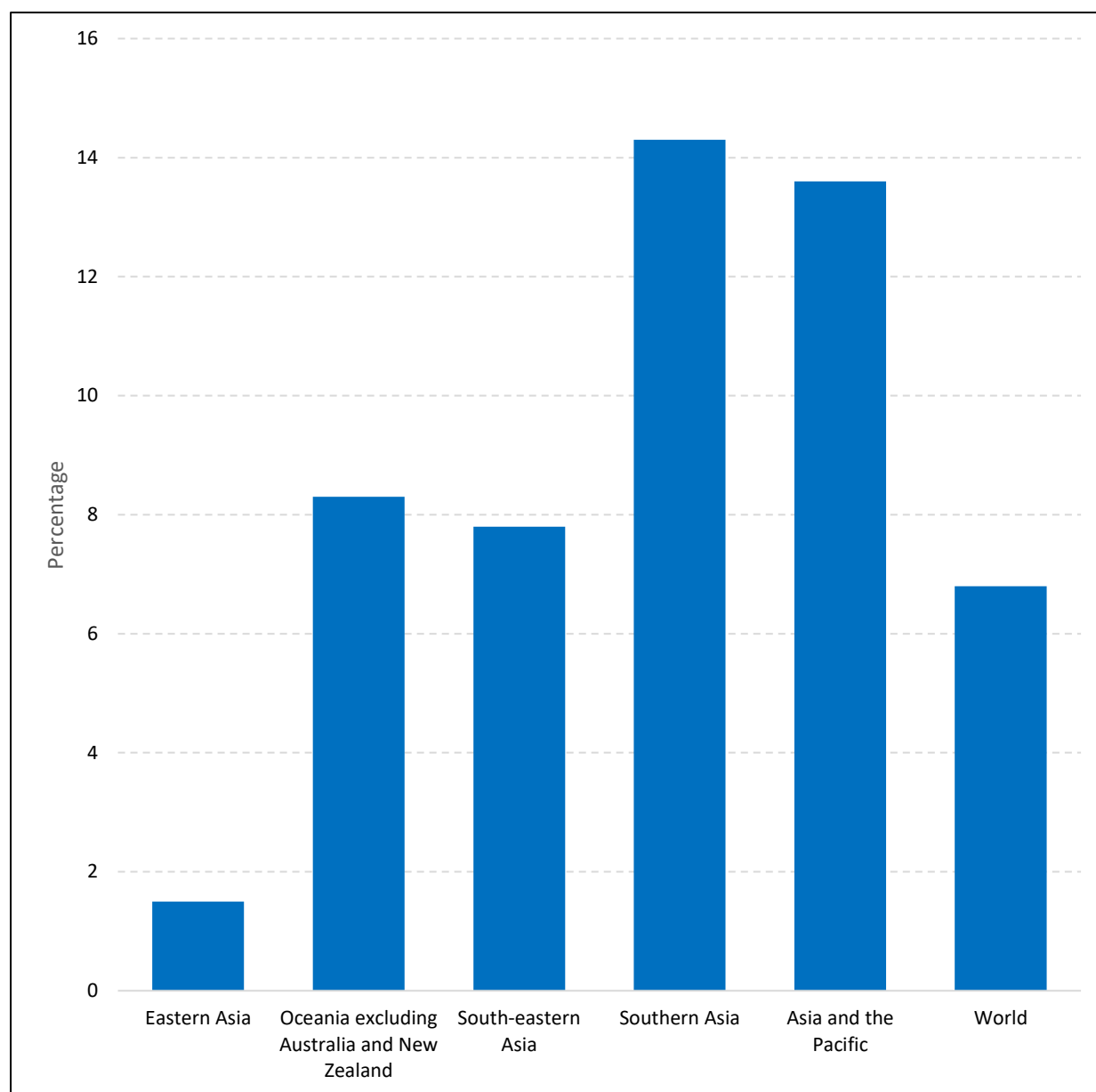
Figure 1.2. Prevalence of Stunting Among Children Under 5 Years of Age in Asia and the Pacific by Country and Subregion (2022)



Source: Same as for Figure 1.1.

It is also interesting to note that Asia and the Pacific region overall has more children under 5 years affected by wasting (acute undernutrition) than the world average in 2022 – in fact double the percent of the world; and within this region, Southern Asia had the highest percent (14.3 percent), which is slightly higher than that of the entire region (13.6) (Figure 1.3).

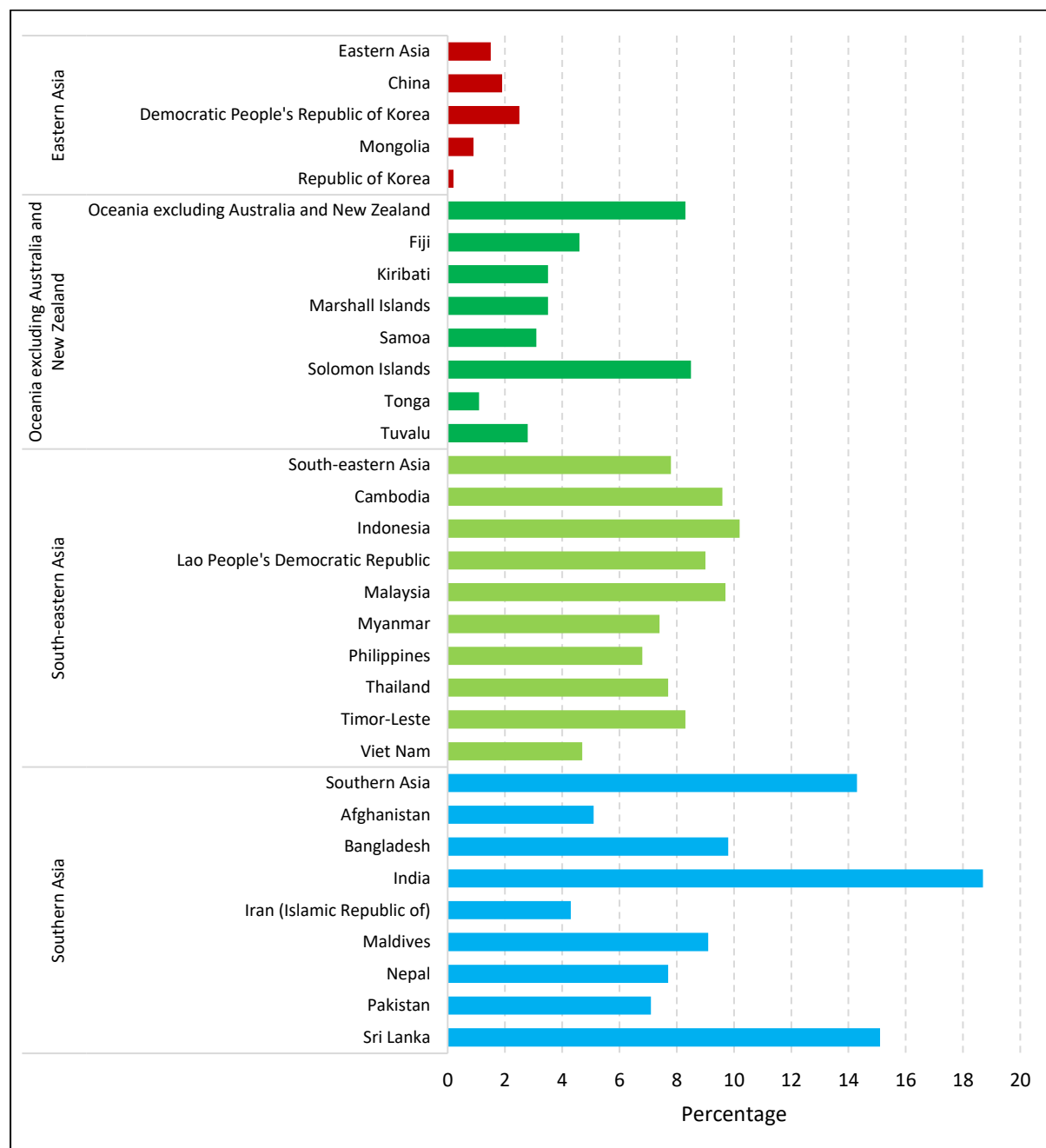
Figure 1.3. Prevalence of Wasting Among Children Under 5 Years of Age in Asia and the Pacific by Subregion (2022)



Source: Same as for Figure 1.1.

Within South Asia, India, Sri Lanka and Bangladesh reported the high prevalence of wasting (Figure 1.4).

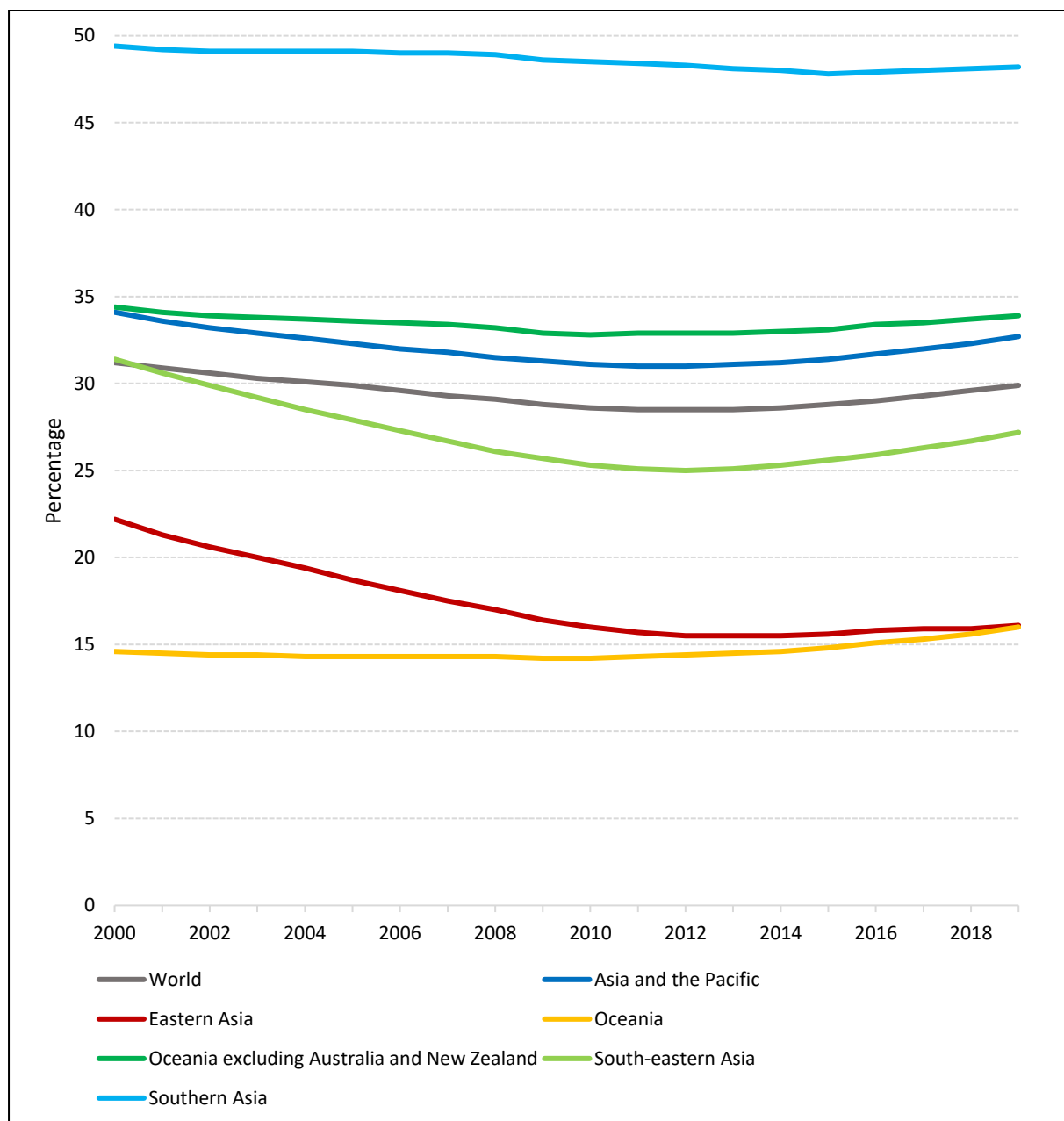
Figure 1.4. Prevalence of Wasting Among Children Under 5 Years of Age in Asia and the Pacific by Country and subregion (2015-2022)



Source: Same as for Figure 1.1.

The Asia and the Pacific region has also higher prevalence of anaemic women (32.9 per cent) in the age group 15-40 years compared to the world average of 29.9 per cent; Southern Asia had the highest prevalence of anaemia for this group (48.2 per cent), which is considered to be a severe public health problem based on the WHO classification of 40 percent or more (Figure 1.5).

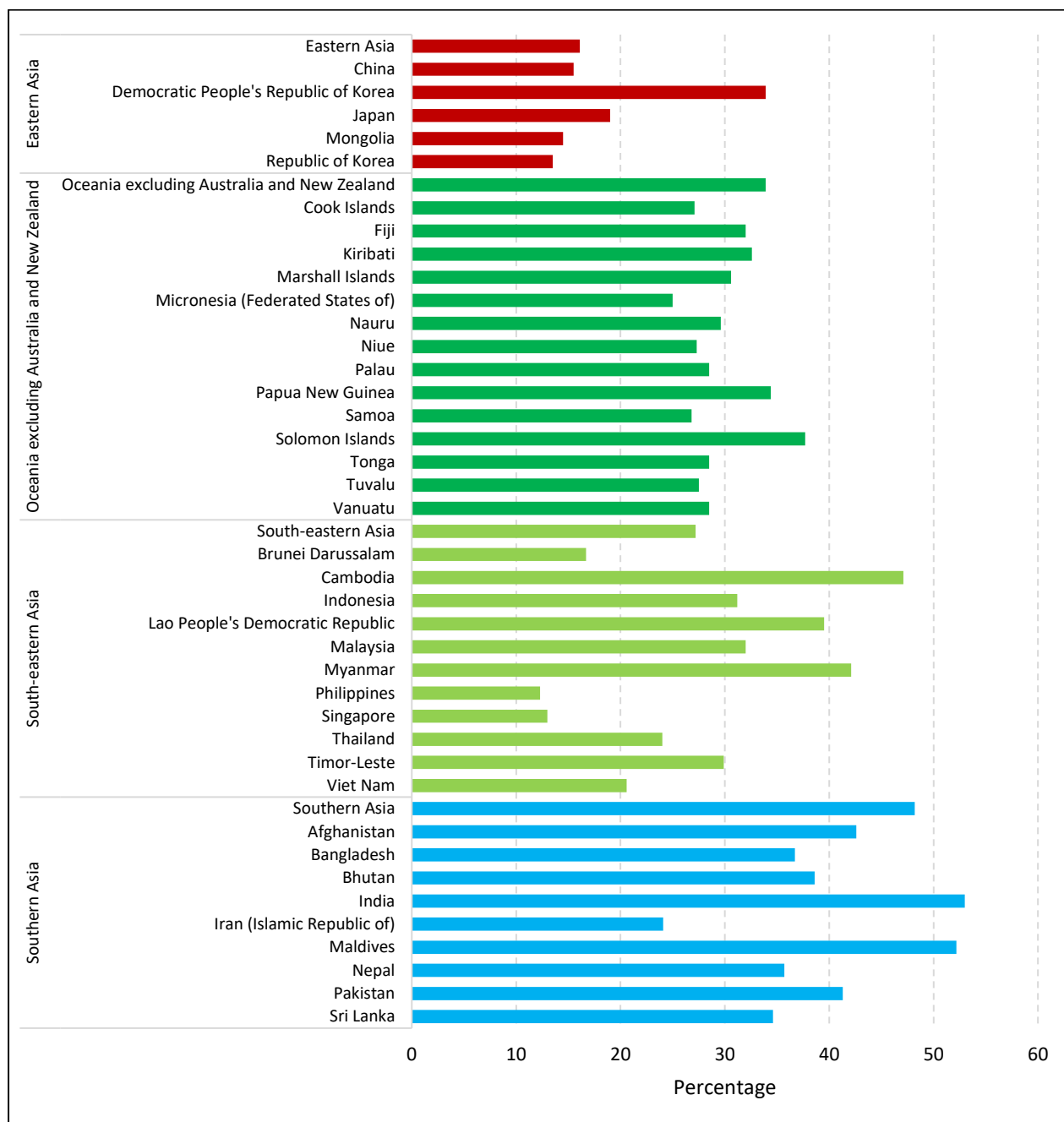
Figure 1.5. Prevalence of Anaemia Among Women Aged 15 to 49 Years in Asia and the Pacific by Subregion



Source: Same as for Figure 1.1.

Afghanistan, India, the Islamic Republic of Iran, and Pakistan are the countries from Southern Asia having severe problem of anaemia (Figure 1.6).

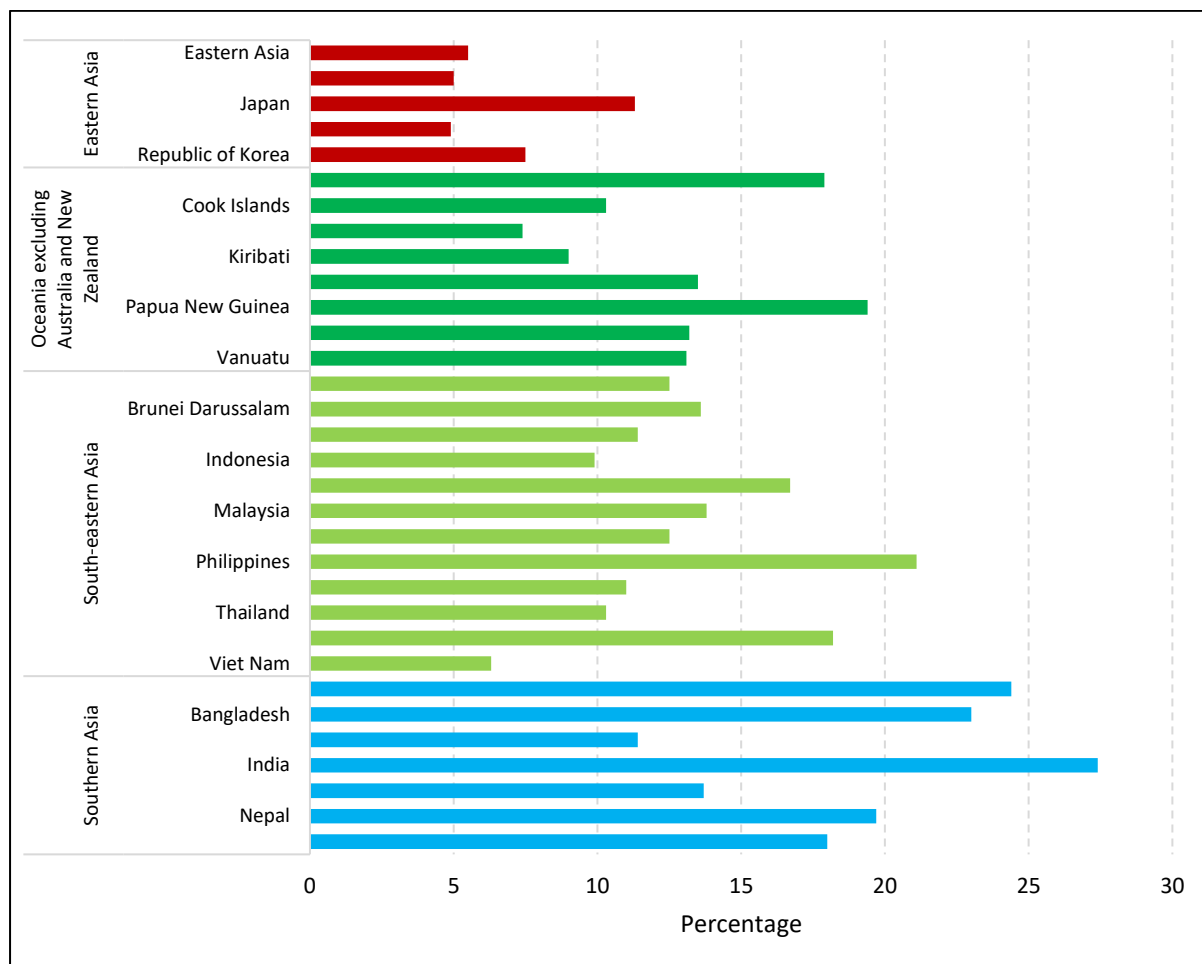
Figure 1.6. Prevalence of Anaemia Among Women Aged 15 to 49 Years in Asia and the Pacific by Country and Subregion (2019)



Source: Same as for Figure 1.1.

Looking at the data disaggregated by country and subregion (Figure 1.7) in 2020, the highest prevalence of low birthweight is in India (Southern Asia), followed by Bangladesh and Nepal (also in Southern Asia).

Figure 1.7. Prevalence of low birthweight in Asia and the Pacific by country and subregion (2020)



Source: Same as for Figure 1.1.

Clearly, the region in general and the countries in particular are off the track in terms of progress in achieving the WHO global nutrition target. In terms of affordability of healthy diet, in 2021, the average cost of a healthy diet in the Asia and the Pacific region was estimated at 4.15 PPP dollars per person per day, making it unaffordable for as many as 1.9 billion people; out of whom 1.4 billion people live in South Asia alone. In this connection, it may be noted that around 21.25 per cent of India's population lives on less than US\$1.9 a day, and India is a home to a quarter of all undernourished people worldwide, making the country a key focus for

tackling hunger on a global scale.¹⁸ As per the **Global Food Security Index (GFSI) - 2020**, India stood at the 71st position among a total of 113 countries. Table 1.2 gives the values of GFSI of G20 member countries (including India) as well as their relative positions among all 113 countries. The trends suggest that India faces challenges in terms of food security compared to some other major economies.

**Table 1.2. Global Food Security Index 2020 - Relative Positions of G20 Members
Among 113 Countries**

Member Country of G20	Value	Rank
United Kingdom	78.5	6
Japan	77.9	9
United States	77.5	11
Canada	77.2	12
Germany	77	13
Italy	76.6	15
France	76.5	17
Russia	73.7	24
South Korea	72.1	29
Australia	71.3	31
Saudi Arabia	69.5	38
China	69.3	39
Mexico	66.2	45
Turkey	65.3	47
Brazil	64.1	50
Argentina	62.7	55
Indonesia	59.5	65
South Africa	57.8	69
India	56.2	71

Source: Global Food Security Index 2020, the Economist Intelligence Unit, accessed at <https://nonews.co/wp-content/uploads/2021/03/GFSI2020.pdf>

¹⁸ World Food Programme: India, accessed at <https://www.wfp.org/countries/india> on 28/07/2022.

Although the fifth round of National Family Health Survey (NFHS) held during 2019-21 (in two phases) (Government of India, 2021) indicates some improvement in malnutrition status, there are still signs of concern, especially when looked in terms of prevalence of anaemia among women and children. Wide interstate disparities are also observed in malnutrition status highlighting the state-specific issues which might have hampered the successful implementation of various nutrition programmes. As per NFHS-V, in India, 36 per cent of children under age 5 years are stunted, 19 per cent are wasted and 32 per cent are underweight (Table 1.3). On the other hand, 18.7 per cent women have less than normal body mass index ($BMI < 18.5 \text{ kg/m}^2$). The alarming situation in terms of high prevalence of anaemia (along with large interstate disparities) can be noticed from Table 1.4 which indicates a deterioration in the prevalence of anaemia from NFHS-IV to NFHS-V. Anaemia is a serious concern for children because it can impair cognitive development, stunt growth and increase morbidity from infectious diseases. Overall, 67 per cent of children had some degree of anaemia. 29 per cent of children had mild anaemia, 36 per cent had moderate anaemia and 2 per cent had severe anaemia. Between 2015-16 and 2019-21, the prevalence of anaemia among children age 6-59 months increased from 59 per cent to 67 per cent. As many as 57 per cent women in the age group 15-49 suffer from anaemia as per round 5 of NFHS (2019-21); this represents an increase in the prevalence of anaemia among women from 53 per cent in round 4 of NFHS (2015-16).

Table 1.3. Status of Malnutrition Among Children and Women as per NFHS Rounds 4 and 5

State/UT	Incidence of Malnutrition (in per cent)							
	Stunting		Wasting		Underweight		Women having below normal BMI	
	NFHS4 (2015-16)	NFHS5 (2019-21)	NFHS4 (2015-16)	NFHS5 (2019-21)	NFHS4 (2015-16)	NFHS5 (2019-21)	NFHS4 (2015-16)	NFHS5 (2019-21)
A&N Islands	23.3	22.5	18.9	16	21.6	23.7	13.1	9.4
Andhra Pradesh	31.4	31.2	17.2	16.1	31.9	29.6	17.6	14.8
Arunachal Pradesh	29.4	28	17.3	13.1	19.4	15.4	8.5	5.7
Assam	36.4	35.3	17	21.7	29.8	32.8	25.7	17.6
Bihar	48.3	42.9	20.8	22.9	43.9	41	30.4	25.6
Chandigarh	28.7	25.3	10.9	8.4	24.5	20.6	13.3	13
Chhattisgarh	37.6	34.6	23.1	18.9	37.7	31.3	26.7	23.1
D&N Haveli and D&D	37.2	39.4	26.7	21.6	35.8	38.7	23.4	25.1
Delhi	31.9	30.9	15.9	11.2	27	21.8	14.9	10
Goa	20.1	25.8	21.9	19.1	23.8	24	14.7	13.8
Gujarat	38.5	39	26.4	25.1	39.3	39.7	27.2	25.2
Haryana	34	27.5	21.2	11.5	29.4	21.5	15.8	15.1
Himachal Pradesh	26.3	30.8	13.7	17.4	21.2	25.5	16.2	13.9
J&K	27.4	26.9	12.1	19	16.6	21	12.2	5.2
Jharkhand	45.3	39.6	29	22.4	47.8	39.4	31.5	26.2
Karnataka	36.2	35.4	26.1	19.5	35.2	32.9	20.7	17.2
Kerala	19.7	23.4	15.7	15.8	16.1	19.7	9.7	10.1
Ladakh	30.9	30.5	9.3	17.5	18.7	20.4	10.5	4.4
Lakshadweep	26.8	32	13.7	17.4	23.6	25.8	13.5	8
Madhya Pradesh	42	35.7	25.8	19	42.8	33	28.4	23
Maharashtra	34.4	35.2	25.6	25.6	36	36.1	23.5	20.8
Manipur	28.9	23.4	6.8	9.9	13.8	13.3	8.8	7.2
Meghalaya	43.8	46.5	15.3	12.1	28.9	26.6	12.1	10.8
Mizoram	28.1	28.9	6.1	9.8	12	12.7	8.4	5.3
Nagaland	28.6	32.7	11.3	19.1	16.7	26.9	12.3	11.1
Odisha	34.1	31	20.4	18.1	34.4	29.7	26.5	20.8
Puducherry	23.7	20	23.6	12.4	22	15.3	11.3	9
Punjab	25.7	24.5	15.6	10.6	21.6	16.9	11.7	12.7
Rajasthan	39.1	31.8	23	16.8	36.7	27.6	27	19.6
Sikkim	29.6	22.3	14.2	13.7	14.2	13.1	6.4	5.8
Tamil Nadu	27.1	25	19.7	14.6	23.8	22	14.6	12.6
Telangana	28	33.1	18.1	21.7	28.4	31.8	22.9	18.8
Tripura	24.3	32.3	16.8	18.2	24.1	25.6	18.9	16.2
Uttar Pradesh	46.3	39.7	17.9	17.3	39.5	32.1	25.3	19
Uttarakhand	33.5	27	19.5	13.2	26.6	21	18.4	13.9
West Bengal	32.5	33.8	20.3	20.3	31.6	32.2	21.3	14.8
India	38.4	35.5	21	19.3	35.8	32.1	22.9	18.7

Table 1.4. Prevalence of Anaemia as per NFHS Rounds 4 and 5

State/UT	NFHS	Prevalence of Anaemia (in per cent)					
		Anaemic Children	Anaemic Non-Pregnant Women	Anaemic Pregnant Women	All Anaemic Women	Anaemic Adolescent Girls	Anaemic Adolescent Boys
A&N Islands	NFHS-5	40	57.6	53.7	57.5	44.9	27.1
A&N Islands	NFHS-4	49	65.8	61.4	65.7	68.1	43
Andhra Pradesh	NFHS-5	63.2	59	53.7	58.8	60.1	18.7
Andhra Pradesh	NFHS-4	58.6	60.2	52.9	60	61.1	29.3
Arunachal Pradesh	NFHS-5	56.6	40.8	27.9	40.3	48.5	24.9
Arunachal Pradesh	NFHS-4	54.2	43.5	37.8	43.2	48.2	22.9
Assam	NFHS-5	68.4	66.4	54.2	65.9	67	39.6
Assam	NFHS-4	35.7	46.1	44.8	46	42.7	23.5
Bihar	NFHS-5	69.4	63.6	63.1	63.5	65.7	34.8
Bihar	NFHS-4	63.5	60.4	58.3	60.3	61	37.8
Chandigarh	NFHS-5	54.6	60.1	*	60.3	57.7	*
Chandigarh	NFHS-4	73.1	75.9	*	75.9	74.7	22.4
Chhattisgarh	NFHS-5	67.2	61.2	51.8	60.8	61.4	31.5
Chhattisgarh	NFHS-4	41.6	47.3	41.5	47	45.5	27.4
Nct Of Delhi	NFHS-5	69.2	50.2	42.2	49.9	51.6	18.9
Nct Of Delhi	NFHS-4	59.7	54.7	46.1	54.3	55.1	25.9
DNH& DD	NFHS-5	75.8	62.6	60.7	62.5	63.9	37
DNH& DD	NFHS-4	82	73.4	62.3	72.9	75.9	36.1
Goa	NFHS-5	53.2	38.9	41	39	44.5	15.8
Goa	NFHS-4	48.3	31.4	26.7	31.3	30.5	6.6
Gujarat	NFHS-5	79.7	65.1	62.6	65	69	36
Gujarat	NFHS-4	62.6	55.1	51.3	54.9	56.5	31.9
Haryana	NFHS-5	70.4	60.6	56.5	60.4	62.3	29.9
Haryana	NFHS-4	71.7	63.1	55	62.7	62.7	29.7
Himachal Pradesh	NFHS-5	55.4	53.4	42.2	53	53.2	22.1
Himachal Pradesh	NFHS-4	53.7	53.6	50.4	53.5	52.7	25
Jammu & Kashmir	NFHS-5	72.7	67.3	44.1	65.9	76.2	53.5
Jammu & Kashmir	NFHS-4	53.8	49	46.9	48.9	49.9	29.5
Jharkhand	NFHS-5	67.5	65.7	56.8	65.3	65.8	39.7
Jharkhand	NFHS-4	69.9	65.3	62.6	65.2	65	35.3
Karnataka	NFHS-5	65.5	47.8	45.7	47.8	49.4	26.5
Karnataka	NFHS-4	60.9	44.8	45.4	44.8	45.3	24.5
Kerala	NFHS-5	39.4	36.5	31.4	36.3	32.5	27.4
Kerala	NFHS-4	35.7	34.7	22.6	34.3	37.8	14.3
Lakshadweep	NFHS-5	43.1	26	20.9	25.8	31.4	*
Lakshadweep	NFHS-4	53.6	46.3	39	46	59	*
Ladakh	NFHS-5	92.5	93.7	78.1	92.8	96.9	93.1
Ladakh	NFHS-4	91.4	78.4	79.3	78.4	81.6	57.6
Madhya Pradesh	NFHS-5	72.7	54.7	52.9	54.7	58.1	30.5
Madhya Pradesh	NFHS-4	68.9	52.4	54.6	52.5	53.2	36.5
Maharashtra	NFHS-5	68.9	54.5	45.7	54.2	57.2	27.9
Maharashtra	NFHS-4	53.8	47.9	49.3	48	49.7	27.5
Manipur	NFHS-5	42.8	29.3	32.4	29.4	27.9	7.8

State/UT	NFHS	Prevalence of Anaemia (in per cent)					
		Anaemic Children	Anaemic Non-Pregnant Women	Anaemic Pregnant Women	All Anaemic Women	Anaemic Adolescent Girls	Anaemic Adolescent Boys
Manipur	NFHS-4	23.9	26.4	26	26.4	21.1	9.2
Meghalaya	NFHS-5	45.1	54.4	45	53.8	52.5	30.1
Meghalaya	NFHS-4	48	56.4	53.3	56.2	52.1	25.2
Mizoram	NFHS-5	46.4	34.8	34	34.8	34.9	21.5
Mizoram	NFHS-4	19.3	24.7	27	24.8	21.3	14.4
Nagaland	NFHS-5	42.7	29.3	22.2	28.9	33.9	19.6
Nagaland	NFHS-4	26.4	27.7	32.7	27.9	26.3	12.2
Odisha	NFHS-5	64.2	64.4	61.8	64.3	65.5	30
Odisha	NFHS-4	44.6	51.2	47.6	51	51	30.3
Puducherry	NFHS-5	64	55.5	42.5	55.1	58.4	30.7
Puducherry	NFHS-4	44.9	53.4	26	52.4	55	40.6
Punjab	NFHS-5	71.1	58.8	51.7	58.7	60.3	32.7
Punjab	NFHS-4	56.6	54	42	53.5	58	30.8
Rajasthan	NFHS-5	71.5	54.7	46.3	54.4	59.4	34
Rajasthan	NFHS-4	60.3	46.8	46.6	46.8	49.1	22.1
Sikkim	NFHS-5	56.4	42.1	40.7	42.1	46.7	17.6
Sikkim	NFHS-4	55.1	35.2	23.6	34.9	48.7	16.7
Tamil Nadu	NFHS-5	57.4	53.6	48.3	53.4	52.9	24.6
Tamil Nadu	NFHS-4	50.7	55.4	44.4	55	54.2	26
Telangana	NFHS-5	70	57.8	53.2	57.6	64.7	25.1
Telangana	NFHS-4	60.7	56.9	48.2	56.6	59.7	19.2
Tripura	NFHS-5	64.3	67.4	61.5	67.2	67.9	27.2
Tripura	NFHS-4	48.3	54.5	54.4	54.5	52.2	22
Uttar Pradesh	NFHS-5	66.4	50.6	45.9	50.4	52.9	28.2
Uttar Pradesh	NFHS-4	63.2	52.5	51	52.4	53.7	31.5
Uttarakhand	NFHS-5	58.8	42.4	46.4	42.6	40.9	27.6
Uttarakhand	NFHS-4	59.8	45.1	46.5	45.2	46.4	22.2
West Bengal	NFHS-5	69	71.7	62.3	71.4	70.8	38.7
West Bengal	NFHS-4	54.2	62.8	53.6	62.5	62.2	31.7
India	NFHS-5	67.1	57.2	52.2	57	59.1	31.1
India	NFHS-4	58.6	53.2	50.4	53.1	54.1	29.2

Note: For definitions of various malnutrition and anaemia related indicators used in Tables 1.3 and 1.4 above, please refer to Appendix A given at the end of this thesis. In case of Table 1.3, stunting, wasting and underweight indicators correspond to children under 5 years of age, whereas anaemia status among children, in Table 1.4, is measured in children age 6-59 months. women age 15-49 years have been considered for assessing their malnutrition status in terms of BMI (Table 1.3) and Anaemia (Table 1.4). The adolescence age group for both girls and boys in Table 1.4 correspond to 15-19 years.

Source: The source for Tables 1.3 and 1.4 is the National Family Health Survey Round 5, the International Institute for Population Sciences.

India is a federal country and its growth and development is thus shaped by the growth and development of its various States and Union Territories. Being specific to health and nutritional status among States, large disparities are observed from Tables 1.3 and 1.4, and West Bengal, which is the sample State for this proposed study stands among poor performers in this respect. Here it is interesting to note that the nutritional status of West Bengal as well as its relative position among different general category States¹⁹ of India has hardly changed (rather it deteriorated in many instances) between Rounds 4 and 5 of National Family Health Survey. The percentage of children who are stunted increased marginally from 33 per cent to 34 per cent between NFHS-4 and NFHS-5. The percentage of children who are underweight (32 per cent) or wasted (20 per cent) has not changed since NFHS-4. Likewise, the overall prevalence of anaemia in children increased from 54 per cent in NFHS-4 to 69 per cent in NFHS-5. On the other hand, 71 per cent of women in West Bengal have anaemia, an increase by 9 percentage points since NFHS-4. Here it may be noted that anaemia is particularly high among rural women, women age 40-49, and scheduled tribe women, but anaemia exceeds 60 percent for every group of women (trends for all categories and groups are not reported in Table 1.4 to conserve the space, but available in the main report of NFHS-5). Thus, the continuing high levels of undernutrition are still a major problem in West Bengal. The interdistrict disparities are even more pronounced on the prevalence of anaemia in West Bengal, as is shown in Table 1.5. The percentage of children aged 6-59 months having any type of anaemia varies from 57.9 per cent in North Twenty Four Parganas (without any competing district closed to it) to a high of 77.9 per cent in Puruliya (with Uttar Dinajpur closed to it having 77.2 per cent prevalence). However, in case of women, the situation is different with Kolkata and Darjeeling having respectively 58.2 per cent and 59.2 per cent women suffering from any type of anaemia, while Dakshin Dinajpur and Paschim Medinipur account for 82 per cent and 81.5 per cent respectively of such women. In order to achieve global targets of malnutrition and to progress on sustainable development goals (SDG2, in particular), States like West Bengal will have to devise effective strategies and will have to make a concerted effort to achieve the desired path of elimination of malnutrition. This is possible only through a collaboration of various stakeholders starting from the government at all levels to the people who are required to be

¹⁹ Prior to the implementation of the recommendations of the Fourteenth Finance Commission, a distinction was drawn between eighteen general category States and eleven special category States (including eight North Eastern States and three States falling in the Himalayan region comprising of the erstwhile State of Jammu and Kashmir). The eighteen general category States were: Andhra Pradesh, Bihar, Chhattisgarh, Goa, Gujarat, Haryana, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Telangana, Uttar Pradesh and West Bengal. The distinction between these two categories of States was introduced based on their socio-economic development and defence aspects. Special category States used to get special Central assistances.

more conscious of their life-style and consumption patterns. In light of this background, the present study is an attempt to examine the case for possible collaboration between public and private stakeholders through a process of so-called public private partnership to achieve the nutritional improvement in West Bengal. In what follows, at first, a brief profile of West Bengal is given to understand the basic nature of the State's economy.

Table 1.5. Prevalence of Anaemia Among Children Aged 6-59 Months and Women Aged 15-49 Years by District – NFHS-5 (2019-21)

District	Percentage of Children Having Any Anaemia	Percentage of Women Having Any Anaemia
Bankura	67.1	77
Birbhum	76.5	77.7
Dakshin Dinajpur	72.5	82
Darjeeling	68.1	59.2
Howrah	67.7	65.3
Hugli	67.9	75.1
Jalpaiguri	67.4	71.4
Koch Bihar	66.4	74.8
Kolkata	72.3	58.2
Maldah	71	73.6
Murshidabad	72.1	77.6
Nadia	63.6	73.4
North Twenty Four Parganas	57.9	65.3
Paschim Bardhaman	74.7	65.8
Paschim Medinipur	66	81.5
Purba Bardhaman	71.5	77.9
Purba Medinipur	67.5	70.4
Puruliya	77.9	76.7
South Twenty Four Parganas	70.4	61.6
Uttar Dinajpur	77.2	72.4
West Bengal	69	71.4

Source: Same as for Tables 1.3 and 1.4.

1.3. A Brief Profile of West Bengal²⁰

West Bengal is located in the eastern region of India along the Bay of Bengal. It is bounded to the east by the country of Bangladesh, to the north by the State of Sikkim and the country of Bhutan, to the northeast by the State of Assam, to the South by the Bay of Bengal, to the Southwest by the State of Odisha, to the West by the States of Jharkhand and Bihar and to the Northwest by the country of Nepal. It includes the Darjeeling Himalayan hill region, the Ganges delta, the Rarh region²¹ and the coastal Sundarbans. The State is spread over a geographical area of 88752 sq.km (2.70 per cent of the country's total geographical area) and is home to around 9.17 crore (7.52 per cent of the population of the country) as per Census 2011. It is the fourth-most populous State and the fourteenth largest by area in India. The State has 23 districts and one autonomous region (Gorkhaland Territorial Administration). The per capita gross state domestic product (GSDP) of the State is Rs.132212. Agriculture forms the basis of West Bengal's economy engaging directly or indirectly roughly 70 per cent of State's population. Rice is the main food crop; wheat, potato, vegetables, oil seeds, etc. being the other ones. Table 1.6 summarises the per capita gross availability of various food crops in West Bengal.

Table 1.6. Annual Per Capita Food Production in West Bengal (in kg)

Year	Rice	Wheat	Coarse cereals	Pulses	Foodgrains
2015-16	167.79	10.09	7.7	3.51	189.11
2016-17	159.92	9.01	7.54	2.71	179.18
2017-18	155.42	3.23	11.99	4.6	175.26
2018-19	167.6	3.48	17.97	3.8	192.86
2019-20	162.86	5.22	20.69	3.94	192.73

Source: Handbook of Statistics on Indian States 2022-23, the Reserve Bank of India; and Population Projections for India and States 2011-2036, Ministry of Health and Family Welfare, Government of India.

As per National Family Health Survey, Round 5 (2019-21), about two-thirds (67 per cent) of the households are in rural areas in West Bengal. The overall sex ratio of the population is 1049

²⁰ This section largely draws on Audit Report No.1 of 2022 on State Finances of West Bengal for the year ending March 2021, released by the Comptroller and Auditor General of India.

²¹ Rarh Bengal is a region in Eastern India that lies between the Chhota Nagpur Plateau on the west and the Ganges Delta on the east. Districts of West Bengal like Purulia, Bankura, Birbhum and Burdwan lie in this region.

females per 1000 males. Appendix B furnishes some indicators pertaining to West Bengal's economy, demography and government finances.

1.4. Motivation for the Present Study and Specific Research Questions

The background set out in this chapter (Sections 1.1 and 1.2) clearly puts India among poor performing nations in terms of food and nutritional achievements. Although India has made significant strides towards improving the food and nutritional status of its citizens over last one-and-a-half decades through a large number of programmes and legislative provisions, the progress still remains a matter of serious concern. This is more so when it comes to achieving the Sustainable Development Goals (SDG2 in this case) by 2030. The wide spread disparities across different Indian States in this respect add further to the concern of food insecurity and malnutrition in the country. West Bengal, which is generally known for its fiscally indisciplined behaviour, is also one of the poor performing States in terms of malnutrition. This provides enough motivation to conduct a subnational level analysis of food and nutrition situation in India, thereby exploring the role of both public as well as private stakeholders (though in a comparative perspective) in improving the outcomes. The present study is an attempt in this direction, considering West Bengal as the case of an in-depth investigation. Specifically, this study seeks to find answers to the following questions:

- I. Did Government of West Bengal make quality spending for food and nutrition?
- II. What is the current scenario of private participation (through CSOs/NGOs, etc.) in financing and providing for food and nutrition services to the needy in West Bengal and how efficiently have these entities performed with and without government support?
- III. How cost-effective are related projects under PPP mode as compared to those under traditional mode?
- IV. What are some general and specific challenges in implementing PPP for food and nutrition in the state?

1.5. Objectives and Testable Hypotheses for the Present Study

In order to find possible answers to the above questions, this study has the following research objectives:

1. To examine the trends in government expenditure of West Bengal along with its effectiveness and efficiency for food and nutrition;

2. To assess the role and efficiency of private entities, such as NGOS in financing and provisioning of food and nutrition in West Bengal;
3. To analyse and compare the cost-effectiveness of water supply projects completed in West Bengal under PPP and traditional modes; and
4. To identify some general and specific challenges in allowing PPP for food and nutrition.

The following hypotheses are developed and will be tested during the course of this study to support the aforementioned objectives.

- (1) West Bengal government spends effectively and efficiently on food and nutrition, though the same is constrained by the extent of tied grants from the Centre;
- (2) Private entities, like NGOs play an important role in food and nutrition security, however, NGOs with government support perform more efficiently than those without government support; and
- (3) Social and Community projects (such as that on water supply) sanctioned and completed under PPP mode are more cost-effective as compared to those under traditional mode in West Bengal.

1.6. Methodology and Data Sources

Although the methodology and approach used for different types of analysis conducted in this study is discussed in the relevant chapters of the thesis along with proper citation of appropriate data sources utilised, here it may be summarised in the following points:

- This study initially builds itself on the available widely scattered relevant literature on the subject, tries to learn from the experiences and evidences from there and attempts to identify the area (or commonly referred to as the research gap) for this study.
- After setting out the research directions, the existing secondary data on subnational government finances have been analysed using exploratory statistical tools, such as percentages, ratios, average and coefficient of variation, etc. so as to highlight the broad trends in government expenditure and its share for food and nutrition. Tables and graphs (line, and bar charts, in particular) have been used to represent the trends.
- Fractional regression with Probit specification (in a panel setting) has been estimated (with alternative specifications) to empirically examine the effectiveness of government expenditure towards food and nutrition. Here the goal is basically to investigate the impact of government spending on major interventions (like expenditure on ICDS,

nutrition, NHM, water supply and sanitation and agriculture and allied activities) on outcomes, such as under-five mortality rate, stunting, wasting and underweight among children, anaemia in children and women, food inflation, per capita production of coarse cereals and pulses and incidence of poverty.

- The efficiency of government expenditure is assessed using data envelopment analysis (DEA) proposed by Charnes, Cooper and Rhodes (1978) and Banker, Charnes and Cooper (1984). Furthermore, DEA-Bootstrap regression technique (proposed by Simar and Wilson (2007)) is employed to investigate the impact of environmental factors on efficiency of government expenditure.
- In order to examine the role of private entities towards food and nutrition, information on NGOs is gathered from various sources available in the public domain, including NGO Darpan, a database of the Government of India. After applying necessary filters, a set of active NGOs operational in the food and nutrition sector in West Bengal has been considered for the present analysis. The analysis is done through a combination of primary data collected through a small structured questionnaire seeking responses from NGOs in West Bengal (via google platform, over phone and WhatsApp); a similar small survey from four selected schools providing mid-day meal to their children; and secondary information utilised from the available literature to supplement the analysis. NGOs' efficiency of resource use is assessed using DEA.
- Lastly, in order to analyse the cost-effectiveness in a comparative perspective for projects on water supply conducted in both the traditional (government-funded) mode and in PPP mode in West Bengal, the database on public private partnership hosted by the Ministry of Finance, Government of India is relied upon. Given the lack of data on many relevant parameters, the analysis is restricted to the cost and output of water supply projects sanctioned under both PPP and traditional modes. The efficiency scores of these projects have been computed using DEA and due to the varying number of projects under both modes, the inferences are drawn based on summary measures.

1.7. Major Limitations of the Present Study

The issue being analysed in this study demands an in-depth investigation of each individual State from various angles. However, given time and resource constraints, a single-researcher-backed study, such as the present one, cannot undertake a fruitful analysis of all States of India. For this reason, this study is confined only to West Bengal. However, non-availability of data at district level on government expenditure in the public domain made it impossible to fully

justify the analysis. Furthermore, time and resources at hand did not allow the researcher to conduct a detailed primary survey on some of the important aspects which this type of study demands, more especially detailed views from different stakeholders about the challenges regarding implementing PPP in the sector of food and nutrition. Moreover, the lack of data on many indicators made it almost impossible to conduct an in-depth investigation of relevant projects sanctioned under PPP and traditional modes with proper identification of factors which impact the productivity of these projects. Notwithstanding these and other limitations, this study makes a preliminary contribution to the existing field in terms of its analysis on a contextual issue from a subnational viewpoint exploring the case of a joint collaboration of public and private stakeholders to solve the problem of food security and malnutrition. In fact, The Sustainable Development Goals also gave due importance to effective collaboration between different partners/stakeholders in the process of development.

1.8. Plan of the Study

Having set out an introductory background in Chapter 1, the second chapter of this thesis presents a brief survey of relevant theoretical and empirical literature on the subject. Chapter 3 provides a trend analysis of government expenditure at the subnational level with a special emphasis on West Bengal. This is followed by an empirical investigation of the effectiveness and efficiency of government expenditure in the same chapter. In Chapter 4 of the thesis, an attempt is made to understand the role of NGOs in providing food and nutrition support to the needy in West Bengal. In doing so, an empirical examination of NGOs' efficiency of resource use is conducted. The endeavour of the fifth chapter is to analyse the cost-effectiveness of projects on water supply in a comparative perspective for traditional and PPP modes. The chapter also highlights some of the major challenges that are barriers in the successful implementation of public private partnership in food and nutrition sector. Finally, Chapter 6 summarises the work, presents the major findings and makes some policy suggestions.

Chapter 2.

Review of Literature

2.1. Introduction

The preceding chapter of this thesis has provided an initial conceptual background to the issue of food and nutrition security. Despite international commitments and national policies, the problem of inadequate food intake and undernourishment continues to remain a major challenge for the developing region. Provision of adequate and nutritious food to all is thus committed under the Addis Ababa Action Agenda of 2030, which most nations have agreed to. A study, like the present one is, therefore, a timely attempt to examine the issue of food and nutrition security for India (West Bengal in particular) from a macroeconomic perspective, taking into account the individual as well as the joint role of public and private stakeholders in achieving the broad objective of “the absence of hunger and malnutrition”. The present chapter provides a critical survey of available and accessible literature relevant to this study, including both theoretical underpinnings as well as empirical works around it, and comprising studies specific to India and from abroad.

2.2. Theoretical Foundations of Food and Nutrition Security

For analytical purpose, the theoretical underpinnings of food and nutrition security may be viewed from two broad angles, namely, demand-side (which includes changes in individual’s own choice and preference for food as well as eating habit and eating behaviour) and supply-side (which basically accounts for developments in policies regarding food and nutrition).

2.2.1. Demand-Side Perspective of Food and Nutrition

The recognition of the importance of nutrition as an inevitable component of human life dates back to the time of Aristotle and Galen. They considered nutrition as a vital part of health, disease, performance, and healing. The power in each part of the body is believed to be dependent on the blood flowing to that part. The blood is formed by the nutrients absorbed from the consumed foods. According to the Greek, Roman, and Chinese classical literature, the diet should consist largely of cereal grains, legumes, fruits, honey, fish, and milk. Foods like meat, wine, and confectionary should be consumed in moderation (Tanaka, 2017). Thus, in ancient times (precisely the beginning phase of human civilization), humans used to feed themselves by seeding, cultivating crops and hunting animals². Like other humanitarian

necessities such as water and a place to live, food has long been equally important part of human survival. Starting with a series of discoveries of vitamins and minerals between 1910 and 1930, nutritional science has evolved alongside modern food production methods. People have now begun to realise the importance of a healthy diet (and not just food of any kind) for a proper growth of their body and mind. As per Cole (1971), "nutrition is the fundamental prerequisite for human welfare and contributes to human and social capital." Better nutrition contributes significantly to the formation of physical health, which in turn contributes significantly to increasing productivity and accelerating economic growth." However, time has changed drastically, and humans have become more powerful (next to Almighty) and more engaged in stressful work-life than ever before in the age of advanced machinery and technology. In this age, food is not considered just a source of energy for survival, instead it is an experience for instant pleasure and gratification. Consequent upon changes in lifestyle and eating habits, no matter why, complications such as obesity, heart disease, diabetes, and metabolic syndrome have become prevalent in many modern societies. This emphasises the role of (a) diets as a core link between food systems and their health and nutrition outcomes; and (b) the food environment in facilitating healthy and sustainable consumer food choices (HLPE, 2017). It is, therefore, imperative to understand a bit about food systems and their constituents before proceeding to the detailed exposition of supply-side perspective of food and nutrition security issues.

2.2.2. Food Systems and Their Constituents¹

A food system gathers all the elements (environment, people, inputs, processes, infrastructures, institutions, etc.) and activities that relate to the production, processing, distribution, preparation and consumption of food, and the outputs of these activities (with specific attention to nutrition and health outcomes of food systems which are relevant to this study). There are broadly three constituent elements of food systems, serving as entry and exit points for nutrition – (i) food supply chains, (ii) food environments and (iii) consumer behaviour.

(i) The food supply chain encompasses all activities that move food from production to consumption, including production, storage, distribution, processing, packaging, retailing and marketing. The decisions made by many actors at any stage of this chain have implications for

¹ This subsection is taken from HLPE (2017).

other stages. They influence the types of food available and accessible, as well as the way they are produced and consumed.

(ii) The food environment refers to the physical, economic, political and socio-cultural context in which consumers engage with the food system to acquire, prepare and consume food. The food environment consists of: “food entry points”, i.e., the physical spaces where food is obtained; the built environment that allows consumers to access these spaces; personal determinants of food choices (including income, education, values, skills, etc.); and the political, social and cultural norms that underlie these interactions. The key elements of the food environment that influence food choices, food acceptability and diets are: physical and economic access to food (proximity and affordability); food promotion, advertising and information; and food quality and safety.

(iii) Consumer behaviour reflects the choices made by consumers, at household or individual levels, on what food to acquire, store, prepare and eat, and on the allocation of food within the household (including gender repartition, feeding of children). Consumer behaviour is influenced by personal preferences determined by taste, convenience, culture and other factors. However, consumer behaviour is also shaped by the existing food environment. Collective changes in consumer behaviour can open pathways to more sustainable food systems that enhance food security and nutrition (FSN) and health.

These three components of food systems impact consumers’ capacity to adopt sustainable diets that are: protective and respectful of biodiversity and ecosystems; culturally acceptable; accessible; economically fair and affordable; and nutritionally adequate, safe and healthy, while optimizing natural and human resources. Depending on food supply chains and food environment, there may exist (or co-exist) broadly three types of food systems at local, national, regional or global levels, namely, traditional food systems; mixed food systems; and modern food systems. In traditional food systems, consumers rely on minimally processed seasonal foods, collected or produced for self-consumption or sold mainly through informal markets. Food supply chains are often short and local, thus access to perishable foods such as animal source foods (ASF) or certain fruits and vegetables can be limited or seasonal. Food environments are usually limited to one’s own production and informal markets that are daily or weekly and may be far from communities. In mixed food systems, food producers rely on both formal and informal markets to sell their crops. Highly-processed and packaged foods are more accessible, physically and economically, while nutrient-rich foods are more expensive.

Frequent branding and advertising accompany everyday activities, seen on billboards and in print publications, while food labelling is sometimes provided in markets. Even when food-based dietary guidelines are available, most consumers have little or no access to this information. Food safety and quality standards exist, but may not always be followed by producers. Modern food systems are characterized by more diverse food options all year long, and by processing and packaging to extend food's shelf life. These systems include both formal and easily accessible markets in high-income areas and food deserts and food swamps in low-income areas. While the cost of staples is lower relative to ASF and perishable foods, specialty foods (e.g. organic, local) are more expensive. Consumers' access to detailed information on food labels, store shelves, and menus and food is highly promoted. Food safety is monitored and enforced, and storage and transport infrastructures (including cold chain) are generally prevalent and reliable.

The food environment in urban centres in India is characterized by increasing choices, including increased access to processed, packaged and ready to eat energy-dense foods. Food is mainly purchased through the informal food sector such as corner stores, street stalls and kiosks, wet markets and unchained fast food restaurants, including street vendors. These outlets are more numerous, accessible and affordable than supermarkets and chained fast food restaurants, making them more popular among consumers. However, the food sold is often of variable quality, much of it is unbranded and does not contain labels. Although the informal food sector in India still dominates, a shift towards modern retail is under way. Between 2006 and 2011, there was a 20 per cent increase in volume growth of chained fast food restaurants as compared with a 7.2 per cent increase in independent restaurants. Over the same period of time, there was a 54 per cent increase in supermarket growth in the country, whereas there was a 4 per cent decline in independent grocers. Coinciding with the shift towards modern retail, there has been significant growth in packaged food sales in the country, including "better for you" packaged foods targeted at more affluent consumers with higher disposable incomes. Although the quality of foods available in the modern retail sector is generally high, food safety is still a concern in the country. To address this, the Food Safety and Standards Authority of India (FSSAI) issues necessary instructions from time to time to the State and Central governments to frame stringent guidelines for monitoring the food safety of products as well as to ensure that food manufacturers remove false claims and/or more fully disclose ingredients on their packaging. Thus, there is a push to improve both the composition of packaged foods as well as the information that is given to consumers in order for them to be able to make more

informed food choices. In connection with the above discussion, there are, however, some serious concerns raised by the recent India Index 2023 released by the Access to Nutrition Initiative (ATNI).² It assesses the performance of 20 of the largest Indian food and beverage manufacturers, which together account for an estimated 36 per cent sales of packaged food and beverages in the country. Based on 1901 products analysed from the 20 indexed companies, 76 per cent of sales are derived from less healthy products. The mean healthiness of companies' products was found to be 1.9 stars out of 5.0, with substantial variation observed between companies. This brings the supply-side perspective of food and nutrition into picture, in terms of effective interventions for nutritious food, strengthening of monitoring systems and regulations, etc.

2.2.3. Supply-Side Perspective of Food and Nutrition Security

As stated in the preceding chapter, the concept of food security evolved as early as during 1940s in light of the growing recognition of the need for a secure, adequate and suitable supply of food for everyone. For example, concerns over food security in India can be linked to the Bengal Famine, which occurred during 1943-45 and claimed millions of lives. The worldwide concern over food security was reflected through various policies and programmes at national and international levels aiming at redistribution of food (Weingärtner, 2004). Food security was viewed as a human right.³ At the 1974 World Food Conference, governments examined the global problem of food production and consumption, and solemnly proclaimed that "every man, woman and child has the inalienable right to be free from hunger and malnutrition in order to develop their physical and mental faculties".⁴ The discussions of food security focused on the supply of food at the global and national level and more specifically on the ability of specific countries to obtain - through production, imports or stocks - an adequate supply of food to feed the country's population.⁵ In 1981, Amartya Sen argued that famines were not always a result of shortage of food, rather the shortage of food resulted from people not being able to access enough to eat instead of a food availability issue (Sen, 1983). This gave rise to discussions on entitlement-based approach to food and famine. Sen argued that a person is reduced to starvation if some change in her/his endowment, such as access to land or loss of labour power due to ill health, or in her/his exchange entitlement mapping such as decreased

² Available at <https://accesstonutrition.org/index/india-index-2023/>.

³ Accessed at <https://www.manage.gov.in/studymaterial/FNS-E.pdf> on 24.12.2023.

⁴ Accessed the report at <https://digitallibrary.un.org/record/701143?ln=en> on October 12, 2023.

⁵ Accessed at <https://www.fao.org/3/x4606e/x4606e00.htm> on October 13, 2023.

wages or loss of employment, increased food prices, or a decrease in the price of the goods she/he produces and sells. This would result in the inability to acquire enough food. Thus, the entitlement approach emphasised the point that the mere physical availability of food does not ensure access to that food by all people, especially in an economic system dominated by market transactions. Sen's analysis also paved the way for the examination of intra-household distribution and allocation of food and resulted in a shift of focus from national and household level food security to individual level food and nutrition security. Following Sen's approach, the definitions of food security in the 1980s reflected the dominance of the entitlement approach at that time.

Although nutrition was mentioned implicitly in earlier discussions on food security, it was for the first time that an International Conference on Nutrition was organised in Rome in 1992 to emphasise the need for a healthy (nutritious diet) and to discuss ways to eradicate hunger and malnutrition. It was recognised that not only sufficient quantity of food is necessary, what is even more important is the nutrition value of the food being consumed. This added "nutrition security" dimension to the already existing concept of food security. The focus on national food self-sufficiency neglected the fact that quite often countries did have adequate food supplies at the national level but still faced widespread hunger. It became increasingly clear that while an adequate national food supply is a necessary condition for food security, it is not a sufficient condition. The coexistence of adequate aggregate food supplies and hunger led to a shift in emphasis from national supply to individual access to food. This shift is reflected in the definition of food security used in the 1996 Rome Declaration on World Food Security: "Physical and economic access at all times, to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life." (also see Chapter 1 of this thesis for conceptual clarity).⁶ The concept was further refined and enlarged, as elaborated by the National Commission on Farmers (NCF) in 2006, which implies that every individual has the physical, economic, social and environmental access to a balanced diet that includes the necessary macro and micro nutrients, safe drinking water, sanitation, environmental hygiene, primary healthcare and education so as to lead a healthy and productive life. Further, food security has three inter-dependent dimensions: (a) National or Macro Food Security, essentially amounting to the local (domestic) availability of food (b) Household Food Security and (c) Individual Food Security, the latter two largely determined by the physical and economic

⁶ Accessed at <https://www.un.org/en/development/devagenda/food.shtml> on October 13, 2023.

access to the available food. Moreover, food security concept has temporal and spatial dimensions which underpin that food must originate from efficient and environmentally benign production technologies that conserve, enhance and sustain the natural resource base of crops, farm animals, forestry, and inland and marine fisheries.⁷

From the discussion undertaken in this section, it is clear that the determinants affecting food and nutrition security vary with the concept and measurement of these two terms. For example, if the food and nutrition security is looked from a macro perspective (global or national), then factors, like food production, crop diversity, economic growth, absolute and relative poverty, development strategies and policies, governance level and public institutions, political institutions, food prices, investment in agriculture and related sectors, public expenditure, monetary and external sector policies in terms of interest rates, tariff and other quotas, etc. matter a lot (Aziz et al., 2021). If, however, the food and nutrition security is assessed from household or individual angles, then income and wealth of households, family size, education level, safe drinking water and proper sanitation facility, healthcare services, individuals' lifestyle, their eating habits, etc. are very important (see, for example, Ganpule et al. (2023)). The next section will present some of the empirical contributions in this respect examining the nexus between food and nutrition security indicators and their underlying determinants. Here it is to be noted that both demand-side as well as supply-side of food and nutrition suffer from certain limitations. The demand-side angle of food and nutrition security requires people to be mature, conscious and responsible about themselves and their dependents regarding lifestyle, choice and preference of food and eating behaviour, and also about various initiatives of the government meant to improve their health and nutritional status. On the other hand, the supply-side of this issue demands effective policy interventions of the government as well as fruitful efforts made by other stakeholders, like civil societies, non-governmental organisations (NGOs), etc. Government policies and programmes often lack proper design, centralised financing and poor implementation (Brahmanand et al., 2013; Vir and Malik, 2015; Sinha et al., 2016; Puri, 2022).

2.3. Survey of Empirical Works

The empirical works surveyed in this section have explored a variety of factors from all three angles – macroeconomic, household and individual.

⁷ Please refer to the paper at <http://indiaenvironmentportal.org.in/files/towards-a-food-secure-india-making-hunger-history.pdf>.

2.3.1. Food Production as a Precondition for Food Security

It has been documented in Aziz et al. (2021) that food production is the main factor responsible for food security, particularly for predictable population growth under increased climate variability. It has been argued that it is basically the production in the agriculture sector that forms the source of nutritious food, helps in reducing food prices⁸ and raises incomes, mainly of the deprived smallholder farmers in different countries irrespective of their level of development (Aryal et al. (2019), Phalkey et al. (2015), Alexander et al. (2015), Weinzettel et al. (2013), Timmer (2005)). In fact, it has been established in the literature that agricultural production reduces the prevalence of undernourishment (Mughal and Fontan, 2020) and also childhood underweight (Balk et al., 2005). Godecke et al. (2018) show that both larger food supplies and diversity help reduce chronic hunger.

2.3.2. Nexus between Economic Growth and Food and Nutrition Security

The economic development of a country has been treated equally important (along with food production) to achieve food and nutrition security (Smith and Haddad, 2002; Ravallion and Chen, 1996). The simple channel for the above argument is that inadequate intake of food (or nutritious food) means increased food and nutrition insecurity (also increase in hunger and starvation), that will gradually deteriorate health parameters, which in turn will decrease productivity at work, it will also tend to reduce life expectancy in long run; the ultimate net result of this devastating impact is reduction in national output (and perhaps collapse of the economy, *ceteris paribus*). This channel is, however, not so simple, and different empirical studies have offered different explanations; even many of them have come up with different findings altogether. This depends on the variables and proxies considered for food security and malnutrition, economic growth, the kind of methodology employed, and also the direction in which the causal nexus is examined. For example, Arcand (2001) examined the effects of two nutritional status variables, namely the incidence of food inadequacy (PFI) and dietary energy supply (DES), on the growth rate of real GDP per capita in 129 nations between 1960s and 1980s in a typical neoclassical growth framework. He observed a statistically significant influence of nutrition on growth, claiming that insufficient nutrition was causing a 0.23 to 4.7% loss in global yearly GDP per capita growth, and a 0.16 to 4.0% loss in Sub-Saharan Africa.

⁸ There are numerous studies examining the nexus between food prices and undernourishment/malnutrition, see for example, Kalkuhl et al. (2016), Ecker and Qaim (2010), Skoufias et al. (2009), Abdulai and Aubert (2004), Von et al. (1991), Strauss (1984), Nandy et al. (2016), Anriquez et al. (2013), Devereux (2008), Baro and Deubel (2006), Sassi (2015), Cornia et al. (2016) and Green et al. (2013).

His findings suggested that the productivity of labour was affected by nutrition in terms of dietary energy supply or the incidence of dietary inadequacy. The Human Capital Augmented Solow Model, introduced by Mankiw, Romer and Weil in 1992 (Brumm, 1996) is an alternative growth theory pertaining to food security with regard to calorie consumption. Nutrition has an effect on human resources. Human capital is derived from investments in human knowledge and good health, such as exercise, schooling and adequate nutrition. Knowledge and health are linked; when people have a good understanding of health and are conscious of the importance of proper nutrition for health, they live longer and have higher economic growth (Brumm, 1996). Using a lagged panel, also known as a conditional change model, Jenkins and Scanlan (2011) have identified six critical food security issues for selected sample of developing countries over the period 1970 to 1990. These issues include: industrialization, economic dependency, urbanisation bias, neo-Malthusian population growth, environmental processes of evolution, and militarization. Soriano and Alberto (2016) show that it takes 2 years for income growth to improve the prevalence of undernourishment. Some other contributions, which have established a positive association between economic growth and undernourishment (with causality running from the former to the latter) include Subramanyam et al. (2011); Kumar (2007); and Ecker and Breisinger (2012). The positive nexus in the other direction from improvement in the undernourishment prevalence to economic growth has also been established (Ataey et al. (2020), Neeliah and Shankar (2008), Fogel (2004), Wang and Taniguchi (2002), Correa and Cummins, 1970; Strauss and Thomas, 1998)). According to the World Bank (1986), income increases may reduce and eventually eradicate insufficient calorie consumption, with calorie-income elasticities varying from 0 to 1. Strauss (1984) calculated 0.82 elasticity for Sierra Leone, whereas Dawson and Tiffin (1998) calculated 0.34 elasticity for India.

There are also evidences with mixed results. For instance, Heltberg (2009) finds little but substantial effects of economic growth on child malnutrition. A study by Haddad et al. (2003) suggests that national income accompanied by unique feeding services may help lessen child malnutrition. Contrary to these, there is an alternative hypothesis: a change in household income has no effect on the consumption of calories, indicating that an increase in calorie intake has no effect on economic growth. This is known as the neutrality hypothesis. A study by Harris and Bhavani (2008) reveals the existence of neutrality hypothesis for Mauritius, i.e., there is no causality going in any way. The authors propose that nutrition policy focus on calorie restriction can be considered without severely affecting economic growth. The study of Warr

(2014) argues that economic growth does not help countries decrease undernourishment. The outcome is only found significant for Asia, but as far as Africa and Latin America are concerned, the results are not found significant. Interestingly, there are evidences to suggest the prevalence of malnutrition in developed countries too (Ataey et al., 2020) and highlight developing strategies and policies to reduce nutritional challenges (Singh et al., 2019; Ramokolo and Wanga, 2018). Policymakers have thus started creating micro-level circumstances for food security with regard to household availability of foodstuffs at market places and household assets. Considering food security strategies, Timmer (2000) has concentrated on Asia in terms of food price volatility in the global food market, the income distribution rate, and trading policy, all of which have an impact on food security and economic growth.

2.3.3. Some Other Macroeconomic Determinants of Food and Nutrition Security

From the discussions of subsections 2.3.1 and 2.3.2, it is easy to infer that there are many more factors than merely economic growth explanations (be it national output or sectoral output) that impact food and nutrition security. One such aspect, which has gained increasing attention of the scholars after Sen (1983), is the channel of human development, more especially the redistributive aspects of it (see, for example, studies by Subramanyan et al. (2011), Headey (2012), Eini-Zinab et al. (2020), Wuyts (2011), Storm et al. (2007)), who emphasise the role of poverty and unequal distribution of income in influencing the nexus between economic growth and food and nutrition security). Furthermore, government interventions also play an important role for countries in improving their food situation (Timmer, 2000). In fact, it has been shown that the capacity of policy interventions maintains the food demand and supply positively (Marsden and Sonnino, 2012; Lang and Barling, 2012); and that the Food insecurity of any country is directly related to unstructured institutes or the inability of the state to impose policy interventions to guarantee legal rights to its people (Sen, 1983; Brinkman et al., 2010). In this respect, it has been argued that the fruits of economic growth should percolate downwards in terms of increased income and wealth of households along with education, clean water and healthcare services (Smith and Haddad, 2002; Case et al, 2002). In this connection, a recent study of Nigeria for a sample of 23344 persons, drawn from a multi-stage probability sampling design demonstrates the interdependence of malnutrition (measured in terms of BMI), cooking fuel, lavatory type, source of drinking water and building construction materials (Prakoeswa et al., 2020). However, for effective policy interventions, and for growth to be inclusive, there has to be good governance (Rodrik et al, 2004; Vos, 2015; Pereira and

Ruysenaar, 2012; Bruck and Derrico, 2019; Smith and Haddad, 2015; Dube and Phiri, 2015). Moreover, the availability of resources as well as their efficient management is deemed equally important for food security, which in turn depends on sound public institutions (Constantine, 2017). In short, the role of the government is quite crucial in boosting food and nutrition security (Pereria and Ruysenaar, 2012; Persson and Tabellini, 2006). For example, in a recent study by Takeshima et al. (2021), it has been found that public expenditures in different sectors have been significantly associated with key indicators under SDGs 1 and 2. Specifically, greater public expenditures for agriculture and health sectors have had relatively positive effects on total factor productivity growth in agriculture, reduced consumer food price indices, reduced poverty, reduced stunting, underweight or overweight among children under 5. A greater public expenditure for agriculture has also been weakly associated with enhanced biodiversity. These relationships are observed for a broad class of countries, but somewhat stronger for countries that had been classified as low- or lower-middle-income in 2000.

Apart from the above, some more explanations of food and nutrition security have been explored in the literature. A couple of studies conducted for Sub-Saharan African countries find that remittances and composite quality control index improve the average production of food (Ogunniyi et al., 2020); and that instability and unrest of political institutions raise an intense conflict that threatens the whole regional well-being by influencing their nutrition (Bello and Moyer, 2018). On a different line, Saboori et al. (2022) conducted a comprehensive examination of global food security during the COVID-19 pandemic by considering the food security index and its four key pillars (affordability, availability, quality and safety, and natural resources and resilience) for 102 countries. In addition to the fixed effect panel data estimator, the Method of Moments Quantile regression is used for disaggregating the impact of the COVID-19 pandemic in relation to inflation, economic growth, urbanisation and agricultural land on global food security among countries with different levels of food security. The authors find that COVID-19 has negatively affected food security globally, especially in countries with a low food security level. The effect of income per capita and urbanization rate on the food security index is positive and statistically significant across all quantiles. Inflation rate and agricultural land, however, adversely affect food security, and this effect is stronger for countries with lower levels of food security. The results of affordability, availability, quality and safety, and natural resources and resilience models provide meaningful implications for governments and policymakers to build resilience in food systems and to be better prepared for future crises and disruptions in the food supply.

2.3.4. A Brief Survey of Some Studies Specific to India

It has been indicated in Chapter 1 of this thesis that India is one of those countries in South Asia which is still struggling to achieve a satisfactory food and nutritional status of its citizens, more especially the children and women. Here a brief review of some of the relevant studies specific to India is presented so as to highlight the ongoing research in this direction and pave the way for the present study.

There is widely scattered literature assessing food and nutrition security in case of India.⁹ The analysis by Rosegrant et al. (n.d.) for India shows that investment in infrastructure for post harvest loss reduction contributes to lower food prices, higher food availability, and improved food security, and has positive economic rates of return. However, increased investments in agricultural research has considerably higher benefit-cost ratios and greater improvement in food security. Both types of investments are essential for future agricultural development. Palanisamy et al. (2021) examine the food security status across the Indian states, by constructing an index comprising 17 indicators developed by the Economist Intelligence Unit, which represents food availability, affordability and quality, and safety. Information from multiple government sources and research reports were combined to develop a comprehensive food security index for 2015-16. By extracting National Family Health Survey-4 (2015-16) data, body mass index and anaemia-based indicators were analysed to study the nutritional status of children and adults across the states. A multivariate linear regression model was employed to explore the relationship between nutritional outcome and food security of the population. Empirical evidence suggests that increase in food security index by one per cent would significantly decline the incidence of stunting and underweight respectively by 0.5 and 0.6 per cent among children and about 0.4 per cent in case of adults underweight, after controlling for state dummy.

Sendhil et al. (2020) examines the dynamics in intake of calorie, protein and fat over years and across provinces and also inequality, determinants and regional prioritization of nutrients consumption. The data extracted from various consumption survey reports of the National Sample Survey Office since 1972-73 to 2011-12 indicated that calorie intake in a majority of the states has witnessed significant changes and reduction over time. While, the intake of protein remained consistent, per capita fat intake increased with rural Punjab and rural Odisha being the highest and lowest consumers, respectively. The per capita fat consumption is higher

⁹ See, for example, McKay et al. (2023) for a survey.

in urban vis-a-vis rural. Variation (CV) and inequality (Gini coefficient) in calorie, protein and fat intake showed a declining trend across rural and urban regions. Regional prioritization (through biplot) indicated a strong linkage between rural and urban for nutrient consumption. Regression analysis using panel data indicated that the nutrient intake in rural India is influenced positively by per capita expenditure on food items, household size and literacy rate, and negatively by poverty rate. The nutrients consumption level is low in a majority of states by any norm which gets reflected in the nutritional outcomes. The authors thus suggest that reduction in inequality and variation accompanied by an increase in intake can be achieved by increased spending on nutri-rich food items and per capita consumption of cereals and pulses.

Sarma et al. (1995) tried to discuss the impact of midday meal program on educational and nutritional status of school-going children in Andhra Pradesh. The survey included 83 schools from three districts, 45 schools with programmes, and 38 schools without programmes. The study's findings on the educational aspect revealed improved attendance, greater retention, lower dropout rates, and a slight improvement in academic performance. The dietary component demonstrated improved development outcomes among the project's regular beneficiaries. Sahu et al. (2015) conducted a systematic review of literature to investigate the status of malnutrition of under-five children in India, its underlying causes and the ongoing strategies for its improvement. The authors have found that as much as 80 per cent of the prevalence of malnutrition among under-five children is concentrated in five States (West Bengal being one of them) and 50 per cent of all villages in India. The incidence of malnutrition and food consumption is more in female children than male children. The authors concluded that the prevalence of mild underweight becomes a alarming indicator of changing public health conditions among preschool children in developing countries like India. An earlier study by Radhakrishna and Ravi (2004) also revealed interstate disparities in undernourishment among children.

Ghosh et al. (2013) assessed nutritional status and socio-demographic profile of Sahariya tribal community in Madhya Pradesh. Using a logistic regression, the authors observed chronic energy deficiency and anaemia in 42.4 per cent and 90.1 per cent of women respectively, while the prevalence of underweight, stunting and wasting among under-five year children was to the extent of 59.1 per cent, 57.3 per cent and 27.7 per cent respectively. However, the common people of Sahariyas suffer from the high prevalence of undernutrition and dietary deficiency because of their lack of community empowerment and improper nutrition education. In this respect, Kumar and Bhawani (2005) for Rajasthan's Sahariya tribal community note that

Nutrition Care Centers (NCCs) are setup for improvement of nutritional status of children since they did not have Anganwadi Centre (AWC). NCC give “targeted feeding and care site” to the malnourished children. The authors suggested cutting down the severe and moderate under nutrition in children from 66.7 per cent to 59.6 per cent within a period of six months between March to September 2003 by paying home-visits and ensuring frequent feeding and care of these children in families.

Dasgupta and Wheeler (2019) have conducted a study to measure the regional difference in mother and child health in Bangladesh, West Bengal, Bihar and Jharkhand. To do this they used Demographic and Health Surveys (DHS) data for India and Bangladesh and the sample contains data on 124327 individuals in 4241 DHS clusters. Two surveys are used for measuring the child and maternal health. The estimation results of logistic regression models between the probabilities of child wasting and maternal anaemia suggest that the poorest, least-educated mothers and their children in Barishal reveal better health performance compare to wealthiest, best –educated counterparts in Jharkhand. Som et al. (2006), using NFHS-2 data conducted a comparative analysis of nutritional status of pre-school children below 5 years for Assam and West Bengal. Utilising multivariate logistic regression, the study concluded that the effect of all socioeconomic indicators was not same on the prevalence of malnutrition in two states. Malnutrition indicators were found to be correlated with illiteracy rate of mothers in West Bengal but there was no significant correlation between malnutrition of children and mother’s literacy in Assam. It was also shown that the effectiveness of both birth order and birth spacing played a pivotal role to measure the nutritional status of children, especially in West Bengal.

There are also a variety of studies conducted exclusively for West Bengal, which is the ultimate focus of the present study. Some of these studies are reviewed here. Ghosh and Rama (2015) have tried to assess the nutritional status of Santal- Munda tribal children in rural area of North Twenty Four Parganas, West Bengal. With data from two villages of the selected district on weight, height, sex and age through personal interviews, the authors found a poor performance on nutritional indicators like stunting (1-10 years), underweight (1-10 years), wasting (1-5 years) and thinness (5-10 years). Hence, children are under acute and chronic nutritional stress due to malnutrition. It is observed that pre-school children are suffering in severe than school going student. Bisai et al. (2008) have assessed the nutritional status of lodha children under five years in a village of Paschim Mednipore District of West Bengal. For a sample of 68 boys and 97 girls aged 1-14 years, the authors found higher rate of prevalence of under nutrition among boys and preschool children (<60 months) compared with girls and school going

children. Bose and Sen (2020) have shown the prevalence of anemia of children aged under five year based on NFHS-4 data. Authors have found the change of food habits of children from healthy to junk food. It reduces the immunity power at alarming rate to protect several diseases. They suggested different measures for reduction of malnutrition problem for pre-school children. Pal et al. (2017) attempted to examine the prevalence of malnutrition of adolescent aged 10-17 years from rural areas in West Bengal and its association with socio-demographic factors. They took 560 adolescents from rural areas in West Bengal for anthropometric measures. This study shows that age and sex combined prevalence of stunting and thinness are 53.57 per cent and 48.75 per cent respectively and it is very high as per WHO classification of severity malnutrition. The prevalence of stunting and thinness is high for girls compare to boys. The primitive reason for malnutrition is health problem and insufficient intake of nutrients food, household food security, nutritional status of parents, income, education, access to clean water and sanitation. The indices of malnutrition of the backward classes like scheduled cast, scheduled tribe cast is more than people belonging to upper class. Das (2018) conducted a study in 12 brickfields of Bhadrakali in Hooghly, West Bengal to compare the nutritional status of 54 male and 62 female preadolescent brickfield workers. With household health status as additional information captured through primary survey, and running one-way ANOVA test, the author find that poverty and low literacy level of parents are the main reasons for the prevalence of malnutrition among preadolescent worker in brickfield. As many as 68.96 per cent of preadolescents are severely thin and 22.4 per cent of preadolescents are moderately thin. It is further found that male preadolescent brickfield workers are more affected compare to female as per their health status and severity of malnutrition is higher for 12 years old children than other age groups. The analysis of 450 children in Puruliya district of West Bengal reveals that the child development has mostly hampered in the age group of 12-23 months. In case of Twin babies, the prevalence of development delay is higher than a singleton. The low birth weight (LBW) hampered the child development (De and Chattopadhyay, 2019).

2.4. Multi-Stakeholder Partnership in Food and Nutrition Security

The need for a cross-sectoral and holistic approach, pooling together the resources, knowledge and expertise of different stakeholders to deal with the complex and multi-dimensional issues, such as food and nutrition security has increasingly been recognised, and it forms a part of the UN 2030 agenda for sustainable development (SDG17, in particular). It is emphasised that in order to successfully implement the 2030 agenda for sustainable development, partnership at

the global level is must, which should further be supplemented by multi-stakeholder partnerships, involving government and non-government entities. This, however, has attracted ample debate regarding the conceptual framework of multi-stakeholder partnership, its potential benefits and limitations, performance, and above all, its relevance as a suitable institutional mechanism for financing and improving food and nutrition security (HLPE, 2018). In light of this, and given the purpose of the present study, this section provides a brief survey of some of the relevant studies conducted on the theme of partnership between government and non-government entities towards food and nutrition security.

Various self-help groups, civil societies (CSOs)/non-governmental organisations (NGOs), etc. have played a significant role towards food and nutrition security, and they have increasingly shouldered the responsibility of the governments around the world. In this respect, women's groups have emerged as crucial platforms for delivering health and nutrition oriented services and addressing gender and livelihood challenges in different countries. Based on a systematic literature review comprising of cross-country evidences, Kumar et al. (2018) propose a framework outlining pathways through which women's group participation may facilitate improvements in nutrition. Their findings suggest that women's group-based programs explicitly triggering behaviour change pathways are most successful in improving nutrition outcomes, with strongest evidence for infant and young child feeding practices. Apart from this, the role and contribution of non-governmental organisations (NGOs) towards solving crucial societal problems has widely been appreciated and documented in the literature. This is also true for food and nutrition sector. For example, in an investigation of the viewpoints of Iranian health system experts and executive stakeholders on the role of NGOs in moving toward universal health coverage (UHC), Sanadgol et al. (2022) reveal that recognizing the critical role of NGOs and their contribution in moving toward UHC is essential, particularly in the local context. Collaboration between NGO stakeholders and the government could facilitate moving toward UHC. A study by Ahmad et al. (2021) was conducted in Pakistan to measure the Non-Governmental Organizations intervention in health nutrition and people's level of satisfaction. Using a sample size of 230 through a simple random sampling procedure, the study revealed the children and women (lactating) benefitted through nutritious food, provision of purification tablets for safe drinking water and provision of food baskets to people. Children were benefitted through the provision of vitamin, and de-warming medication, treatment of pregnant and lactating women and children suffering from malnutrition were significantly associated with people's level of satisfaction. This study recommended that government, along

with NGOs, must take measures for healthy nutrition irrespective of class, caste, and occupation, etc.

Chanani et al. (2018) review the performance of a community-based nutrition programme in preventing and treating wasting without complications among children under age 3 in urban informal settlements of India. Implemented by a non-profit organization, with ICDS and city-level Municipal Corporation of Greater Mumbai government partners, the programme screened 7759 children between May 2014 and April 2015. During this period, the programme admitted 705 moderately wasted and 189 severely wasted children into the treatment group and 6820 not wasted children into the prevention group. Both prevention and treatment groups received growth monitoring, referrals to public health facilities and home-based counselling (if <6 months) by community health workers. Treatment groups received additional home-based counselling and access to medical screenings. Severely wasted children also received access to ready-to-use therapeutic food. The study assessed default rates, wasting status and average weight gain 3 months after admission. Factors associated with growth faltering in the prevention group were explored using logistic regression. Default rates for the severely wasted, moderately wasted, and prevention group were 12.7 per cent, 20.4 per cent, and 22.1 per cent, respectively. Recovery rate was 42.4 per cent for the severely wasted and 61.3 per cent for the moderately wasted. For the moderately wasted, mean weight gain was 2.1 g/kg/day, 95 per cent confidence interval (CI) [1.6, 2.6], and 4.5 g/kg/day for the severely wasted, 95 per cent CI [3.1, 5.9]. Among prevention group children, 3.6 per cent faltered into wasting—3.2 per cent into moderate and 0.4 per cent into severe.

Sharma et al. (2010) attempted to study the impact of wholesome Mid-Day Meal (MDM) program run by an NGO on the growth of the primary school students in rural area of Mathura district of Uttar Pradesh, India. This intervention study involved children enrolled in Government run rural primary schools in Mathura district from March through August, 2010. A wholesome, nutritionally balanced MDM provided by an NGO for the students in the 6 primary schools was selected as intervention group. Control group consisted of children in 8 schools which received locally prepared MDM by village panchayats. Height, weight, change in height/month, change in weight/month, prevalence of protein-energy malnutrition and prevalence of signs of vitamin deficiencies, were measured. The study concluded that MDM provided by the NGO had no better impact on growth of the primary school children, however, it reduced prevalence of vitamin deficiency significantly in comparison to the MDM run by Village Panchayats.

With growing recognition of the role and contributions of non-governmental entities in improving health care as well as food and nutrition security, the scholars have devoted their attention towards exploring the possible path for public private partnership in this respect, as well as challenges associated with it. Based on the experiences, interests and challenges in jurisdictions across Canada, a Multi-Sectoral Partnerships Task Group (2013) finds that among the six jurisdictions that have engaged with the food industry, all of them have entered into a partnership model, and more than half have engaged in a “platform for discussion” created for information sharing. The majority of jurisdictions have also engaged in lower levels of engagement through donation or sponsorship. Jurisdictions have reported multiple types of engagement with the food industry and are approaching the full spectrum of the food sector ranging from producers to retailers. Save the Children (2017) explores the role of public-private partnerships in reaching SDG2: “ending hunger, achieving food security and improved nutrition, and promoting sustainable agriculture”. It advocates an improved cross-sectoral collaboration and public-private coordination. The study makes several suggestions regarding the potential role that various public and private actor – governments, civil societies and companies can play in the process. For instance, the study advocates that all involved actors, government, civil society and companies, should agree upon, and adopt, an integrated approach to development and FNS.

Smyth et al. (2021) also reviews the context, discusses the logic for PPP and explores the range of P3s that have been used and their impacts on the global agri-food system. The authors conclude that rather than reversing direction (out of concerns of PPP in the sector), the use of both strategic and tactical partnerships should be accelerated in order to improve global food security. Kraak (2022) offers some advises to governments, civil societies, etc. to decide whether and how to engage with industry actors to improve diets for populations. First, food systems governance actors must acknowledge and reconcile competing visions, harmonize numerous corporate-engagement principles, and support a shared narrative to motivate collective actions toward healthy sustainable diets. Second, food systems governance actors have tools to guide engagement through many alliances, networks, coalitions and multi-stakeholder platforms with different levels of risk and trust. Third, food systems governance actors must prioritize accountability by setting corporate-performance threshold scores to justify private-sector engagement; evaluating engagement processes, outcomes and consequences; using incentives, financial penalties and social media advocacy to accelerate time-bound changes; and revoking UN consultative status for corporate actors who undermine

healthy people and planet. There are a few studies which have explored the role of PPP in the social sector for India, more especially in health care (see, for example, Ramkrishna (2012), Rajasulochana and Maurya (2020), etc.).

2.5. Concluding Observations

The review of literature presented in this chapter indicates a wide variety of studies on the theme of food and nutrition security, analysing this multi-dimensional concept from different angles and its interdependence with large sets of determinants ranging from macroeconomic perspective to household and individual levels. The theoretical framework as well as empirical studies have, by and large, confirmed that in the run up to 2030 agenda for sustainable development, governments will have to make a concerted effort in order to improve the situation of food and nutrition security, and to achieve SDG2, in particular. Furthermore, the literature has emphasised that despite numerous challenges and issues confronted with multi-stakeholder partnerships towards this end, it is the only option to reap benefits of growing technology in the sector of food and nutrition. With scarce literature on this aspect for India, the present study makes an endeavour in this direction.

Chapter 3.

Subnational Government Expenditure, Implications for Financing Food and Nutrition

3.1. Introduction

It has been discussed in Chapter 1 that Government of India sponsors a large number of direct as well as indirect food and nutrition interventions through its various Ministries/Departments. As most of these interventions are in the form of Centrally Sponsored Schemes, State governments play a crucial role in the implementation of these schemes. State governments not only provide their matching contributions, but also physical infrastructure and manpower for this purpose. The survey of literature, conducted in Chapter 2 also reveals that public expenditure is a key input in improving food and nutritional status in different countries. The present chapter, therefore, makes an attempt to first trace the pattern of government expenditure at subnational level and derive implications for food and nutrition therefrom. This is followed by the empirical examination of the quality of government expenditure at the subnational level through the lens of its effectiveness and efficiency for financing food and nutrition. Although the focus of this study is the State of West Bengal, however, due to non-availability of district level data on government expenditure in the public domain, the situation of West Bengal is assessed in relative terms vis-à-vis other States.

3.2. Government Expenditure Trends, a Subnational Level Analysis

Under the Constitutional assignments of fiscal powers and functional responsibilities between the Centre and states, the latter have more expenditure obligations, but less manoeuvrability for adjustments. The states have predominant role to play in the provision of social and economic services along with huge administrative responsibilities. Thus, the availability of better social and physical infrastructure in a state generally reflects the quality of its public expenditure. In this section, trends in government expenditure from different angles are analysed for eighteen major States (including Goa) (earlier referred to as general category (GC) States)¹ with special focus on West Bengal. This trend analysis seeks to trace the developmental priorities of States (including food and nutrition). This trend analysis is confined to the period

¹ These are Andhra Pradesh, Bihar, Chhattisgarh, Goa, Gujarat, Haryana, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Telangana, Uttar Pradesh and West Bengal.

from 2014-15 to 2020-21, because, prior to 2014-15, State budgets did not fully reflect the resources spent for developmental purposes.² Main data sources for this analysis include: database of the Reserve Bank of India on “State Finances a Study of Budgets”; Finance Accounts released by Controller and Auditor General of India (CAG) for respective States for various years and Ministry of Statistics and Programme Implementation, Government of India for gross state domestic product (GSDP) 2011 series and consumer price index (CPI) series with base 2012. For projected population to compute per capita expenditure, “Population Projections for India and States 2011-2036” by Ministry of Health and Family Welfare, Government of India is considered. Appendix C provides all data for West Bengal used in this chapter relating to various categories of government expenditure, gross domestic product (GSDP), consumer price index (CPI) and population.

Table 3.1 gives the ratios of aggregate expenditure to GSDP of major States from 2014-15 to 2020-21. It may be observed from this table that there is a considerable difference among States in terms of what they spend relative to their output; this difference is observed to be more than double between the lowest spending State and the highest spending State in different years. West Bengal spent, at an average, 16.23 per cent of its GSDP during 2014-15 to 2019-20 and stood at the 11th position among 18 GC States. West Bengal’s total expenditure to GSDP ratio declined from 15.88 per cent in 2014-15 to 15.25 per cent in 2019-20, but increased to 16.72 per cent during the pandemic year 2020-21. The relative position of West Bengal among eighteen major States remained stagnant in most of the period under analysis. However, compared with 2014-15 its relative position deteriorated from 10 to 11 in 2019-20 and further to 12 in 2020-21.

When it comes to capital spending, which is considered growth supportive, the interstate disparities have widened even further in terms of their share of capital spending in their respective total expenditure (Table 3.2) as well as the ratio of capital expenditure to their respective GSDP (Table 3.3). On an average, West Bengal is found to incur 10.49 per cent of its total expenditure and 1.7 per cent relative to its output for investment purposes during 2014-15 to 2019-20, thus standing at 17th and 16th positions respectively among 18 GC States. With some fluctuations, the share of capital expenditure in total expenditure of West Bengal rose from 9.11 per cent in 2014-15 to a peak of 13.58 per cent in 2018-19, but fell quite significantly

² Central assistance under various schemes began to flow through State budgets only since 2014-15. Prior to this, all Central assistance used to flow directly to the implementing societies, thereby largely bypassing the State budgets.

to 9.59 per cent in 2019-20 and further to 7.92 per cent in 2020-21. It may also be seen from Table 3.2 that the relative position of West Bengal among eighteen States deteriorated slightly from 15 in 2014-15 to 16 in 2020-21. As a ratio to its GSDP, West Bengal's capital spending remained less than 2 per cent (except 2018-19 when it reached at 2.23 per cent) (Table 3.3). It may be noticed from Tables 3.2 and 3.3 that in none of the years from 2014-15 to 2020-21, West Bengal was among first ten States in terms of its capital expenditure relative to aggregate spending and output respectively.

Table 3.1. Total Government Expenditure of Eighteen General States Relative to Their Respective GSDP (in per cent) – 2014-15 to 2020-21

State/Year	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	Average during 2014-15 to 2019-20
Andhra Pradesh	24.28(2)	18.34(8)	19.28(9)	17.49(9)	17.21(9)	16.75(10)	18.12(9)	18.89(8)
Bihar	26.56(1)	29.12(1)	29(1)	28.11(1)	27.92(1)	23.46(2)	28(1)	27.36(1)
Chhattisgarh	20.89(5)	23.01(6)	22.03(6)	23.56(3)	22.49(3)	23.82(1)	22.75(3)	22.63(3)
Goa	18.08(7)	18.24(9)	16.69(12)	18.27(8)	18.43(8)	17.66(8)	18.68(8)	17.9(9)
Gujarat	12.06(16)	11.72(17)	10.86(18)	10.9(18)	10.9(18)	10.38(18)	11.06(18)	11.14(18)
Haryana	12.28(15)	16.02(12)	14.21(15)	13.8(14)	13.34(16)	14.18(12)	13.04(16)	13.97(15)
Jharkhand	17.46(9)	25.26(2)	24.21(3)	24(2)	20.43(7)	21.43(4)	24(2)	22.13(4)
Karnataka	13.55(14)	13.24(16)	13.42(16)	13.37(15)	13.75(15)	13.27(16)	13.79(15)	13.43(16)
Kerala	14.97(11)	15.49(13)	16.13(13)	15.71(11)	15.23(12)	14.07(14)	18(10)	15.27(12)
Madhya Pradesh	22.25(4)	22.13(7)	23.35(5)	22.4(4)	20.74(5)	19.47(6)	20.41(6)	21.73(6)
Maharashtra	11.14(18)	10.9(18)	11.15(17)	11.45(17)	12(17)	12.75(17)	13.04(17)	11.56(17)
Odisha	19.91(6)	23.2(5)	21.37(7)	21.53(5)	22.06(4)	22.45(3)	21.26(5)	21.75(5)
Punjab	14.08(12)	15.15(14)	23.66(4)	13.92(13)	15.45(11)	17.59(9)	16.95(11)	16.64(10)
Rajasthan	18.09(8)	24.19(4)	20.65(8)	20.16(7)	20.57(6)	19.37(7)	19.04(7)	20.5(7)
Tamil Nadu	14.07(13)	13.8(15)	15.35(14)	13.28(16)	14(14)	13.77(15)	15.28(14)	14.04(14)
Telangana	12(17)	16.39(11)	18(10)	15.4(12)	14.98(13)	14.14(13)	15.91(13)	15.14(13)
Uttar Pradesh	22.36(3)	25.16(3)	24.3(2)	21.31(6)	23.42(2)	21.23(5)	21.39(4)	22.96(2)
West Bengal	15.88(10)	16.57(10)	16.78(11)	16.46(10)	16.42(10)	15.25(11)	16.72(12)	16.23(11)
Minimum	11.14	10.9	10.86	10.91	10.9	10.38	11.06	
Maximum	26.56	29.12	29	28.11	27.92	23.82	28	
Mean	17.22	18.77	18.91	17.84	17.74	17.28	18.19	
CV (in per cent)	26.98	28.23	26.54	27.25	25.66	23.51	23.72	

Note: Figures within parentheses indicate the relative position of the State vis-à-vis other States (rank).

Source: e-State Database on Finances of States, Reserve Bank of India.

Table 3.2. Percentage Share of Capital Expenditure in Total Expenditures of Eighteen General States – 2014-15 to 2020-21

State/Year	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	Average during 2014-15 to 2019-20
Andhra Pradesh	9.9(14)	13.4(14)	11.93(16)	11.84(15)	14.51(11)	11.35(12)	11.93(11)	12.15(15)
Bihar	20.33(4)	22.72(6)	22.38(6)	22.12(3)	15.28(10)	9.5(16)	12.17(10)	18.72(7)
Chhattisgarh	14.52(11)	15.65(11)	16.83(12)	15.57(10)	12.43(14)	10.5(14)	11.47(12)	14.25(14)
Goa	14.32(12)	16.18(10)	15.63(13)	16.79(9)	16.33(9)	12.63(10)	14.63(8)	15.31(12)
Gujarat	22.05(3)	20.6(7)	18.02(11)	18.58(7)	18.33(6)	16.06(8)	15.67(6)	18.94(6)
Haryana	8.49(16)	25.39(4)	14.26(14)	16.93(8)	17.23(8)	18.28(4)	7.02(17)	16.76(10)
Jharkhand	16.68(6)	29.96(2)	21.18(8)	21.32(4)	19.53(3)	15.1(9)	16.66(4)	20.63(3)
Karnataka	16.31(7)	15.44(12)	18.57(10)	20.06(5)	19.24(4)	18.52(3)	21.45(1)	18.02(8)
Kerala	6.51(18)	9.59(18)	11.02(17)	9.33(17)	8.12(17)	8.45(18)	11.12(13)	8.84(18)
Madhya Pradesh	22.86(2)	16.69(9)	21.24(7)	19.95(6)	17.73(7)	16.73(7)	16.09(5)	19.2(5)
Maharashtra	10.42(13)	11.16(16)	12.99(15)	10.33(16)	12.05(15)	11.33(13)	9.35(14)	11.38(16)
Odisha	18.27(5)	22.86(5)	22.52(5)	24.24(2)	22.41(2)	17.85(5)	17.02(3)	21.36(2)
Punjab	6.78(17)	15.28(13)	45.25(1)	4.75(18)	4.77(18)	19.7(1)	5.82(18)	16.09(11)
Rajasthan	15.09(9)	35.54(1)	19.06(9)	13.09(13)	11.07(16)	8.77(17)	8.12(15)	17.1(9)
Tamil Nadu	14.66(10)	13.14(15)	23.38(4)	13.73(11)	13.5(13)	12.35(11)	13.5(9)	15.13(13)
Telangana	16.28(8)	19.87(8)	31.11(2)	26.08(1)	24.41(1)	19.02(2)	17.86(2)	22.8(1)
Uttar Pradesh	24.39(1)	25.69(3)	24.44(3)	13.23(12)	18.56(5)	17.21(6)	15.17(7)	20.59(4)
West Bengal	9.11(15)	10.05(17)	8.56(18)	12.05(14)	13.58(12)	9.59(15)	7.92(16)	10.49(17)
Minimum	6.51	9.59	8.56	4.75	4.77	8.45	5.82	
Maximum	24.39	35.54	45.25	26.08	24.41	19.7	21.45	
Mean	14.83	18.85	19.91	16.11	15.5	14.05	12.94	
CV (in per cent)	36.89	37.7	42.23	34.75	31.39	28	32.81	

Note: Same as for Table 3.1.

Source: Same as for Table 3.1.

Table 3.3. Capital Expenditure of Eighteen General States Relative to Their Respective GSDP (in per cent) – 2014-15 to 2020-21

State/Year	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	Average during 2014-15 to 2019-20
Andhra Pradesh	2.4(10)	2.46(11)	2.3(13)	2.07(12)	2.5(10)	1.9(12)	2.16(10)	2.27(13)
Bihar	5.4(2)	6.62(3)	6.49(2)	6.22(1)	4.27(3)	2.23(11)	3.41(3)	5.2(1)
Chhattisgarh	3.03(5)	3.6(8)	3.71(9)	3.67(6)	2.8(8)	2.5(8)	2.61(9)	3.22(8)
Goa	2.59(9)	2.95(10)	2.61(11)	3.07(7)	3.01(7)	2.23(10)	2.73(8)	2.74(10)
Gujarat	2.66(8)	2.41(12)	1.96(15)	2.03(13)	2(14)	1.67(15)	1.73(13)	2.12(15)
Haryana	1.04(16)	4.07(6)	2.03(14)	2.34(11)	2.3(11)	2.59(7)	0.92(18)	2.39(12)
Jharkhand	2.91(6)	7.57(2)	5.13(5)	5.12(3)	3.99(4)	3.24(5)	3.99(1)	4.66(3)
Karnataka	2.21(11)	2.04(14)	2.49(12)	2.68(9)	2.65(9)	2.46(9)	2.96(6)	2.42(11)
Kerala	0.98(17)	1.48(17)	1.78(16)	1.47(16)	1.24(17)	1.19(18)	2(12)	1.35(17)
Madhya Pradesh	5.09(3)	3.7(7)	4.96(6)	4.47(4)	3.68(5)	3.26(4)	3.28(4)	4.19(5)
Maharashtra	1.16(15)	1.22(18)	1.45(17)	1.18(17)	1.45(16)	1.44(17)	1.22(16)	1.32(18)
Odisha	3.64(4)	5.3(5)	4.81(7)	5.22(2)	4.94(1)	4.01(1)	3.62(2)	4.65(4)
Punjab	0.95(18)	2.31(13)	10.71(1)	0.66(18)	0.74(18)	3.47(3)	0.99(17)	3.14(9)
Rajasthan	2.73(7)	8.6(1)	3.94(8)	2.64(10)	2.28(12)	1.7(14)	1.55(14)	3.65(6)
Tamil Nadu	2.06(12)	1.81(15)	3.59(10)	1.82(15)	1.89(15)	1.7(13)	2.06(11)	2.15(14)
Telangana	1.95(13)	3.26(9)	5.59(4)	4.01(5)	3.66(6)	2.69(6)	2.84(7)	3.53(7)
Uttar Pradesh	5.45(1)	6.46(4)	5.94(3)	2.82(8)	4.35(2)	3.65(2)	3.24(5)	4.78(2)
West Bengal	1.45(14)	1.67(16)	1.44(18)	1.98(14)	2.23(13)	1.46(16)	1.32(15)	1.7(16)
Minimum	0.95	1.22	1.44	0.66	0.74	1.19	0.92	
Maximum	5.45	8.6	10.71	6.22	4.94	4.01	3.99	
Mean	2.65	3.75	3.94	2.97	2.77	2.41	2.37	
CV (in per cent)	54.58	59.65	59.6	51.28	41.98	34.77	40.21	

Note: Same as for Table 3.1.

Source: Same as for Table 3.1.

Apart from revenue-capital classification of government expenditure for budgetary and accounting purposes, there also exists a functional classification, which broadly distinguishes government expenditure as that incurred on social services, on economic services and that on general services. Government expenditure incurred on social and economic services is clubbed to be referred to as developmental expenditure, while that on general services is called non-developmental expenditure, which largely comprises of committed liabilities of the government. Guided by the direct interest of this study, Tables 3.4 and 3.5 report developmental expenditure of major States from 2014-15 to 2020-21 in relation to their respective GSDP as well as corresponding shares in their total expenditures respectively. Notwithstanding wide disparities across States, as suggested by the trends given in these tables,

West Bengal's absolute position improved between 2014-15 and 2020-21. Developmental expenditure-to-GSDP ratio of West Bengal increased from 9.79 per cent in 2014-15 to 10.93 per cent in 2017-18, then came down to 9.9 per cent in 2019-20 and again went up to 10.52 per cent in 2020-21 (Table 3.4). However, barring the pandemic year (2020-21), it shows a marginal improvement by 0.11 percentage points. It thus averaged at 10.54 per cent during 2014-15 to 2019-20, placing the State at the eleventh position among 18 GC States. The average share of developmental expenditure in total expenditure of West Bengal during the same period stood at 64.97 per cent placing the State at the fourteenth position. It rose from 61.63 per cent to 66.39 per cent between 2014-15 and 2017-18, but declined to 64.89 per cent in 2019-20 and further to 62.9 per cent in 2020-21. Thus, an overall increase of 3.26 percentage points is witnessed in the share of developmental expenditure for West Bengal between 2014-15 and 2019-20 (Table 3.5).

Table 3.4. Developmental Expenditure of Eighteen General States Relative to Their Respective GSDP (in per cent) – 2014-15 to 2020-21

State/Year	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	Average during 2014-15 to 2019-20
Andhra Pradesh	18.7(1)	13.56(8)	14.43(9)	12.47(9)	12.48(8)	11.46(9)	12.32(9)	13.85(8)
Bihar	18.35(2)	20.61(1)	21.23(1)	20.4(1)	19.97(1)	15.89(3)	19.6(1)	19.41(1)
Chhattisgarh	16.24(4)	17.83(5)	17.15(4)	18.41(2)	17.46(2)	17.9(1)	16.65(3)	17.5(2)
Goa	12.49(8)	13.09(9)	11.8(11)	12.6(8)	12.44(9)	12.01(8)	12.78(8)	12.4(9)
Gujarat	8.65(14)	8.39(16)	7.7(17)	7.69(16)	7.62(18)	7.27(17)	7.78(18)	7.89(16)
Haryana	8.32(15)	12.07(11)	10.2(15)	9.48(13)	9.17(13)	9.74(14)	8.28(15)	9.83(13)
Jharkhand	12.45(9)	19.17(3)	18.45(2)	17.56(3)	14.47(6)	15(4)	17(2)	16.18(5)
Karnataka	9.73(11)	9.61(13)	10.27(14)	10.22(12)	10.45(12)	9.8(12)	9.98(13)	10.01(12)
Kerala	7.56(16)	8.32(17)	8.74(16)	8.16(15)	7.63(17)	6.48(18)	10.21(12)	7.81(17)
Madhya Pradesh	16.66(3)	16.19(7)	17.91(3)	16.91(4)	15.2(4)	14.44(5)	14.72(5)	16.22(4)
Maharashtra	7.55(17)	7.27(18)	7.48(18)	7.4(17)	7.8(15)	8.13(16)	8.25(16)	7.6(18)
Odisha	14.89(5)	18.2(4)	16.75(5)	16.53(5)	16.81(3)	16.71(2)	15.62(4)	16.65(3)
Punjab	7.34(18)	8.56(15)	16.7(6)	6.28(18)	7.76(16)	9.77(13)	7.81(17)	9.4(14)
Rajasthan	13.47(7)	19.57(2)	15.44(8)	14.87(6)	14.54(5)	13.7(6)	13.1(7)	15.27(6)
Tamil Nadu	9.15(12)	8.92(14)	10.37(13)	8.31(14)	8.57(14)	8.32(15)	9.93(14)	8.94(15)
Telangana	9.06(13)	12.28(10)	14.03(10)	11.19(10)	10.9(11)	10.23(10)	11.64(10)	11.28(10)
Uttar Pradesh	14.52(6)	17.46(6)	16.18(7)	12.97(7)	14.15(7)	13.31(7)	13.2(6)	14.76(7)
West Bengal	9.79(10)	10.65(12)	10.88(12)	10.93(11)	11.13(10)	9.9(11)	10.52(11)	10.54(11)
Minimum	7.34	7.27	7.48	6.28	7.62	6.48	7.78	
Maximum	18.7	20.61	21.23	20.4	19.97	17.9	19.6	
Mean	11.94	13.43	13.65	12.35	12.14	11.67	12.19	
CV (in per cent)	32.44	33.65	29.89	34.4	31.08	28.94	28.48	

Note: Same as for Table 3.1.

Source: Same as for Table 3.1.

Table 3.5. Percentage Share of Developmental Expenditure in Total Expenditure of Eighteen General States – 2014-15 to 2020-21

State/Year	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	Average during 2014-15 to 2019-20
Andhra Pradesh	77.02(2)	73.93(7)	74.84(7)	71.27(9)	72.5(6)	68.39(10)	67.97(11)	72.99(7)
Bihar	69.08(10)	70.79(12)	73.2(9)	72.56(8)	71.5(7)	67.75(12)	70(8)	70.81(9)
Chhattisgarh	77.73(1)	77.47(3)	77.84(3)	78.17(1)	77.66(1)	75.14(1)	73.18(2)	77.34(1)
Goa	69.04(11)	71.76(10)	70.7(12)	68.98(11)	67.47(13)	67.99(11)	68.42(10)	69.32(12)
Gujarat	71.69(8)	71.57(11)	70.91(11)	70.49(10)	69.96(10)	70.02(7)	70.35(7)	70.77(10)
Haryana	67.73(13)	75.32(5)	71.78(10)	68.67(12)	68.72(11)	68.66(9)	63.49(13)	70.15(11)
Jharkhand	71.3(9)	75.89(4)	76.19(6)	73.17(6)	70.82(8)	69.99(8)	70.92(6)	72.89(8)
Karnataka	71.81(7)	72.58(9)	76.53(5)	76.46(3)	75.96(3)	73.8(4)	72.38(4)	74.52(4)
Kerala	50.52(18)	53.75(18)	54.19(18)	51.92(17)	50.08(18)	46.02(18)	56.71(17)	51.08(18)
Madhya Pradesh	74.86(4)	73.16(8)	76.67(4)	75.47(4)	73.31(4)	74.15(3)	72.11(5)	74.6(3)
Maharashtra	67.81(12)	66.73(14)	67.08(15)	64.59(14)	64.95(14)	63.81(14)	63.3(14)	65.82(13)
Odisha	74.78(5)	78.44(2)	78.4(1)	76.78(2)	76.19(2)	74.42(2)	73.46(1)	76.5(2)
Punjab	52.11(17)	56.49(17)	70.6(13)	45.07(18)	50.24(17)	55.53(17)	46.05(18)	55.01(17)
Rajasthan	74.49(6)	80.92(1)	74.77(8)	73.79(5)	70.7(9)	70.72(6)	68.8(9)	74.23(6)
Tamil Nadu	65.02(14)	64.64(15)	67.59(14)	62.53(15)	61.27(15)	60.44(16)	64.95(12)	63.58(16)
Telangana	75.7(3)	74.92(6)	78.15(2)	72.7(7)	72.79(5)	72.36(5)	73.15(3)	74.44(5)
Uttar Pradesh	64.96(15)	69.39(13)	66.59(16)	60.85(16)	60.44(16)	62.69(15)	61.7(16)	64.15(15)
West Bengal	61.63(16)	64.29(16)	64.8(17)	66.39(13)	67.79(12)	64.89(13)	62.9(15)	64.97(14)
Minimum	50.52	53.75	54.19	45.07	50.08	46.02	46.05	
Maximum	77.73	80.92	78.4	78.17	77.66	75.14	73.46	
Mean	68.74	70.67	71.71	68.33	67.91	67.04	66.66	
CV (in per cent)	11.26	10.2	8.52	12.83	11.71	11.05	10.5	

Note: Same as for Table 3.1.

Source: Same as for Table 3.1.

As stated above, developmental expenditure of the government comprises of expenditure on both social and economic services, it is basically expenditure on social services that is quite crucial for financing food and nutrition. Categories, such as health and family welfare, water supply and sanitation, and nutrition are of direct relevance for improvement in nutrition. On the other hand, while food programmes are generally in the form of Central Sector Schemes, many States run their own versions of food related programmes. Tables 3.6 and 3.7 furnish the trends in social sector expenditure³ of major States from 2014-15 to 2020-21 in relation to their respective GSDP and also as a percentage share of their total expenditures respectively. Ranging between 7.97 per cent and 9.02 per cent of GSDP, West Bengal's social sector expenditure averaged at 8.47 per cent between 2014-15 and 2019-20 placing it at the 9th position among all 18 GC States (Table 3.6). As regards its percentage share of social sector in total expenditure, it ranged from a minimum of 50.22 per cent in 2014-15 to a maximum of 54.76 per cent in 2017-18 (Table 3.7). Exhibiting some fluctuations, the share of social sector expenditure of West Bengal in its total expenditure averaged at 52.22 per cent placing it on the top of all 18 GC States during the period 2014-15 to 2019-20 (Table 3.7).

Plotted in Figure 3.1 are the trends in the percentage shares of capital account of social services in total social services as well as capital account of selected social services in total of those services for West Bengal from 2014-15 to 2020-21. These trends exhibit large fluctuations over the years registering a decline in the investment in social infrastructure between 2014-15 and 2019-20 and further in 2020-21. Almost similar trends are visible in case of investment in key social services, namely, medical and public health, family welfare and water supply and sanitation. These trends demonstrate the fact that discretionary components of government expenditure are subject to frequent changes during fiscal stress.

³ This category of expenditure includes expenditure on social services, rural development, and that on food storage and warehousing.

**Table 3.6. Social Sector Expenditure as per cent of GSDP of Eighteen General States –
2014-15 to 2020-21**

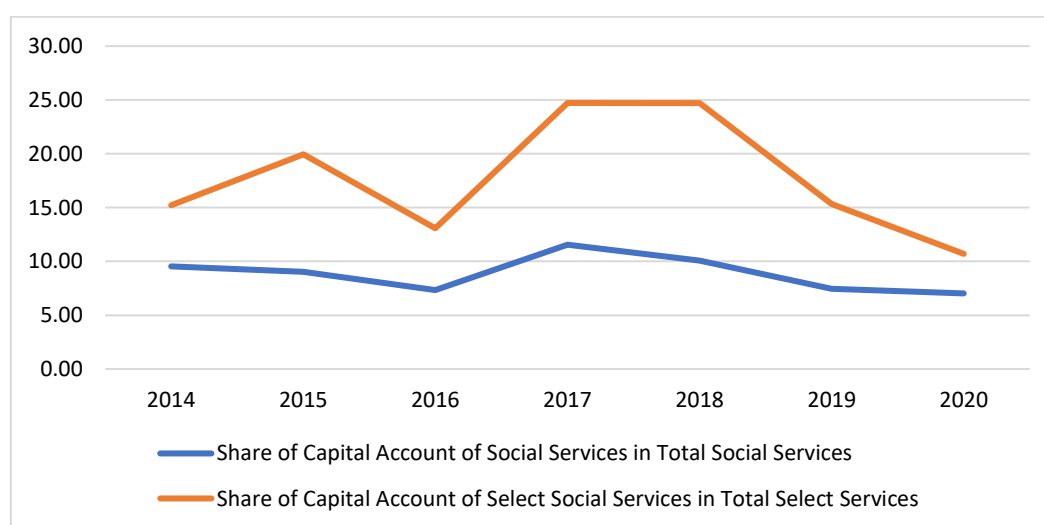
State/Year	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	Average during 2014-15 to 2019-20
Andhra Pradesh	10.46(3)	9.52(6)	9.18(8)	9.27(6)	8.79(7)	8.51(7)	9.08(7)	9.29(6)
Bihar	12.37(1)	14.18(1)	14.38(1)	14.56(1)	14.31(1)	12.37(1)	15.23(1)	13.69(1)
Chhattisgarh	10.71(2)	12.21(2)	12.14(3)	12.42(2)	9.92(3)	11.38(2)	10.46(4)	11.46(2)
Goa	6.63(10)	6.68(11)	6.27(12)	7.22(10)	7.16(10)	6.77(10)	7.33(11)	6.79(10)
Gujarat	5.13(14)	5.2(15)	4.8(17)	4.56(16)	4.48(17)	4.44(17)	4.7(17)	4.77(18)
Haryana	5.04(15)	5.15(16)	5.43(15)	5.55(14)	5.55(14)	6.22(11)	5.78(14)	5.49(14)
Jharkhand	8.12(8)	10.6(4)	12.51(2)	10.88(3)	9.89(4)	10.58(4)	11.6(2)	10.43(4)
Karnataka	5.64(12)	5.69(14)	5.85(14)	5.73(13)	6.14(12)	5.45(13)	5.36(16)	5.75(12)
Kerala	5.56(13)	5.89(13)	6.15(13)	5.82(12)	5.57(13)	4.74(16)	7.42(10)	5.62(13)
Madhya Pradesh	9.25(5)	10.27(5)	10.04(7)	10.28(4)	9.23(6)	9.18(5)	9.84(5)	9.71(5)
Maharashtra	4.96(16)	4.75(17)	4.76(18)	4.53(17)	5.02(16)	5.42(14)	5.44(15)	4.91(17)
Odisha	9.31(4)	11.03(3)	10.09(5)	10.25(5)	10.85(2)	11.36(3)	10.77(3)	10.48(3)
Punjab	4.37(18)	4.17(18)	11.3(4)	3.69(18)	4.11(18)	4.03(18)	4.69(18)	5.28(16)
Rajasthan	8.9(6)	9.14(8)	8.88(9)	9.16(7)	9.27(5)	8.72(6)	9.21(6)	9.01(7)
Tamil Nadu	5.85(11)	5.95(12)	5.35(16)	4.9(15)	5.29(15)	4.96(15)	6.01(13)	5.38(15)
Telangana	4.83(17)	7.36(10)	7.28(11)	6.69(11)	6.63(11)	6.1(12)	6.73(12)	6.48(11)
Uttar Pradesh	8.53(7)	9.51(7)	10.07(6)	8.13(9)	8.5(9)	8.37(8)	8.72(9)	8.85(8)
West Bengal	7.97(9)	8.51(9)	8.56(10)	9.01(8)	8.59(8)	8.18(9)	9.02(8)	8.47(9)
Minimum	4.37	4.17	4.76	3.69	4.11	4.03	4.69	
Maximum	12.37	14.18	14.38	14.56	14.31	12.37	15.23	
Mean	7.42	8.1	8.5	7.93	7.74	7.6	8.19	
CV (in per cent)	32.4	35.48	34.44	38.13	34.32	34.61	34.1	

Table 3.7. Percentage Share of Social Sector Expenditure in Total Expenditure of Eighteen General States – 2014-15 to 2020-21

State/Year	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	Average during 2014-15 to 2019-20
Andhra Pradesh	43.08(8)	51.92(2)	47.6(6)	52.99(2)	51.04(3)	50.81(3)	50.09(4)	49.57(4)
Bihar	46.57(5)	48.71(4)	49.61(4)	51.78(4)	51.23(2)	52.71(2)	54.41(1)	50.1(3)
Chhattisgarh	51.24(1)	53.08(1)	55.08(1)	52.75(3)	44.11(10)	47.78(6)	45.98(8)	50.67(2)
Goa	36.67(17)	36.61(16)	37.55(17)	39.51(14)	38.83(14)	38.34(15)	39.24(16)	37.92(16)
Gujarat	42.51(9)	44.32(8)	44.22(8)	41.8(11)	41.11(13)	42.76(11)	42.47(10)	42.79(10)
Haryana	41.06(13)	32.12(17)	38.24(15)	40.18(12)	41.64(12)	43.87(9)	44.3(9)	39.52(13)
Jharkhand	46.47(6)	41.96(12)	51.67(2)	45.33(8)	48.39(5)	49.35(5)	48.38(6)	47.19(6)
Karnataka	41.6(10)	42.94(11)	43.62(9)	42.88(10)	44.67(7)	41.07(13)	38.89(17)	42.8(9)
Kerala	37.15(16)	38.02(13)	38.15(16)	37.05(16)	36.54(16)	33.7(17)	41.23(13)	36.77(17)
Madhya Pradesh	41.56(12)	46.38(6)	42.99(10)	45.87(6)	44.53(8)	47.14(7)	48.2(7)	44.75(7)
Maharashtra	44.56(7)	43.55(9)	42.72(12)	39.58(13)	41.77(11)	42.53(12)	41.74(12)	42.45(12)
Odisha	46.75(4)	47.56(5)	47.22(7)	47.63(5)	49.17(4)	50.58(4)	50.65(3)	48.15(5)
Punjab	31.01(18)	27.55(18)	47.79(5)	26.52(18)	26.62(18)	22.92(18)	27.68(18)	30.4(18)
Rajasthan	49.23(3)	37.77(15)	42.98(11)	45.43(7)	45.04(6)	45.01(8)	48.39(5)	44.24(8)
Tamil Nadu	41.58(11)	43.16(10)	34.85(18)	36.89(17)	37.82(15)	35.98(16)	39.35(15)	38.38(15)
Telangana	40.37(14)	44.88(7)	40.56(14)	43.48(9)	44.29(9)	43.1(10)	42.3(11)	42.78(11)
Uttar Pradesh	38.16(15)	37.79(14)	41.44(13)	38.16(15)	36.3(17)	39.42(14)	40.78(14)	38.55(14)
West Bengal	50.22(2)	51.35(3)	51.01(3)	54.76(1)	52.33(1)	53.63(1)	53.94(2)	52.22(1)
Minimum	31.01	27.55	34.85	26.52	26.62	22.92	27.68	
Maximum	51.24	53.08	55.08	54.76	52.33	53.63	54.41	
Mean	42.77	42.76	44.29	43.48	43.08	43.37	44.33	
CV (in per cent)	12.13	16.03	12.41	16.25	14.95	17.56	14.59	

Notes and sources are same as for Table 3.1.

Figure 3.1. Capital Account of Social Services and Its Selected Components (in per cent)



Source: Same as for Table 3.1.

So far, the trends in the relative shares of various components of public expenditures, or their ratios to GSDP have been examined. However, the movement in the relative shares/ratios of various expenditure categories may not reflect the true picture. For example, the decline in the relative share of developmental/social sector expenditure in total expenditure of a particular state over time may partly be attributed to the rising committed liabilities of the state. Likewise, the rapid growth of a State's output relative to its government expenditure also results in the falling ratio of developmental/social sector expenditure to its GSDP. It may further be noted that social sector expenditure of a State can directly be associated to the cost of living prevailing in that State as well as its population growth. Social sector expenditure of States has, therefore, also been examined in real per capita terms. For this purpose, Table 3.8 presents the real per capita social sector expenditures as well as the relative positions of major States in this respect separately from 2014-15 to 2020-21. It may be observed from this table that the average real per capita expenditure of West Bengal during 2014-15 to 2019-20 stood at Rs.6207.49 keeping the State at 14th position among 18 GC States. West Bengal actually recorded a continuous increase in its real per capita social sector expenditure from as low as Rs.5082.1 in 2014-15 to a peak of Rs.6908.94 in 2018-19 before declining to Rs.6685.93 and Rs.6607.85 in 2019-20 and 2020-21 respectively. West Bengal's relative position amongst eighteen major States deteriorated slightly from 13 in 2014-15 to 14 in 2015-16 and further to 16 in 2016-17. The State managed to regain its initial position (13) in 2017-18 and stabilised at 14th position since 2018-19. While Goa occupied the topmost position throughout the period under consideration, Bihar and Uttar Pradesh seemed to have competed for the bottom position. Appendix D gives the percentage shares of government expenditure of West Bengal on major schemes of food and nutrition, including Integrated Child Development Service (ICDS) scheme, Mid-Day Meal (MDM) programme, National Health Mission (NHM) and some other State level initiatives for the purpose. It will be seen from this Appendix that, on average, West Bengal spent around 11.6 per cent of its total expenditure during 2014-15 to 2019-20 on direct and indirect programmes towards food and nutrition. This, however, should be interpreted with great caution, as it reflects a broad picture; a thorough public expenditure review (PER) exercise for nutrition is not attempted in this thesis due to lack of time and resource constraints.

All these trends discussed above clearly indicate that although West Bengal is increasing the per head allocation of its budgetary resources for social sector, but the State lies far below other

GC States. Furthermore, the trends in government expenditures of States indicate large fluctuations over the sample period. In this connection, it is pertinent to note that in a federal country like India, States depend largely on Central fiscal transfers to meet their expenditure requirements for developmental purposes. Various studies have revealed the uncertain nature of these Central fiscal transfers, leading to uncertainty in the revenue projections of State governments, which in turn creeps into their expenditure estimates. In case of West Bengal, it may be noticed from Figure 3.2 and Appendix figures A1.1, A1.2 and A1.3 that with low own revenue mobilisation, large dependence on Central transfers and poor quality of fiscal deficit relative to many other GC States, the public finances of West Bengal are quite unsustainable in so far as the accomplishment of various plan targets/schemes of economic and social importance under Sustainable Development Goals (SDGs).

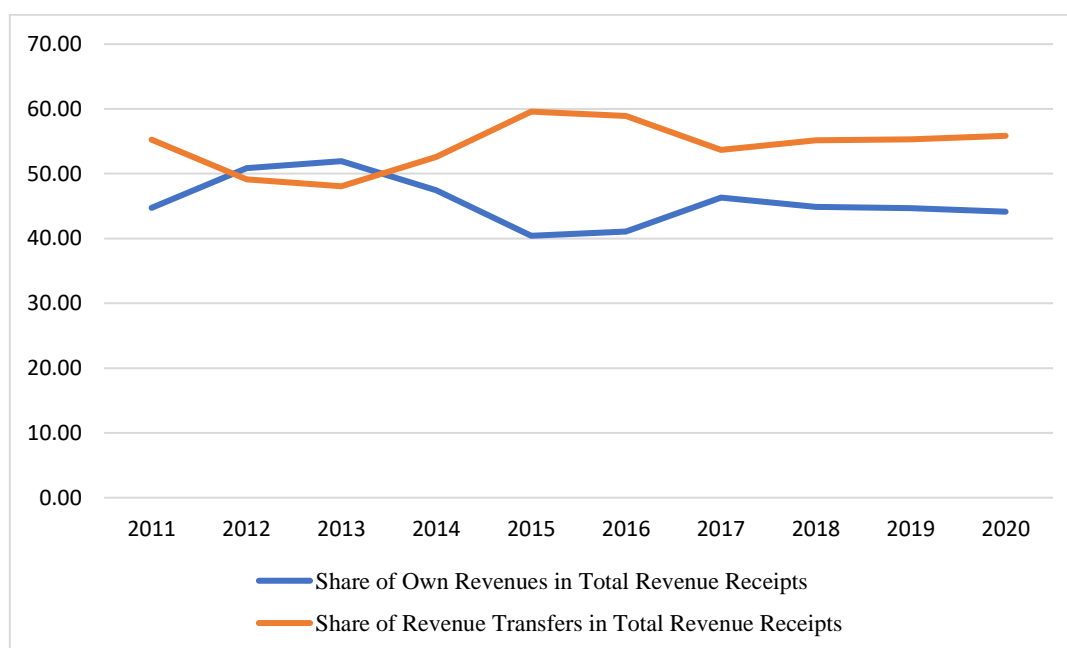
Higher budgetary allocations do not always get translated into better outcomes. It is in this context that an examination of the effectiveness and efficiency of government expenditure of West Bengal is the topic of the subsequent sections. In other words, the answers to the following questions are sought: Did government expenditure on ICDS and NHM reduce U5MR and improve nutritional status of children under 5 years? Did prevalence of anaemia in women of reproductive age group reduce as a result of government on medical and public health, family welfare, water supply and sanitation and nutrition? Does government expenditure on agriculture and allied activities help to reduce food inflation, improve per capita production of coarse cereals and pulses and reduce the incidence of poverty? Before moving to the next section, it must be categorically noted that West Bengal being the focus of this study, the exercises of assessing the effectiveness and efficiency of government expenditure should ideally be for West Bengal only. However, given the absence of data pertaining to government expenditure at the district level in the public domain for a State, and also less frequency of output indicators compared to government expenditure data, these exercises are being conducted in a panel regression framework taking into account all eighteen major States over the period from 2014-15 to 2020-21 for which almost comparable data on government expenditure variables are available.

Table 3.8. Real Per Capita Social Sector Expenditure of Eighteen General States (in Rs.) – 2014-15 to 2020-21

State/Year	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	Average during 2014-15 to 2019-20
Andhra Pradesh	9047.4(2)	8821.26(3)	9087.92(4)	10140.3(2)	10511.36(3)	10364.64(4)	10424.91(3)	9662.15(2)
Bihar	3090.89(18)	3612.32(18)	3933.87(18)	4250.5(17)	4461.81(17)	4097.67(18)	4518.4(17)	3907.84(18)
Chhattisgarh	7213.39(3)	7848.26(4)	8668.27(5)	9168.01(5)	8157.72(8)	9494.04(5)	8042.72(9)	8424.95(5)
Goa	17612.08(1)	19496.58(1)	19751.28(1)	24000(1)	23871.7(1)	22465.5(1)	22808(1)	21199.53(1)
Gujarat	6278.14(10)	6768.8(9)	6650.03(13)	6910.58(12)	7333.9(12)	7494.57(11)	7382.12(12)	6906(12)
Haryana	6978.11(5)	7643.18(6)	8631.45(6)	9489.29(4)	9960.18(4)	11055.23(2)	9690.75(5)	8959.57(4)
Jharkhand	4230.65(16)	4889.82(15)	6174.48(15)	5818.9(15)	5693.41(15)	5853.26(15)	5706.81(15)	5443.42(16)
Karnataka	6691.73(7)	7234.45(8)	8156.76(8)	8496.02(6)	9698.25(5)	8808.8(7)	8198.62(7)	8181(6)
Kerala	6875.71(6)	7657.49(5)	8608.96(7)	8447.68(7)	8601.67(7)	7083.19(13)	9880.18(4)	7879.12(7)
Madhya Pradesh	4815.27(14)	5775.04(13)	6448.81(14)	7077.74(10)	6922.24(13)	7192.69(12)	7327.1(13)	6371.96(13)
Maharashtra	6435.15(8)	6510.74(11)	6923.59(10)	6711.97(14)	7668.3(11)	8259.69(8)	7605.9(11)	7084.91(10)
Odisha	5581.34(12)	6501.65(12)	6713.27(12)	7423.08(8)	8601.89(6)	9210.41(6)	8072.3(8)	7338.61(9)
Punjab	4569.05(15)	4593.7(16)	12934.61(2)	4457.3(16)	5163.73(16)	5012.28(16)	5532.7(16)	6121.78(15)
Rajasthan	6304.9(9)	6669.26(10)	6770.56(11)	7309.5(9)	7813.94(10)	7549.15(10)	7698.8(10)	7069.55(11)
Tamil Nadu	7097.64(4)	7496.85(7)	7130.02(9)	6966.53(11)	8033.43(9)	7577.63(9)	8732.96(6)	7383.68(8)
Telangana	5754.85(11)	9488.19(2)	10002.85(3)	10014.74(3)	10985.87(2)	10626.32(3)	10634.27(2)	9478.81(3)
Uttar Pradesh	3402.33(17)	4036.33(17)	4578.01(17)	3982.33(18)	4349.39(18)	4290.7(17)	4026.54(18)	4106.52(17)
West Bengal	5082.1(13)	5772.88(14)	6016.09(16)	6779(13)	6908.94(14)	6685.93(14)	6607.85(14)	6207.49(14)
Minimum	3090.89	3612.32	3933.87	3982.33	4349.39	4097.67	4026.54	
Maximum	17612.08	19496.6	19751.28	24000	23871.7	22465.5	22808	
Mean	6503.37	7267.6	8176.71	8191.3	8596.54	8506.76	8493.94	
CV (in per cent)	48.29	47.24	43.3	53.18	49.7	47.47	47.52	

Notes and sources are the same as for Table 3.1.

Figure 3.2. Percentage Shares of Own Revenues and Revenue Transfers from the Centre in Total Revenue Receipts of West Bengal – 2011-12 to 2020-21



3.3. Effectiveness of Government Expenditure of States Towards Food and Nutrition

In order to examine the effectiveness of government expenditure towards food and nutrition at subnational level, various categories of government expenditures, relevant for the exercise are combined with different output indicators in alternate panel regression specifications estimated over the period 2014-15 to 2020-21. The baseline regression specification is as under:

$$Y_{it} = \alpha_i + \beta_i X_{it} + \theta_i + \mu_t$$

In the first regression specification, the endeavour is to see if per child government expenditure on ICDS and per capita government expenditure on NHM reduces the incidence of under-five mortality rate (U5MR) and also improves the nutritional status among children under five years in terms of prevalence of stunted, wasted, underweight and anaemic children. Thus, five alternative specifications with U5MR and with four malnutritional indicators, as stated above, are estimated, each with the same set of explanatory variables. These include, real per capita government expenditures on ICDS and NHM⁴ (both in logarithmic form) as variables of interest along with two controlled variables, namely, policy-focus dummy and percentage of women with ten or more years of schooling (women's education, for short hereafter). The policy focus dummy is defined to capture recent restructuring of nutrition related schemes, including ICDS; it takes the value 1 for 2018-19, and 0 for 2014-15. Since the outcome variables are taken from National Family Health Survey Rounds IV (2015-16) and V (2019-21), the respective government expenditure categories correspond to the year 2014-15 and 2018-19 respectively (with one-year lag). Thus, the dataset for this regression is a balanced panel with eighteen States (including Goa) (as mentioned in the preceding section) with two time points. Since the outcome variables assume their values between 0 and 100 per cent (including the end-points), and that too, without censoring, fractional regression with Probit specification is chosen to fit the data. Furthermore, since the outcome variables are negative indicators, i.e., higher the value, worse is the outcome and vice versa, the positive impact of explanatory variables on respective outcomes is indicated by the negative coefficients. Since the direct interpretation of the estimated coefficients from fractional regression (probit specification) is difficult, Table 3.9 reports the marginal effects of the estimated regression (all

⁴ Per capita expenditure on ICDS is obtained by dividing government expenditure on ICDS by projected population of children in the age group 0-6 years. However, the same could not be done for NHM expenditure category, because the reproductive and child health (RCH) component under NHM is not shown separately in States' Finance Accounts; and NHM expenditure, as a whole, is for the entire population. Thus, per capita NHM expenditure is obtained by dividing the corresponding expenditure by the total projected population.

five specifications). It may be seen from Table 3.9 that, for the given dataset, ICDS expenditure tends to significantly and strongly reduce the prevalence of anaemia as well as stunted rate among children under 5 years. For example, 1 per cent increase in real per capita ICDS expenditure reduces the prevalence of anaemia and stunted rate among under-five year children by 0.22 percentage points and 0.13 per centage points respectively. ICDS expenditure is also found to have negative and statistically significant relationship with U5MR and prevalence of underweight children below five years, thus indicating a positive impact. The positive and statistically significant impact of NHM expenditure is also observed for all four nutritional outcome indicators. This expenditure category shows signs of improvement for U5MR, but the estimated elasticity coefficient is not statistically significant at any reasonable level for the dataset being used here. Interestingly, women’s education variable comes out with negative and statistically significant coefficients in all five specifications, thereby indicating a promising role for the improvement in U5MR as well as nutritional status of children below five years. The policy-focus dummy turns quite ambiguous.

Table 3.9. Impact of Subnational Government Expenditure on Undernourishment Among Children

Fractional Regression Results (Probit Specification) – Marginal Effects

Independent Variable	Dependent Variables				
	U5MR	Stunted	Wasted	Underweight	Anaemic
Log-PCExp_ICDS	-.0539***	-.1339*	-.0163	-.0809**	-.2220*
Log-PCExp_NHM	-.0306	-.1310**	-.1473**	-.1548*	-.1172**
PolicyFocus	.0143	.0621**	-.0161	.0407***	.1546*
WE	-.5302*	-.5731*	-.2742*	-.5695*	-.3583*

Notes: *, ** and *** indicate the level of significance with $0 \leq p \leq .01$, $.01 > p \leq .05$, $.05 > p \leq .10$ respectively.

Source: Own computation using Stata.

The second regression is run to assess the impact of government expenditure on the prevalence of anaemia among all women in the reproductive age group 15-49 years. For this purpose, a

fractional regression with probit specification is estimated, taking government expenditures on NHM, water supply and sanitation and nutrition together as the variable of interest, expressed in real per capita terms⁵ and used in log form in the regression. Apart from this, women’s education, policy-focus, population density and per capita millet production⁶ are considered as controls for this regression. Table 3.10 shows the marginal effects of the estimated regression. As shown in the table, the variable of interest, namely, Log-PCExp_NHMWSSN as well as the controlled variable, WE have appeared with expected signs and are statistically significant, indicating a crucial role of government expenditure on NHM, water supply and sanitation and nutrition and women’s education in reducing the prevalence of anaemia among women. Here too, the PolicyFocus variable does not find any explanation as to why it tends to increase the prevalence of anaemia among women. Although the estimated coefficients of PopDens and Log-PCProd_Millet have appeared with expected positive and negative signs respectively, these variables do not find any statistical support for our data.

Table 3.10. Impact of Subnational Government Expenditure on Prevalence of Anaemia Among Women

Fractional Regression Results (Probit Specification) – Marginal Effects

Independent Variable	Dependent Variables
	WA1549
Log-PCExp_NHMWSSN	-.1367**
PolicyFocus	.0888*
PopDens	.0426
WE	-.4120*
Log-PCProd_Millet	-.01749

Notes: Same as for Table 3.9.

Source: Same as for Table 3.9.

Lastly, the third panel regression, estimated in a fixed effect setting using simple Least-Square method over a balanced panel of 18 States over 5 years from 2014-15 to 2018-19 (with one

⁵ Women’s projected population in the age group 15-49 years is considered to convert the expenditure in per capita terms.

⁶ Millet production is considered in the absence of consumption data for the same. Further, this is gross production; data on distribution, etc. are not available at the State level so as to get the net availability of millet.

year lead for outcome variables) is an attempt to assess the impact of government expenditure on three outcome variables, namely, food inflation, log of per capita production of coarse cereals and pulses and incidence of poverty (measured by log of projected poor population)⁷. For the first two outcome variables, namely, food inflation and per capita availability of coarse cereals and pulses, real per capita government expenditure on agriculture and allied activities (expressed in log form) is used, while for the third outcome variable – incidence of poverty, total developmental expenditure (in real per capita terms) (expressed in log form) is used, since poverty is a multi-dimensional concept, and requires government efforts on both economic and social fronts to eradicate it. Other controlled variables, used in all these three specifications, include: economic growth of a State (captured by real GSDP growth), log of average annual rainfall, log of daily wage of agriculture labourers and share of credit to agriculture in total credit given by the scheduled Commercial banks. The estimation results, as reported in Table 3.11 show that per capita government expenditure on agriculture and allied activities, which is the variable of interest in this exercise, positively and significantly affects food inflation. This result may find its explanation in a recent study by the Foundation for Agrarian Studies (Ramakumar et al., 2022). The study reveals a low and declining share of combined public expenditure of Centre and States on agriculture in agriculture GVA from 2010-11 to 2019-20, and that the compositional shift in public expenditure on agriculture has been in favour of income support and credit-based assistance thus moving away from support for direct production. Interestingly, annual average rainfall as well as share of agriculture credit in total credit by scheduled commercial banks tend to reduce food inflation with reasonable levels of statistical significance, while agriculture wage rate significantly contributes to it. In the second specification, Table 3.11 shows that per capita production of coarse cereals and pulses (which may be considered as a measure of gross availability of these items) has a positive but insignificant elasticity (.07) with respect to per capita government expenditure on agriculture and allied activities. The only statistically significant variables in this specification are the growth of GSDP with coefficient -.04 and annual average rainfall that bears a positive relationship (having the coefficient .11) with the dependent variable. Lastly, the third specification relates to the log of per capita poor population as the dependent variable. For this specification, the regression results are quite promising; per capita government expenditure on developmental activities has a negative and significant association with poor population, so

⁷ 2011 poverty rate (based on MRP consumption as per Tendulkar methodology) for each individual State furnished in Handbook of Statistics on Indian States, published by RBI is applied to the total projected population of that State for various years to get the poor population for those years.

is the case with GSDP growth and agriculture wage rate. Share of agriculture credit, though appears with expected negative coefficient, lacks statistical significance at any reasonable level.

Table 3.11. Panel Regression Results for Food Security

	Dependent Variables		
	FoodInflation	log(PCCoarseCerealsPulses)	log(PoorPop)
C	73.41 *	-1.5	15.01 *
log(PC-EXP_Agri)	2.09 **	0.07	-1.77 *
Growth	-0.07	-0.04 *	-0.23 **
log(Rainfall)	-2.28 ***	0.11 **	0.07
log(Wage)	1.75 *	0.87	-0.14 *
ShareAgriCredit	-0.24 ***	-0.005	-0.01
Cross-Section Effect	Fixed Yes	Yes	Yes
F-Statistic	4.75 **	81.8 *	88.05 *

Notes: Same as for Table 3.9.

Source: Same as for Table 3.9.

3.4. Efficiency of Government Expenditure for Food and Nutrition⁸

In this section, the efficiency of government expenditure at the subnational level for food and nutrition is assessed along with an empirical investigation of its determinants. Thus, the entire analysis is conducted in two stages. In the first stage, the efficiency of government expenditure is measured using data envelopment analysis (DEA) technique. DEA is used to estimate the shape of the efficiency frontier (a set of points that shows the efficient combination of inputs and outputs which can be obtained in the systems examined). DEA constructs an efficiency frontier using input and output data for the entire sample following a mathematical programming procedure. In other words, DEA is based on a linear combination of inputs and outputs in order to specify the efficiency frontier. Convexity of the set of input-output

⁸ A somewhat enlarged version of the analysis conducted in this section has been published in the Journal of Public Affairs, please refer to Dixit et al. (2023).

combinations is assumed since this method constructs an envelope around the observed combinations. By assumption, the frontier determines the best or efficient practices and the distance of a decision-making unit (DMU) from the frontier measures its potential efficiency gain. The efficiency score, in the presence of multiple inputs and outputs is defined as:

Efficiency = Weighted Sum of Outputs ÷ Weighted Sum of Inputs.

This is, in strict sense, a measure of technical efficiency (TE); the allocative efficiency requires the information on input prices.

Different variants of DEA models have been proposed and applied in the literature, such as input-oriented, output-oriented, non-oriented, radial vs non-radial models; and models with constant returns to scale (CRS) or with variable returns to scale (VRS) (Coelli, 1996). The nature of efficiency exercise determines which variant of DEA is most suited for the purpose. For example, for the present analysis, the efficiency analysis is conducted assuming variable returns to scale (VRS) in both output-oriented as well as input-oriented settings. The choice of the DEA model may be defended on the ground that the subnational Governments in India face fiscal constraints, more especially when it comes to allocating funds for critical social sector areas. In India, expenditure in areas like health and nutrition is abysmally low, and these areas witness further cuts in public spending when there is any upward pressure on committed liabilities.

For efficiency analysis here, five variables, namely, three monetary inputs, namely, government spending on nutrition and related social services (NRSSE)⁹, government spending on agriculture and allied activities (AGALAC) and other expenditure of the government (Other), defined as the difference between total government expenditure and the sum of the NRSSE and AGALAC; and two outputs, Viz., malnutrition index for children (MNIC) and malnutrition for women (MNIW) (please refer to Appendix E for procedure of constructing these two indices) have been considered. All expenditure categories have been expressed as per cent of GSDP. The efficiency has been measured in both input-oriented as well as in output-oriented settings under variable returns to scale (VRS) assumption at two time points, Viz.,

⁹ This category is defined to include expenditures on medical and public health, family welfare, water supply and sanitation, social security and welfare and nutrition.

2014-15 and 2018-19. The results so obtained are furnished in Table 3.12. Before explaining these efficiency results it is worth noting that in order to avoid any outlier in the expenditure data and to account for some lag between inputs used and outputs realised, three years' average is taken for each category of public expenditure used in the efficiency analysis corresponding to one year of output. Thus, different expenditure categories used in the efficiency analysis have been averaged over 2012-13 to 2014-15 (period1) and over 2016-17 to 2018-19 (period2) to correspond to the outputs in years 2015-16 (period1) and 2019-20 (period2) respectively.

It can be seen from Table 3.12 that Goa, Haryana, Kerala and Maharashtra are found to be on the efficiency frontier at both time points under analysis, viz., 2014-15 and 2018-19 under both output and input orientation settings. Thus, Maharashtra turned out as the odd State which utilised public funds quite efficiently to achieve the maximum possible output under given state of technology. Telangana and West Bengal performed efficiently during 2014-15 only, while Gujarat, Karnataka and Tamil Nadu exhibited efficient performance only during 2018-19 towards nutrition under both output and input orientation. Bihar and Jharkhand appeared as the bottom performers under output-oriented setting. A common trend, visible throughout Table 3.12 is that the inefficiency of Government expenditure is more pronounced under input-oriented setting as compared to output-oriented setting. To put this in policy perspective, there is a greater scope of avoiding wasteful expenditure to achieve a given level of output towards elementary education and nutrition as suggested by the trends in the efficiency scores. This result is consistent with those observed by (Purohit, 2014) for education and health and also in broad conformity with the findings of Mohanty and Bhanumurthy, (2020) for social sector expenditure as well as education and health expenditures. This is important, because the levels of public expenditures in these basic services are already low compared to the desired norms, and a further leakage of public funds from these services will keep outcomes far from realisation. In what follows, an empirical investigation is attempted to examine the impact of some potential environmental factors on the variability of inefficiency scores across States.

Table 3.12. Efficiency Scores of Government Expenditure on Food and Nutrition for General Category States

	Output-Oriented Efficiency Scores	Input-Oriented Efficiency Scores	Output-Oriented Efficiency Scores	Input-Oriented Efficiency Scores
	2014-15	2014-15	2018-19	2018-19
Andhra Pradesh	0.805	0.448	0.816	0.777
Bihar	0.693	0.46	0.74	0.743
Chhattisgarh	0.859	0.724	0.763	0.635
Goa	1	1	1	1
Gujarat	0.917	0.969	1	1
Haryana	1	1	1	1
Jharkhand	0.774	0.887	0.731	0.648
Karnataka	0.965	0.955	1	1
Kerala	1	1	1	1
Madhya Pradesh	0.748	0.543	0.771	0.536
Maharashtra	1	1	1	1
Odisha	0.869	0.706	0.802	0.633
Punjab	0.984	0.966	0.969	0.934
Rajasthan	0.834	0.774	0.81	0.703
Tamil Nadu	0.962	0.952	1	1
Telangana	1	1	0.813	0.814
Uttar Pradesh	0.825	0.776	0.827	0.636
West Bengal	1	1	0.85	0.983
Minimum	0.693	0.448	0.731	0.536
Mean	0.902	0.843	0.883	0.836
CV (in per cent)	11.37	23.04	12.26	20.46

Source: Author's computation using DEAP Version 2.1.

For this, a baseline regression of the following form is specified below (4)

$$\delta_i = z_i\beta + \varepsilon_i \quad (i = 1, 2, \dots, n) \dots\dots\dots (4)$$

Where: δ_i is a vector of obtained TE scores from stage 1, z_i is the vector of exogenous variables that might have an impact on the efficiency scores (δ_i), β represents the vector of unknown parameters to be estimated, and ε_i is the disturbance term, which is assumed to follow the usual assumptions of the classical normal linear regression model. In this paper, a set of five explanatory variables, namely, level of economic development of a State (captured by log of per capita GSDP); share of Union fiscal transfers to a State; nature of fiscal transfers (defined as the ratio of general-purpose transfers to total transfers); governance level in the State and women's education are considered in the initial specification. However, two augmented specifications have been estimated using two additional interaction variables – net fiscal autonomy to a State (captured by the interaction of the share and nature of Union fiscal transfers to a State) and fiscal absorptive capacity of the State (captured through the interaction of newly formed net fiscal autonomy variable and governance variable). While the aim of the baseline regression is to know the average marginal effect of all five variables, the second specification tries to estimate the combined effect of adequate fiscal transfers when less (more) of them are of general purpose nature. Finally, the goal of the third specification is to know if the combined effect of the nature and share of fiscal transfers along with the level of governance in the State is significant.

The direct estimation of the above regression using Ordinary Least Squares technique, TOBIT, LOGIT, etc. gives misleading results and their interpretation due to the lack of any coherent data-generating process (DGP) and for reasons of serial correlation as well as possible upward bias in the efficiency scores, δ_i and an expected correlation of exogenous (non-discretionary) variables with inputs and outputs, thus leading to the dependence between z_i and ε_i . For these reasons, Simar and Wilson (2007) proposed a multi-step procedure that involves (i) estimation of a radial measure of technical efficiency, (ii) truncated regression analysis, (iii) simulating the unknown error correlation, and (iv) calculating bootstrap standard errors and confidence intervals. Simar and Wilson (2007) proposed two algorithms that differ in either using uncorrected (algorithm 1) or bias-corrected (algorithm 2) efficiency scores. Though both algorithms allow valid inference, algorithm 2 improves statistical efficiency in the second stage regression. This paper employs algorithm 2 of Simar and Wilson (2007) with 100 replications for estimating bootstrap efficiency scores so as to finally get bias-corrected efficiency scores and 2000 bootstrap replications for estimating coefficient parameters, β and variance parameter, σ and also for computing percentile-based confidence intervals of the truncated

regression (with bias-corrected efficiency scores as the dependent variable).¹⁰ For a detail of the methodology proposed by Simar and Wilson (2007), please refer to the original paper.

Since our direct interest is to know the coefficients which may be interpreted in terms of effects of different variables, Table 3.13 reports the average marginal effects of estimated specifications. Table 3.13 shows that corresponding to the first specification, the share of State's transfer in aggregate Union transfers as well as the level of governance in the State appear to be immaterial so far as their average marginal effects on inefficiency. On the other hand, the level of economic development, the nature of fiscal transfers and women's education in a State are found to be statistically significant. All explanatory variables in this specification appear with expected negative signs indicating their inverse marginal impact on inefficiency. The results corresponding to the second and third specifications are almost the same as regards the average marginal effects of level of economic development and Women's education. Interestingly, in the second specification, the level of governance indicates a significant tendency of reducing inefficiency of State Government expenditure on nutrition. However, the combined negative mean marginal effect of two fiscal transfer variables (NFAS) is not statistically significant. Yet another interesting result from Specification3 in Table 2 relates to the quite strong and significant mean marginal effect of FACS on bias-corrected inefficiency scores.

The above empirical findings have some very important policy implications in the context of India's fiscal federalism. The estimation results clearly suggest a greater role of fiscal autonomy along with good governance at the subnational level so as to improve the quality of Government expenditure for most crucial social services that require proactive intervention of the Government. Another important finding pertains to the role of women's education in improving the efficiency of Government expenditure. Though with meagre average marginal effect, this particular variable appeared with expected sign and remained statistically significant in all specifications. The empirical results of this analysis broadly corroborates the findings of Hauner (2007) and Mohanty and Bhanumurthy (2020). For example, in the Russian Federation, Hauner (2007), who found larger efficiency gains for healthcare and social protection as compared to education, attributed the difference in regional outcomes positively to per capita income and the quality of governance, and negatively to the share of federal transfers and the level of spending. Mohanty and Bhanumurthy (2020) find that the level of

¹⁰ This regression exercise has been conducted in Stata16.1 using 'simarwilson' command proposed by Badunenko and Tauchmann (2019).

governance, per capita GSDP and mother's schooling improve efficiency of social sector expenditure. It has been advocated in the literature that constrained by their finances and having differences in relative priorities, absorptive capacities, institutions and infrastructure, it is not possible for all States with varying fiscal abilities to make uniform matching contributions and utilize Central Assistance under CSSs effectively. Thus, wide differences in Central Assistance to States under CSSs are found with richer States capturing more funds as compared to their poor counterparts (Rao, 2017; Kapur, 2019). The present analysis, therefore, focuses, not only on the share of Union transfers, but also how much of total Union transfers have been in the nature of general purpose (untied transfers) (captured by NFAS) (a larger part of which comprised of tied grants in 2014-15, but changed in favour of untied transfers since 2015-16). Even the general purpose grants may remain less effectively utilised for basic public services if the level of governance in a State is poor and institutions are weak. Thus, the fiscal absorptive capacity of a State, though narrowly defined in the present analysis takes into account the interaction of NFAS and the level of governance. To put this in perspective, the fiscal absorptive capacity of a State remains weak unless its fiscal autonomy (allowed through a greater share of general purpose transfers) is complemented by better governance in the State.

Table 3.13. DEA-Bootstrap Truncated Regression Results – Average Marginal Effects

	Dependent Variable: Bias-Corrected Inefficiency Scores of Nutrition Related Expenditure		
	Specification1	Specification2	Specification3
Log Per Capita GSDP	-.09 *	-.07 ***	-.09 **
Share of Union Fiscal Transfers to a State	-.006	NA	NA
Nature of Fiscal Transfers Received by a State	-.27 **	NA	NA
Governance Index	-.08	-.12 ***	NA
Women's Education	-.004 *	-.004 *	-.005 *
Net Fiscal Autonomy to a State	NA	-.14	NA
Fiscal Absorptive Capacity of a State	NA	NA	-.32 **
State FE	Yes	Yes	Yes

Source: Author's computation using Stata 16.

3.5. Concluding Observations

The objective of this chapter was to assess the quality of government expenditure of States for food and nutrition. While the first step in assessing the quality of public expenditure is to measure its adequacy, this kind of exercise is both time-consuming and data-intensive process and is thus beyond the scope of this work. However, the relative adequacy of government expenditure of States is attempted by examining the broad pattern of allocations by States for developmental purposes, more especially, for social sector. The sample period for this analysis spans from 2014-15 to 2020-21 which corresponds to the period of a significant compositional shift in Central Government fiscal transfers to States, and the period ended with the year characterised by the COVID-19 pandemic, which adversely affected all economies around the world. With a special focus on West Bengal, the trend analysis conducted in this chapter revealed the fact that West Bengal's real per head allocation for social sector were quite less than those of other GC States during the sample period. The real per head allocations are more relevant in the present work compared to allocations relative to total expenditure or output of the State. Furthermore, the sustainability of the government finances of West Bengal are also doubtful in light of the poor quality of fiscal deficit as well as its low own revenue base and heavy dependence on Central fiscal transfers for social sector. Apart from adequacy angle, the quality of government expenditure is also assessed through the lens of effectiveness and efficiency of expenditure. The results of the empirical exercises conducted in this chapter indicate that government expenditure has been quite effective in reducing the incidence of U5MR as well as in improving the nutritional status of children below five years and women in the age group 15-49 years. The increased per head allocation on overall developmental expenditure tends to reduce the poor population. State governments (more especially West Bengal) have a greater scope of bringing economies in their expenditure. This efficiency in government spending can be achieved through a combination of higher per capita income, greater share of general purpose transfers in total fiscal transfers to States, improving the governance in the State and increasing women's education.

Chapter 4.

Role of Non-Governmental Organisations Towards Food and Nutrition Security: A Study of West Bengal

4.1. Introduction

The term ‘non-governmental organisation’ (NGO) is often used synonymously with ‘non-profit organisation’, ‘voluntary organisation’ and ‘civil society organisation’, depending on the contexts, cultures and histories in which thinking about these organisations has emerged.¹ No matter what terminology is used for such organisations, they are structurally and operationally self-governing, private and not-for-profit organisations that are geared to improving the quality of life for disadvantaged people (Vakil, 1997). They play a complementary role in solving the long-standing development issues characterised by inefficiencies in government operations and ineffective development projects. Initially focused on social welfare, the active involvement of NGOs with promising role has increased considerably since the decade of 1980s in various countries around the globe to cover several complex societal issues, ranging from women empowerment, human rights, democracy building, cultural preservation, policy analysis, research and information provision to world-wide challenges of environment and climate. Broadly speaking, the activities of NGOs fall under (a) service delivery to people in need and (b) the organisation of policy advocacy and public campaigns in pursuit of social transformation. The important role of such organisations to provide healthcare services, food and other essential services to the needy during the tough time of COVID pandemic has been widely recognised and appreciated. The present chapter attempts to examine the role and impact of NGOs in West Bengal towards the provision of nutritious food to the needy. For this purpose, primary surveys, separately from selected NGOs and also from few beneficiaries are combined with some secondary data on NGOs’ activities to draw meaningful insights.

4.2. Evolution of NGOs in India²

Concepts like ‘dharma’ (duty) ‘daan’ (giving) and ‘seva’ (service) are deeply rooted in India’s age-old tradition and culture spread through teachings across all religious sections thus

¹ See Lewis (2010) for definition and history of NGOs.

² This section largely draws on Civil Society Briefs on India of the Asian Development Bank released in 2023 and 2009 and accessed at <https://www.adb.org/sites/default/files/publication/879896/civil-society-brief-india.pdf> and <https://www.adb.org/sites/default/files/publication/28966/csb-ind.pdf> respectively.

encouraging people to help others in need. For instance, a large section, follower of Hindu mythology believed in the concept of 'Karma' (doing good in the present life will carry forward into the next incarnation, and vice versa). Such religious teachings and socio-cultural practices led the concept of voluntary services in India in the form of social and religious movements of serving others in need. Various voluntary organisations emerged in the medieval era to play a proactive role in cultural promotion, education, health and natural disaster relief. They proliferated during British rule, working to improve social welfare and literacy and pursuing relief projects. In fact, the colonial period in India witnessed several reformers fighting against systemic social injustices. This played a significant role in challenging social norms of the time. It also gave rise to many organisations for the service of the disadvantaged, including Brahmo Samaj founded in 1828 to educate people against the persisting social and religious evil practices in the society in Kolkata. The nationalist consciousness and consequent socio-political movements, primarily focusing on self-help in the second-half of the nineteenth century led further rise in many more voluntary organisations, including Friend-in-Need Society (1858), Prathana Samaj (1864), Satya Shodhan Samaj (1873), Arya Samaj (1875), the National Council for Women in India (1875), the Indian National Conference (1887), Ramakrishna Mission (1897) and Seva Samiti (1914). Here it is worth mentioning that the development of voluntary organisations in India did not originate only from inside the country by the Indians, rather Christian missionaries active in India at that time also directed their efforts toward reducing poverty and constructing hospitals, schools, roads and other infrastructure. It may further be interesting to note that The Societies Registration Act (SR A) was approved in 1860 to confirm the legal status of the growing body of nongovernment organizations (NGOs). The number of organisations rose even further with growing dimensions of their work after having inspired and motivated by Mahatma Gandhi's philosophy of social welfare, Swadeshi moment and his teachings of self-reliance and upliftment of the poorest.

The development of voluntary organisations (or so-called non-governmental organisations) in the post-Independent India widened their scope of activities to cover various other dimensions of development (and not just welfare aspect, as was mostly the case prior to Independence). Organisations started to play a bigger role in the public service delivery of basic goods. With greater awareness of inequalities of caste, class, and gender, many organisations came forward to contribute to the upliftment of the marginalized. Both welfare and empowerment-oriented organisations emerged during this period, and development, civil liberties, education,

environment, health, and livelihood all became the focus of attention. With community participation as a defined component in a number of social sector projects during the 1970s and 1980s, NGOs began to be formally recognized as development partners of the state. Their work was increasingly characterized by grassroots interventions, advocacy at various levels, and mobilization of the marginalized to protect their rights.

In 2007, the first ever national policy on voluntary sector was introduced to provide institutional mechanism for its participation and collaboration with the government in areas of development, where these organisations had already established their worth in terms of finding innovative solutions to poverty, deprivation, discrimination and exclusion, through tools such as awareness raising, social mobilization, service delivery, training, research and advocacy. The legal and regulatory framework in this direction was also strengthened in recent years through a revised Section 8 of the Indian Companies Act, 2013 as well as adoption and modification of earlier Societies Registration Act, 1860 and the Indian Trusts Act, 1882 by subnational governments to cater to their own State-specific acts. The purpose of these legal and regulatory provisions is to provide registered civil societies/NGOs/Trusts a professional and legal identity and also income tax exemptions to these registered entities as well as individuals making donations to them.

4.3. Presence of active NGOs in India

It has become clear from the discussion in the preceding section that NGOs have become an integral part of the development process of the country. The present section provides a snapshot of the active NGOs across various sectors as well as in different States of India. This will be helpful to identify the strength of non-governmental organisations towards food and nutrition, which is the direct focus of the present study.

Table 4.1 gives sector-wise distribution of NGOs. This table shows that there are about 44 sectors in which NGOs operate actively. Most of the NGOs in India (106306) work in the education and literacy sector accounting for 8.2 per cent of total NGOs followed by health and family welfare (71528 NGOs) accounting for 5.51 per cent. The animal welfare segment receives the least attention of NGOs with only 0.02 per cent of NGOS, i.e., 331 in number. The number of NGOs engaged in activities related to food and nutrition, namely, agriculture, food processing, drinking water and nutrition sectors stand at 129549, accounting for 9.98 per cent

of total NGOs. From the above, it becomes clear that NGOs involved in sectors of health and family welfare and nutrition related activities account for the largest area of engagement.

Table 4.1 Sector wise presence of NGOs in India (As on End-June 2023)

Panel A				Panel B			
Sl. No.	Sector	Number of NGO	Percentage to Total NGOs	Sl. No.	Sector	Number of NGO	Percentage to Total NGOs
1	Education & Literacy	106306	8.2	23	Civil Issues	25643	1.97
2	Health & Family welfare	71528	5.51	24	Sports	25337	1.95
3	Children	66850	5.15	25	Dalit upliftment	24117	1.86
4	Women's Development & Empowerment	63034	4.86	26	Urban development & Poverty Alleviation	23191	1.78
5	Environment & Forest	48827	3.76	27	Micro and Medium Enterprise	22331	1.72
6	Art & Culture	48594	3.74	28	Nutrition	22191	1.71
7	Vocational Training	46786	3.6	29	Skill Development	22182	1.71
8	Rural Development & Poverty Alleviation	45168	3.48	30	Minority Issues	21307	1.64
9	Agriculture	44247	3.41	31	Micro Finance (SHGs)	21304	1.64
10	Drinking Water	36303	2.8	32	Traibal Affairs	20941	1.61
11	Human Rights	33372	2.57	33	Water Resources	20343	1.56
12	Aged/Elderly	32876	2.54	34	Science & Technology	19420	1.5
13	Youth Affairs	32849	2.53	35	Panchayat Raj	19325	1.49
14	Animal husbandery , Dairing& fisheries	31771	2.45	36	Biotechnology	16398	1.26
15	Labour& Employment	31520	2.43	37	Right to information and Advocacy	15301	1.18
16	Any Others	31209	2.4	38	Housing	14730	1.14
17	Differently abled	29284	2.25	39	New & Renewable energy	14667	1.13
18	HIV/AIDS	29021	2.23	40	Land Resources	13023	1
19	Disaster management	27750	2.14	41	Tourism	12728	0.98
20	Food processing	26808	2.06	42	Scientific and Industrial Research	10997	0.84
22	Legal awareness and Aid	26504	2.04	44	Animal welfare	331	0.02
Total							1296414

Source: NGO Darpan portal, Government of India: <https://ngodarpan.gov.in>.

When seen across eighteen general category States, the spread of NGOs is quite uneven with Uttar Pradesh having the highest number of NGOs (27464) comprising of 14.65 per cent followed by Maharashtra with 25852 active NGOs accounting for 13.79 per cent (Table 4.2). West Bengal accounts for 7.4 per cent of total NGOs (13867 NGOs in number). Goa has the least number (345) of NGOs accounting for only 0.18 per cent. Out of the active NGOs in various States, 7614 NGOs (5.87 per cent) work for food and nutrition related services in Uttar Pradesh. Similarly, West Bengal has 2988 NGOs working for food and nutrition accounting for 2.3 per cent of total active NGOs in the State.

Table 4.2. Presence of NGOs in Eighteen General Category States as on End-June 2023

Sl. No.	State	Number of NGO	Percentage of NGO in Total	Number of NGO working for food and nutrition related service	Percentage in total NGOs in the State
1	Andhra Pradesh	6811	3.63	1475	1.13
2	Bihar	6556	3.49	2238	1.72
3	Chhattisgarh	2422	1.29	644	0.49
4	Goa	345	0.18	40	0.03
5	Gujarat	8643	4.61	1616	1.24
6	Haryana	4911	2.62	666	0.51
7	Jharkhand	3458	1.84	1253	0.96
8	Karnataka	10767	5.74	1884	1.45
9	Kerala	5257	2.8	565	0.43
10	Madhya Pradesh	8449	4.5	2139	1.65
11	Maharashtra	25852	13.79	6505	5.02
12	Odisha	5263	2.8	1547	1.19
13	Punjab	2616	1.39	231	0.17
14	Rajasthan	7495	3.99	1671	1.28
15	Tamil Nadu	12730	6.79	2382	1.83
16	Telangana	4828	2.57	851	0.65
17	Uttar Pradesh	27464	14.65	7614	5.87
18	West Bengal	13867	7.4	2988	2.3

Source: Same as for Table 4.1.

4.4 Some leading NGOs for food and nutrition in India

In India, the persistent challenges of poverty and hunger affect millions of individuals. While the government has implemented various initiatives to address these issues, non-governmental organizations (NGOs) have emerged as vital contributors in alleviating the plight of the underprivileged. Among the diverse array of services provided by NGOs, the provision of free food stands out as a particularly impactful endeavour. These organizations actively collect surplus food from events, gather donations from both individuals and corporate entities, and meticulously prepare nutritious meals for distribution to those in need. Some of the Leading and well-rated organisations include: Akshaya Patra Foundation, No Hunger child , Gram Vikas Trust, Annamrita Foundation, Save the Children (registered as Bal Raksha Bharat), Turnstone Global, Sri Sathya Sai Annapoorna Trust, etc. Given below is a brief overview of three such impactful NGOs, namely, Akshaya Patra, No Hunger Child, and the Annamita Foundation.

4.4.1. Akshaya Patra

Akshaya Patra, an Indian-based non-profit organization, operates one of the world's largest mid-day meal programs. Established in 2000, its mission is to combat childhood hunger and promote education by providing nutritious meals to school children. The Akshaya Patra Foundation operates as an independent charitable trust, duly registered under the Indian Trusts Act 1882 (Reg. No. 154). The primary objective is to implement the Government of India's PM POSHAN Initiative, formerly known as the Mid-Day Meal Scheme, with the aim of systematically addressing the pervasive societal challenges of classroom hunger and malnutrition on a large scale. Akshaya Patra firmly believes that investing in child nutrition and education constitutes a pivotal entry point for fostering human development. Guided by this conviction, their mission is to provide children with a nourishing and appetizing mid-day meal every school day, serving as an incentive for regular school attendance. The overarching vision is clear: “No child in India shall be deprived of education because of hunger.”

Key Highlights of Akshaya Patra:

- i) **Mid-Day Meal Program:** Collaborating with the government and partners, Akshaya Patra implements the Mid-Day Meal Scheme, offering free, nutritious meals to school children to boost regular attendance and enhance overall health and well-being.
- ii) **Scale of Operations:** Operating across multiple states in India, Akshaya Patra runs centralized kitchens for large-scale preparation of nutritious meals. The

organization prioritizes efficiency and scalability to reach a substantial number of beneficiaries.

- iii) **Nutritious Meals:** Emphasizing nutritional value, Akshaya Patra designs menus to meet the dietary needs of growing children, focusing on enhancing physical and cognitive development.
- iv) **Technological Innovation:** Employing technological solutions, the organization streamlines kitchen operations, optimizes meal planning, and ensures food safety. This efficiency enables Akshaya Patra to serve millions of meals daily.
- v) **Public-Private Partnership:** Through collaboration with the government, corporate sponsors, and individual donors, Akshaya Patra funds and implements programs. This public-private partnership model maximizes resource leverage.
- vi) **Impact on Education:** By addressing hunger, Akshaya Patra aims to eliminate a significant barrier to education. The provision of mid-day meals has demonstrated increases in school enrollment, attendance, and concentration among students.
- vii) **Community Engagement:** Actively involving local communities, volunteers, and donors, Akshaya Patra fosters a sense of ownership, ensuring the sustainability of its programs.

In alignment with the United Nations' Sustainable Development Goals, particularly Goal 2: Zero Hunger and Goal 4: Quality Education, Akshaya Patra's commitment to alleviating childhood hunger and promoting education has garnered recognition and support from various quarters. Presently, Akshaya Patra extend their services to over 2 million children enrolled in 23,242 government and government-aided schools and Anganwadi centres across 67 locations in 15 states and 2 union territories of India.

4.4.2. No Hunger Child

The concept of No Hungry Child originated from Mr. V Sridhar, who transitioned from a corporate career in 2000 to dedicate himself to the Social Development Sector. Initially, his focus was on supporting social organizations in fundraising to ensure the continuity of essential social programs despite financial constraints. With the assistance of generous philanthropies, Mr. Sridhar initiated the Nutritious Meal Program in Bangalore. Recognizing the program's potential impact, he envisioned its expansion beyond the city to encompass the entire state, nation, and eventually the global community. To achieve this vision, he understood the

importance of establishing a network with numerous NGOs to facilitate the widespread implementation of the Nutritious Meal Program nationwide.

The No Hungry Child Free Food Program is specifically designed to provide hot, nutritious, and fresh meals to underprivileged and hungry children in poverty-stricken areas across India. The organization proudly declares, "We consistently reach over 20,000 hungry and underprivileged children daily, ensuring a smooth, efficient, and dependable food distribution regimen throughout the year - 365 days."

4.4.3. Annamrita Foundation

Established in 2004, the Annamrita Foundation with its headquarter in Delhi, is dedicated to the belief that food consumption not only sustains an individual but also lays the foundation for a healthy future. Our mission revolves around providing nourishing meals to those who need them the most. The organization emphasizes its collaboration with central and state government entities to ensure the excellence of its food donation program. From delivering mid-day meals to school-going children to serving meals to frontline workers and the underprivileged, our food relief initiatives have a profound and wide-reaching impact on society. Over the course of the past 17 years, Annamrita has successfully provided sustenance to over 10 million children and distributed more than 12 million meals across the country.

4.4.4. Remarkable Performance of NGOs During Covid 19 Situation

During the COVID-19 pandemic in India, several leading NGOs have been actively involved in addressing food and nutrition challenges exacerbated by the crisis. These organizations have implemented various initiatives to ensure food security and provide nutritional support to vulnerable communities. Here are some common activities undertaken by leading NGOs in India during the COVID-19 situation related to food and nutrition:

- i) **Food Distribution and Relief:** NGOs have organized large-scale food distribution drives, providing essential food items to marginalized and economically vulnerable populations. Distribution of ready-to-eat meals, ration kits, and nutritional supplements to families in need. (Vameghi, M et al (2022))
- ii) **Support for Migrant Workers and Daily Wage Laborers:** Targeted efforts to provide food and nutrition support to migrant workers and daily wage labourers who faced job losses and economic hardships during lockdowns. (Geysler, L. (2021))

- iii) Community Kitchens: Setting up community kitchens to prepare and distribute nutritious meals to individuals and families affected by the economic impact of the pandemic. (Varughese, S. (2020).)
- iv) Nutritional Education and Awareness: Conducting awareness campaigns on proper nutrition, especially targeting communities that may face heightened vulnerabilities during the pandemic. Providing guidance on maintaining a balanced diet and nutritional practices to boost immunity.(Ribeiro-Silva et al (2020))
- v) Supplementary Nutrition Programs: Implementation of supplementary nutrition programs for children, pregnant women, and lactating mothers to address the increased risk of malnutrition during the pandemic. (Varughese, S. (2020).)
- vi) Support for Agriculture and Livelihoods: Initiatives to support farmers and rural communities, ensuring continuity in agricultural activities and promoting sustainable livelihoods to secure the food supply chain. (Ntambara, J et. al.(2021))
- vii) Collaboration with Government Agencies: Collaboration with government agencies to complement and enhance the impact of existing food security and nutrition programs. Advocacy for policy changes or additional support to address the specific challenges arising from the pandemic. .(Ribeiro-Silva et al (2020))
- viii) Monitoring and Assessment: Regular monitoring and assessment of the nutritional status of communities to identify emerging needs and gaps in the delivery of food and nutrition services. (Ntambara, J et. al.(2021))

Leading NGOs such as Akshaya Patra, Feeding India, Action Against Hunger, and others have played instrumental roles in addressing food and nutrition challenges during the COVID-19 pandemic. Their activities often involve a combination of short-term relief efforts and long-term strategies to build resilience in communities.

4.5. Impact Assessment of NGOs for Food and Nutritional related services

This section attempts to empirically examine the impact of NGOs on food and nutrition support to the needy as well as the efficiency of resource use of these NGOs.

4.5.1. Empirical Evaluation of Akshay Patra's Performance

Akshay Patra, one of the leading NGOs providing food and nutritional support is chosen first to assess its impact at an aggregate level. Utilising time series data from the official website of this NGO on number of beneficiaries, Number of Staff (including both male and female),

Revenue from Government subsidy and own revenue collection³ for 15 years from 2005-06 to 2019-20 and using simple ordinary least-squares technique, It is noted that government subsidy as well as the interaction of government subsidy with NGOs' own revenues has positive and significant impact on NGOs' reach/coverage of beneficiaries (Table 4.3). Also, NGOs' staff is found to have positive and statistically significant coefficient.

Table 4.3. Performance Evaluation of Akshay Patra – Simple Regression Results

Independent Variable	Dependent Variable
	Log(Beneficiaries)
Log (Government Subsidy)	0.72 *
Log (Own Revenue)	-0.12
Interaction	0.08 *
Log (Staff)	0.314 *
R-Squared	0.97
Adjusted R-Squared	0.96
F-Statistic	209.93 *
Obs	15

*Indicates 1% level of significance.

Source: Author's own computation using data from Akshay Patra's various Annual Reports.

4.5.2 Case study of selected NGOs for food and nutrition in West Bengal

In order to have a closer examination of the impact of NGOs on food and nutrition support in West Bengal, a small survey, limited in its scope, was conducted with NGOs in the State. Based on the information available on Central Government's NGO Darpan portal⁴, NGOs working for food and nutrition related services primarily in West Bengal (913 in total) were identified, listed and arranged alphabetically so as to avoid any duplication. Given the time and resource constraints at hand, a small survey was conducted with these NGOs during July to October 2023. For this purpose, a structured questionnaire through google form (also given in Appendix A of this thesis) was sent to all NGOs whose email IDs/contact details (mobile/WhatsApp number) was available on the NGO Darpan portal or on their respective websites. In addition

³ Total revenue of Akshay Patra comes from two source i) Government Subsidy , ii) Own revenue (In form of Donation , Subscription , Foreign Aid , Own Production, etc.).

⁴ Since 2015, the Government of India in collaboration with NITI Aayog started a dedicated portal to maintain the record of all registered NGOs in the country. The portal is: <https://ngodarpan.gov.in>. The NITI Aayog encourages all Voluntary Organisations (VOs) and Non-Governmental Organisations (NGOs) to register on the portal. VOs/NGOs contribute significantly to national development by supplementing government efforts.

to the google form, some NGOs, who were not able to respond to the web-survey, were also contacted through phone/WhatsApp to fetch their responses. Out of 80 NGOs who responded to the survey, 74 sheets were considered in the final analysis due to incomplete responses to many questions by six respondents. The primary survey data were combined with secondary information on NGO activities gathered from government publications, books, research articles, newspapers, etc. in order to substantiate the research study wherever it was required.

Before presenting the survey results, it is useful to furnish the brief information about NGOs which are mainly contributing to food and nutrition as well as other areas such as food processing, drinking water, agriculture, etc.

Table 4.4. District-wise Number of NGOs per lakh population in West Bengal

Sl. No.	Name of district #	Number of registered NGO's those are working towards Food and Nutrition related services	Number of NGO per Lakh people in the District
1	Bankura	96	2
2	Bardhaman	224	2
3	Birbhum	140	3
4	Cooch Behar	41	1
5	Dakshin Dinajpur	33	2
6	Darjeeling	44	2
7	Hoogly	111	2
8	Howrah	115	2
9	Jalpaiguri	48	1
10	Kolkata	332	10
11	Malda	112	2
12	Murshidabad	145	1
13	Nadia	178	3
14	North 24 Parganas	280	3
15	Paschim Mednipur	198	3
16	Purba Mednipur	180	3
17	Purulia	88	2
18	South 24 Parganas	472	4
19	Uttar Dinajpur	96	2

Source: Same as for Table 4.1.

#: Many of the parent districts considered in this table have been bifurcated after the Decennial census of 2011. Therefore, while projecting district level population, the populations of bifurcated districts were added to get a single population corresponding to the parent district.

Table 4.4 shows that South 24 Parganas district has the highest number of NGOs (472) followed by Kolkata district (332). South Dinajpur district has the least number of NGOs (33) providing food and nutrition related services. When it comes to NGO density per lakh people, Kolkata with 10 NGOs and South 24 Parganas with 4 NGOs stand at the first two positions.

Furnished in Table 4.5 is the summary of the NGO survey data. It can be seen from this table that there are 23 NGOs receiving government support and 51 NGOs with no government support. NGOs with government support report an average annual income of Rs.2303000, while those without government support report it at Rs.3230000. On the other hand, NGOs with government support have an average annual total expense of Rs.2233000, while NGOs without government support have an average annual total expense of Rs.3134970. NGOs with government support spend an average of Rs.458450 towards food and nutrition related activities, whereas NGOs without government support incur, on an average, Rs.613900 for the same annually. In so far as staff of these two types of NGOs, NGOs with government support have an average of 84 staff members, while those without government support have an average of 72 staff members. An average of 28642 and 29012 beneficiaries are served by NGOs with government support and those without government support respectively. It thus becomes clear from this discussion that NGOs with government support, on average, have a lower annual income and total expenses compared to NGOs without government support. Both categories of NGOs allocate a significant portion of their budget to food and nutrition programs. NGOs with government support have a higher average number of staff members, suggesting potentially more extensive operations or programs. The average number of beneficiaries served is relatively similar in both categories, with NGOs without government support having a slightly higher average. This information provides insights into the financial, operational, and programmatic characteristics of NGOs based on their relationship with government support.

Table 4.5. Summary of Survey Data

Item	Information	
	NGOs Receiving Government Support	NGOs Without Any Government Support
Number of NGO	23	51
Average annual income (In Rs.)	2303000	3230000
Average annual total expense (In Rs.)	2233000	3134970
Average Annual expenditure towards food and nutrition (In Rs.)	458450	613900
Average number of staff	84	72
Average number of beneficiaries (Number of Meals)	28642	29012

Source : Primary Survey

4.5.3. Efficiency Analysis of Respondent NGO's

In order to assess the technical efficiency of the respondent NGOs, the data envelopment analysis is used in output-oriented setting under variable returns to scale (VRS) assumption with two inputs, namely, average annual expenditure of NGO towards food and nutrition related services and number of NGO staff; and one output, Viz., number of beneficiaries (number of meals). The summarised DEA efficiency scores are given in Table 4.6. It can be noted from this table that the mean efficiency score of government supported NGOs is higher (0.95) with less variability (as indicated by coefficient of variation of 7 per cent) compared to those without government support (0.84 with 20 per cent CV). The least efficient NGOs with and without government support emerge with DEA scores of 0.75 and 0.55 respectively. These results indicate ample scope of improving output by both types of NGOs in terms of their reach and coverage of beneficiaries with their given resources.

Table 4.6 DEA Scores - Resource-Use Efficiency of NGOs

	VRS TE	
	NGO with Govt. Support	NGO without Govt. Support
Mean	0.95	0.84
Min	0.75	0.55
CV (in per cent)	7	20
No. efficient NGO	7	5

Source: Computed using DEAP Version 2.1 taking primary survey data.

A truncated regression is also run to empirically test if factors like total revenues of an NGO, its staff as well as its type (whether government supported or not) matter for its technical efficiency. Since our concern is the inefficient NGOs, thus, the inefficiency scores are considered as the dependent variable with the above stated three factors as the independent variables. It may be noted that the type of NGO is captured by a dummy variable Type with 1 if the NGO is receiving government support, 0 otherwise. It may also be noted that total revenues as well as number of staff of NGO are considered in logarithmic form in the regression. Reported in Table 4.7 are the results of the estimation exercise. It may be seen from this table that all the explanatory variables appear with expected negative signs having a statistically significant relationship with inefficiency scores, indicating positive improvement in efficiency of NGOs. The two interaction terms – one with type and total revenues and the other with type and staff appear to have expected relationships with inefficiency scores. While NGO type with total revenues is negative, but insignificant, NGO type interaction with staff turns out to be negatively and significantly related to inefficiency scores, giving a better indication of NGO strength of manpower.

Table 4.7. Determinants' Analysis of Technical Efficiency of NGOs - Marginal effects of Truncated Regression

Independent Variable	Dependent Variable
	Inefficiency Score
Log (Total Revenue)	-0.59 *
Type Dummy	-0.15 *
Log (Total staff)	-0.04 **
Interaction of Type with Log(Revenues)	-0.33
Interaction of Type with Log(staff)	-0.25 **

* and ** indicate level of statistical significance at 1 per cent and 5 per cent respectively.

Source: Author's computation using EViews.

4.5.4. Beneficiaries Perspective

While the supply-side perspective of food and nutrition, almost independent of government is examined with the help of NGO related survey, it was imperative to have a demand-side orientation also in terms of what beneficiaries of these services perceive about NGOs' role towards these services. Here too, given time and resources at hand did not permit to cover a large number of beneficiaries in the survey. Only selected beneficiaries in four schools (chosen as per our convenience) were interviewed with a set of just three questions pertaining to government-sponsored Mid Day Meal scheme in which NGOs also play a proactive role. Out of these four schools, two schools are chosen where the Mid Day Meal scheme is run entirely through the government initiatives and in other two schools, the Mid Day Meal scheme is run jointly by the government and NGOs. All these four schools are located in West Bengal. For reasons of privacy and confidentiality, names of NGOs as well as those of schools who participated in the survey/interview are not being disclosed. Table 4.8 summarises the responses of beneficiaries from class V to VIII. Beneficiaries in all schools have reported that they get meal under the MDM scheme daily. However, the percentage of beneficiaries liking the meal is slightly higher in schools which are receiving a collaborative support from the government as well as from NGOs compared to those which receive government support completely. On the question "Have you ever fallen sick within 2 hours after taking meal in the school?", just one school with complete government support reported less than 100 per cent negative response.

Table 4.8. Interaction Outcomes of Beneficiaries

Information	Schools Serving MDM Through NGO Support		Schools Serving MDM Completely Through Government Support	
	School 1	School 2	School 1	School 2
Total number of respondents interacted with	31	27	35	29
Do you get meal daily	Yes(100%)	Yes(100%)	Yes(100%)	Yes(100%)
Do you like meal	Yes(76%)	Yes(70%)	Yes(69%)	Yes(65%)
Have you ever fallen sick within 2h after taking meal in the school?	No (100%)	No (100%)	No (97%)	No (100%)
State briefly some problems you see in NGO support for the cause £	Summarised in Section 4.6	Summarised in Section 4.6	Summarised in Section 4.6	Summarised in Section 4.6
Dropout rate \$	3%	5%	8%	10%

£: This question is asked from the school principal or the administrative staff concerned having either support from the NGO or ever looked for the same.

\$: The data on dropout rate are gathered from school register as well as from Banglar Shiksha portal: <https://school.banglarshiksha.gov.in>.

Source: Personal interview.

4.6. Challenges Faced by NGOs

As a part of the survey questions, NGOs have reported various challenges they face while performing their operations and running their organisations. Administrative staff of schools who participated in the survey have also provided their feedback/perspective on difficulties with NGOs. The challenges highlighted by both parties as well as those revealed from the relevant literature range from trust building to management and governance, political interference and, above all, lack of funding, skilled staff and sound database on NGOs. These are summarised in the following points.

1. **Hard to Build Trust:** Trust building is the creation of social capital stock; it requires loyalty as well as effective communication whom one interacts with. As the trust develops, a strong network is likely to grow. NGOs rely on this informal institution, for, they have to interact and work with local communities. However, many NGOs, which participated in the survey, reported to have struggled (or are still facing issues) in building trust and creating network due to ineffective communication. This is reported to happen for various reasons. At the first place, an NGO, when starts its operations, has to convince the donors and other clients as well as the community it serves and win their trust that it does not duplicate the already existing efforts in this direction; and its vision for the cause as well as working principles and style are unique/different from others. This also happens while getting their organisation registered, or when some support from any local authority is needed. This concern has been equally shared by respondent schools, who told that sometimes, some NGOs start their operations without even taking a complete stock of the existing needs and situation of the locality/community. The situation is further complicated (I) if the NGO lacks experience-based learning; (II) if the existing policies do not favour NGO's vision and/or its working style; (III) if the NGO is not able to overcome the structural hurdles that are underway in their smooth operations; and (IV) if there occurs destructive competition among similar NGOs for resources, which basically spoils NGOs' reputation and renders their activities ineffective. In fact, transparency and accountability issues are mostly reported by respondent schools who took part in the survey. This was also highlighted in 2015 through a submission from Central Bureau of Investigation to Supreme Court of India that only around 10 per cent of all NGOs

(nearly 31 lakhs as per CBI's estimation in 2015) in India filed their annual income and expenditure statements, raising the issue of transparency regarding their functioning.⁵

2. **Management and Governance Issues:** Many NGOs vis-à-vis some others demonstrated the importance of an organised administrative setup within an NGO with clearly defined role and responsibilities for effective operations and management of resources. Failing the above, resources are often mismanaged leading to inefficient operations. In this connection, an observation made by one of the schools interviewed in this study is worth noting here: "Sometimes a group of individuals form an NGO, not for any sound social motive, but to gain self-sufficiency [there may, of course be other reasons as well]. These individuals represent on NGO's board and hold key positions and they often misappropriate the donations which come from a variety of sources in the name of the cause which the NGO is known (or registered) for."
3. **Political Interference:** It has been reported by some government-supported NGOs (as well as by those who wish to collaborate with government) that their smooth operations are often hampered by local and politically influential people. This happens when local leaders promise to help them getting more funds and other facilities from government officials; and ask NGOs to provide support in the specified areas or for specified people comprising of larger vote-bank. This renders the operations of NGOs ineffective, and resources misused leaving intended beneficiaries unserved. One school official, present at the time of our interview pointed out that NGOs themselves often lack knowledge about the laws and Constitutional provisions which can protect them against such intimidation.
4. **Lack of Adequate and Sustainable Funding:** NGOs in India receive funding from various sources, such as grants from the Government, funding from abroad and domestic funding, that mainly comes in the form of individual donations, membership subscriptions, income and receipts from operations, rent, interest, etc., corporate social responsibility and philanthropy. As noted in a Civil Society Brief on India from ADB for 2023⁶, "The number of NGOs that receive foreign funds reduced from 18304 in 2016-17 to 18235 in 2017-18 and 17540 in 2018-19. On the other hand, domestic

⁵ India Today accessed on 01.01.2024 at <https://www.indiatoday.in/india/story/90-per-cent-of-ngos-do-not-file-annual-statement-cbi-to-sc-263703-2015-09-18>.

⁶ Accessed at <https://www.adb.org/sites/default/files/publication/879896/civil-society-brief-india.pdf> on 02.01.2024.

funding for the development sector and likely CSOs has increased in the same decade. The corporate social responsibility (CSR) corpus by companies contributed to the sector on critical issues such as health, nutrition, and rural development, among others.” Thus, getting sufficient and sustainable funds for NGOs has always been a major challenge towards achieving their desired goals. NGOs without any government support or those working in difficult areas and/or with dangerous conflict-prone communities struggle more in arrangement for funds to carryout their activities. They often find it difficult to convince donors, and if they manage, this, in many cases, turns out to be a one-time funding support. Several NGOs are also able to fetch funds from foreign donors, because their contributions in the development process complements the efforts of the government. However, effective management of collected funds as well as its proper utilisation remains challenging on account of lack of knowledge, experience and necessary skills and most importantly, non-transparency in their operations on the part of NGOs. For instance, CBI reports in 2015 highlighted the cases of use of foreign funds by NGOs for anti-national activities.⁷ This stresses the need for a stronger regulation to monitor foreign funding in NGOs.

5. **Limited Staff:** Most NGOs in India are small and dependent on volunteers. Citing a report released in 2012 by Ministry of Statistics and Programme Implementation, Government of India, Civil Society Brief – India, 2023 (op.cit.) notes, “A total of 18.2 million people was engaged in working with non-profit institutions, out of which less than 15 per cent were paid workers and the rest were volunteers.” This poses a serious issue in smooth and successful operations of NGOs, more especially those working in remote and difficult areas, or for difficult causes.
6. **Lack of a Sound and Comprehensive Database on NGOs:** A comprehensive and reliable database on registered NGOs, their compliance status, annual statements of accounts, etc. does not exist in India. There are fragmented databases prepared by some organisations⁸, but they lack comprehensiveness, uniformity in definitions adopted about various organisations, uniformity in legislations, etc. Even Government of India’s

⁷ See Press Information Bureau Statement at <https://pib.gov.in/newsite/PrintRelease.aspx?relid=116430>, accessed on 01.01.2024.

⁸ These include: NGO Darpan (<https://ngodarpan.gov.in>); NGOs India (<https://ngosindia.com>); Give India (<https://www.giveindia.org>), (<https://give.do/discover/>); and Guidestar India (<https://guidestarindia.org/Default.aspx>).

NGO Darpan portal does not provide disaggregated information on many important parameters, such as funding channels, of an NGO, its compliance status, etc.

4.7. Conclusion

In light of the rapidly increasing role and significance of NGOs in various developmental activities, this chapter attempted to examine the impact that NGOs have made on providing the nutritional support to the needy in West Bengal. Taking aggregate empirical insights from positive and significant impact of Akshay Patra on nutritional support, this chapter delved further into a case investigation of NGOs active for the same cause in West Bengal. Based on a small primary survey with select NGOs, personal interview with select schools in Kolkata as well as secondary information gathered from respective websites of NGOs, NGO Darpan, and other relevant literature, it is found that NGOs' support towards nutrition to the beneficiaries in West Bengal has been crucial in terms of their substantial resources devoted for the cause. NGOs with government support are found to have more effective and efficient utilisation of their resources as compared to those working without government support. NGO staff has also positive and significant association with beneficiary coverage/reach. The personal interviews conducted with beneficiaries in selected schools reveal that schools provide daily meal under MDM programme whether they are completely government-funded or have to collaborate with NGOs. Children like the quality of food and have hardly any complaint of being sick after taking the meal at school. Notwithstanding the significant role of NGOs in providing nutritional support to the needy, they are faced with numerous challenges ranging from network building and effective communication, management and governance issues, political interference, lack of adequate funding, less staff than the actual requirement to the lack of a sound and comprehensive database of NGOs. In view of these findings, it is suggested that government, donors and other stakeholders should collaborate with various voluntary organisations to achieve different development agenda. In doing so, effective mechanisms will have to be developed to institutionalise the process of this change and collaboration, thereby avoiding the risk of fraud and anti-national activities.

Chapter 5.

Examining the Possibility of Public Private Partnership in Food and Nutrition Sector in West Bengal

5.1. Introduction

The previous four chapters of this thesis provide enough justification for a collaborative and coordinated effort from the government at different levels along with other stakeholders for providing food and nutrition security to the people in the country. This has assumed even more significance in the run up to achieving Sustainable Development Goals by 2030. The discussion in the previous chapters (chapters 1, 3 and 4, in particular) reveals that, while Government of India along with its subnational counterparts runs various food and nutrition related programmes attracting substantial funds, the net outcome is less than satisfactory in terms of prevalent incidence of hunger and malnutrition. It is further shown that, despite various challenges, non-government organisations have demonstrated exemplary performance in supporting the needy for nutritious food, healthcare and other basic requirements, thereby largely complementing government's efforts. In light of these findings, the intent of the present chapter is to look further into public private partnership (PPP) type of arrangements, implemented so far in relevant social and community service projects in India so as to explore the possibility (if any) for such arrangement regarding food and nutrition sector, in India in general, and particularly in West Bengal. In doing so, the chapter attempts to empirically investigate and compare the cost efficiency of water supply projects in West Bengal which were sanctioned between 1995 and 2023 under two different modes, namely, the traditional (government-funded) mode and under PPP mode. This analysis is, however, very preliminary and illustrative, given the absence of data on several related and important parameters, such as time in project execution and its controls like size of the project, its location, etc. Finally, the chapter ends up on highlighting some important challenges that are underway in the implementation of food and nutrition related projects under PPP mode.

5.2. A Brief Overview of Public Private Partnership

Public private partnership (PPP) has emerged as a crucial tool for achieving development goals around the world. PPPs are collaborative arrangements between the public and private sectors to deliver public services or infrastructure projects. They have been used to address a wide range of development challenges, including poverty reduction, infrastructure development, and

environmental sustainability.¹ The complementarity of PPPs with the public sector has been growing in recent years. PPPs can help governments leverage private sector expertise, innovation, and financing to deliver public services more efficiently and effectively. In turn, the public sector can provide a stable policy environment, regulatory oversight, and public goods that are essential for private sector investment². In fact, PPPs have the potential to achieve development goals more rapidly and effectively than what governments can do alone; however, PPPs are not a panacea and require careful design, implementation, and monitoring to ensure that they deliver the intended benefits. Governments must ensure that PPPs are transparent, accountable, and aligned with public policy objectives (Ma et al., 2022).

Private sector participation in public services can take many forms. Each form differs in the degree of responsibilities shared by the public and private sectors. They vary from service contracts where the private operator is assured of a fixed payment on providing a service, to full-fledged divestitures where erstwhile public sector companies have been privatised. Some of the many parameters on which such modes of participation vary are design, build, finance, own, operate and tenure. Although there is no agreed definition of public-private partnership (PPP), yet the generally accepted approach of public-private partnership implies an arrangement under which services are delivered by the private sector, both for-profit and non-profit organisations, while the responsibility for providing the resources rests with the government. This kind of a partnership refers to the sharing of resources needed to work together towards a common goal while respecting one another's identity. Most of the definitions of PPP reveal many common features, but some of them are customised to fit certain constraints and objectives of the entity formulating the definition.

In India, PPP applies to a contractual arrangement between a government or statutory or a government-owned entity on one side, and a private sector entity on the other, for the provision of public assets or public services. This is done through investments made or management undertaken by the private sector entity for a specified period of time, with a well-defined allocation of risk between the private sector and public entity, whereby the private entity receives performance linked revenues that conform or are benchmarked to specified or pre-determined performance standards, measurable by the public entity or its representative (Government of India, 2016). The characteristics of a PPP framework include:

- Private sector involvement in building infrastructure assets and in providing services derived from those assets.

¹ https://ieg.worldbankgroup.org/sites/default/files/Data/reports/chapters/ppp_chap1_0.pdf

² <https://www.csis.org/analysis/future-public-private-partnerships-strengthening-powerful-instrument-global-development>

- Delivery of superior quality and well-maintained assets that provide pre-defined services with a higher level of accountability.
- Stress on long-term service delivery rather than asset creation.
- Implementation by an entity, which normally has no public sector equity (or minority shareholding by the public sector).
- Asset reverts to the public authority at the end of the concession.

PPPs do not include public investment in private infrastructure, private investment in private infrastructure, private investment in avenues other than providing a public service or good or joint ventures between the government and the private sector for activities such as manufacturing or the New Exploration Licensing Policy for Production-sharing Contracts in the Oil sector.

5.3. PPP-Led Delivery of Outcomes: Some Insights from the Literature

Over the last two decades or so, almost all governments around the world have increasingly turned to private sector involvement in the development, financing and provision of public infrastructure and services. A recent study by Roehrich et al. (2014) reports that over the past decade, the use of PPPs has grown almost five-fold, with nearly US\$ 4 billion of health PPP contracts were signed worldwide in 2010 alone. The increasing popularity of PPPs for a range of public sector infrastructure and service delivery for a number of developed, developing and emerging economies has been well documented (English, 2005; Guasch et al., 2008; Yang et al., 2013; Barlow et al., 2013; Roehrich et al., 2013). It has, however, been noted in Roehrich et al. (2014) that despite their global prevalence, empirical evidence of benefits of PPPs is mixed.

While reviewing the literature on different the aspects of PPP, varying results for various types of PPP projects as revealed in several studies have been observed. For example, Pollock et al. (2002) concluded that PPPs are more cost efficient than traditional procurement methods. They found that PPP provide superior performance in both the cost and time dimensions, and that the PPP advantage increases (in absolute terms) with size and complexity of projects. In a similar kind of study by McKee et al. (2006) for hospital infrastructure projects in Australia, USA, UK, Canada and the European Union, varied findings are observed for different countries. But the general finding for all countries investigated indicates that PPP is a significant success with regard to delivery on time and on budget of hospital infrastructure, although this is achieved at the expense of quality such that the gains of efficiency and time could be diluted from the detriment of poor quality. Further, their results imply that new facilities are in general, more expensive under PPP than they would have been if procured using traditional methods. PPP seems to work well on budget discipline and timely delivery aspects,

assuming that neither budgets nor time are inflated at the contracting time. Consistent with these findings are the results of HM Treasury (2003) which carried out a study among all PPP projects in Britain. Hammami et al. (2006) utilised panel regression analysis to investigate empirically cross-country and cross-industry determinants of PPP over the period 1990 to 2003. Their PPP database incorporated projects in low and middle income economies mostly in Latin America, the Caribbean, East Asia, the Pacific, Eastern Europe, Central Asia, South Asia, Sub-Saharan Africa, the Middle East and the North Africa. Authors find that PPPs are more common in countries where governments suffer from heavy debt burdens and where aggregate demand and market size are large. Their findings suggests that macroeconomic stability is essential for successful implementation of PPPs. Further, the importance of institutional quality is emphasised in their findings, as their results reveal that countries with less corruption and better laws in place have more PPPs; also countries having longer experience in PPPs tend to have more PPPs in future. The determinants across industries are found to differ.

In India too, PPPs have now become a preferred mode of investment, especially in infrastructure, which is one of the primary requirements of our economy. The idea how important PPPs have become for India can be had from some recent developments. First, at the end of December 2014, the value of all projects, mostly in the infrastructure sector, that have been stalled, stood at Rs.8.8 lakh crore (i.e., 7 per cent of GDP) (Government of India, 2015). Second, as cited in Government of India (2015), according to the 2015 Infrascope report of the Economist Intelligence Unit, “Evaluating the Environment for PPPs in Asia-Pacific 2014”, India ranks first in the world in “Operational Maturity” for PPP projects, third for sub-national PPP activity and fifth overall in terms of having an ideal environment for PPP projects. The growth in the number of PPP projects over the last three decades or so has made India a leading PPP market globally. India has been at the forefront of PPPs, with over 1100 PPP projects launched as of November 2020, representing a total of \$274,959,000,000 of committed investments. The Indian government has identified PPPs as a key strategy for infrastructure development and has taken several steps to promote PPPs, including the establishment of the Public Private Partnership Appraisal Committee (PPPAC) and the Viability Gap Funding Scheme (VGFS). The PPPAC has approved 351 projects with a total funding of Rs.638,825.11 crore, while the VGFS has approved 234 projects with a total funding of Rs.111,549.70 crore.³ This growth in PPP projects has been the result of various initiatives undertaken by the Central and state governments from time to time. Some of the key policy and institutional initiatives undertaken so far include:

³ <https://www.pppinindia.gov.in/>

- i. Setting up of the PPP Appraisal Committee (PPPAC).
- ii. Extending financing support through the Viability Gap Fund (VGF) Scheme.
- iii. Creation of PPP architecture.
- iv. Setting up of the India Infrastructure Finance Company Limited (IIFCL).
- v. Establishment of the India Infrastructure Project Development Fund (IIPDF).
- vi. Preparation of PPP toolkits, guidelines and knowledge dissemination products.
- vii. Establishment of transparent and competitive bidding processes – through creation of standardised procurement documents.

Apart from these, several enabling and capacity building initiatives have been undertaken including capacity building programmes, knowledge exchange programmes, training programmes, guidance and consultations, etc. Some of the key infrastructure initiatives undertaken by states using PPPs include: development of Bangalore International Airport and Hyderabad International Airport in Karnataka and Andhra Pradesh respectively, Salt Lake City Centre and the Hiland Residential Project (under joint venture) in West Bengal, Trivandrum City Road Improvement Project and the Vizhinjam International Container Transshipment Project in Kerala, development of 1500 km road through BOT, water supply, city bypass, mobile medical units, bus stands, etc in Madhya Pradesh and Ahmedabad Bus Rapid Transit Systems, Rajkot-Jamnagar-Vadinar Road, Ahmedabad Convention Centre, Dahej SEZ, Four-laning of Halol-Godhra-Shamlaji Road and Ahmedabad-Viramgam Road, etc in Gujarat.⁴

5.4. Status of Public Private Partnership in Social Infrastructure

While better physical infrastructure augments productivity (and lowers production costs), it is no guarantee to sustainable development in the absence of investment in human capital. India has had policies in favour of attracting private participation, but mainly it focused on physical infrastructure; social sector, in general and basic services, specifically has received relatively less attention so far as their provision and expansion of coverage through PPP. The erstwhile Planning Commission explicitly emphasised the need for ‘inclusiveness’ in country’s growth strategy in its 11th Five Year Plan document. Inclusiveness was meant to mobilise the marginalised and make them active agents of their own development. The erstwhile Twelfth Five-Year Plan from 2012-2017 carried forward that vision of the Planning Commission and invited social infrastructure projects under PPP mode. As of June 2023, there were 162 projects under the social and commercial infrastructure sector and 119 projects under the water sanitation sector. Table 5.1 furnishes the information on the number of projects as well as cost incurred on them for various sectors.

⁴ http://www.archive.india.gov.in/business/infrastructure/state_level.php

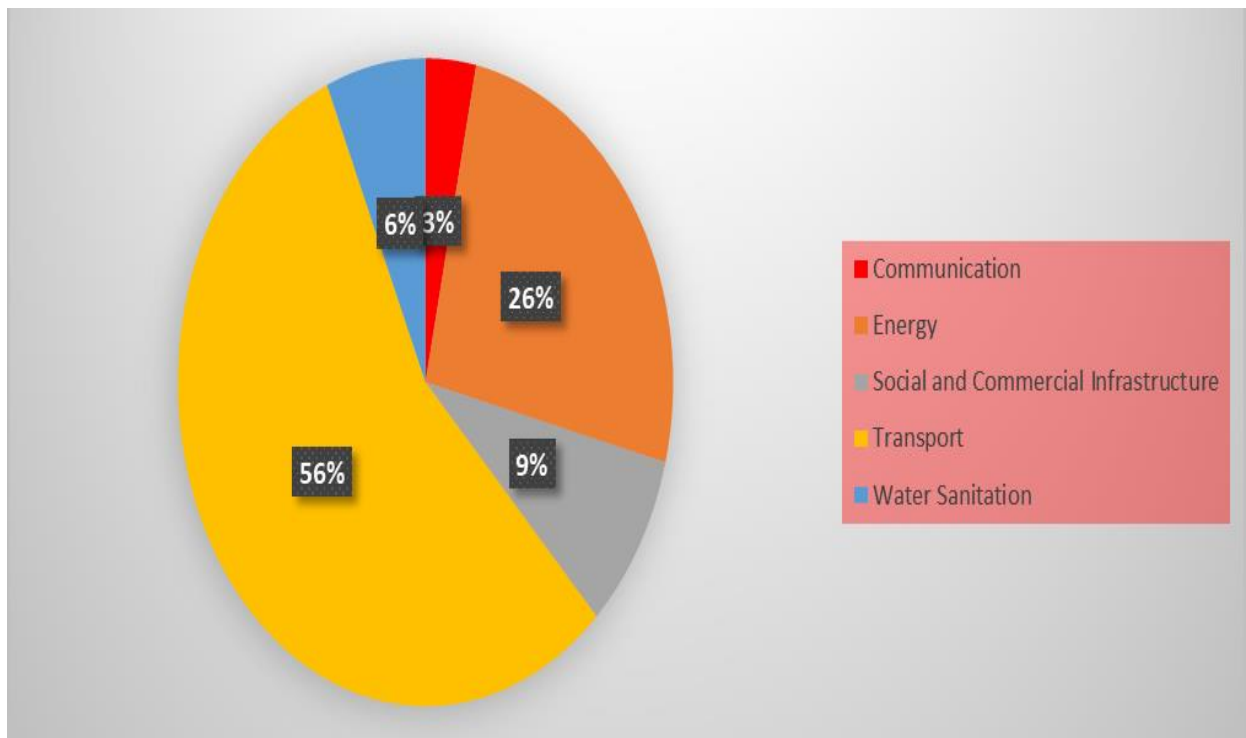
Table 5.1. Sector-wise Presence of PPP Projects in India as of End-June 2023

Sector/Sub-sector	Number Of Project	Total Project Cost (in Rs Crore)
1.Communication	60	875934.76
1.1.Telecommunication Network and Services	60	875934.76
2.Energy	469	821317.97
2.1. Electricity Distribution	16	28757.24
2.2. Electricity transmission	34	29213.68
2.3. Electricity generation (grid)	79	399370.61
2.4. Renewable energy (grid)	339	363071.44
2.5. Oil/ Gas/ LNG Storage	1	905.00
3.Social and Commercial Infrastructure	162	18347.67
3.1. Cold Chain	8	1610.51
3.2. Education	37	468.81
3.3. Common infrastructure for industrial parks, SEZ	29	7089.30
3.4. Post-harvest storage infrastructure for agriculture and horticulture produce including cold storage	21	678.02
3.5. Health Care	14	1412.61
3.6. Tourism	53	7088.42
4.Transport	1015	764007.38
4.1. Airports	11	35923.94
4.2. Railway track, tunnel, viaducts, bridges	9	15397.43
4.3. Ports (excluding captive)	99	139100.04
4.4. Urban public transport (except rolling stock)	72	34765.94
4.5. Roads and bridges	824	538820.03
5.Water Sanitation	119	15960.66
5.1. Irrigation (dams, channels, embankments, etc.)	1	9.50
5.2. Solid waste management	70	8375.06
5.3. Sewage collection, treatment and disposal system	21	1421.98
5.4. Water treatment plants	7	1394.24
5.5. Water supply pipeline	20	4759.88
Total	1825	2495568.44

Source: Author's compilation from <https://www.pppinindia.gov.in/> (List of PPP Project)

Displayed in Figure 5.1 is the percentage composition of projects in various sectors under PPP mode. As can be seen from this figure, more than half of the total PPP projects in India are in the transport sector (56 per cent) followed by the energy sector (26%). The communication sector attracts the least percentage of projects (3 per cent) under PPP mode. Out of the total projects sanctioned under PPP mode, 9 per cent and 6 per cent are in the social and infrastructure sector and water sanitation sector respectively.

Figure 5.1. Percentage Composition of Sector-wise PPP Projects in India as of End-June 2023



Source: Same as for Table 5.1.

A subnational analysis of PPP projects in India between 1991 and 2023 reveals that the state of Maharashtra holds the top position with 12 per cent of total projects (1825) at a total cost of Rs.178386.11 crore (Table 5.2). Madhya Pradesh occupies the second position in terms of number and percentage of projects sanctioned under PPP mode, i.e., 10.25 per cent (187) projects, but ranks fourth in terms of project cost at Rs.98773.58 crore. In case of West Bengal, the state could attract only 32 projects (1.75 per cent) under PPP mode standing at 12th position, while its position in terms of total project cost under PPP mode is 16th.

Table 5.2. Information on PPP Projects Sanctioned and Completed between 1991 and 2023 for General Category States as of End-June 2023

Sl. No.	State	Number Of Project	Rank	Total Project Cost (in Rs Crore)	Rank
1	Andhra Pradesh	85(4.66)	6	71,677.02	7
2	Bihar	21(1.15)	16	20,529.01	15
3	Chhattisgarh	22(1.21)	15	73,846.01	6
4	Goa	11(0.6)	18	8,937.23	17
5	Gujarat	130(7.12)	5	1,31,008.62	3
6	Haryana	28(1.53)	13	31,353.84	12
7	Jharkhand	16(0.88)	17	5,944.47	18
8	Karnataka	140(7.67)	4	70,746.36	8
9	Kerala	33(1.81)	11	21,439.43	14
10	Madhya Pradesh	187(10.25)	2	98,773.58	4
11	Maharashtra	219(12)	1	1,78,386.11	1
12	Odisha	44(2.41)	10	77,818.87	5
13	Punjab	62(3.4)	9	35,798.06	11
14	Rajasthan	175(9.59)	3	62,598.59	9
15	Tamil Nadu	80(4.38)	7	48,485.97	10
16	Telangana	27(1.48)	14	30,687.64	13
17	Uttar Pradesh	77(4.22)	8	1,34,133.45	2
18	West Bengal	32(1.75)	12	17,770.66	16

Figures in parentheses indicate the percentage to total.

Source: Same as for Table 5.1.

5.5. Efficiency Analysis of Select Social and Community Service Project in West Bengal

In this section, an attempt is made to investigate the efficiency of select social and community project, namely, related to water supply, some of which were sanctioned and completed/ongoing under traditional (government-funded) mode and others under PPP mode in West Bengal during 1995 to 2023. As stated in the introductory background of this chapter, the present exercise lacks data on several important parameters which would have certainly

added some more insights. Notwithstanding this limitation, the efficiency analysis provides an illustrative preliminary insight. For water supply projects considered in this analysis, total cost of each project (in Rs. Crores) forms the input, while project capacity is the output – million-litre per day (mld) for water supply⁵ The efficiency exercise is conducted using DEA with both input-oriented as well as output-oriented settings under VRS assumptions. Table 5.3 gives the details of different projects on water supply under both traditional and PPP modes. Here it is important to note that while no single project is done under PPP mode with a sole objective of improving the nutritional status of people, the project on water supply is closely related towards health and nutrition, and partly serves the direct interest of this study. It is seen from Table 5.3 that projects on water supply undertaken under PPP mode are far less than those done under traditional mode. Water supply projects under the traditional mode generated an average capacity of 74.96 mld at an average cost of Rs.167.62 crores, while those under PPP mode generated on average 7.34 mld at Rs.60 crores.

Table 5.3. Details of Water Supply Projects in West Bengal as End-June 2023

Panel A: Projects Under Traditional Mode				Panel B: Projects Under PPP Mode		
Sl. No.	Project Name	Project Capacity (in mld)	Total Project Cost (in Rs. Crore)	Project Name	Project Capacity (in mld)	Total Project Cost (in Rs. Crore)
1.	Water Supply Scheme at Simlapal in Bankura	13.1	51.21	Water Supply and Sewerage Scheme at Salt Lake	8	67
2.	Water Supply Scheme at Habra-Gaighata	147	577.72	Water Supply Scheme (Naba Diganta Industrial Township)	8	68.01
3.	Water Supply Scheme at Bishnupur	15.3	64.17	O&M and Management of 6 mld Water Treatment Plant	6	45

⁵ Here it should be noted that different water supply projects had different units of output measured (capacity), thus, for the purpose of the present analysis, the unit of output has been standardised for all projects under analysis as million-litre per day (mld).

	Panel A: Projects Under Traditional Mode			Panel B: Projects Under PPP Mode		
Sl. No.	Project Name	Project Capacity (in mld)	Total Project Cost (in Rs. Crore)	Project Name	Project Capacity (in mld)	Total Project Cost (in Rs. Crore)
4.	Water Supply Scheme at Beldanga-I in Murshidabad	16.8	54.21	NA	NA	NA
5.	Water Supply Scheme at Indus in Bankura	19.3	68.36	NA	NA	NA
6.	Water Supply Scheme at Palta and Garden Reach in Kolkata	75.7	80.56	NA	NA	NA
7.	Water Supply Scheme at Gangarampur	18.8	145.02	NA	NA	NA
8.	Water Supply Scheme at Tapan	20.6	165.5	NA	NA	NA
9.	Water Supply System at Ashoka Nagar Kalyangarh	20.81	110.67	NA	NA	NA
10.	Water Supply Scheme in Khatra, Hirbandh and Ranibandh Blocks of Bankura	27	179.47	NA	NA	NA
11.	Water Supply Scheme for Panskura-II in Purba Medinipur	30	219.68	NA	NA	NA
12.	Water Supply System at Habra	215.36	110.35	NA	NA	NA

	Panel A: Projects Under Traditional Mode			Panel B: Projects Under PPP Mode		
Sl. No.	Project Name	Project Capacity (in mld)	Total Project Cost (in Rs. Crore)	Project Name	Project Capacity (in mld)	Total Project Cost (in Rs. Crore)
13.	Water Supply Scheme at Raipur in Bankura	14.5	59.36	NA	NA	NA
14.	Water Supply Scheme at New Town, Kolkata	378.5	245.15	NA	NA	NA
15.	Water Supply Scheme for Panihati Municipality	59	246.02	NA	NA	NA
16.	Water Supply Scheme in Murshidabad	84.4	255.56	NA	NA	NA
17.	Water Supply Scheme at Bansberia in Hooghly	56.77	71.34	NA	NA	NA
18.	Water Supply Scheme for Dumdum, South Dumdum and North Dumdum	136.4	312.72	NA	NA	NA
Average		74.96	167.61		7.33	60

Note: mld – million litre per day; NA – not applicable.

Source: <https://www.pppinindia.gov.in>; limited access provided by CMIE CAPEX Database; and respective websites furnishing individual project details.

The efficiency analysis results are summarised in Table 5.4 for water supply projects. Here it is to be noted that in case of water supply projects, there is a wide difference in the number of projects done under the traditional and PPP modes. Thus, for reasons of comparability in the efficiency analysis, efficiency scores of only three projects done under the PPP mode have been furnished along with the six projects undertaken in the traditional mode, three with highest

capacities delivered, namely, Water Supply Scheme at New Town Kolkata (with 378.5 mld), Water Supply System at Habra (with 215.36 mld) and Water Supply Scheme for Dumdum, South Dumdum and North Dumdum (with 136.4 mld), and three projects with least cost, namely, Water Supply Scheme at Simlapal in Bankura, Water Supply Scheme at Beldanga-I in Murshidabad and Water Supply Scheme at Raipur in Bankura.

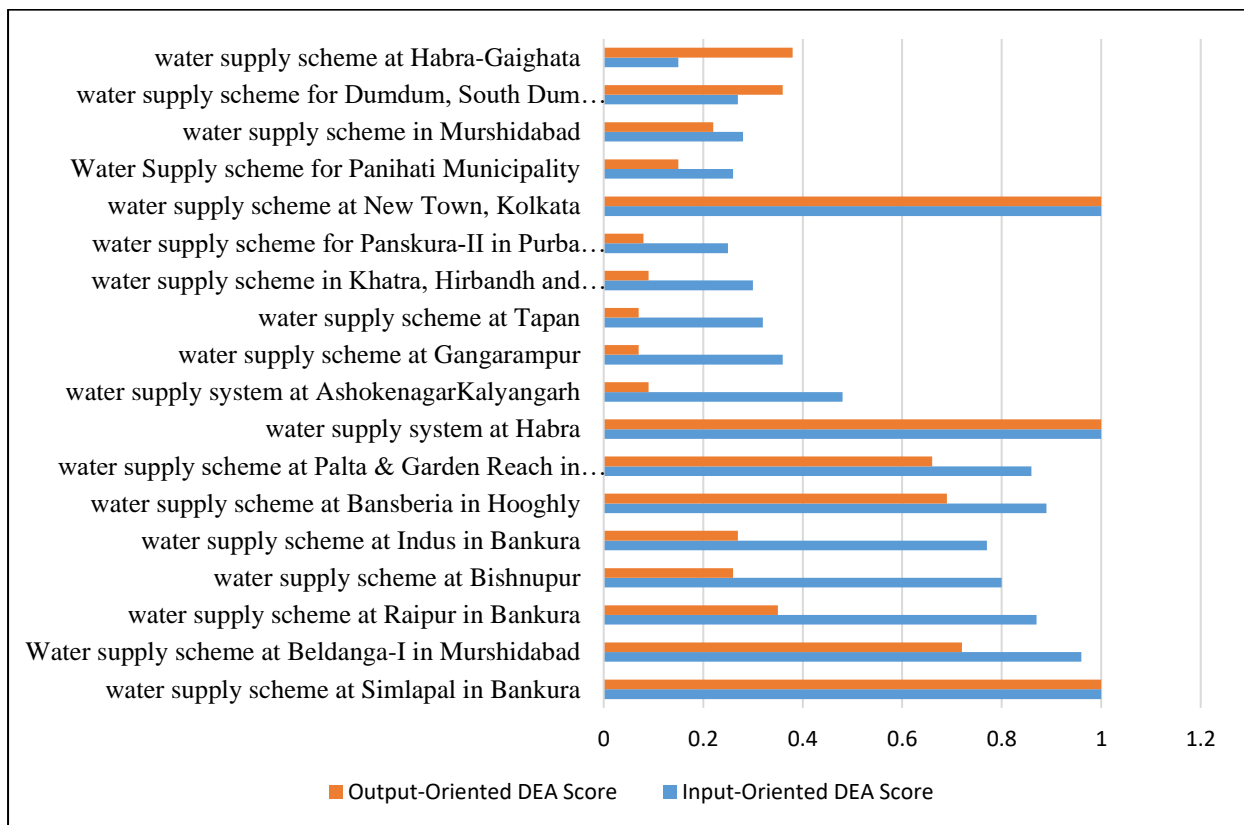
Table 5.4. DEA Efficiency Scores for Water Supply Projects

Project Name	Input-Oriented DEA Score	Input-Oriented DEA Score	Output-Oriented DEA Score	Output-Oriented DEA Score
	Traditional Mode	PPP Mode	Traditional Mode	PPP Mode
Water Supply Scheme at New Town, Kolkata#	1	NA	1	NA
Water Supply System at Habra#	1	NA	1	NA
Water Supply Scheme for Dumdum, South Dumdum and North Dumdum#	0.35	NA	0.38	NA
Water Supply Scheme at Simlapal in Bankura\$	1	NA	1	NA
Water Supply Scheme at Beldanga-I in Murshidabad\$	1	NA	1	NA
Water Supply Scheme at Raipur in Bankura\$	0.88	NA	0.86	NA
Water Supply and Sewerage Scheme at Salt Lake^	NA	1	NA	1
Water Supply Scheme (Naba Diganta Industrial Township)^	NA	1	NA	1
O&M and Management of 6 mld Water Treatment Plant^	NA	0.92	NA	1

#: Project under traditional mode having highest output; \$: Project under traditional mode with least cost; ^: The project is under PPP mode; NA: not applicable.

Source: Same as for Table 5.3; author's computation using DEAP Version 2.1.

Figure 5.2. Efficiency Scores of All Eighteen Projects Under Traditional Mode



Source: Same as for Table 5.4.

It can be seen from Table 5.4 that water supply projects done under both the traditional as well as under PPP mode are almost equally efficient, barring one project under the traditional mode for both input-oriented and output-oriented setting and one project under PPP mode for input-oriented setting. The above plot in Figure shows that in traditional mode, the minimum efficiency score is 0.15 (in input-oriented setting) and 0.07 (in output-oriented setting). The simple implication of this exercise is that in terms of project cost vis-à-vis project capacity, PPP mode has been somewhat more efficient relative to government-funded projects. The data limitation on various factors that might impact this efficiency does not permit to investigate any further the impact of environmental factors on this efficiency level of projects.

5.6. Challenges in Implementing Food and Nutrition Projects Under Public Private Partnership Mode

The scarce literature on public private partnership in food and nutrition sector for different countries (Save the Children, 2017; Fanzo et al., 2016) has highlighted numerous challenges, many of them are relevant for a country, like India. These include amongst others the following:

(a) The uncertain and risky nature of agriculture makes it difficult for agriculture-related PPPs to access credit, and even when they do, projects often fail due to a lack of investment management capacity and insufficient knowledge of the fundamental market risks and of the entire food value chain.

(b) There is particularly insufficient trust between public and private stakeholders around agriculture and FSN. This relates to the influence of the large companies on the supply and production of food products, including their food content and quality, such as baby milk, packaged food products, etc. Most PPPs related to agriculture and FSN are so far in sub-sectors such as “staples” (e.g., rice, maize, banana, etc.) and “cash crops”, i.e., the most widely traded commodities worldwide (tea, coffee, cocoa, palm oil, etc.) involving multinationals, commercial operators, large estates and mono-cropping; rather than in the smallholders’ food produce sub-sectors (e.g., local varieties of tubers, vegetables, pulses, underutilised species, etc.), where family farming, informal activities, and multi-cropping tend to benefit more directly the marginal players in the value chain. Apart from this, there prevails ambiguity and misalignment in goals of public and private stakeholders. The public sector comes to the table with public health objectives and the private sector with profit-making objectives. These goals often clash, hampering PPP performance. In the absence of any kind of formal agreement between public and private stakeholders with well-defined terms and conditions, the issue of mistrust between both parties can hardly be resolved.

(c) Most PPPs related to agriculture and FSN are like mega agricultural PPPs with skewed benefits of investments towards the privileged and more powerful, while the risks falling onto the poorest and most vulnerable.

(d) Hardly any incentive for local innovation and processing, and for marginal players to become entrepreneurs. PPP models in food and nutrition sector have been criticized as ‘extractive’ because the foreign company or local aggregator gives incentives for smallholders (often contract farmers) to cluster along the VC, by offering input pre-financing and an output market (most likely foreign markets); but little space is there for local innovation and processing and for those marginal players to become entrepreneurs.

(e) Huge inequalities within FVC: Strong concentration in the food value chains giving supermarkets and more upstream purchasing companies very large powers and influence, compared to farmers, consumers and other stakeholders. The huge inequalities within food value chains are hard to be solved through a PPP: effective cooperation between the parties and

development outcomes depend on what type of PS is involved and whether the governance arrangement of the partnership can guarantee a “win-win” situation for family farmers, consumers, foreign companies, etc. This political economy of the global food industry (only 10 companies control almost every large food and beverage brand in the world) makes it difficult for internationally-set development and sustainability standards/principles to trickle down to, and be implemented, by companies, consumers and retail markets.

(f) Resource Imbalances. Resource problems also hamper PPP performance. The PPP mechanism is partly designed to address the issue of affordability by pooling resources from various sources to overcome the limited funding available in the public sector, which often brings in-kind contributions to the table. However, governments do not invest enough in nutrition within their national budgets nor in official development assistance (ODA). However, with any partnership there is a tendency to value tangible financial resources above intangible resources such as capacities, expertise, reputation or networks. Hence partners committing more financial resources (more likely the private sector) tend to have greater bargaining power. This unequal power relationship within PPPs can create an environment in which weaker partners feel detached from the decision-making and management processes. Furthermore, a large number of informal or small-scale players in the private sector lack capacity to effectively engage in the partnership and deliver on the agreed-upon goals. While small and medium enterprises (SMEs) are flexible and can quickly respond to consumer demands, their ability to address growing concerns of food safety, traceability and health and environmental sourcing constrains their ability to partner effectively.

(g) Weak Accountability. Nutrition related PPPs also face problems with accountability and transparency. Here accountability means two things: (i) Answerability: key actors provide an account of their decision and actions to relevant stakeholders using a trusted, transparent, responsive, credible and inclusive process that provides meaningful and verifiable information; and (ii) Enforceability: key actors comply with established standards and codes of conduct, and are subject to penalties or restrictions when they do not deliver on their pledges, commitments and obligations.

India is a large country with agrarian sector still engaging a sizeable population. Any PPP arrangement in the food and nutrition sector will have to be designed very carefully through an active involvement of various stakeholders, including farmers and consumers. For this purpose,

a legislative framework may be put in place outlining clearcut guidelines on sensitive issues, including risk-sharing, financing pattern, incentives to farmers and other parties involved, etc.

5.7. Concluding Observations

The present chapter attempted to take a stock of the progress of public private partnership in India along with cross country evidences and tried to examine the practical feasibility of this kind of arrangement in the food and nutrition sector in the State of West Bengal. The findings of this chapter reveals a low adoption rate of overall projects under PPP mode in West Bengal compared to the rest of the country. The specific case of water supply projects examined for the State of West Bengal under both traditional as well as PPP mode between 1995 and 2023 points to the fact that only three projects in the sector in West Bengal pertained to water supply projects, while in the traditional mode, this number was 18. Comparing the efficiency of these projects under the two modes indicates somewhat greater cost-efficiency of projects under PPP mode as compared to those under the traditional mode. The data constraints on many other important indicators restricted the scope of the present analysis. There are a number of challenges indicated in the literature for implementing projects under PPP mode in food and nutrition sector, ranging from risk and uncertainty in the agriculture sector preventing effective implementation of PPP projects to insufficient trust between public and private stakeholders, hardly any incentive to local farmers for participation and innovation, uneven concentration in the food value chains, resource imbalance, and most important, weak accountability and lack of transparency. It is suggested that a clearcut legislative and institutional mechanism is the prerequisite for initiating any PPP based project in the food and nutrition sector in India, more especially in a State, like West Bengal, which generally suffers from non-viable government finances.

Chapter 6.

Conclusion

The present thesis investigates the issue of food and nutrition security in West Bengal and examines the role of the State government as well as that of the non-governmental organisations (NGOs) towards food and nutrition security in the State. While governments have traditionally held the key responsibility for the provision of basic public services, such as food, health and nutrition, education, etc., non-governmental non-profit organisations have increasingly shouldered the responsibility of the government in the provision of various public services to the people. In this way, these private entities complement the efforts of the government in solving the long-standing development issues characterised by inefficiencies in government operations and ineffective development projects. When it comes to food and nutrition security, which itself is a quite sensitive, complex and multi-dimensional issue, a holistic approach is the need of the time (in light of the 2030 agenda for sustainable development) involving cross-sectoral collaboration and coordination by pooling together the resources, knowledge and expertise of different stakeholders. The partnership between the public and private stakeholders in this respect through any formal arrangement (such as public private partnership) is, however, not free from concerns, including financing pattern, risk-sharing, legal and regulatory aspects, etc. Most of the studies on the issue of food and nutrition security interest themselves in the improvement of food and nutritional status of people irrespective of the service provider. Very few scholars have assessed the role of NGOs in improving the health and nutritional status. There is, however, hardly any study examining the comparative performance of the public and private stakeholders towards food and nutrition security, more especially in the Indian context. The present thesis, therefore, attempts to fill this gap in the literature by examining the comparative role and performance of government and non-governmental organisations in improving food and nutritional outcomes in West Bengal and identifying the issues associated with possible collaboration and coordination between the two through public-private partnership arrangement. Specifically, this thesis addresses four research questions, namely, role of the State government of West Bengal in improving food and nutritional outcomes through quality spending; role of private entities (NGOs in the present case) as well as their efficiency in providing nutritious food to the needy (with and without government support) in West Bengal; cost-effectiveness of select water supply projects sanctioned and completed/ongoing in the State under analysis between 1995

and 2023 under the traditional (government-funded) mode and under PPP mode; and the identification of the major challenges in the successful implementation of public private partnership project in food and nutrition sector. The present chapter concludes the work by summarizing the findings of this study, outlining major limitations of this work, providing some policy recommendations and pointing out the agenda for future research.

6.1. Summary of Findings

The objective of Chapter 3 of the thesis was to assess the quality of government expenditure of States for food and nutrition. While the first step in assessing the quality of public expenditure is to measure its adequacy, this kind of exercise is both time-consuming and data-intensive process and is thus beyond the scope of this work. However, the relative adequacy of government expenditure of States is attempted by examining the broad pattern of allocations by States for developmental purposes, more especially, for social sector. The sample period for this analysis spans from 2014-15 to 2020-21 which corresponds to the period of a significant compositional shift in Central Government fiscal transfers to States, and the period ended with the year characterised by the COVID-19 pandemic, which adversely affected all economies around the world. With a special focus on West Bengal, the trend analysis conducted in this chapter revealed the fact that West Bengal's real per head allocation for social sector were quite less than those of other GC States during the sample period. The real per head allocations are more relevant in the present work compared to allocations relative to total expenditure or output of the State. Furthermore, the sustainability of the government finances of West Bengal are also doubtful in light of the poor quality of fiscal deficit as well as its low own revenue base and heavy dependence on Central fiscal transfers for social sector. Apart from adequacy angle, the quality of government expenditure is also assessed through the lens of effectiveness and efficiency of expenditure. The results of the empirical exercises conducted in this chapter indicate that government expenditure has been quite effective in reducing the incidence of U5MR as well as in improving the nutritional status of children below five years and women in the age group 15-49 years. The increased per head allocation on overall developmental expenditure tends to reduce the poor population. The results of government expenditure efficiency analysis indicate that State governments (more especially West Bengal) have a greater scope of bringing economies in their expenditure. This efficiency in government spending can be achieved through a combination of higher per capita income, greater share of general purpose transfers in total fiscal transfers to States, improving the governance in the State and increasing women's education.

In light of the rapidly increasing role and significance of NGOs in various developmental activities, Chapter 4 of the thesis attempted to examine the impact that NGOs might have made on providing the nutritional support to the needy in West Bengal. Taking aggregate empirical insights from positive and significant impact of Akshay Patra on nutritional support, this chapter delved further into a case investigation of NGOs active for the same cause in West Bengal. Based on a small primary survey with select NGOs, personal interview with select schools in Kolkata as well as secondary information gathered from respective websites of NGOs, NGO Darpan, and other relevant literature, it is found that NGOs' support towards nutrition to the beneficiaries in West Bengal has been crucial in terms of their substantial resources devoted for the cause. NGOs with government support are found to have more effective and efficient utilisation of their resources as compared to those working without government support. NGO staff has also positive and significant association with beneficiary coverage/reach. The personal interviews conducted with beneficiaries in selected schools reveal that schools provide daily meal under MDM programme whether they are completely government-funded or have to collaborate with NGOs. Children like the quality of food and have hardly any complaint of being sick after taking the meal at school. Notwithstanding the significant role of NGOs in providing nutritional support to the needy, they are faced with numerous challenges ranging from network building and effective communication, management and governance issues, political interference, lack of adequate funding, less staff than the actual requirement to the lack of a sound and comprehensive database of NGOs.

Given the significant role played by NGOs in improving the food and nutrition outcomes in West Bengal, the intent of the fifth chapter of this thesis is to look further into public private partnership (PPP) type of arrangements, implemented so far in relevant social and community service projects in India so as to explore the possibility (if any) for such arrangement regarding food and nutrition sector, in India in general, and particularly in West Bengal. In doing so, the chapter attempts to empirically investigate and compare the cost efficiency of water supply projects in West Bengal which were sanctioned between 1995 and 2023 under two different modes, namely, the traditional (government-funded) mode and under PPP mode. Finally, the chapter ends up on highlighting some important challenges that are underway in the implementation of food and nutrition related projects under PPP mode. It is found that between 1991 and 2023, West Bengal could attract only 32 projects under PPP mode accounting for just 1.75 per cent of all projects sanctioned under PPP mode in India over this period. The State thus stood at the 12th position out of 18 GC States, and 16th position in terms of project cost.

For water supply, there were only three Projects undertaken under PPP mode as compared to eighteen under the traditional mode. Water supply projects under the traditional mode generated an average capacity of 74.96 mld at an average cost of Rs.167.62 crores, while those under PPP mode generated on average 7.34 mld at Rs.60 crores. The DEA efficiency scores indicated that water supply projects done under PPP mode have been somewhat more efficient as compared to those done under the traditional mode. There are a number of challenges indicated in the literature for implementing projects under PPP mode in food and nutrition sector, ranging from risk and uncertainty in the agriculture sector preventing effective implementation of PPP projects to insufficient trust between public and private stakeholders, hardly any incentive to local farmers for participation and innovation and most important, uneven concentration in the food value chains. It is suggested that a clearcut legislative and institutional mechanism is the prerequisite for initiating any PPP based project in the food and nutrition sector in India, more especially in a State, like West Bengal, which generally suffers from non-viable government finances.

6.2. Limitations of the Study

As stated elsewhere in this study, this type of work is a timely contribution to the knowledge base on the subject for examining the role of both public and private stakeholders in improving food and nutrition situation in light of fast approaching deadline of SDGs. It is, however, admitted that for a non-funded and time-bound study such as the present one, the scope and purpose of work is quite restricted and thus be treated as a preliminary and illustrative attempt of its type.

The first and foremost limitation faced by the present study is the lack of data on district level government expenditure. A more insightful analysis could be done for West Bengal had there been the availability of data at the district level pertaining to the State. Moreover, the absolute adequacy of government expenditure on food and nutrition for West Bengal (which is the focus of this study) could not be ascertained due to intense data required for its calculation, including the unit cost of all items, the norms for intake of calorie and nutritional value, etc. Furthermore, despite the fact that non-monetary inputs such as school infrastructure, teaching quality resources, stock of human capital, access to safe drinking water and improved sanitation facility, etc. are no less important in improving the educational and nutritional outcomes, this study relies merely on the monetary inputs, Viz., government expenditures in the efficiency analysis, again mainly due to time and resources in hand, non-availability (or difficult access)

of data on many important variables and small sample size of this study. Likewise, many other relevant and potential environmental factors explaining the efficiency of subnational Government expenditures, such as monetary indicators, unemployment, own revenues of States, political determinants, etc. could not be considered. Even the fiscal absorptive capacity variable has been narrowly defined in this analysis for the sake of analytical and practical convenience.

A study, such as the present one, should be enriched with large field surveys and personal interactions with various stakeholders covering the supply-side as well as the demand-side of food and nutrition. For various reasons, including the time and resource constraints in hand, the present study has to rely largely on secondary sources of information, and to some extent, a handful of data collected from selected NGOs and schools in West Bengal. Though the findings based on these data provide preliminary, but useful insights, they may vary under different contexts and situations. For example, the resource use efficiency of NGOs with and without government support as well as the challenges faced by them may vary to some extent in far flung areas (or those affected by Left-Wing Extremist (LWE)) compared to other parts of India. The analysis of Chapter 5 of the thesis on assessing the efficiency of water supply projects under PPP and traditional modes is very preliminary and illustrative, given the absence of data on several related and important parameters, such as time in project execution and its controls like size of the project, its location, etc. This study has relied on PPP web portal hosted by the Department of Economic Affairs, Ministry of Finance, Government of India; and very limited access to CMIE's CAPEX database. Similarly, the idea of various challenges faced in the implementation of PPP based projects in food and nutrition sector in West Bengal is largely drawn on the available literature. A personal and structured interaction with experts and practitioners in this area is the ideal approach for gathering deep and more meaningful insights in these cases, which is not attempted in this study for reasons stated above.

6.3. Policy Suggestions

The trend analysis of government expenditure indicates low per capita expenditure on social sector in West Bengal compared to many other GC States. This suggests that the State should increase its per head allocation for social sector programmes, such as food nutrition and health care, mostly through its own revenues. Debt financing for social sector is not at all a viable option in the long run. Interventions, like ICDS and NHM have been very effective in reducing the incidence of U5MR and prevalence of malnutrition among children and women. These

interventions should, therefore, be continued in a goal-oriented manner, ensuring that Central grants for the purpose are not substituted by the State, rather supplemented by its own spending. It is also revealed from the efficiency analysis of government expenditure that State governments (more especially West Bengal) have a greater scope of bringing economies in their expenditure. This efficiency in government spending can be achieved through a combination of higher per capita income, greater share of general purpose transfers in total fiscal transfers to States, improving the governance in the State and increasing women's education.

In light of the increasing role of NGOs in improving food and nutrition outcomes in West Bengal as well as numerous challenges being faced by them, it is suggested that government, donors and other stakeholders should collaborate with various voluntary organisations to achieve different development agenda. In doing so, effective mechanisms will have to be developed to institutionalise the process of this change and collaboration, thereby avoiding the risk of fraud and anti-national activities. The government has to build up trust with private stakeholders, such as NGOs, companies, etc. to have an effective partnership with them for improving food and nutrition security. Government policies must be clear with regards to various aspects pertaining to public private partnership in the sector, like sharing of risks, proper financing pattern, adequate incentive to each party to stay meaningfully in the partnership and other responsibilities and role so that the interest of the beneficiaries is not compromised in any case. Towards this end, there must also be some guiding legislations defining clearcut rules and procedures of partnership so as to minimise the conflict of interests of various stakeholders involved in the partnership, including small and marginal farmers.

6.4 Future Research Agenda

The future studies in this area should plan large field surveys and interviews with government officials (at different levels including local officials), civil societies/NGOs, intended beneficiaries, and also with leading experts and practitioners in the field. This will fetch up a rich and large data set on various desired parameters where the secondary information is either absent altogether or is scarce. Furthermore, given the differences in resource endowments of States as well as their fiscal capacities and institutional setups, such studies should take up, at least two States for detailed analysis for comparative purposes.

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Appendices

Appendix A.

A1. Definitions and Concepts of Malnutrition Indicators Used in the Thesis

Stunting (or short for their age): Stunting, or low height-for-age, is a sign of chronic undernutrition that reflects failure to receive adequate nutrition over a long period. Stunting can also be affected by recurrent and chronic illness. Height-for-age is a measure of linear growth retardation and cumulative growth deficits. Children whose height-for-age Z-score is below minus two standard deviations (-2 SD) from the median of the reference population are considered short for their age (stunted), or chronically undernourished. Children who are below minus three standard deviations (-3 SD) are considered severely stunted.

Wasting (or thin for their height):Wasting, or low weight-for-height, is a measure of acute undernutrition and represents the failure to receive adequate nutrition in the period immediately before the survey. Wasting may result from inadequate food intake or from a recent episode of illness causing weight loss. The opposite of wasting is overweight (high weight-for-height), a measure of overnutrition. Weight-for-age is a composite index that takes into account both acute and chronic undernutrition. Weight-for-height index measures body mass in relation to body height or length and describes current nutritional status. Children whose Z-score is below minus two standard deviations (-2 SD) from the median of the reference population are considered thin (wasted), or acutely undernourished. Children whose weight-for-height Z-score is below minus three standard deviations (-3 SD) from the median of the reference population are considered severely wasted.

Underweight (or thin for their age) and overweight (or heavy for their height):As stated above, weight-for-age is a composite index of height-for-age and weight-for-height. It takes into account both acute and chronic undernutrition. Children whose weight-for-age Z-score is below minus two standard deviations (-2 SD) from the median of the reference population are classified as underweight. Children whose weight-for-age Z-score is below minus three standard deviations (-3 SD) from the median are considered severely underweight. Low birthweight is defined by WHO as weight at birth of less than 2500 g (5.5 lbs.). This WHO global nutrition target refers to a 30 percent reduction in the number of infants born with a weight lower than 2500 g by 2025. It is a global public health problem with associated

negative short- and long-term health consequences, including increased risk of mortality and NCDs in later life. Overweight children are those whose weight-for-height Z-score is more than 2 standard deviations (+2 SD) above the median of the reference population.

Corollary: In connection with the above definitions, it should be noted that a mean Z-score of less than zero (i.e., a negative mean value for stunting, wasting or underweight) suggests a downward shift in the entire sample population’s nutritional status relative to the reference population. The farther away the mean z-scores are from zero, the higher is the prevalence of undernutrition.

Anaemia: Anaemia is a condition that is marked by low levels of haemoglobin in the blood. Iron is a key component of haemoglobin, and iron deficiency is estimated to be responsible for half of all anaemia globally. Other causes of anaemia include malaria, hookworm and other helminths, other nutritional deficiencies, chronic infections, and genetic conditions. Anaemia is a serious concern for children because it can impair cognitive development, stunt growth and increase morbidity from infectious diseases.

Anaemia in Children	
Anaemia Status	Haemoglobin Level (in grams/decilitre) *
Anaemic	<11.0
Mildly Anaemic	10.0-10.9
Moderately Anaemic	7.0-9.9
Severely Anaemic	<7.0
Not Anaemic	≥11.0

*: Haemoglobin levels are adjusted in the National Family Health Survey (NFHS) round 5 for altitude in enumeration areas that are above 1000 metres.

Anaemia Prevalence in Adults	
Adult Type	Haemoglobin Level (in grams/decilitre) *
Non-pregnant women aged 15-49 years	<11.0
Pregnant women aged 15-49 years	<12.0
Men aged 15-49 years	<13.0

*: Haemoglobin levels are adjusted for smoking, and for altitude in enumeration areas that are above 1000 metres.

Body Mass Index (BMI): As per NFHS-5, the body mass index (BMI) is measured for adults (women aged 15-49 years and men aged 15-54 years). It is calculated by dividing weight in kilograms by the square of height in metres.

Status	BMI (kg/m ²)
Too thin for their height	<18.5
Normal	18.5-24.9
Overweight	25.0-29.9
Obese	≥30.0

Waist-to-hip ratio (WHR): WHR helps to identify the distribution of body fat and predicts abdominal obesity. Abdominal obesity is associated with an increased risk of type 2 diabetes mellitus, myocardial infarction, stroke, and premature death. WHR is calculated by dividing the waist circumference by the hip circumference. According to WHO, a healthy WHR is: 0.9 or less in men and 0.85 or less in women.

Source: This Appendix relies on the information contained in the report of National Family Health Survey, round 5 (2019-21), India.

Appendix B.

B1. A Brief Profile of West Bengal – Some Select Indicators

A. General Data						
Sl. No.	Particulars				Figures	
1.	Area (in sq. km.)				88752	
2.	Population (in crore)					
a.	2011 Census (all India = 122.02)				9.17	
b.	2021 Projections (all India = 137.03)				9.84	
3.	Population Density (as per 2011 Census) (in persons / sq. km.) (all India = 382)				1028	
4.	Population Below Poverty Line (in per cent) (all India average = 21.92)				19.98	
5.	Literacy Rate (as per 2011 Census) (in per cent) (all India average = 73)				76.3	
6.	Infant Mortality Rate (per 1000 live births) (all India average = 30)				20	
7.	Life Expectancy at Birth (in years) (all India average = 69.4)				71.6	
8.	Gini Coefficient (all India = 0.36)				0.38	
9.	Human Development Index					
a.	2018 (all India average = 0.642)				0.492	
b.	2019 (all India average = 0.645)				NA	
10.	Gross State Domestic Product 2020-21 (at current prices) (in Rs. Crore)				1301017	
11.	Per Capita GSDP (in Rs. Crore) (per capita GDP of India = 144096)				132212	
12.	Per Capita GSDP CAGR (2011-2021) (in per cent) (all India = 8.08)				9.87	
13.	GSDP CAGR (2011-2021) (in per cent) (all India = 9.48)				10.72	
14.	Population Growth (2011-2021) (in per cent) (all India = 12.3)				7.29	
B. Financial Data						
Sl. No.	Particulars	Growth Rate (in per cent)				
		2018-19 to 2019-20	2018-19 to 2019-20	2019-20 to 2020-21	2019-20 to 2020-21	

		GC States!	West Bengal	GC States!	West Bengal
15.	Revenue Receipts	2.08	-2.1	-4.56	3.83
16.	Own Tax Revenue	2.12	-0.1	-4.43	-0.63
17.	Non-Tax Revenue	23.38	-12.14	-35.6	61.78
18.	Total Expenditure	4.16	-0.63	4.54	7.46
19.	Capital Expenditure	-5.55	-29.88	-2.36	-11.17
20.	Revenue Expenditure on Education	11.97	10.15	-1.32	11.98
21.	Revenue Expenditure on Health	8.07	20.63	14.65	17.16
22.	Salary and Wages	9.07	16.91	2.27	16.66
23.	Pension	10.46	8.71	6.02	22.52
24.	Subsidies	-2.13	-27.56	6.55	27.48

NA: not available. !: Earlier eighteen States, namely, Andhra Pradesh, Bihar, Chhattisgarh, Goa, Gujarat, Haryana, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Telangana, Uttar Pradesh and West Bengal were referred to as general category (GC) States.

Source: Audit report of the Comptroller and Auditor General of India on State Finances for the year ended March 2021 (Report No. 1 of 2022) (Appendix 1.1), Government of West Bengal.

Figure A1.1A. Revenue Deficit (per cent of GSDP) of West Bengal vis-à-vis Average of GC States – 2018-19 to 2021-22

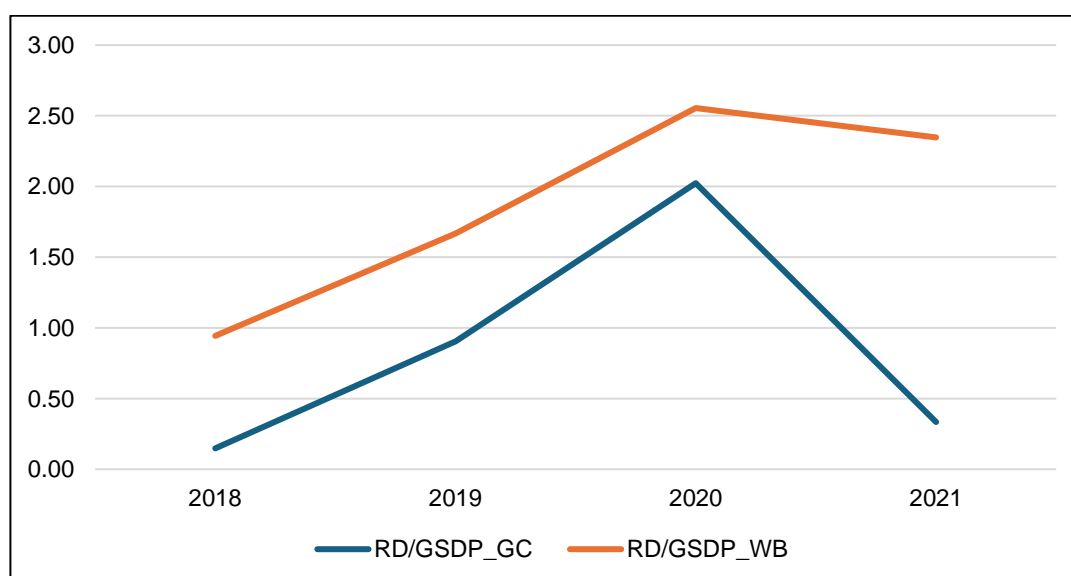


Figure A1.1B. Fiscal Deficit (per cent of GSDP) of West Bengal vis-à-vis Average of GC States – 2018-19 to 2021-22

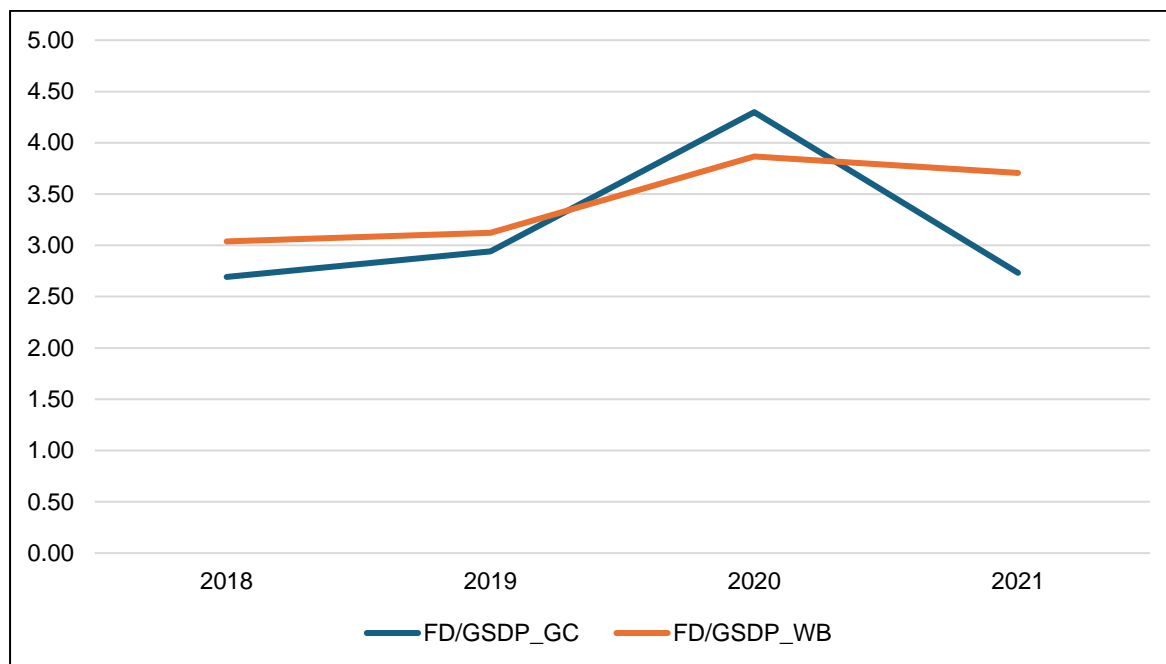
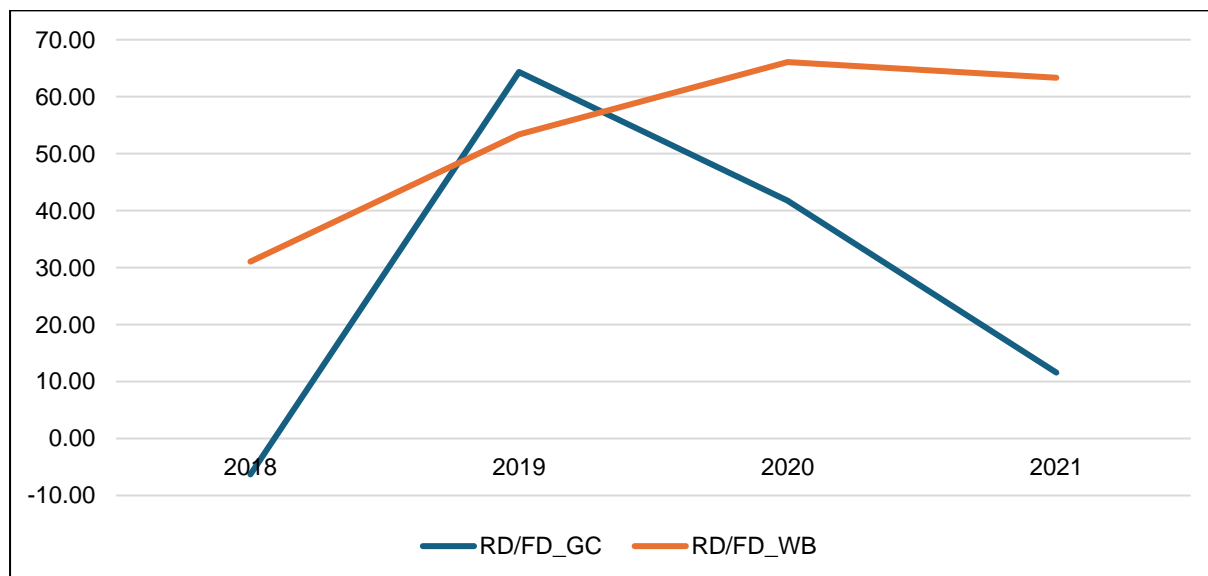


Figure A1.1C. Revenue Deficit (per cent of Fiscal Deficit) of West Bengal vis-à-vis Average of GC States – 2018-19 to 2021-22



Source: The above figures (A1.1A, A1.1B and A1.1C) have been drawn using the data of RBI's State Finances, a Study of Budgets (various years).

Appendix C.

C1. Data Pertaining to West Bengal Used in Text Tables 3.1 through 3.8.

Year/Item	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Total Expenditure*	114035	132108.3	146451.2	160414.9	180956.72	179811.94	193231.77
Capital Expenditure*	10383.38	13280.98	12533.63	19337.52	24582.81	17236.82	15310.48
Developmental Expenditure*	70274.79	84935.29	94899.03	106505.2	122673.74	116681.33	121552.4
Social Sector Expenditure* \$	57264.41	67836.96	74697.67	87844.74	94697.66	96428.58	104229.59
Social Services*	44386.62	52089.36	61589.72	67374.49	76462.19	78984.1	84804.99
Medical and Public Health*	5787.66	7236.58	7597.47	8135.85	8858.26	9874.37	11680.73
Family Welfare	590.22	624.28	665.65	720.84	819.42	959.88	1150.75
Water Supply and Sanitation	1458.04	2208.38	2117.52	3391.37	3236.66	2449.67	1743.03
Nutrition	994.14	1106.98	1173.57	1076.71	1761.15	1600.89	690.65
Agriculture and Allied Activities	3345.88	4673.1	4470.43	4345.76	9059.27	5661.83	5011.31
Rural Development	12565.28	15481.03	12844.58	19937.99	17877.13	17095.73	19080.24
Food Storage and Warehousing	312.51	266.56	263.37	532.27	358.34	348.74	344.36
GSDP (at current prices, 2011 series)	718082	797300	872527	974700	1102054	1179097	1155821
Population (in thousands)	94318	95079	95688	96297	96906	97516	98125
CPI (2011-12 series)	119.47	123.59	129.76	134.57	141.44	147.9	160.75

Note: All figures, except population and CPI are in rupees crores. *: Includes revenue expenditure, capital outlays and loans and advances given by the State for the purpose. \$: Includes expenditure on social services and that on food storage and warehousing and rural development.

Source: Estate Database of the Reserve Bank of India on State Finances a Study of Budgets; Website of the Ministry of Statistics and Programme Implementation, Government of India; and Report on Population Projections for India and States 2011-2036, Ministry of Health and Family Welfare, Government of India.

Appendix D.

D1. Percentage Share of Total Government Expenditure on Direct and Indirect Interventions Relating to Food and Nutrition in West Bengal

Year/Scheme	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	Average
Integrated Child Development Services (ICDS)	1.51	1.28	1.56	1.35	1.40	1.77	1.48
National Health Mission(NHM)	1.21	1.22	0.94	1.04	1.28	1.41	1.18
Swachh Bharat Abhiyan	NA	NA	NA	0.09	0.42	0.28	0.26
Nirmal Bharat Abhiyan	0.40	0.35	0.83	0.59	0.42	0.28	0.48
National Programme of Mid Day Meals in Schools	1.25	0.89	1.15	0.94	0.72	0.89	0.97
National Rural Drinking Water Programme (NRDWP)	0.71	0.80	0.82	1.24	0.90	0.54	0.83
Rajiv Gandhi scheme for Empowerment of Adolescent Girls (RGSEAG) SABLA	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Integrated Child Protection Scheme (ICPS)	0.00	0.01	0.03	0.08	0.03	0.02	0.03
Integrated Watershed Management Programme(IWMP)	0.02	0.01	0.03	0.02	0.04	0.08	0.03
Grants to Pris for Execution of Rural Water Supply Schemes (Spot Sources)	NA	NA	0.01	0.03	0.00	0.01	0.01
National Food Security Mission	0.04	0.05	0.06	0.10	0.10	0.09	0.07
Establishment of ICDS Project	0.17	0.22	0.14	0.26	0.28	0.39	0.24
Special Assisstance Programme of Mid-Day Meal in Schools	NA	NA	0.02	0.07	0.08	0.06	0.06
Accelerated irrigation benefit & food management programme (merging AIBP and other programme s of water resources such as cad, FMP etc.) (aca)	0.11	0.09	0.07	0.05	0.00	NA	0.07
Backward regions grant fund (BRGF) (state component)	1.14	0.35	0.72	0.11	0.00	NA	0.47
Border area development programme (BADP) (aca) (mha/m/o finance)	0.08	0.09	0.08	0.04	0.13	0.09	0.08
Consumer awareness programme	0.00	0.00	0.00	0.00	0.00	NA	0.00
Human resource in health and medical education	0.00	0.02	0.11	0.07	0.00	NA	0.04
National livestock health and disease control programme	0.02	0.01	0.00	0.01	0.00	0.22	0.04
National livestock management programme	0.02	0.00	0.01	0.01	0.28	NA	0.06
National mission for empowerment of women including Indra Gandhi Matritrav Sahyog Yojana	0.02	0.01	0.00	0.00	0.00	NA	0.01
National mission on agriculture extension and technology	0.02	0.05	0.03	0.05	0.00	NA	0.03
National mission on ayush including mission on medicinal plants	0.00	0.13	0.01	0.02	0.00	NA	0.03
National mission on food processing	0.01	0.00	0.00	0.00	0.00	NA	0.00
National mission on sustainable agriculture	0.01	0.00	0.03	0.01	0.00	NA	0.01
National oilseed and oil palm mission	0.01	0.01	0.01	0.02	0.00	NA	0.01
National plan for dairy development	0.00	0.00	0.00	0.00	0.00	NA	0.00
National rural employment guarantee scheme(MGNREGA)	2.05	2.54	2.87	1.18	1.23	1.34	1.87
National rural lively hood mission (NRLM)	0.06	0.07	0.13	0.23	0.00	0.00	0.08
National social assistance programme (NSAP) (m/o rd / m/o finance)	1.15	1.08	1.40	0.62	0.66	0.86	0.96

Year/Scheme	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	Average
National urban livelihood mission	0.04	0.02	0.01	0.02	0.00	NA	0.02
Promotion and strengthening of agricultural mechanization through training, testing and demonstration	0.00	0.00	0.00	0.00	0.00	NA	0.00
Gandhi scheme for empowerment of adolescent girls (SABALA)	0.00	0.00	0.00	0.01	0.00	NA	0.00
Rashtriya Krishi vikas yojana (RKVY) (aca)	0.46	0.18	0.28	0.25	0.14	0.15	0.24
Scheme for development of economically backward classes	0.00	0.00	0.05	0.03	0.09	0.07	0.04
Scheme for development of scheduled castes	0.18	0.14	0.14	0.18	0.12	0.13	0.15
Social security for unorganized workers including Rashtriya Swasthya Bima Yojana	0.11	0.10	0.06	0.08	0.02	0.00	0.06
Special central assistance to schedule caste subplan	0.05	0.00	0.00	0.00	0.00	NA	0.01
Strengthening of database and geographical information system for fisheries sector	0.00	0.00	0.00	0.00	0.00	NA	0.00
Development of infrastructure of district, subdivisional and other hospitals under BRGFS	NA	0.12	0.00	0.22	NA	NA	0.11
Establishment of i.c.d.s. project [cw]	0.17	0.22	0.14	0.26	0.28	0.39	0.24
Grant to panchayat bodies as per recommendation of third state finance commission (glb) [pn]	0.56	0.20	0.21	0.21	0.12	0.19	0.25
Grants to urban local bodies as per recommendation of third state finance commission (glb) [ma]	0.18	0.16	0.17	0.09	0.12	0.13	0.14
Implementation of Kanyashree Prakalpa	0.44	0.67	0.66	0.77	0.80	0.73	0.68
Medical care facilities in rural population (bms) [hf]	0.11	0.12	0.17	0.21	0.09	0.16	0.14
Nutrition programmes under DFID assisted HSDI project (eap)	0.08	0.00	NA	NA	NA	0.01	0.03
Provident fund schemes for unorganised workers in urban and rural areas [lb]	0.09	0.09	NA	0.12	0.06	0.00	0.07
West Bengal urban employment scheme [ma]	0.20	0.16	NA	0.11	0.10	0.09	0.13
SwasthyaSathi	NA	NA	NA	0.23	0.02	0.21	0.15
Green revolution	NA	NA	NA	0.40	0.00	0.28	0.23
Backward region grant (special) funded by the state	NA	NA	NA	NA	0.02	NA	0.02
Construction/reconstruction/repair etc. of food storage godowns and allied works	NA	NA	NA	NA	0.05	0.00	0.03
White revolution	NA	NA	NA	NA	0.03	0.00	0.01
Environment, forestry and wildlife	NA	NA	NA	0.00	0.07	0.05	0.04
Conservation of natural resources and ecosystems	0.00	0.00	0.00	NA	NA	NA	0.00
Total	12.69	11.49	12.98	11.41	10.11	10.91	11.60

NA: Not available.

Source: Finance Account of West Bengal (Appendix 5) for the year ended March 2021, Comptroller and Auditor General of India.

Appendix E.

E1. Construction of Malnutrition Indices

The first malnutrition index for children, denoted as MNIC is the geometric mean of three indicators (all transformed on a common scale from 0 to 1). These three indicators are: percentage of children under 5 years who are stunted (height for age), percentage of children under 5 years who are wasted (weight for height) and percentage of children aged 6-59 months who are anaemic. For constructing the second malnutrition index for women (MNIW), geometric mean of two indicators (both transformed on a common scale from 0 to 1) is taken. These two indicators are: percentage of women whose body mass index (BMI) is below normal and percentage of all women aged 15-49 years who are anaemic. Clearly, higher percentage of each of these five indicators of malnutrition for children and women mentioned above indicate worse performance. Therefore, taking 0 and 100 as the cases of best and worst performances respectively, each indicator, j is transformed on a common scale as under

$$MNI_j = \frac{MAXIMUM - ACTUAL}{MAXIMUM - MINIMUM}$$