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Background

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.

As per the report on 'The State of Food Security and Nutrition in the World', 2019(FAO, International Fund for Agricultural Development [IFAD], UNICEF, World Food Programme [WFP] and WHO, 2019), around 2 billion of the global population suffers from moderate to severe food insecurity. Despite India being self-sufficient in foodgrain production, it was home to the largest number of undernourished people in the world (24 per cent of the world population). As a proportion of India's own population, around 14 per cent of the total population was undernourished during 2016-18. India also accounts for the highest proportion of stunted (31 per cent) and wasted children (51 per cent) worldwide (FAO, IFAD, UNICEF, WFP and WHO, 2019). The main victims of undernourishment are poor, especially young children, pregnant and lactating mothers. Since the nutritional status of women has a direct impact on the nutritional and health status of a child, the food and nutritional developments aimed at improving the diets of women especially of reproductive age is crucial to end the cycle of hunger and malnutrition (Jose et al., 2020).

There are a number of welfare schemes run by the Government of India as well as by various State governments on their own aiming at improving the food and nutritional status of people in the country, including Mid Day Meal Programme, Anganwadi services under the Integrated Child Development Scheme and subsidised foodgrains through the targeted public distribution system under the National Food Security Act, 2013. More recently, the central government launched the National Nutrition Strategy (2017) which aims to reduce the prevalence of underweight children (0-3 years) by three percentage points every year by 2022 from NHFS 2015-16 estimates.[2] Additionally, the National Nutrition Mission (NNM), also known as POSHAN Abhiyan aims to reduce stunting and underweight and low birth weight,

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

[2]https://pib.gov.in/newsite/printrelease.aspx?relid=174442

each by 2% per annum; and anaemia among children, adolescent girls and women, each by 3% per annum by 2022.[3] However, the Global Burden of Disease Study 1990–2017 has estimated, if the current trend continues, India would fall short of achieving the targets of stunting, underweight and low birth weight under NNM by 2022 (Institute for Health Metrics and Evaluation [IHME], 2018).

Clearly, the piecemeal efforts of all those concerned have not been able to bring significant improvement in nutritional status of the population.Accordingto the **Global Food Security Index (GFSI) - 2020**, India stood at the 71st position among a total of 113 countries.[4]As per NFHS-V (2019-21) (Government of India, 2021), in India, 36 per cent of children under age 5 years are stunted, 19 per cent are wasted and 32 per cent are underweight. On the other hand, 18.7 per cent women have less than normal body mass index (BMI<18.5kg/m^2). The alarming situation in terms of high prevalence of anaemia (along with large interstate disparities) is also observed. There has been in fact 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. 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).

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 the findings of NFHS-5, 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 States[5] of India has

[3]https://www.india.gov.in/spotlight/poshan-abhiyaan-pms-overarching-scheme-holistic-nourishment

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

[5]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.

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. 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. 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.

It is clear from the trends discussed above that 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 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.

Brief Survey of Literature

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."

There exist ample studies analysing the determinants of food and nutrition security in India and abroad. 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 prices and raises incomes, mainly of the deprived smallholder farmers in different countries irrespective of their level of development. On the nexus between food and nutrition security and economic development, studies are divided and various channels have been explained to understand this nexus. Authors like Brumm (1996), Arcand (2001), Jenkins and Scanlan (2011), Soriano and Alberto (2016), etc. have explained positive linkage between food security, nutrition and economic growth via lag effects, human capital, industrialisation, urbanisation, etc. 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 policyfocus 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. The role of government intervention in improving food and nutrition situation has been emphasised by Timmer (2000). Takeshima et al. (2021) highlighted the role of public expenditure in affecting food and nutrition security.

There is widely scattered literature assessing food and nutrition security in case of India.[6] 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

[6] See, for example, McKay et al. (2023) for a survey.

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 percent would significantly decline the incidence of stunting and underweight respectively by 0.5 and 0.6 percent among children and about 0.4 percent in case of adults underweight, after controlling for state dummy.

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 Pati (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 reduce the immunity power at alarming rate to protect several diseases.They suggested different measures for reduction of malnutrition problem for pre- school children.

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 (Kumar et al., 2018). 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 (see, for example, Sanadgol et al., 2022; Chanani et al., 2018; Sharma et al., 2010; etc.). Some Studies like (Fanzo et al., 2021; Save the Children, 2017; Smyth et al., 2021)have explored the role of public private partnership (PPP) in food and nutrition sector. A few of them have also examined various challenges faced in the implementation of PPP in this sector.

Research Questions, Objectives and Hypotheses

The brief survey of literature presented above indicates the dearth of literature in the Indian context examining the role of the public and private stakeholders in a comparative perspective for food and nutrition sector. The present thesis, therefore, attempts to address the following four research 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?

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.

Methodology and Data Sources

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. Finance Accounts of West Bengal (for various years), released by Comptroller and Auditor General of India (CAG) have been mainly relied upon for disaggregated government expenditure categories. This has been supplemented by the Estate database on State Finances, a Study of Budgets, released by the Reserve Bank of India for aggregate government expenditure items for all States as well as government revenues and deficit indicators of West Bengal. The gross State domestic product (GSDP) and consumer price index (CPI) series have been obtained from the website of the Ministry of Statistics and Programme Implementation, Government of India. Data on State-wise population has been obtained from the report on Population Projections for India and States – 2011-2036, Ministry of Health and Family Welfare, Government of India.

Tables and graphs (line, and bar charts, in particular) have been used to represent the trends. Alternate specifications of fractional regression in Probit framework, under a panel setting have been estimated 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 [https://ngodarpan.gov.in], 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 [https://www.pppinindia.gov.in/] is relied upon, supplemented by very limited access to the CAPEX database of the Centre for Monitoring the Indian Economy (CMIE). 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.

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. 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. For example, while the cost-effectiveness of water supply projects under the traditional and PPP modes could be assessed with limited scope, the same assessment could not be done for time-effectiveness. Further, what makes these projects more effective in mode compared to the other mode could not be identified due to the lack of data on many important variables.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.

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.

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