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Mid-day Meal scheme in India: Current status, critical issues and Challenges

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Abstract

This piece of work examines the impact of the midday meal program on body mass index using secondary data on several Indian states. India has implemented the Mid-day Meal Program to improve the enrollment, attendance, retention, and academic success of school-aged children. A significant portion of schoolchildren from lower socioeconomic categories rely on cooked midday meals. When it comes to the pattern of midday meal consumption, girls outnumber boys among those who never ate it and those who stopped eating it, but when it comes to those who maintained eating it, boys outnumber girls. Less youngsters who take use of the midday meal the higher their academic grades are. The majority of kids are underweight (have a low body mass index), and boys make up a larger percentage of the underweight kids than girls do. When compared to children who are Above Poverty Line (BPL), a greater percentage of youngsters who fall into the Below Poverty Line (BPL) group have low body mass indices. To meet the goals of the Mid-day Meal Scheme, it is important to avoid repetition of the roughly same sort of meal menu.

Keyworsd: Current status, critical issues, Challenges

INTRODUCTION

The Mid-Day Meal Program, often known as the school lunch program, aims to provide one meal out of the three meals for a student in the school, as well as at least one third of the recommended daily allowance of calories and half of the recommended daily allowance of protein. The meal should be able to fill the nutrient gap in children's meals in low socioeconomic communities. Children who are healthy are better able to attend school and learn than those who are ill or malnourished (World Bank, 2014). Most children from low socioeconomic backgrounds are malnourished, and they leave school more frequently, which has a direct impact on how they develop as people and indirectly on how the country develops its human capital. Poor

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socioeconomic situations, child labor, and a lack of desire are all factors that contribute to low enrollment and a higher school dropout rate, according to Ayeni and Adelabu (2012). The goal of the mid-day meal program was to have two effects: (i) lower the cost of education by offering free meals, which would increase enrollment, attendance, retention, and educational attainment; and (ii) improve learning abilities of children by providing additional nutritional support, as malnutrition, anemia, and deficiencies in vitamin A and iodine are all very common among children in India. Additionally, by providing a shared dining space for various socioreligious and economic groups, the Mid-day Meal Scheme also attempted to achieve social fairness.

Food< Nutritional and Calorific norms under MDMS		
Items	Primary(I-V)	Upper Primary (VI-VIII)
A. Nutritional Norms (Per Child per day)		
1. Calorie	450	700
2. protein	12 gms	20 gms
B. Food Norms (Per child per day)		
1. Food-grains(rice/wheat)	100 gms	150gms
2. Pulses	20 gms	30 gms
3. vegetables	50 gms	75 gms
4. oil & fat	5 gms	7.5 gms
5. **6. Salt & Condiments**	As per need	As per need
7. Micro-Nutrients	Adequate qualities of micro-nutrirnts like iron, folic acid , vitamin-A etc . in convergence with NHM	

According to a recent World Health Organization report, there are 178 million undernourished children worldwide. Of these, 20 million (or 11% of the total) are severely malnourished (Humbwavali, Giugliani, Nunes, Dalcastagnê, & Duncan, 2019). Eighty percent of the world's undernourished people live in 20 nations, and India is home to about 60 million of them (Yadav et al., 2016). Due to its high population growth rate, inadequate food intake, and poor dietary quality, India's malnutrition situation has become problematic. As a result, the country currently ranks 102 out of 119 countries in the global hunger index (Murarkar et al., 2020;

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Patidar, 2019). Additionally, malnutrition is a factor in more than 50% of all childhood mortality in India (Yadav et al., 2016). Therefore, a key step in eradicating hunger and malnutrition will be a food security strategy that focuses on children (Lentz, Barrett, Gomez, & Maxwell, 2013). One food intervention to combat hunger and malnutrition is the school feeding program. In order to improve child survival and reduce malnutrition, school feeding programs have been implemented in a number of nations (Neervoort et al., 2013). According to Jomaa et al. (2011), the majority (more than 70%) of low- and middle-income nations have started this initiative. The National Programme for Nutritional Support to Primary Education (NP-NSPE), a social safety net program in India, introduced the school feeding program in 1995 with the goal of improving the nutritional status of school-going children in order to increase their enrollment, retention, and attendance (Agnihotri, 2010). Later, the program became known as the Mid-Day Meal (MDM) program. The first state to apply it in India was Madras in 1925 (Si & Sharma, 2008). Since then, other states have followed suit. With 11.59 crore children enrolled, it is the largest nationwide program in history.

According to studies by Powell, Walker, Chang, and Grantham-McGregor (1998), Murphy et al. (2003), and Van Stuijvenberg (2005), the school feeding program has a positive influence on nutritional achievement in both industrialized and developing nations. Anitha et al., 2019, Laxmaiah et al., 1999, Patel, Patel, Chiplonkar, Khadilkar, & Patel, 2016, among others, conducted studies to evaluate the impact of MDM (India's school feeding program) on nutritional status taking into account body mass index, total calorie consumption, and protein content. It is clear from the aforementioned literature that studies regarding the impact assessment of school feeding programs on nutritional status are biased in favor of developed states, and the nutritional benefits received by children under the MDM scheme taking into account a variety of nutrient contents in a backward state in general and Odisha in particular is sparsely investigated. In order to close the aforementioned glaring gap, this study attempts to evaluate the nutritional advantages of the MDM program in Odisha. Odisha is also considered a backward region due to the high rates of hunger and food insecurity (Mishra, Mishra, Baitharu, & Das, 2020), making it the ideal choice for a case study and a potential contribution to the body of literature.

The Mid-Day Meal Scheme (MDMS) is a significant initiative in the elementary education sector that works to increase student retention and enrollment among children (6–14 years old). In 2012–13, 57.7 percent of primary schools had MDMS coverage; by 2017–18, that number had risen to 62.9 percent, an increase of 5.0 percentage points. In both 2012–13 and 2017–18, the

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coverage of MDMS at the upper primary level remained essentially constant at 57 percent.

State-wise Number of Children Enrolled under Mid-Day Meal Scheme (MDMS) in India (2018-2019 to 2020-2021)			
States/UTs	2018-2019	2019-2020	2020-2021
Andaman & Nicobar Islands	32337	31115	31115
Andhra Pradesh	3003654	2961814	2961814
Arunachal Pradesh	167565	160977	160977
Assam	4263752	4320767	4320767
Bihar	18095158	17239412	17239412
Chandigarh	95334	93762	93762
Chhattisgarh	3041123	2909916	3396887
Dadra & Nagar Haveli and Daman & Diu	61694	63274	74293
Delhi	1626379	1604505	1604505
Goa	161693	161495	181376
Gujarat	5488319	5172288	5172288
Haryana	1491169	1447990	1447990
Himachal Pradesh	509804	497774	497774
Jammu & Kashmir	9415541	887033	887033
Jharkhand	4402797	4180954	4180954
Karnataka	4632909	4511680	4511680
Kerala	2728751	2785523	2785523
Ladakh	-	16577	16577
Lakshadweep	7481	7290	7290
Madhya Pradesh	6809497	6664246	6664246
Maharashtra	10788967	10692617	10692617
Manipur	171169	169803	169803
Meghalaya	716078	592325	592325
Mizoram	136951	131849	131876
Nagaland	168338	159710	159710
Odisha	4641593	4513758	4513758
Puducherry	56516	48427	48427

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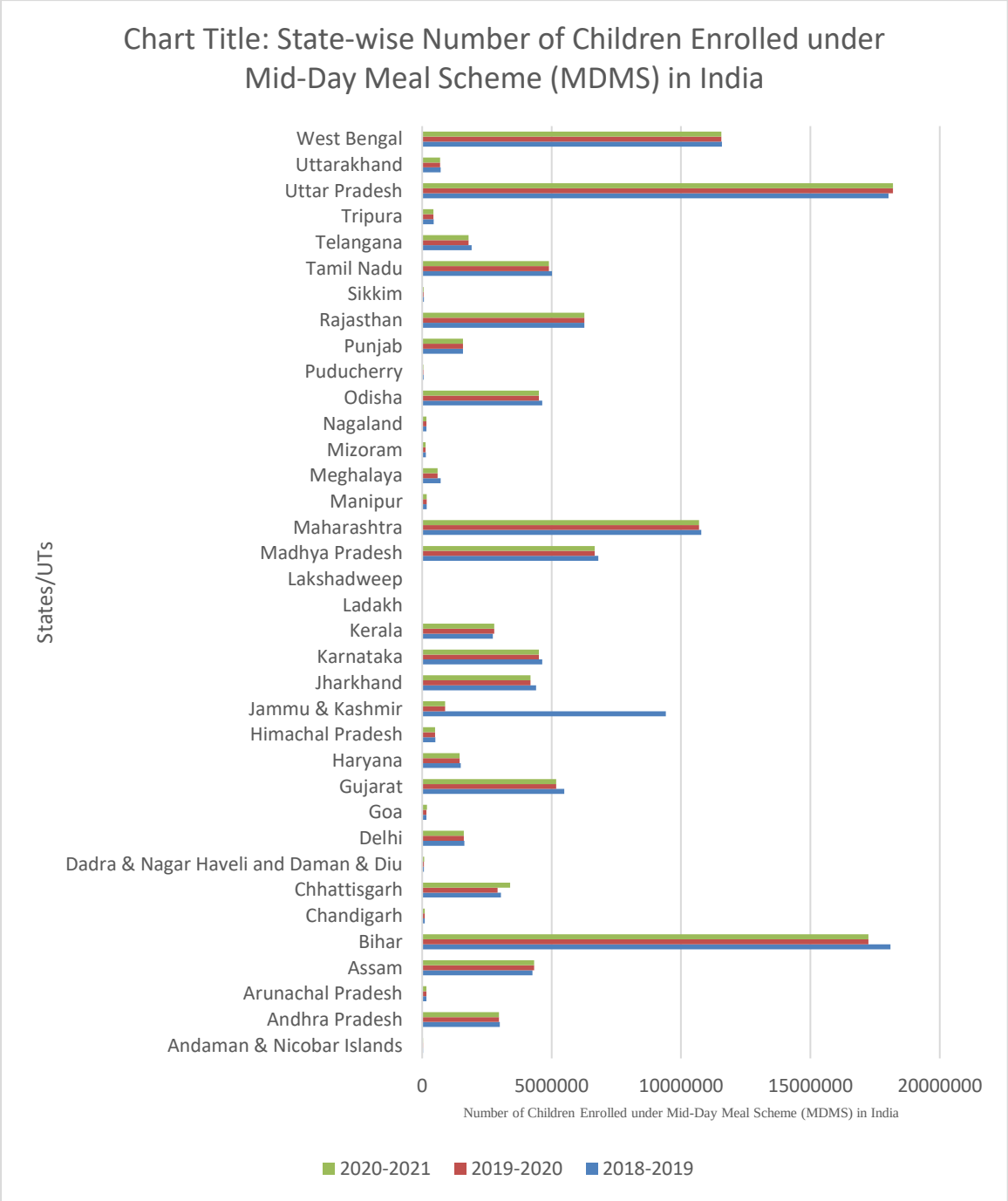
Punjab	1574441	1574443	1574443
Rajasthan	6265346	6267136	6267136
Sikkim	60691	55905	55905
Tamil Nadu	5010783	4900596	4900596
Telangana	1913868	1795956	1795956
Tripura	446226	432279	432279
Uttar Pradesh	18019846	18193664	18193664
Uttarakhand	716910	689306	689307
West Bengal	11579246	11562465	11562465
India	119827939	117498631	118016530

Note: [1]: Including Ladakh.

Source: Lok Sabha Unstarred Question No. 1020, dated on 26.07.2021.

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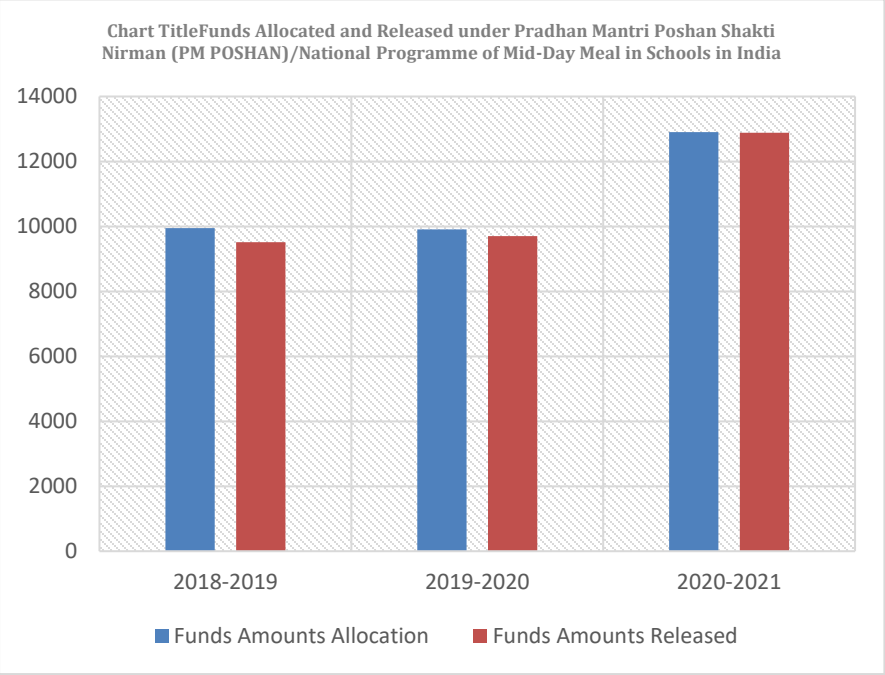
The Mid-Day Meal Scheme (MDMS) is a crucial intervention in the elementary education sector to encourage increased enrollment of students in the age range of 6 to 14 years and their retention in the classroom. The program has important effects on socioeconomic fairness and the children's nutritional status as well. In India, midday meals in schools have a lengthy tradition. A Mid-Day Meal Program for underprivileged kids was launched in Madras Municipal Corporation in 1925. By the middle of the 1980s, a prepared mid-day meal program for primary-aged students had been universalized in three states (Gujarat, Kerala, Tamil Nadu, and the UT of Pondicherry). By 1990–1991 there were 12 states (Goa, Gujarat, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Mizoram, Nagaland, Sikkim, Tamil Nadu, Tripura, and Uttar Pradesh) that were universally or extensively executing the Mid-Day Meal program with their own resources. The program was being carried out in three other states—Karnataka, Odisha, and West Bengal—using both state funding and outside support. Two more states (Andhra Pradesh and Rajasthan) were carrying out the program totally with aid from foreign countries. To provide a mid-day meal to the children enrolled in primary school, the central government finally established the National Program of Nutritional Support to Primary Education (NP-NSPE), also known as the Mid-Day Meal Scheme, on August 15, 1995. The government was ordered to offer cooked midday meals in all government-run and government-aided primary schools by the Supreme Court in 2002. It was become universal in 2005, encompassing learning centers as well as all primary schools. In October 2007, the program's reach was expanded to include students in upper elementary classes, and its name was changed to the National Program of Mid-Day Meal in Schools. The central and state governments will split the expense of MDMS in a 60:40 ratio starting in 2015–16. The recommendations specify the nutritional content of the mid-day meal in order to fulfill the scheme's goals (Table 11.22).

Funds Allocated and Released under Pradhan Mantri Poshan Shakti Nirman (PM POSHAN)/National Programme of Mid-Day Meal in Schools in India		
(2018-2019 to 2020-2021)		
(Rs. in Crore)		
Year	Funds	Amount
2018-2019	Allocation	9947.74

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	Released	9518.08
2019-2020	Allocation	9912.21
	Released	9705.94
2020-2021	Allocation	12900
	Released	12882.11

Source: Lok Sabha Unstarred Question No. 2912, dated on 21.03.2022



Budget Estimates, Revised Estimates and Actual Expenditure under National Programme of Mid-Day Meals in Schools of India			
(2011-2012 to 2013-2014, 2019-2020 and 2020-2021)			
(Rs. in Crore)			
Year	Budget Estimates	Revised Estimates	Actual Expenditure
2011-2012	6514	6341.67	6166.45

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2012-2013	6927	6662.76	6628.9
2013-2014	7976	7110.77	6413.54
2019-2020	11000	-	-
2020-2021	11000	-	-

Source: Lok Sabha Unstarred Question No. 3393, dated on 01.08.2014 & Rajya Sabha Unstarred Question No. 2630, dated on 17.03.2020.

In accordance with the national policy, the Center must provide foodgrains at no cost to the states, who are responsible for paying for other ingredients, labor, and infrastructure. However, implementation was sporadic in the beginning. Fewer states choose to participate in the program due to various financial restrictions. Instead, they provided dry rations to the students. The initiative must be implemented in public and government-aided primary schools, according to a Supreme Court directive issued in November 2001. The upper primary (6th to 8th standard) level was added to the program in the 2007/08 Union Budget. The 11th Five Year Plan had an outlay of Rs 48,000 crore, whereas the financial allocation for 2012/13 was Rs 11,937 crore. The project has received major support from the government. At the elementary and higher primary levels, the program currently covers roughly 72% of children nationwide. The coverage is around 100% in states like Kerala and Goa. But in certain states, implementation is still difficult. Some of the states with coverage levels below the national average are Bihar, Chhattisgarh, Uttar Pradesh, Gujarat, and, unfortunately, Tamil Nadu. However, the Planning Commission's Approach Paper for the 12th Five Year Plan (2012–17) provides some insight into its effectiveness. The percentage of children who are not enrolled in school for the age range of six to 14 years in all of rural India has decreased from 6.6% in 2005 to 3.5% in 2010, according to the study. In the age group of 11 to 14 years, the percentage of girls who were not enrolled in school decreased as well, from 11.2% in 2005 to 5.9% in 2010. There's food for thinking. The PM Poshan Midday Meal Scheme has a new name, but there are other changes as well. The noon meal program was created in 1995 with the intention of guaranteeing that all students attending public schools had at least one meal each day, especially those who were unable to obtain food at home. It also evolved into a program to increase school enrollment. The program is now being updated to broaden its scope. Education Minister Dharmendra Pradhan stated on Wednesday that the Cabinet has approved the PM Poshan program. The program has so far helped 11.80 billion beneficiaries (children) in 11.20 million schools nationwide. Through Balvatika, it will begin to provide coverage for an additional

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24 lakh individuals in the age range of 5 to 6 years who will now be enrolled in the official school system. The pre-school known as Balvatika was established in government schools last year in order to enroll children under the age of six in the formal educational system. With a budget of Rs. 1,30,794.90 crore, PM Poshan has been established for an initial term of five years (2021–22 to 202–26). The national government's portion is Rs 54,061.73 crore, and the state governments' portion is Rs 31,733.17 crore. The additional cost for foodgrains will be covered by the Center at a cost of Rs. 45,000 crore. The program continues to divide expenses between the Center and the States 60:40.

The introduction of eggs in mid-day meal schemes has been opposed by religious and caste groups that push for vegetarian meals in several states.

According to information shared by the education ministry with Lok Sabha on Monday during the ongoing budget session of Parliament, fourteen states and union territories (UTs) are providing eggs to school students from their own resources under the Pradhan Mantri Poshan Shakti Nirman (PM POSHAN) scheme. Out of the 14 states and UTs, six provide eggs once per week, four twice per week, two three times per week, Andhra Pradesh five days per week, and Tamil Nadu daily as part of midday meals. The PM POSHAN, formerly known as the mid-day meal scheme (MDM), is a centrally sponsored program that benefits 10.84 lakh public and government-aided schools and about 12.21 crore Bal Vatika and Class 1–8 students. According to the plan, a hot meal should provide 450 calories and 12 grams of protein for kids in primary classes (1–5) and 700 calories and 20 grams for students in upper primary courses (6–8). The state governments and UT administrations are ultimately in charge of delivering midday meals, and they also cover 40% of the expense. In order to satisfy the required nutritional content, the States and UTs set their menus based on local requirements. In response to inquiries from Nationalist Congress Party (NCP) MPs Amol Ramsing Kolhe and Supriya Sule, education minister Dharmendra Pradhan wrote in a written statement that "some States and UTs provide eggs as additional items with their own resources." The National Family Health Survey (NFHS)-5 statistics (2019–21) show that 30% of children under the age of five are underweight and that 27% of children under the age of five are stunted. Over 65% of infants aged six to 59 months have anemia. Over 65% of infants aged six to 59 months have anemia. Over 65% of infants aged six to 59 months have anemia.

The National Education Policy (NEP) 2020 claims that mornings can be made more productive by "providing a simple but energizing breakfast in addition to midday meals," noting

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that "Children are unable to learn optimally when they are undernourished or ill." In November 2022, Tamil Nadu became the first and only state to serve students breakfast in compliance with NEP 2020 requirements. Tamil Nadu was the first state to provide schools with lunch in 1982. According to information released by the Department of Public Instruction in January 2023, as of December 14, 2022, 38.37 lakh of the 47.97 lakh pupils enrolled in Karnataka government schools in Classes 1 through 8 liked eggs, 3.37 lakh preferred bananas, and 2.27 lakh preferred chikkis. The Karnataka government had carried out a pilot project between December 2021 and March 2022, as part of which eggs were provided under the midday meal program in seven districts. Religious authorities objected, but the state administration moved forward with the pilot project and decided on July 22 to expand the program statewide. Karnataka, however, was not included on the central government's list of states that provide eggs to schoolchildren. According to the Karnataka position document on NEP 2020, serving eggs and meat during school lunchtimes would lead to "lifestyle disorders" and "hormonal imbalance."

PM POSHAN Budget

The important midday meal program was incorporated into PM POSHAN in 2021. The total amount the national government had allotted for PM POSHAN in the fiscal year 2022–2023 was increased to Rs 12,800 crore from Rs 10,233.75 crore. To yet, the federal government has only given states and UTs a total of Rs 6,789.06 crore to implement the scheme. In order to finish FY 2022–23, there are only two months (February and March) left to release the remaining 53% of the RE, according to this. For PM POSHAN, the government has allotted Rs 11,600 crore in the union budget for 2023–24, 13% more than the BEs but 9% less than the REs for FY 2022–23. In comparison to BEs, REs for the plan in FY 2022–23 increased by 25%. Minister of State (MoS) for Education Annpurna Devi responded to inquiries about the funding given under the PM POSHAN scheme by stating that it was Rs 9,912.21 crore for the 2019–20 fiscal year and will rise to Rs 12,900.00 crore for the 2020–21 fiscal year. Funds allocated and released by central government to states

Year	2019-20	2020-21	2021-22	2022-23
Allocation (in Rs crore)	9,912.21	12,900	10233.75	12,800
Released Amount (in Rs crore)	9700.04	12874.01	10226.75	6,789.06*

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Difference between allocated and released amount (in Rs crore)	212.17	25.99	-7	6,010.94

* till January 2023

The federal government increased the material cost by 9.6% above and above the pre-existing material cost in October 2022, basing the revision on the Consumer Price Index (CPI). For Bal Vatika and Primary classrooms as well as Upper Primary courses, the updated material cost per day per kid is Rs. 5.45 and Rs. 8.17 as opposed to the old cost of Rs. 4.97 and Rs. 7.45, respectively. Vegetables, pulses, oil, condiments, and fuel are included in the material cost. "If inflation is considered, "PM POSHAN allocations in FY 2022-23 were 20% lower in real terms than the allocations made five years prior in FY 2017-18," according to an analysis by the Delhi-based think-tank, Centre for Policy Research's Accountability Initiative. As part of the program, Cook-cum Helpers (CCHs) receive an honorarium of Rs 1000 per month for 10 months in a year in exchange for cooking and serving hot meals at schools. Bengal's government calls the Center's study on the midday food program "one-sided." The West Bengal government criticized the panel from the Union Ministry of Education on Wednesday, saying it was "one-sided" and that the data "needs to be verified" because it found "serious discrepancies in the information submitted regarding the number of meals served at various levels." Following reports of anomalies, the Ministry of Education (MoE) established the "joint review mission" (JRM) in January to examine the implementation of the Centrally Sponsored Scheme PM POSHAN in West Bengal. The panel discovered that the local administration in West Bengal overstated the serving of almost 16 crore midday meals, which were served from April to September of last year and cost over Rs 100 crore. The commission also questioned the misallocation of food grains, cooking of rice, dal, and vegetables up to 70% less than "prescribed quantities," and use of expired packages of condiments. These actions were aimed to give compensation to fire victims. Bratya Basu, the minister of education for West Bengal, responded to the report by claiming that the JRM submitted it without the project director of the state-cooked midday meal program, a representative of the state government, signing it. "So what is the 'joint' in the joint review committee if he isn't even given the report to consider or share his comments on? Therefore, it is evident that the state's viewpoints have not been taken into account. We have already written the JRM chairman in complaint, but we have not yet heard back," Basu said in a statement. Basu questioned the purpose of this "hide and seek" and stated that the data that has been reported in the media needs to be checked if there is no malicious intent on the part of the state

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administration. It must be determined whether the JRM report accurately reflects the facts and whether the state government's opinions regarding the discrepancies have been taken into account, he said. According to Basu, the CAG performed an audit until February 21–22, but the state administration never received any feedback. Senior TMC MP Santanu Sen echoed him in calling the study "baseless" and an effort to discredit the state government. It's an effort to discredit the state government. Why does the state government representative's signature not appear on the report? This reveals the Center's vengeful mentality, he said. The state government came under heavy fire from the opposition BJP, which claimed that the TMC dictatorship had made corruption widespread in the state.The government of Mamata Banerjee is rife with corruption. Even the PM Poshan funds were not spared by her government. The state and the center conducted a joint assessment, and they discovered that WB diverted 100 cr for other uses! The feeding of children was inadequate. Cuts in supply. Amit Malviya, a senior member of the BJP and co-in charge of West Bengal, tweeted that LoP @SuvenduWB had filed a complaint. Last year, West Bengal overreported midday meals by more than Rs 100 crore, according to the Center.

Flow of funds allotted for food

The team also looked at the flow of funds from the state to schools or implementing organizations, the scope of the program, the management structure at the state, district, and block levels, the method by which the state delivers food to schools, the development of kitchen-cum-stores, and the acquisition or replacement of kitchen appliances, among other things. Delhi's unschooled, underprivileged children who rely on midday meals look at their empty plates and uncertain future. The percentage of severely stunted children is highest in Delhi (11.7%). In line with the findings of the Urban Hunger and Malnutrition (HUNGaMA) study, which was published in February 2018, Arvind Kejriwal, the chief minister of Delhi, and Manish Sisodia, the deputy chief minister, introduced a program to provide dry ration kits in place of midday meals on December 29 in Mandawali, an area of east Delhi that is part of Sisodia's Patparganj Assembly district. Wheat, rice, lentils, and oil were all included in each kit's provisions for a six-month supply. In order to replace the midday meals while the school was under lockdown, Kejriwal said, "We tried to provide an allowance in the students' bank accounts. However, now we are starting to distribute dry-ration to students." Even though the program will continue until the schools reopen, Sisodia acknowledged that depriving kids of lunch has had a significant negative impact. According to Sisodia, "many families were struggling to put enough food on their plates." "Massive

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unemployment brought on by COVID-19 has made the problem worse. The notion to distribute rations rather than transfer money was put forth by the chief minister. We now provide dry rations to more than eight lakh pupils in government and government-aided schools in Delhi as a result. Midday meal has been called PM Poshan as the Center broadens the program's reach. The program has undergone a number of different modifications, such as the inclusion of local women, encouragement of gardening, cooking competitions, and a focus on providing micronutrients for schools, particularly anemic children.

The PM Poshan Shati Nirman Scheme has replaced the National Programme for Mid-Day Meal in Schools, often known as the Mid-Day Meal Scheme. The program will now provide hot, cooked lunches to Balvatikas or pre-primary classes as well. Prior to then, only pupils in grades 1 through 8 were eligible. In 11.20 lakh schools, this is anticipated to help about 11.80 crore students. The program has undergone a number of different modifications, such as the inclusion of local women, encouragement of gardening, cooking competitions, and a focus on providing micronutrients for schoolchildren, particularly anemic children.Over a five-year period, the Indian government will pay Rs 99,061.73 crore, which includes the price of food grains for PM POSHAN. According to Union Education Minister Dharmendra Pradhan, the introduction of Tithi Bhojan, social audits, school nutrition gardens, and various other initiatives will aid in the efficient implementation of the program and improve learning and nutritional outcomes. "PM POSHAN will involve FPOs and women SHGs in the implementation of the scheme to support Vocal4Local and fulfill the goals of the Aatmanirbhar Bharat initiative," stated Pradhan. The national scheme will continue for another five years, with funding from the federal government and state governments totaling Rs 54,061.73 crore and Rs 31,733.17 crore, respectively. The additional cost of Rs. 45000 crore for food grains will also be covered by the central government. Bringing the overall budget for the scheme to Rs. 1,30,794.90 crore. Ande khao roz? Why it has been controversial to include eggs in Karnataka's mid-day meals. Malnutrition is a widespread issue in India, particularly among youngsters. The Karnataka Bharatiya Janata Party (BJP) government intends to expand its idea of distributing eggs in mid-day meals in more schools around the state beginning with the following academic session in an effort to combat it. Beginning in December 2021, eggs were served in seven "backward" districts of north Karnataka as part of the experimental program. According to The Indian Express, the BJP now wants to expand this program to include more schools. Fruits and other options would be made available for kids who don't eat eggs. The introduction of eggs by the Karanataka government, a great source of protein and other essential elements, should be

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applauded in a nation where more than 33 lakh children are undernourished. On the contrary, though. The idea is currently awaiting state government permission, but it is being opposed by a number of religious groups, including the powerful Ligayats and the Jains. The politics vs nutrition argument first surfaced in Karnataka in 2021, but other states have also experienced it in the past. We examine the benefits of midday meals, the requirement for better nutrition, and the ongoing controversy surrounding it.

POLICY RECOMMENDATION

Hidden Food Safety Attributes1-gram grains were soaked in 10 ml of demineralized, double-distilled glass water for 10–15 minutes in order to estimate the amount of uric acid, a sign of rodent activity, on the surface of the grains. The presence of uric acid was then determined in these water samples using Jaffe's reaction, which created a blue color that was detected at 680 nm using a spectrophotometer. Aflatoxins were detected in both cooked and uncooked samples using thin layer chromatography. After activating at C for an hour, silica plates were made and coated with a chloroform extract of food samples. After experimenting with various solvent systems, it was discovered that Methanol: Chloroform (95:5) produced the best results for the separation and identification of Aflatoxin bands.

Nutritional Attributes: We measured total fats using the gravimetric technique. To remove the entire fat, petroleum ether was utilized. Grams per cent (gm%) were used to denote the total weight. Bradford's technique was used to calculate total proteins, which were then expressed in gm%. In an extraction buffer containing phenyl methane sulfonyl fluoride (PMSF), proteins were extracted. Food ingredients were ignited in crucibles to produce ash samples of various food items, cooked as well as uncooked grains, at relatively high temperatures.

Screening and Selection of Food Item as the Replacement

According to Gopalan et al. (2018), it is clear that vegetables, pulses & legumes, and cereals are excellent suppliers of Zn and Ca. As a result, the restructure should be based on selecting one food item from each of the three categories mentioned above. The highest Zn content foods were discovered to be betel leaves among green vegetables, cow pea among pulses and legumes, and pearl millet among cereal grains. Additionally, among cereal grains, horse gram, pulses & legumes, and leafy vegetables, fetid cassia was shown to have the greatest Ca concentration (Gopalan et

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al., 2018).

Other Recommendations

The pamphlet also makes the suggestion to construct a curry using the same quantity of veggies that were used to produce dalma. The research also advises developing guidelines for including vegetables that should be based on their nutritional value. That suggests that schools should offer students a variety of vegetables to use in vegetable curry while taking into mind their nutritional value. In this regard, the minimum recommended daily allowance (RDA) for vegetables for elementary students is 2 grams of carbohydrate, 1.2 grams of protein, 0.1 grams of lipids, 12 grams of energy, 0.25 mg of iron, 8 mg of magnesium, 1 mg of zinc, and 15 mg of calcium. For upper elementary kids, vegetables should contain a minimum of 3 grams of carbohydrates, 1.5 grams of protein, 0.15 grams of lipids, 20 grams of energy, 0.5 milligrams of iron, 12 milligrams of magnesium, 0.15 milligrams of zinc, and 15 milligrams of calcium. The report advises giving a list of veggies with their nutritious contents to all the MDM operating schools in this situation to make it easier for instructors to choose vegetables based on nutrient content. The next important considerations are how much more money will need to be spent on giving red gram and how much nutritional benefit the kids will receive after the suggestion for policy reform. The cost benefit analysis (CBA), which reveals the ratio of an intervention's incremental cost to its benefits while taking into account all unstated costs and advantages, is included in the paper to aid in comprehension.

Cost-Benefit Analysis for the Policy Restructuring

Cost

Except for the pulses, there won't be any changes, as was already mentioned. As a result, the only additional cost associated with policy restructuring will be the cost of pulse. Inquiries were made in the five municipal corporations of Odisha to determine the price disparities between red gram and horse gram, and the results show that the price of horse gram is 20–30% higher than the price of red gram. Therefore, for elementary and upper primary pupils, the government must spend an additional INR 1.47 (30% of 4.93) and INR 2.19 (30% of 7.32) correspondingly.

Benefits

What nutritional benefits the children would receive with the higher expense of INR 1.47 and INR 2.19 is the main concern. In response to the aforementioned query, the study argues that

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substituting horse gram for red gram in MDM (with the same quantity) will increase the Ca content for primary children by 97%, Zn content by 70%, iron content by 31%, and protein content by 40%. If horse gram is substituted for red gram, the Ca, Zn, iron, and protein levels for upper primary kids will increase by 93.4%, 48.9%, 31.4%, and 35.6%, respectively.

CONCLUSION REMARKS

The research study explicitly states that mid-day meals have a positive impact on student enrollment, attendance, and dropout rate, which is crucial for ensuring universal access to elementary education, especially in rural areas where the rate of illiteracy is high due to wastage, stagnation, and other related causes. The study found that mid-day meal programs are crucial for lowering dropout rates and raising enrollment. A substantial correlation between the mid-day meal program and student enrolment and dropout rates was found by the chi-square test, according to the results. The outcome of the multiple regression model also showed a favorable relationship between lunchtime meals and student enrollment and dropout rates. Other advantages of the mid-day meal program, aside from enrollment and dropout rates, include the elimination of hunger in the classroom, the development of healthy eating habits, the reduction of malnutrition, and the development of physical and social fairness. However, in order to achieve satisfying results, the government and relevant authorities should exercise extreme caution in order to fulfill the scheme's fundamental goals. The purpose of the current study was to evaluate the nutritional advantages that the children in Odisha obtained from the meals provided under the MDM program. According to the report, the government distributes food in accordance with a weekly plan. The nutritional value of the food was evaluated using nutrients including carbohydrate, protein, fat, and total calories as well as calcium, iron, zinc, and magnesium. The food's nutritious level was found to be lower on Monday and Thursday (the days when rice and dalma are served) than on other days. This was brought on by the lack of instructions for how to prepare dalma with the veggies and pulses. Additionally, the study advises changing the red gram on Monday and Thursday to horse gram and advocates making a vegetable curry with the veggies that were previously used to make dalma because of their nutritious value. Additionally, it was discovered that substituting horse gram for red gram would result in an overall increase in nutrients at a roughly additional cost of INR 1.47 for basic kids and INR 2.19 for upper primary students. To overcome the aforementioned problems, we propose certain adjustments. One choice is to work with private organizations, which are expected to prepare food in accordance

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with specified hygiene standards. The quality of cooked meals may be periodically checked by food inspectors. Additionally, snacks like chikki, sukhdi, an occasional nutrition bar, and/or fruits like bananas on some days could be given in addition to meals. This will provide the kids more variety and guarantee their nourishment. Nutrition bars may be delivered by food goliaths like ITC through a public-private collaboration. Delivering packaged goods in place of some loose grains could increase supply chain accountability. In the near future, the use of GM food grains with nutrient enhancements, like Golden Rice, may be taken into consideration for midday meals.

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