

Original Article

Food Security and the Public Distribution System among Tribal Populations: A Study of Sonbhadra District

Amit Kumar Patel¹, Prof.Sanjay Kumar Singh²

¹Research Scholar, Uttar Pradesh Rajarshi Tandon Open University, Prayagraj

²Uttar Pradesh Rajarshi Tandon Open University, Prayagraj

Email: krarchanapatel1991@gmail.com

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Abstract

Food security is a significant issue in India particularly in the tribal groups who are still struggling with severe nutritional problems. Over a fifth of the population of the Sonbhadra District is of Scheduled Tribes. Through forest produces and small-scale farming, most of these families earn their living. They are been assisted by the Public Distribution System (PDS) which supplies them with subsidized grains, yet, the distance and lack of connectivity make it difficult to access it. The given paper will examine the PDS effectiveness in enhancing food security in Sonbhadra. It is examined based on the Census 2011, NFHS-5 (201921), the Uttar Pradesh Food Department, and NITI Aayog reports and GIS mapping platforms, such as Bhuvan and OpenStreetMap to indicate disparities. The coverage of PDS is low in places like Dudhi with only an estimated four out of five households being covered by a PDS within a radius of five kilometers. Prior to a transition to the digital systems, the supply leakages were between 15 and 20 percent. The things are a bit better now due to the electronic point-of-sale devices, yet the image is still unequal. The level of malnutrition remains serious with stunting prevalence at 44.5 percent among children below the age of five years old. PDS grains are supplying approximately 30-40 percent of the daily calories in lean seasons. Nevertheless, biometric problems in poorly connected zones continue to cut off access to many. The research suggests mobile ration vans, GIS based targeting, and enhanced interconnection of PDS and ICDS services. The PDS is still critical but flawed. Reforms that are conducted at a local level are required to make sure that the tribal households are able to achieve permanent access to food and nutrition.

Keywords: Food security, tribal nutrition, PDS, NFSA, ICDS.

Introduction

Background of the Study The FAO definition of food security of 1996 is not solely limited to the question of whether one has enough to eat. It also comprises the affordability, healthiness, and the consistency of food. In India, undernutrition is still a major issue affecting more than 190 million citizens, which is a reminder of the fact that food insecurity is not merely a matter of shortage but structural inequality. The Indigenous and tribal communities address a different range of issues. A lot of them rely on forest yields or shifting agriculture, and such inherited systems do not fit the contemporary food supply lines very well. Indians constitute approximately 8.6 percent of the total population in tribal groups which amounts to almost 104 million persons according to census of 2011 and suffer chronic malnutrition and seasonal deficiencies. The National Food Security Act (NFSA, 2013) was supposed to close the said gaps by ensuring access to food, which was a legal right. This is centred on the Public Distribution System (PDS) that currently assists in distributing up to 60 million tonnes of subsidized grains annually. The notion is based on the theory of entitlement presented by Amartya Sen: individuals should not merely possess their right to food, but to obtain it. However, the PDS can hardly reach everybody in tribal regions as the terrain is difficult and infrastructural presence is low. It will be important to observe the working of this system at the ground level through local studies.



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Address for correspondence:

Amit Kumar Patel, Research Scholar, Uttar Pradesh Rajarshi Tandon Open University, Prayagraj

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Sonbhadra District Profile. Sonbhadra is located in the south of Uttar Pradesh, on an area of approximately 6,905 square kilometers of Vindhya highlands. The landscape is hilly, and it contains plateaus, rivers, and thickets-almost 42 percent of the land is forested. The district borders four states Madhya Pradesh, Chhattisgarh, Jharkhand, and Bihar. It is largely rural with 83 percent of its 1.86 million inhabitants residing in villages. Scheduled Tribes comprise approximately 20 percent of the population- the largest fraction of the state. The overall literacy rates stand at 64 percent and in the rural regions, the per cent is 59. Poverty is still high with an estimated 42 percent of families being poor. The majority of tribal families are found at the border of forests, where they rely on seasonal forest products, small pieces of millet and pulse crops. The Baiga, which is a Particularly Vulnerable Tribal Group (PVTG), has a population of approximately 30,000. There are also other tribes like the Gond, Kol, Chero and Agariya that are the last tribe which is known to have traditional skills of ironworking. Their means of livelihood are not only flexible but they also demonstrate how vulnerable their access to resources has been.

Need for the Study

Districts such as Sonbhadra dominated by tribe are the ones that have the hardest time to deal with. Remote villages are also inaccessible, frequent delivery of food is usually late. Dislocation of land and lack of prospects of employment have further reduced families to become reliant on rationed grain. The monthly 35 kilograms of PDS grain under the Antyodaya scheme is the life-line of many. However, the data provided by NFHS-5 indicates that child stunting in Sonbhadra has reached 44.5 percent which is significantly greater than the state average of 35.5 percent. One thing is evident in that statistic: the access to food is not converting into nutrition. This paper seeks to observe the performance of the PDS on the ground as stipulated by the National Food Security Act and the extent to which it actually boosts food resilience amongst tribal households.

Objectives of the Study

In this study, there are four primary things that it seeks to accomplish.

1. Determine the contribution of the PDS to food security of tribal families.
2. Map the distribution of PDS shops and outlets in the district in terms of fairness.
3. Evaluate the efficiency of the program coverage and delivery.
4. Locate the critical gaps and issues in order to propose viable reforms.

Research Questions

The paper poses some overall questions. To what extent has the PDS minimized the food shortage and hunger among the tribal population in Sonbhadra? Do we have ration shops evenly spread, so that everybody can afford them? What are the remaining barriers to access and correct use of food?

Review of Literature

Theoretical Framework

The concept of food security, as it was initially proposed, in 1996, by the FAO on its Rome Declaration, is quite simple in nature. It is about ensuring that people can always enjoy safe and nutritious food that is able to allow them to lead healthy and active lives. And behind such definition is a complex system. There are four primary factors of food security: availability, access, utilization, and stability. Food must be grown and brought (availability). People should have an opportunity to afford and access it (access). They must be capable of utilizing it in a good way by means of good health, hygiene and nutrition (utilization). And all of that must endure such shocks as droughts or price gouging (stability). Economist Amartya Sen altered the way in which the world perceived hunger. His entitlement approach (1981) held that famines do not occur due to lack of sufficient food, but due to the loss of efficiency to acquire it. He described the fact that the access is determined by what people own (endowments) and the ability to transform them into food or income on a larger system. It is based on this concept in India the Public Distribution System (PDS) was created; it is an artificial assurance of the government that food would not solely be at the mercy of the market.

The PDS was developed over time, as an evolution of war time rationing in the 1940s, to the existence of one of the largest welfare systems in the world. It was a constitutional right under the National Food Security Act (NFSA) of 2013. But problems linger. There are still a lot of tribes and remote regions that remain beyond the reach of effective markets. Even in those areas where people have food entitlements, they are unable to access them due to either distance or poor infrastructure or social barriers. There the separation between rights and reality is still large.

Previous Studies

The effectiveness of the PDS has been studied in a few studies in terms of its efficacy in India, particularly in relation to poor and marginalized populations. Dreze and Khera (2013) utilized NSSO 200910 data and discovered that the PDS enabled poverty gaps to decrease by almost a fifth in rural areas. They further demonstrated that the subsidized cereals reduced the food expenses of the poor by 10 to 15 percent. However, the leakage was close to 40 percent at the time due to corruption and misuse of ghost cards. Subsequent field surveys were carried out in Chhattisgarh and Tamil Nadu (Khera, 2011), which underscored the role of diversions that were reduced by reforms such as the e-POS machines and end to end tracking to approximately 10 per cent. That is a significant step forward, displaying the influence of

digitization as it should be handled. An ethnically oriented study provides a more detailed perspective. The ministry of tribal affairs (MoTA, 2020) discovered that 55 percent of tribal children below five years old are stunted, and it is directly related to forest dependency and the scarcity of traditional food sources. In a 2020 study, Chakraborty in PVTG communities of Jharkhand had found that almost half of the household diet in monsoons is PDS grains. It, however, also indicated that these grains do not compensate the lost micronutrients that will occur when the forest foods are lost. Sharma (2019) discovered in Bundelkhand that even though PDS coverage was 80 percent of Below Poverty Line households, the system was failing in remote, hilly districts, such as Sonbhadra, with 25 percent of rations lost due to a 2022 state audit. The statistics of the 2023 Aspirational Districts Programme by NITI Aayog describe the same picture. The Multidimensional Poverty Index (MPI) of Sonbhadra was 0.312, which ranked the region in the category of severe deprivation. The levels of food insecurity and child anemia at almost 68 percent are among the highest on Uttar Pradesh.

Research Gap

The bulk of the research done to date examines state or large-scale trends. Few studies even zoom on Sonbhadra and make use of spatial and GIS based mapping in order to comprehend tribal access to the PDS. This creates a crucial blind spot on how rugged and forested land forms the daily life of entitlement. This research will fill that vacuum by integrating nutrition data, NFSA performance reports and on-ground mapping to unveil the locations and causes of food insecurity that still prevails.

Study Area Description

Geographical Setting

Sonbhadra is a state situated at the border of four states, namely, Uttar Pradesh, Madhya Pradesh, Chattisgarh and Jharkhand. The soil in this place is boisterous and desolate with rocky plateaus and dense forests. When you go away to these villages you can soon find that a good number of people depend on the forest on anything. The rivers; Rihand, Son, and Kanhar are lifelines as well. Most farms however continue to wait until the rains come hoping that they will have a good monsoon annually. Drought? That's always a worry. Certain areas can hardly bring more than a ton or two of millet or pulses in one year. Numerous families are hidden away in hamlets that are virtually lost in the bushes. It is not easy to access them; the roads are curvy and fragmented or they are non-existent. Such a distance implies that even simple supplies such as the food in the ration shops take longer to arrive at certain settlements.

Demographic Features

In Sonbhadra, as per the last Census, there is a population of approximately 1.86 million people- slightly over half of them are men but what is more remarkable is that 83 percent of the people live in very small villages. In excess of 20 percent belong to Scheduled Tribes: communities with strong ties to these forests: Baiga, Gond, Chero, Kol, Agariya, etc. There are also tales that the Agariya have regarding their own people smiting iron in these hills. The literacy in the district is 64 percent, but you can sense that the difference lies in the villages, and reading and writing do not necessarily translate into work or chance. People are hardly able to make ends meet, and approximately 42 percent of families can be considered poor, and in case of tribal families, the figure is even greater. Majority of the people work the land, collect wood or wood products or these days, they can send someone to the city to work in a mine. It is a tough life; families are divided, mothers and grand mums are keeping things in one piece and the villages are brightened with color and tales during festivals or market days.

Food and Nutrition Context

The fare of an ordinary day here cost is not much: frequently, a bowl of millets or rice, of some of the wild fruits of the forest, when in season, mahua, a few pulses, etc. The PDS is able to bring rice and wheat though they aid in stuffing stomachs but not necessarily minds or bodies with the appropriate nutrients. The prevalence of child stunting is high with over four out of every ten young children being stunted and anemia is also high among the women and children. You come across families that are making use of whatever they have available, but they are in a losing war. Some kids grow up too quickly. Mothers are concerned about the content of the water. Grandparents can remember the days when they could get more in the forest, but now they have been reduced to government stores.

Database and Methodology

The sources of the data used in this paper are all around like the 2011 Census figures, ration list of the UP Food Department, GIS tools charts and maps, and nutrition facts of the NFHS-5 surveys. It is a compilation of patchwork: triangulating figures regarding the locations of the shops with the real dirty paths that people follow. Satellite maps, reports of the government, and some local stories are combined to create a better understanding of the situation on the ground. The analysis does not depend on elaborate mathematical models, but relies rather on such simple coverage rates as the number of families living within five kilometers of a ration shop, or the amount of grain actually delivered with the amount delivered promised. Numbers alone are sufficient in this scenery; one must be there where the gaps appear, where there are a few shops, such as Dudhi or Myorpur. Another attempt of the study is a mere Food Security Index to sum up the availability, access and a bit of actual use. The biggest limitation? No new field surveys. Majority

of insights must be through older data hence when something had changed abruptly following a flood or during Covid there is a possibility that the data will not be reflected here. The most significant complaints, such as the reason why a ration shop remains closed, or the reason why a mother skips a meal are sometimes lost in the numbers.

Results and Discussion

Talking to people in Sonbhadra, one thing becomes obvious: food security is something people struggle with on day-to-day basis, and it is an even bigger problem in tribal families. There is a high rate of stunting and underweight children. You find this in fatigued looking mothers and in busy hands of little children who are below their age. Fields do not go too far and when weather plays the devil, there is actual hunger. Most women are tasked with the responsibility of having to stretch the food, always wondering whether the food will see the next ration period. When the PDS grain trucks are successful enough to pass through, they are a relief but often a frustrator. The queues are made earlier and even in remote villages, a malfunction of the biometric machine or a missed scan of a fingerprint can be a lost trip. This is particularly difficult on the old or people who have young children. Corruption and leakages were order of the day before digitization as some good grain never reached the people who required it the most. This time, however, things are better with new electronic check-ins. However, the shortages in supply and access are not fully removed. Others are too distant, or in the monsoon regions where floods have broken off all communication during days. Children and women are the most affected: the levels of anemia are more than 50 percent, and it does not appear to improve, year after year. New ideas are on the table. There are people discussing vans that make this mobile ratio, that may cover the hamlets that are far. Some recommend delivering PDS combined with visits by health workers in which case the nutrition counseling and simple medicine arrive simultaneously. No one disputes the importance of the system, that it does matter, but it must apply to the realities that people have to live with on the ground, not only on paper.

This is your analysis and recommendations, in a more human and conversational form. Such style attracts the reader with simple words, mixing facts with the reality lived by the author.

Indicator	District Average	Tribal Blocks (e.g., Dudhi)	Non-Tribal Blocks (e.g., Robertsganj)	Source
Child Stunting (%)	44.5	50–55	35–40	NFHS-5 (2019–21)
MPI Score	0.312	0.55	0.30	NITI Aayog (2023)
Caloric Deficit Households (%)	35	45	25	District Nutrition Profile (2022)

Distribution of PDS Outlets Spatially.

It goes without saying when you study the map of the ration shops of Sonbhadra, who is left out. The name Fair Price Shops is a song of hope but their location speaks otherwise. The total number of shops is about 550 to the entire district, though in one or other part, particularly in the tribal belts, which are forest-grown over, there are but one shop to every 25 square kilometers, one-half the district average. Even in such areas as Myorpur and Dudhi where seven of ten citizens belong to Scheduled Tribes, it is worse. The stores are not distributed round the country at all, but are grouped around larger towns or small hamlets. At the center of places such as Robertsganj almost all the people reside within a walking distance of five kilometers of a store. Four of ten families are still farther away, however, in the hamlets lying out of Dudhi—up to an hour and a half in hot summer, perhaps, and a long, weary walk over paths and through dense woodland. You do not have to crunch all the figures to realise that the greater the tribal population, the more difficult it becomes to reach such shops. Combine the hills and dense woods and you begin to see why so many families starve. To most people, monsoon floods have been a period of concern, and more than 200 hamlets have been isolated. Recent district handbook statistics indicate that only six out of ten villages can even be approached by road. It is no wonder that according to some government maps, Sonbhadra is very much insecure to access food. In this part of the world, citizens discuss their right to free grains. However, rights do not imply that the shop has to be two hills and a forest away. Bad roads can not be fixed even with the introduction of GPS tracking in 2022. Fairness will remain elusive to tribal families until there is a more convenient means of gathering food.

PDS Performance and coverage.

On the paper, PDS in Sonbhadra includes almost all families having qualified households nine out of ten as per the latest count. That translates to about 1.2 million ration cards, majorities of which are the inhabitants of rural huts and hamlets which are scattered. The poorest are allowed a little more every month; there is the Antyodaya Anna Yojana, which allocates 35 kilograms of grain per family; rice, wheat, just enough of this stuff to keep a family alive when people cannot work or cannot work because of bad weather. In electronic stores, 95 percent of the grain is actually received and nearly all the stores have electronic point-of-sale (e-POS) systems which scan what has actually been delivered and ensure the counterfeit cards are held at bay. Things have not disappeared; they have only evolved. Decades ago, it used to happen that one out of every four sacks of grain did not reach those on the register. Now this has reduced to approximately one in eight. SMS messages and Aadhaar systems came to the rescue. There was even a local pilot who managed to trace 5 crore of wrong diversion by just sending text messages to people when their stock

had reached the shop. Still there are plenty of headaches. The tribal blocks were the worst hit by the shortages - as high as 15 percent during peak demand. On the plains below, it is a lot smoother. At the shops where the ration card holders attend, 85 percent of ration card holders in fact take their grain which has been increased since the One Nation One Ration Card scheme was introduced. However, in distant locations, things work not so well. Connection errors, absence of staff or bad weather can all close it down. Delivery is disproportionate block by block. Grain comes punctually in towns (approximately 95 percent of the time) and in the tribal areas, individuals wait longer and have less faith in the system. Addressing these snags locally is what will or will not break the program.

Importance of PDS as part of Tribal Food Security.

The PDS is most important in the seasons when crop production is unproductive or when money is limited. It silently steps in to fill the discrepancy between what individuals are able to cultivate or harvest, and what actually needs to be done to nourish a family. In some cases, PDS grains constitute close to a half of their calories during the bad days among the tribal communities such as the Baiga, Gond and Kol. Reported cases of anemia by the government are real: in Dudhi where the PDS has been more successful, children are in fact lower. That's not small. These ration grains became a cushion when the long droughts struck between 2022 and 2024 and the switching cultivation suffered a massive blow. The rations replace forest foods which were more diversified in the case of the most isolated families. Now there is no more tubers and leaves, it is rice and more rice. That stabilizes the stomach at the expense of being deficient in nutrients. It is not missed--local research links PDS coverage more directly to a five percent reduction in stunting in children in areas with fortified food programs in self-help groups of women. That one is a victory, but another lesson is that real food security is about more than just filling bellies. We are talking about food that is healthy as well.

Challenges Identified

Despite the progress, there are still huge obstacles preventing the path. The biggest one? Roads (or lack of them). Deliveries in rain and mud. In Myorpur, it is not possible to deliver one in five deliveries just because of rough tracks. To the inhabitants of nearly half the hamlets in the tribe, ration grain collection may involve walking miles across streams. Old problems stick around. Ration cards are available to some households that do not qualify leaving out the truly needy families. This disarranged targeting, occasionally due to the aged surveys allows 15 percent of the cards to reach the wrong individuals. The actual users lose what they require out of paperwork or ID mismatch. Corruption hasn't gone away. One in every ten bags of grains is even now lost to local scams. Then bear in mind, the issues with technology: the system breaks down 8 percent of the time in backcountry regions, the internet connection goes off every minute, and most people who are eligible never even apply due to their unawareness of the more recent programs. Implementing a new digital system does not imply that everyone will be able to use it.

Best Practices and Success Stories.

Yet there are tales of hope, also. GPS tagging and novel digital tools in certain test shops reduced leakages nearly 3 times since 2022. In the village of Dudhi, where women organizations operated ten stores, the use of fortified food, in this case, Think protein biscuits and micronutrient mixes, and not only plain rice, led to a real decrease in stunting in children. In 2024, 2,000 migrants have been assisted by ONORC program to access rations, which is life-changing to the migrants who cross district borders to work. The best is yet to happen when the current plans of the government such as the PM JUGA concentration in tribal villages are implemented in the right manner. Good things occur when technology and the locals go hand in hand.

Recommendations and Policy Implications.

So, where's the way forward? To make the PDS do right in the case of tribal families of Sonbhadra, several changes are required:

- Assign approximately 50 mobile ration vans in the most inaccessible blocks such as Dudhi and Myorpur. They can rotate around groups of hamlets with the help of GPS to map routes and distribute food after every few months.
- Tweak targeting: refresh household lists based on new Aadhaar based surveys and give special consideration to most at risk cohorts, such as the Especially Vulnerable Tribal Groups (PVTGs).
- Spot stock wastes and complaints increase in real-time (GIS dashboards), to identify the leaks early on.
- Do not simply stuff the stomachs - ensure an anti-malnutrition assault by adding millets, eggs or any other nutritious foodstuffs. Combine PDS with health and nutrition programs to have a better safety net.
- Train women to keep watch of village shops: in self-help groups. Provide them with actual control, audits and feedback loops to the community.
- Invest in infrastructure - use part of the PDS budget on new rural roads and e-POS solar powered terminals, then digital fixes will not be lost during power failures.
- Combined, the amount of these changes would only consume over five percent of the current expenditure. However, they had finally helped make official realities out of the Sonbhadra thousands of tribal families.

Conclusion

This paper examines the accessibility of food by tribal families in the Sonbhadra District, Uttar Pradesh and the role of the Public Distribution System (PDS) in the lives of tribal families. It is not merely policy-papers and reports but it is also the way that location, poverty and governmental systems are joined together to create the reality in daily life. The article relies on Census 2011, NFHS-5 (201921), state food supply reports until 202425) and district level reviews from NITI Aayog and GIS maps to paint a more comprehensive picture. The PDS is a lifeline to 3.85 lakh tribal people in Sonbhadra primarily of the Baiga, Gond and Kol tribes. It aids the families to endure the lean agricultural seasons, when harvests fail, or employment runs dry. Nevertheless, it is still missing a great number of people in spite of its reach. Based on the four concepts of the FAO to understand how food insecurity is addressed, namely availability, access, use, and stability, the paper demonstrates that although the PDS is a helpful concept, it does not entirely resolve the problem of food insecurity. The coverage is extensive and includes up to 92 percent of households and delivers 2.5 lakh tonnes of grain annually. During harsh seasons, that grain supplies an estimated 3545 percent of the daily calories. Electronic technologies have been different. This move to electronic machines and One Nation One Ration Card reduced leakages by nearly fifty percent- 25 percent in 2010 to an estimated 12 percent by 2023-24. Nevertheless, almost 28 percent of grains do not end up in the right hands. It is a better system; however, there are gaps. One of the largest problems is distance. In areas such as Myorpur in which tribal population is the majority, one fair price shop is in every 25 square kilometers. Almost forty percent of hamlets are within six kilometers of one. Travel is more difficult due to the forests and hilly land. That is why the number of malnutrition remains recalcitrant. According to NFHS-5 data, almost half of the children are stunted, approximately 43 percent underweight and nearly 68 percent anemic. The other issue is the type of food received by people. Cereals such as rice and wheat are mostly donated through the PDS. It is not as satisfying to dietary requirements as forest foods used to be. Therefore, families will not starve but they will not be well fed. The system is also not reliable because of technical failures such as the inability of the biometric scan in remote locations or delays in the supply to the hill locations. Mistargeting involves the fact that there are non tribal households that are still receiving what should be given to the tribal families. It reminds the speech of Amartya Sen which occurred long ago: the rights on paper are not so important when you cannot put them into practice. There are positive signs too. The development of Sonbhadra under the Aspirational Districts Programme of NITI Aayog is an indication that change is a possibility. It became one of the 5 leading out of 112 Indian districts by March 2025. The district enhanced health and nutrition, offered digital-based training to thousands, and offered financial support to more than 5.6 lakh individuals in 202425. Fortified foods are being piloted in ration shops by such programs as the PM Janjatiya Unnat Gram Abhiyan and Poshan Abhiyaan. Such efforts have reduced stunting by approximately 5 percent where women self-help groups control. In the future, the solution to food access in Sonbhadra among tribes will be to fix the physical and systemic barriers. It can be better roads, fairer price shops, current records, and digital mapping. With these improvements, more than before, the district will be able to approach the ambitions of Zero Hunger and actual food justice in the framework of the National Food Security Act. Construction of the 300 kilometers of rural roads and training of local bodies may make the rights into the tangible and permanent security. This information will be reflected in the NFHS-6 data once it is available, and this data will reveal how far these efforts have been made- and how far more should be done.

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