



# Food Security in Rajasthan

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**ABSTRACT:** The present study tries to analyse the status of food security, along with its various components, such as food availability, accessibility, and stability with the help of a multidimensional index across districts of Rajasthan, India based on an indicator approach. The QGIS mapping computer application and quintile method were used to map districts into low, medium, high, and very high categories. Furthermore, multiple regression analysis was applied to find out the significant determinants of food security and its respective components. The results confirm that there is a wide range of inequalities in terms of food security and its components of availability, accessibility, and stability across districts. It was found that the Ganganagar district (0.407) was rated the most food-secure district due to relatively higher food stability (0.401) in the Rajasthan state. On the contrary, lower food availability (0.084) and accessibility (0.183) contributed to the lowest food security in the Dungarpur district. Moreover, districts associated with dry regions are highly vulnerable and relatively less food secure compared to districts having surface irrigation facilities. Hence, the study recommends; diversification from farm to non-farm activities; sufficient storage capacity to control price fluctuations throughout the year, formulation and dissemination of climate-resilient technologies; investment in infrastructure, promotion of water management, conservation technologies, regulation and replenishment of groundwater in rural areas for augmenting cropping intensity; district-specific policies to arrest food insecurity; and strengthening the coverage of rural employment programme, i.e. MGNREGA.

**KEYWORDS:** food security, Rajasthan, irrigation, water management, cropping, rural employment

## I. INTRODUCTION

The National Food Security Act 2013, also known as Right to Food Act, is an Indian Act of Parliament which aims to provide subsidized food grains to approximately two thirds of the country's 1.2 billion people.<sup>[1]</sup> It was signed into law on 12 September 2013, retroactive to 5 July 2013.<sup>[2][3]</sup>

The National Food Security Act, 2013 (NFSA 2013) converts into legal entitlements for existing food security programmes of the Government of India. It includes the Midday Meal Scheme, Integrated Child Development Services scheme and the Public Distribution System. Further, the NFSA 2013 recognizes maternity entitlements. The Midday Meal Scheme and the Integrated Child Development Services Scheme are universal in nature whereas the PDS will reach about two-thirds of the population (75% in rural areas and 50% in urban areas).<sup>1</sup>

Under the provisions of the bill, beneficiaries of the Public Distribution System (or, PDS) are entitled to 5 kilograms (11 lb) per person per month of cereals at the following prices:

- Rice at ₹3 (3.8¢ US) per kg
- Wheat at ₹2 (2.5¢ US) per kg
- Coarse grains (millet) at ₹1 (1.3¢ US) per kg.

Pregnant women, lactating mothers, and certain categories of children are eligible for daily free cereals.<sup>2</sup>

The bill has been highly controversial. It was introduced into India's parliament on 22 December 2011, promulgated as a presidential ordinance on 5 July 2013, and enacted into law on 12 September 2013.<sup>[4][5]</sup> Government of Odisha announced implementation of the act in 14 district from 17 November 2015.<sup>[6]</sup> Government of Assam implemented the Act on 24 December 2015.<sup>[7]</sup>

Rajasthan is a mineral-rich state and has a diversified economy having agriculture, mining and tourism as its main engines of growth. The state mines produce gold, silver, sandstone, limestone, marble, rock phosphate, copper and lignite. It is the second-largest producer of cement and contributes one tenth of the salt produced in India.<sup>[7]</sup> Wheat<sup>[8]</sup> and barley are cultivated in large areas, as are pulses, sugarcane, and oilseeds. Cotton and tobacco are cash crops. Rajasthan is among the largest producers of edible oils in India and the second largest producer of oilseeds. Rajasthan is also the biggest wool-producing state in India. There are mainly two crop seasons Kharif and Rabi. The main source of irrigation is wells and tanks. The Indira Gandhi Canal irrigates northwestern Rajasthan.<sup>3</sup>



Rajasthan is the largest producer of rapeseed, bajra, mustard and wool in India and the second largest producer of oilseeds and spices and milk. Rajasthan is third largest producer of soya bean and coarse cereals in India.<sup>[9]</sup>

Rajasthan is also the leading producer of milk in North India. Saras milk product brand of Rajasthan Co-operative Milk Producer Union has its outlets in Jodhpur(HQ), Jaipur and New Delhi.

Food security refers to ensuring adequate food supply to people, especially those who are deprived of basic nutrition. Food security has been a major concern in India. According to UNO -India, there are nearly 195 million undernourished people in India, which is a quarter of the world's hunger burden. Also, roughly 43% of children in India are chronically<sup>4</sup> undernourished.<sup>[1]</sup> India ranks 68 out of 113 major countries in terms of food security index 2020. Though the available nutritional standard is 100% of the requirement, India lags far behind in terms of quality protein intake at 20% which needs to be tackled by making available protein-rich food products such as soybeans, lentils, meat, eggs, dairy, etc. at affordable prices.<sup>[2]</sup> The Human Rights Measurement Initiative<sup>[3]</sup> finds that India is doing 56.8% of what should be possible at its level of income for the right to food.<sup>[4]</sup> Rajasthani cuisine (Hindi: राजस्थानी व्यञ्जन) is the cuisine of the Rajasthan region in North West India. It was influenced by various factors like the warlike lifestyles of its inhabitants, the availability of ingredients in an arid region and by Hindu temple traditions<sup>5</sup> of sampradayas like Pushtimarg and Ramanandi.<sup>[1][2]</sup> Food that could last for several days and could be eaten without heating was preferred. Scarcity of water and fresh green vegetables have all had their effect on the cooking. Signature Rajasthani dishes include Dal Baati Churma, Panchratna Dal, Papad ro Saag, Gatte ro Saag.<sup>6</sup> It is also known for its snacks like Bikaneri bhujia, Mirchi bada and Kanda kachauri. Other famous dishes include Dal Baati, malaidar special lassi (lassi) and Lashun ki chutney (hot garlic paste), Mawa lassi from Jodhpur, Alwar ka mawa, Malpauas from Pushkar and rasgulla from Bikaner, "paniya" and "gheriya" from Mewar.<sup>[2]</sup> Originating for the Marwar region of the state is the concept Marwari Bhojnalaya, or vegetarian restaurants, today found in many parts of India, which offer vegetarian food of the Marwari people. The history also has its effect on the diet as the Rajputs preferred majorly a non-vegetarian diet while the Brahmin, Jains, and others preferred a vegetarian diet. So, the state has a myriad of both types of delicacies.<sup>[3]</sup>

According to a 2014 survey released by the registrar general of India, Rajasthan has 74.9% vegetarians, which makes it the most vegetarian state in India.<sup>[4]</sup>

Since Rajasthan is mostly an arid state, wheat and millets form the staple diet instead of rice (which are common in rest of India).<sup>7</sup>

Various breads are prepared from wheat like tawa roti, Angarki/Tandoori roti, Kinwani roti (naturally fermented flour roti) etc. Khoba Roti is a special roti from Rajasthan which is prepared by pinching the dough to make a beautiful pattern of indentations on roti.<sup>[16]</sup> It is very common to prepare large sized rotis called Rotlas/Bhakri using flour of millets like Bajra (Pearl millet), Makai (Maize), Jowar etc.<sup>8</sup>

Gram flour is usually mixed with wheat flour to prepare missi atta which is then used to prepare Missi Roti. Sometimes, multigrain flatbread called Bejad Roti is prepared by mixing wheat flour with jowar flour and besan.<sup>[17]</sup> Tikkad is another typical Rajasthani bread which is prepared by blend of flours and vegetables.<sup>[18]</sup> Kanda Tamatar Tikkad and Bajra Mooli Tikkad are some common variations of Tikkad.<sup>[19]</sup>

Deep fried breads include: puris & kachauris (stuffed with dal pithi, vegetables, mawa etc.). Kanda Kachauri, prepared using stuffing of onion based mixture is a speciality of Rajasthani cuisine. Mawa Kachauri is sweet version of Kachauri stuffed with mawa. Jhakolma Puri is a speciality of Mewari cuisine which is a large sized puri prepared using wheat dough of flowing consistency.<sup>[20]</sup> It is served with Chana Dal and Amchur chutney.<sup>9</sup>

Pan cooked breads like parathas (mostly stuffed with vegetables, dals or chhena), cheelas, pudlas, tikkads, malpauas etc. One unique paratha of Rajasthan is Korma Paratha or Dal Churi Paratha which is prepared using korma or dal churi (semi crushed coarse lentils and its husk). Some common variations of Cheelas include Besan Cheela and Mogar Cheela. using Baked breads include Baatis Angarki roti/Tandoori roti, Angarki paratha, Kinwani roti etc.<sup>10</sup>

Food security means having, at all times, both physical and economic access to sufficient food to meet dietary needs for a productive and healthy life. A family is food secure when its members do not live in hunger or fear of hunger. Food insecurity is often rooted in poverty and has long-term impacts on the ability of families, communities and countries to develop and prosper. Prolonged undernourishment stunts growth, slows cognitive development and increases susceptibility to illness.<sup>11</sup>

Today, many people in Rajasthan go to bed hungry every night, most of them smallholder farmers who depend on agriculture to make a living and feed their families. Despite an explosion in the growth of urban slums over the last decade, nearly 75 percent of poor people in Rajasthan live in rural areas. Growth in the agriculture sector -- from farm



to fork -- has been shown to be at least twice as effective in reducing poverty as growth in other sectors. Investing in these smallholder farmers—many of whom are women—and the food systems that nourish them is more important than ever. In order to feed a population expected to grow many people by future, Rajasthan will have to double its current food production. Given scarcity of natural resources and other challenges, Rajasthan will need to be more efficient in how it meets this demand. To ensure that people have sufficient food, aligning short-term assistance with a long-term development strategy can help Rajasthan state feed their own people.<sup>12</sup>

As part of this effort, government is scaling up a comprehensive approach to fighting hunger and strengthening food security in Rajasthan by:

- Leading Rajasthan state Feed the Future initiative to strengthen agriculture-led growth, nutrition and resilience in collaboration with multiple Government agencies and departments, the private sector, civil society, researchers and universities, and partner governments.
- Providing emergency food assistance so vulnerable populations and malnourished can survive and bounce back in times of crisis.<sup>13</sup>

## II. DISCUSSION

Climate change impacts food availability through its effect on the production of food and its storage, processing, distribution, and exchange. Climate change between 1981 and 2010 has decreased global mean yields of maize, wheat, and soybeans by 4.1, 1.8 and 4.5%, respectively, relative to preindustrial climate, even when CO<sub>2</sub> fertilisation and agronomic adjustments are considered. Uncertainties (90% probability interval) in the yield impacts are -8.5 to +0.5% for maize, -7.5 to +4.3% for wheat, and -8.4 to -0.5% for soybeans. For rice, no significant impacts were detected. This study suggests that climate change has modulated recent yields in Rajasthan state. This led to production losses, and that adaptations to date have not been sufficient to offset the negative impacts of climate change.<sup>14</sup> Dryland settlements are perceived as vulnerable to climate change with regard to food security, particularly in Rajasthan. The declines in rainfall and rising daily maximum temperatures based on simulations of 50 sites caused water-limited yield potential to decline by 27% from 1990 to 2015, even though elevated atmospheric CO<sub>2</sub> concentrations had a positive effect. There are numerous studies demonstrating that climate change is affecting agriculture and food security in Asia. Several studies with remote sensing and statistical data have examined rice areas in north-eastern Rajasthan. Similar crop yield studies focusing here have found that warming has reduced wheat yields by 5.2% from 1981 to 2009, despite adaptation and that maximum daytime temperatures have risen along with some night-time temperatures. Climate change is already affecting food security (high confidence). Recent studies in both large-scale and smallholder farming systems document declines in crop productivity related to rising temperatures and changes in precipitation. Evidence for climate change impacts (e.g., declines and stagnation in yields, changes in sowing and harvest dates, increased infestation of pests and diseases, and declining viability of some crop varieties) is emerging from detection and attribution studies.<sup>15</sup>

The prevalence of malnutrition in Rajasthan is extremely high and it performs very badly as compared to other Indian states. With half of the pregnant women being anaemic and 23 percent of children being born with low birth weight (NFHS-4), the provision of essential health and nutrition inputs becomes a topmost priority. Around 40 percent of children are stunted in Rajasthan.<sup>16</sup>

The Government of India has in place nutrition and health programmes Integrated Child Development Scheme (ICDS) implemented by the Ministry of Women and Child Development & National Health Mission (NHM) implemented by the Ministry of Health and Family Welfare which include nutrition based interventions. However, the problem in Rajasthan is the low coverage of these interventions over the last 10 years. Essential health and nutrition inputs reach only less than 55 percent of mothers and children and the consequences of poor nutrition manifest in terms of growth failure of child, reduced learning capacity, increased rate of morbidity and mortality. This study is an attempt to estimate the costs and benefits accruing from increasing the coverage of the national interventions in Rajasthan.<sup>17</sup>

Estimated benefits for Rajasthan from the overall package at 3 times the value of per capita SDP and discounted at 5% are Rs. 91,577 and estimated costs are Rs. 14,144 per beneficiary, resulting in a benefit/cost ratio of approximately 6. The overall intervention is expected to reduce the prevalence of both severe and moderate stunting by 20 per cent to 13.8 percent and 17.4 percent respectively in Rajasthan.



### III. RESULTS

Interventions	BCR	Total benefit (INR per beneficiary)	Total cost (INR per beneficiary)
Direct nutrition based interventions	6	91,577	14,144
Interpersonal counseling for behaviour change	43	54,134	1,245
Supplementary food for mother and child	7	81,202	11,532
Micronutrient supplementation for pregnant women during ANC visits	37	23,453	637
Community based treatment of SAM using RUTF (median)	5	46,951	9,395

All costs and benefits are discounted at 5%

In Rajasthan, 39 percent of children below five years are stunted and 23 percent are wasted. 46.8 percent of women in reproductive age group are anaemic (NFHS-4). Such nutritional deficiencies adversely affect the health of mother and children. It will be a six-year intervention (2015-2020). Cost will be incurred for provision of supplementary food and micronutrients which are distributed through government programmes. Cost per beneficiary is Rs. 14,144 and for a 10 percentage point increase in coverage the total cost is Rs. 233 crore. 57 per cent of the cost is the value of caregiver time and the rest are financial outlays by the state. The primary beneficiaries are pregnant women and lactating mothers and children up to 5 years of age. Benefits have been estimated in terms of reduction in terms of Years of Life Lost (YLLS) and Years lost due to disability (YLDs) as well as stunting. A 10 percent increase in coverage would avoid 365 deaths, and reduce stunting by 20% in the population receiving the intervention. Benefits realized per beneficiary are Rs. 91,577, 85 percent of which represent improved lifetime productivity from avoided stunting. Total benefits for a 10 percent increase in coverage are Rs. 1509 crore. Diarrhoea is a major contributor of deaths among children under 5 years of age in Rajasthan (6 percent of all deaths, (GBD, 2016)). Low socioeconomic status, poor maternal literacy, inadequate breastfeeding, malnutrition, poor sanitation and hygiene practices of the mother or the caretaker are the major determinants of diarrheal diseases. The intervention focuses on interpersonal counselling for behaviour change.<sup>18</sup> A six-year intervention which include counselling for breastfeeding, complementary feeding and hand washing will help in avoiding 328 deaths in Rajasthan which are related to diarrhoea. Major proportion of cost (Rs. 486) will be incurred on providing complementary feeding and hand washing education (6–12 months of age). Cost per beneficiary is Rs. 1245 and cost for increasing coverage by 10 per cent is Rs. 21 crore. 35 percent of the cost is the value of caregiver time and the rest are for financial outlays by the state. A total of 216 YLLS and 161 YLDs will be avoided for a 10 per cent increase in coverage, major beneficiaries are the children under 5 years of age who will benefit from reduction in diarrhoea. Stunting will be reduced by 12% in the beneficiary population. Benefits realized per beneficiary are Rs. 54,134, 85 per cent of which represent improved lifetime productivity from avoided stunting. Total benefits for a 10 percent increase in coverage are Rs. 892 crore. All children below 6 years of age, pregnant women and lactating mothers are eligible for availing of supplementary food services under the Integrated Child Development Scheme (ICDS) which is funded by both Central and State government.<sup>19</sup>

Supplementary nutrition need to be better targeted towards those sections that actually require the appropriate nutrition.

### IV. CONCLUSION

For food security right and any problem regarding malnutrition in patients we can

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The state's food and civil supplies department has identified 7.38 lakh National Food Security Act (NFSA) beneficiaries who have not picked up wheat from fair price shops in the last seven to eight months. Out of these, the names of 2.89 lakh beneficiaries have already been deleted from the NFSA list.

Food and civil supplies minister Pratap Singh Khachariawas during his first meeting with the officials of the department on Thursday had made an appeal stating that "NFSA beneficiaries who are now financially sound, keeping in mind the interest of the poor and deprived sections, must voluntarily remove their names from the NFSA list. The department has launched an exercise to identify those beneficiaries who are now financially sound (or do not require benefits under the scheme anymore) and have stopped availing themselves of the benefits under the scheme. "We don't have data of people who are financially sound. If we had data we would have removed the names from the list. If they don't remove their names on their own, there will be an investigation followed by recovery, as it is done for the government employees," said Anil Kumar Agarwal, additional food commissioner, Rajasthan. "We are presuming that those who have not picked up wheat even once in the last 6-7 months, do not require it anymore. We have collated data of such NFSA beneficiaries and sent it to the district collectors. Maybe they do not need it anymore or have shifted to other places. A scrutiny is being conducted at the district level to figure out the reason for not picking up wheat from fair price shops. The names will be removed only after the scrutiny. Some districts have already removed the names from the list," he added.

There are around 4.44 crore NFSA beneficiaries in Rajasthan. The department has so far recovered Rs 72.69 crore from 59,260 defaulter government employees who had received benefits under NFSA. In all, 83,687 such employees have been identified in the state.<sup>20</sup>

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