Social Safety Nets for Food Security and Nutritional Outcome among Rural Indian Adults

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Abstract

As policy interventions, the Public Distribution System (PDS) and Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA) were expected to be crucial in addressing food security in India. This empirical study aims to demonstrate the association between food security safety nets and nutritional status among adults aged 15-49 years. Based on analysis of data from 855 eligible adults from across India, the paper argues that although obesity is associated with the PDS programme**,** the PDS did not show any association to address the problem of underweight individuals in the sampled population. Achieving nutrition security through economic security by way of the MNREGA programme must also be reviewed.

Keywords food security, nutrition, PDS, MNREGA, India

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Introduction

When India joined 188 countries in 2000 in committing to halve the proportion of people who suffer from hunger by 2015, this target was deemed globally achievable (UN 2013). However, India's performance has remained unacceptably poor with a recent global hunger report showing that more than 21% of the Indian population is undernourished, signaling an alarming condition in terms of food sufficiency (IFPRI 2013).

To tackle India's nutrition and food security of the household, the government created two safety net programs: the Public Distribution System (PDS) (Nawani 1994), and the Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA) (Ministry of Rural Development 2008). While under the MNREGA an employment entitlement, at minimum wage, to any adult willing to do casual labour was created by the government, through the PDS a classification of food grain beneficiaries according to monthly household income was made and their entitlements secured (Ministry of Rural Development 2008). The three broad income categories established were households above the poverty line (APL), below the poverty line (BPL), and households deemed the poorest of the poor, named *Antyodaya Anna Yojana* (AAY) (Nawani 1994). As per their eligibility, each household is issued a ration card, identifying their household status among the three groups, and accordingly, their respective food entitlements under the PDS are provided through their local fair price shop (FPS).

The PDS and MNREGA target two critical aspects of food security, that of availability and access. Through MNREGA, employment opportunities are made available so that people are able to earn income to purchase subsidized foods under PDS, as well as fulfill other dietary needs. With the PDS, there is both a procurement dimension of grains to ensure sufficient buffer stocks and grains for distribution; as well as the provision of subsidized grains to ensure there is direct access to staple foods among the most vulnerable households. The Indian government recently passed a highly debated National Food Security Act (NFSA), 2013 that promises to offer food grains covering 75% of rural and 50% of urban households. The bill states that it is "an Act to provide for food and nutritional security in human life cycle approach, by ensuring access to adequate quantity of quality food at affordable prices to people to live a life with dignity and for matters connected therewith or incidental thereto"(The Gazette of India 2013).

Mixed reactions were received regarding the ability of PDS and MNREGA to address the food and nutrition security of households. Till date, no study has empirically demonstrated the effect of safety nets such as PDS or MNREGA on securing nutrition among adults. Using a sample household survey conducted across seven states in 2013, this study

aims to demonstrate the association between social welfare programs and nutritional status among adults aged 15-49 years.

Food Security and the Welfare State in India

In recent years, India has seen the push and pull of civil and political forces in an attempt to advance a welfare state model of governance. This has been evident in the passing of several pieces of legislation that have made needs such as education, employment, and food a legal entitlement.

The welfare state model of government surged in the post-World War II era among several Western countries. This transition saw the moulding of social policies into more comprehensive social benefits programs, so as to ensure a basic standard of living for all (Quadagno 1987). Some argued that in part the rise of the welfare state in various countries, and even the justification for it, was that even with extensive economic growth and advanced industrialisation, there are gaps that will inevitably form as parts of the labour force are dislocated, both physically and in the market (Quadagno 1987). Therefore the very revenues that growing economies and industrialisation yield could fund social programs to mitigate the concomitant disparities in the labour force.

However, subsequent studies demonstrated that industrialization did not necessitate the development of a welfare state. In fact, countries with lower levels of economic growth and industrialization exhibited comparable levels of welfare programming and policies, thus bringing greater attention to the need for political development and will (Quadagno 1987).

India's beginnings as an independent state intended to put it on the path to a welfare state, with the preamble of the Constitution emphasizing basic amenities and provisions for all citizens (e.g. food, health, and livelihoods). Even the 1976 amendment to the Constitution calls for a "socio-economic revolution, which would end poverty and ignorance and disease and inequality of opportunity" (The Government of India 1976). However India's success, and failures, in truly embodying and delivering on its welfare responsibilities has been heatedly contested over the years.

Writing in the aftermath of the neo-liberal reforms of the 1990s Jayal notes that the absence of a rights-framework primarily because rights were never a cornerstone to welfare programming in India (Jayal 1994). Jayal uses this to categorize India not as a welfare state, but rather an interventionist state, which in the absence of legal rights can cast aside such provisions (Jayal 1994). However, in the last decade, a series of key pieces of legislations have looked to equip citizens with legal rights to essential social services. While some have

ushered these in as a new turn in India's advancement to a welfare state (Tharoor 2013), others find that even with a gamut of safety nets, others see holes in safety nets intended to support the most vulnerable segments of society (The Economist 2013).

The NFSA leverages the existing PDS to deliver a legal entitlement to nearly 70 percent of the population, making it the most expansive social safety net in the world. However, considering the problems that have plagued the PDS over the last 20 years, it remains to be seen whether the legal right to food for the country's majority can address the pervasive levels of food and nutrition security.

Methods

Survey dataset

In 2013, a cross sectional survey was conducted among 700 randomly selected households across seven states of India, covering 100 households from one purposively selected district per state. The districts selected were Kaithal, Sirmaur, Patiala, Dehradun, Mayurbhanj, East Medinipur, and Jashpur from the states of Haryana, Himachal Pradesh, Punjab, Uttarakhand, Orissa, West Bengal, and Chhattisgarh, respectively (**Figure 1**). In selecting the households from particular districts, we chose villages located in a district adjacent to a state border because the survey intended to understand the inter-state differential in demand and supply of food-grains; and this proposition was guided by the review conducted by the M. S. Swaminathan Research Foundation (MSSRF 2008). The preparation of household listing served as the sampling frame of households. The mapping and listing was carried out by a team comprising a mapper, a lister, and a supervisor. Two health investigators on each survey team measured the height and weight of all women and men aged 15-49 years present in each household. A standardized height and weight measurement tool was used across the seven states surveyed to increase the precision of measurement. They were trained in methods of height/weight measurement and ethical requirements. Systematic monitoring and supervision procedures were adopted to maintain the data quality and consistency check. An interviewer-administered questionnaire was used for collecting data. A range of information on socio-economic and demographic characteristics of household was collected in the survey. The survey protocol was approved by the independent ethics committee at the University of Sydney, Australia as well as the Tata Institute of Social Sciences, India. The Tata Institute of Social Sciences acted as the nodal agency to conduct the survey. All individuals selected in the survey were provided with informed voluntary as well as written consent. A trained

interviewer explained the research objectives and methods to each participant. Each individual's approval was sought, and then only the interview was conducted.

Outcome variable

Quetelet's index or body mass index (BMI) is widely used as a measure of fatness or the nutritional status of the population in both developed and developing countries (WHO Expert Consultation 2004). Data selected for the present analysis were from women and men aged 15-49 years. Additionally, the data set excludes women declared pregnant at the time of the survey as well as women with a birth in the 2 months preceding the survey. In the survey, data were collected on BMI defined as the ratio of the weight in kilograms to the square of the height in meters (kg/m^2). A BMI of less than 18·5 kg/m^2 is widely used as a practical measure of CED, whereas a BMI ranging between 18·5 to 23 kg/m^2 and BMI $\geqslant$ 23 kg/m^2 is indicative of optimum and overweight/obesity, respectively for Asian populations (WHO Expert Consultation 2004).

Predictor variable

To reiterate, this study aims to understand the association between social safety nets for food security (PDS and MNREGA) and nutritional status. The outcome variable is BMI as a measure of nutritional status among adults mean and women. Aside from indicators for PDS and MNREGA, other predictor variables considered were current age (ranges between 15 to 49 years), sex (categorized as male, and female), caste / tribes (scheduled caste / scheduled tribe, and non - scheduled caste / scheduled tribe), and whether the adults belong to households own any cultivable crop land (categorized as no, and yes). Guided by the empirical study (Mallick and Rafi 2010) conducted in a setting similar to India, a set of variables were considered to understand whether the level of food security at the household level affects the nutritional status of adults living in the same household. In the survey, a set of 5 questions were posed to the household head, whether in the preceding twelve months of the survey the household experienced any of the following: ate meals without vegetables; felt that could only afford to consume food from the PDS; they consumed only a single meal in a day; if ever all three (cereal, pulses, and vegetable) main food categories were unavailable; and if everybody got less than the amount to satiate hunger. To understand the level of subjective well-being, self reported economic status by the household head was measured to represent the view of the household. In a three step ladder (poor, middle, and rich), the

household head reported the current situation of the household. Since inter-district differential is expected to be a possible factor associated with over all nutritional status, a variable representing seven states was considered as a predictor.

Statistical approach

Bivariate and multivariable analyses were applied. To understand the association between institutions for food security and nutritional status among adults, multinomial logit regression model, also known as polytomous logit regression, was applied. The multinomial logit regression is proven to be appropriate where the outcome variable of interest has more than two categories (Hosmer and Lemeshow 2000; Greene 2012). The test for multicollinearity with variance inflation factors were performed, all of which were much smaller than 5.0, suggesting that the possibility of high multicollinearity was low. The survey sample size had sufficient statistical power and qualified for bivariate and multivariate analyses. The statistical software (StataCorp 2011), Stata version 12 was used to execute the entire analysis. Total eligible sample of 855 adults were included in the analysis.

Results

Sample characteristics

Table 1 represents the percentage (distribution) or mean value of nutritional status among adults by their background characteristics. Nearly 18% of the adults belonging to households having an APL card were underweight, and among adults belonging to households having BPL and AAY card almost 30% and 28 % were underweight, respectively, whereas, the estimate of overweight /obese adults for APL, BPL, and AAY was almost 40%, 19%, and 17% respectively. Thirty two percent of adults residing in households having MNREGA job cards were underweight, whereas 22% were overweight /obese. The underweight prevalence for adults belonging to households without MNREGA job cards is almost 22%,, and the obesity prevalence is nearly 32%. Thirty one percent of all female adults were estimated to be overweight / obese whereas almost 25% of male adults were overweight / obese. The percentage of underweight adults was more than twice as high among self-reported poor adults (30%) than the rich (13%), whereas among the rich, 60% of adults were overweight / obese. The prevalence of underweight adults in Odhisa is 33%, the highest among our selected states, whereas the prevalence of obese/overweight was the highest (42%) in Haryana.

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Table 2 represents the coefficients with 95% confidence interval (CI) estimated from multinomial logistic regression showing the association between institutions for food security and nutritional status of adults. The likelihood ratio chi-square of 199.23 with a p value < 0.0001 indicates that the model as a whole fits significantly better than an empty model (i.e. a model with no predictors). The relative log odds of adults being overweight/obese vs. optimum decreased among adults having a BPL (coefficient: -0.436; 95% CI: - 0.888-0.016), and AAY card (coefficient: -0.756; 95% CI: -1.464 - -0.049) as compared to adults with an APL card. The results noted no statistically significant association between MNREGA job card and nutritional status - whether it is underweight vs. optimum (coefficient: 0.271; 95% CI: -0.183 - 0.724), or overweight / obese vs. optimum (coefficient: 0.173; 95% CI: -0.334 - 0.679).

Discussion

Using the data from the survey conducted in the seven sates of India, this study is an attempt to demonstrate whether social welfare schemes, such as PDS and MNREGA developed by the Indian government, are able to address nutritional outcomes among adults aged 15-49 years. After adjusting for potential confounding factors, the study demonstrates that the PDS has little effect on nutritional status among adults in our selected sample. With reference to optimum BMI, adults belonging to households having BPL or AAY card have a negative probability to be overweight/obese compared to adults living in households having an APL card. But no association was documented among card types while comparing underweight BMI with optimum BMI. The possession of a job card does not show a statistically significant association with an adult being underweight or overweight/obese.

Previous studies have aimed to study the role of institutions and social programs in addressing nutritional security in India. A mixed reaction in editorials from journals, opinion papers, and commentaries have discussed whether the PDS and MNREGA would be able to address the nutrition security in India (Dreze and Sen 2013; Dreze and Khera 2013; Parasuraman and Rajaretnam 2011; Dev and Sharma 2010), but no studies were empirically performed to take a standpoint on this issue. Evaluations of PDS programme have demonstrated the increased coverage of the PDS, but the effectiveness of PDS in addressing nutrition security was criticized (Planning Commission 2005). Some argued that apart from staple food, the nutrition through providing supplementary nutrition would be beneficial for

the people (Dev and Sharma 2010; Radhakrishna and Reddy 2004). As far as MNREGA is concerned in securing nutrition, scholars have argued that economic security will bring purchasing power to low-income households which will in turn diversify food intake and help secure nutrition at the household level, although some remained sceptical about the ultimate use of money earned through MNREGA (Vatta, Grover and Grover 2014).

Unlike previous studies, this study conducted an empirical analysis using data from seven states of India which suggests the potential failure in the envisioned role and implementation of PDS and MNREGA to secure undernutrition. In order to address the nutrition security in India, the role of PDS and MNREGA need to be revisited and it should be evaluated whether the institutions supporting these programs are designed to address the problem of nutrition in India. Since the creation of these programs it was expected that the PDS and MNREGA would be successful in addressing food security. The money saved from the subsidized grains of the PDS, coupled with the economic support received from the MNREGA was to bring food variety and diversity in the household's food basket. Findings from this study suggest a failure of both these programs to have any positive effect on nutrition security, especially undernutrition.

Part of this is due to the gaps in these programs themselves. The failures of the PDS and its subsequent Targeted PDS (TPDS) have been written about extensively, from exclusion/inclusion errors in granting of ration cards, to leakages during the procurement and distribution operations, to the issuance of poor quality grains (Planning Commission 2005). The most recent policy effort has been the NFSA 2013, which looks to expand coverage, in hopes to minimize exclusion, and further cuts the rate of rice, wheat and coarse grains. However, it remains to be seen if anything will change substantively in the operation of the TPDS, which remains the vehicle for executing the NFSA. The shortcomings of the MNREGA have also invited great criticism. While the Act states it will give 100 days of work to those able and willing, in most of our sample households, no household had received full allotment of working days. In fact, the average working days per household for 2012-2013 were 36 days (Ministry of Rural Development 2013). The program created to give employment is only meeting one-third of its own target, meaning little improvement for vulnerable households and little income security. Nutritional security cannot be achieved through isolated interventions or provisions, but rather demands a system of interventions. While the schemes and programs are many, there is evidently an absence of integration across these programs to ensure that each crucial stage for nutrition is being met.

It is encouraging to note that the Government of India has decided to establish a Prime Minister's National Council on India's Nutrition Challenges (Prime Minister of India 2013) for – (a) policy direction, (b) review, and (c) effective coordination between Ministries – Ministry of Human Resource and Development; Ministry of Agriculture, Consumer Affairs, Food and Public Distribution; Ministry of Health and Family Welfare; Minister of Women and Child Development; Ministry of Rural Development; Ministry of Urban Development; Ministry of Information and Broadcasting; and Ministry of *Panchayati Raj*. Also, the 'High Level Expert Group Report on Universal Health Coverage for India' instituted by the Planning Commission, Government of India has proposed a'National Health Package' for essential health for all citizens of India by 2022 (High Level Expert Group 2011). More such communication, cooperation, and integration across government institutions and the resulting policies are imperative to mitigate nutrition insecurity among Indian adults.

Limitations of this study

Some limitations are suggested to be counted while interpreting and drawing conclusions from the findings of this study. The sample included for this study should not be generalized to the general population, even at the district level of the state. Secondly, we measured the BMI for all the adults available in a household at the time of the survey to increase the power of the sample. Thirdly, the cards for PDS and MNREGA belong to the household, not to each person, thus we have extrapolated that the benefit from those cards could be reached equally to all the household members. Fourthly, the other determinates of BMI such as morbidity status of the adults and others were not in the scope of the information collected in our survey, thus remained untouched. Finally, the Integrated Child Development Scheme, safety nets designed to address the nutrition security of children less than six years of age, as well as pregnant and lactating women was not included in this study because it does not target all household members, but rather specific individuals.

References

Dev, S M and A N Sharma (2010): "Food Security in India: Performance, Challenges and Policies", Oxfam India working papers series, New Delhi.

Dreze, J, and R Khera (2013): "Rural poverty and the Public Distribution System", *Economic and Political Weekly,* 45/46 (16), pp 55-60.

Dreze, J, and A Sen (2013): "An Uncertain Glory: India and Its Contradictions", Allen Lane, Penguin Group, Thompson Press India Ltd, New Delhi.

Greene, WH (2012): "Econometric Analysis", (7th ed.), Upper Saddle River, NJ, Prentice Hall.

High Level Expert Group (2011): "Report on Universal Health Coverage for India", Planning Commission of India, New Delhi.

Hosmer, DW Jr. and S Lemeshow (2000): "Applied Logistic Regression", (2nd ed.) Wiley, New York.

International Food Policy Research Institute (2013): "The Global Hunger Index, The Challenge of Hunger: Building Resilience to Achieve Food and Nutrition Security", Bonn / Washington, DC / Dublin: IFPRI.

Jayal, N G (1994): "The Gentle Leviathan: Welfare and the Indian State", *Social Scientist,* 22 (9/12), pp 18-26

M S Swaminathan Research Foundation (2008): "Report on the State of Food Security in Rural India", Chennai.

Mallick, D and M Rafi (2010): "Are Female-headed Households More Food Insecure? Evidence from Bangladesh" *World Development,* 38(4), pp 593 -605.

Ministry of Rural Development, Department of Rural Development, Government of India (2013): "Implementation of Mahatma Gandhi National Rural Employment Guarantee Act, 2005", forty second report, New Delhi.

Ministry of Rural development, Government of India (2008): "The National Rural Employment Guarantee Act 2005 (NREGA), Operational Guideline"' New Delhi.

Nawani, N, P (1994): "Indian Experience on Household Food and Nutrition Security (Regional Expert Consultation)", Bangkok.

Parasuraman, S, and T Rajaretnam (2011): "Agriculture, Food Security and Nutrition in Vidarbha: a Household Level Analysis", *Economic and Political Weekly,* 46(19), pp 42-50.

Planning Commission (2005): “Performance Evaluation of Targeted Public Distribution System (TPDS)”, Programme Evaluation Organization. Planning Commission, Government of India, New Delhi.

Prime Minister of India (2013): “PM's National Council on India's Nutrition Challenges”, New Delhi, Prime Minister’s Office, viewed on 1 July 2014, http://pmindia.nic.in/committeescouncils_details.php?nodeid=14

Quadagno, J (1987): “Welfare State Growth and Development”, *Annual Review of Sociology*, 33, pp 109-128.

Radhakrishna, R and K V Reddy (2004): “Food Security and Nutrition: Vision 2020”, Planning Commission, New Delhi.

StataCorp (2011): “Stata Statistical Software: Release 12”, College Station, TX.

Tharoor, S (2013): “India Embraces the Welfare State”, viewed on 1 July, http://www.project-syndicate.org/commentary/india-embraces-the-welfare-state-by-shashi-tharoor

The Economist (2011): “The State of India's Welfare State”, viewed on 1 July 2014, http://www.economist.com/blogs/freeexchange/2011/05/state_indias_welfare_state

The Gazette of India, Ministry of Law and Justice, Government of India (2013): “The National Food Security Act”, New Delhi.

The Government of India (1976): “The Constitution (Forty-Second Amendment) Act, 1976”, viewed on 1 July 2014, http://indiacode.nic.in/coiweb/amend/amend42.htm

United Nations (2013): The Millennium Development Goal Report. UN, New York.

Vatta, K, D K Grover and T Grover (2014): “Impact of NREGA on Wage Rates, Food Security and Rural Urban Migration in Punjab”, Agro-economic Research Centre, Department of Economics and Sociology, Punjab Agricultural University, Ludhiana. viewed on 1 July 2014, http://www.aercpau.com/docs/NREGA.pdf

WHO Expert Consultation (2004): “Appropriate Body-mass Index for Asian Populations and its Implications for Policy and Intervention Strategies”, *Lancet*, 363 (9403), 157-63.

Table 1: Percentage (distribution) or mean value of nutritional status among adults aged 15 – 49 years by their background characteristics, 2013

Background characteristics	Underweight	Optimum	Overweight/Obese	Total
Type of card				
Above poverty line	17.8	42.7	39.5	424
Below poverty line	30.1	50.5	19.4	316
Antodaya anna yojana	27.8	55.6	16.6	115
Had MNREGA card				
No	21.7	47.6	30.7	707
Yes	32.0	46.0	22.0	148
Age (mean value)	26.6	28.9	33.2	855
Sex				
Male	25.4	49.8	24.8	366
Female	24.0	45.0	31.0	489
Caste / Tribe				
Scheduled caste / Scheduled tribe	28.3	50.6	21.1	440
Non - Scheduled caste / Scheduled tribe	21.7	44.1	34.2	415
Cultivated crop in any land				
No	22.3	48.7	29.0	395
Yes	26.4	46.1	27.5	460
Ate without vegetables				
No	28.9	53.7	17.4	269
Yes	22.0	43.9	34.1	586
Could afford food from PDS only				
No	31.1	56.4	12.5	179
Yes	22.0	44.0	34.0	676
Only single meal in a day				
No	26.3	55.7	18.0	101
Yes	23.9	45.4	30.7	754
Absence of cereal, pulses, and vegetable				
No	31.4	53.8	14.8	75
Yes	23.1	46.0	30.9	780
Satiated the hunger with less food				
No	27.3	54.5	18.2	86
Yes	24.4	46.8	28.8	769
Self reported economic status				
Poor	30.0	50.3	19.7	546
Middle	16.2	43.1	40.7	271
Rich	13.3	26.7	60.0	38

State (district)				
Uttarakhand (Dehradun)	17.9	47.1	35.0	110
West Bengal (East Medinipur)	29.8	55.4	14.8	101
Chhattisgarh (Jashpur)	27.4	53.5	19.1	127
Haryana (Kaithal)	20.0	37.7	42.3	100
Odhisa (Mayurbhanj)	33.3	55.1	11.6	168
Punjab (Patiala)	13.5	35.1	51.4	118
Himachal Pradesh (Sirmaur)	26.1	45.3	28.6	131
Total	23.8	47.3	28.9	855

Table 2: Coefficients estimated from multinomial logistic regression showing the association between safety nets for food security and nutritional status of adults, 2013

			95% Confidence Interval	
	Adjusted coefficient[1]	p value	Lower limit	Upper Limit
Underweight				
Type of card				
Above poverty line (ref.)				
Below poverty line	0.091	0.702	-0.376	0.559
Antodaya anna yojana	0.019	0.953	-0.610	0.649
Had MNREGA card				
No (ref.)				
Yes	0.271	0.243	-0.183	0.724
Optimum	(base outcome)			
Overweight / obese				
Type of card				
Above poverty line (ref.)				
Below poverty line	-0.436	0.059	-0.888	0.016
Antodaya anna yojana	-0.756	0.036	-1.464	-0.049
Had MNREGA card				
No (ref.)				
Yes	0.173	0.504	-0.334	0.679
Log likelihood	-806.970			
$\chi 2$ level of significance	< 0.0001			
Likelihood Ratio $\chi 2$	199.23			
Number of observation	855			

[1]Coefficients for availability of 'type of card' and having 'MNREGA card' adjusted for variables shown in Table 1.
(ref.), reference category

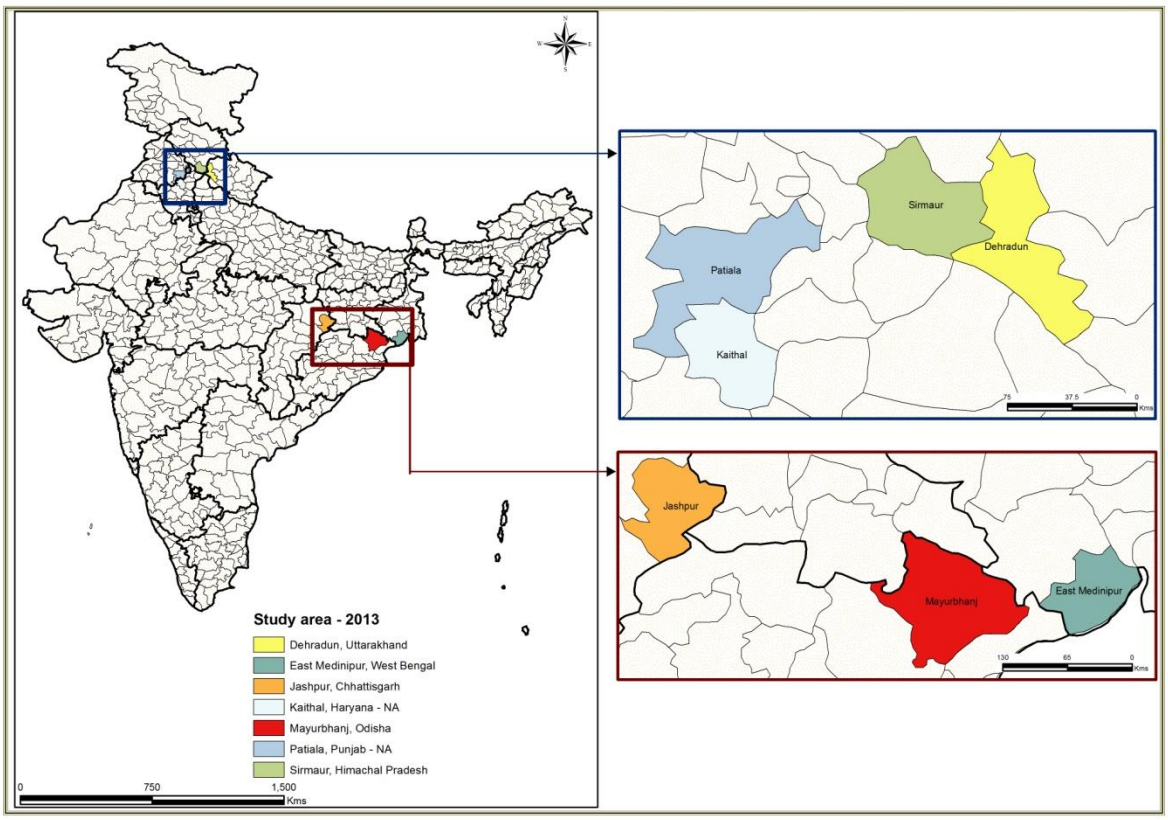

Figure 1: Districts in respective states selected for the study, 2013