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Social safety nets for food and nutritional security in India

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Social Safety Nets for Food and Nutritional Security in India[1]

Sudha Narayanan and Nicolas Gerber

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Abstract

This paper brings together existing literature on the Mahatma Gandhi National Rural Employment Guarantee Act (MGNRGEA) and the Public Distribution System (PDS) in India, offering a narrative review of the evidence on impacts on food security, health and nutrition of beneficiaries. Both programs operate on a large scale and have the capacity to impact the factors leading to undernutrition. It is evident that despite the deficiencies in implementation, both the MGNREGA and the PDS are inclusive and reach the poor and the marginalized who are likely to also experience greater undernutrition and poor health. Data challenges have however prevented researchers from conducting studies that assess the ultimate impact of these two large-scale programs on health and nutrition. The evidence that exists suggests largely positive impacts indicating a clear potential to make these programs more nutrition sensitive not just by incorporating elements that would explicitly address nutritional concerns but also by directing specific attention to innovations that strengthen critical complementarities and synergies that exist between the two programs.

Keywords: social safety nets, India, complementarity and synergies, food and nutrition security, health

JEL Classification: H5, H7, I38

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List of Acronyms

AIE	Alternative and Innovative Education
APL	Above Poverty Line
BPL	Below Poverty Line
DLHS	District Level Health Survey
ICDS	Integrated Child Development Services
EGS	Employment Guarantee Scheme
FFW	Food for Work Program
GDP	Gross Domestic Product
IGMSY	Indira Gandhi Matritva Sahyog Yojana
IHDS	India Human Development Survey
JSY	Janani Suraksha Yojana
KBK	Koraput-Bolangir-Kalahandi
MDM	Mid-day Meals
MSP	Minimum Support Price
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
NAC	National Advisory Council
NCLP	National Child Labour Project
NFHS (DHS)	National Family Health Survey (Demographic Health Surveys)
NFSA	National Food Security Act
NFSB	National Food Security Bill
NIF	National Investment Fund
NSS	National Sample Survey
PDS	Public Distribution System
PSK	Prarambhik Shiksha Kosh
PSM	Propensity Score Matching
RPDS	Revamped Public Distribution System
TPDS	Targeted Public Distribution System
WTO	World Trade Organization

1 Introduction

India has seen a slew of rights based social assistance initiatives in the past decade. Among these, the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), 2006, and the National Food Security Act (NFSA), 2013, stand out for their scale and ambition.[2] The MGNREGA is a demand driven program that guarantees a minimum of 100 days of unskilled manual work for each rural household. The works created under the MGNREGA are meant to provide communities with durable assets that can secure their livelihoods in substantive ways. The NFSA aims to provide for food and nutritional security through a human life cycle approach that addresses needs of an individual from birth to senescence. The MGNREGA is arguably the largest public works program in the world, having generated more than 18 billion person days of work and involving expenditures at the cost of US$ 44.6 billion since its inception in 2006.[3] The NFSA operates on a similarly massive scale and includes, among others, the largest school meal and childcare program and perhaps the largest subsidized foodgrain distribution scheme in the world with an allocation of 56.24 million tonnes of foodgrains across various welfare schemes during the year in 2015-16.[4] The enacting of these laws came after a long and contentious debate with respect to a host of issues, including especially the fiscal cost that this would impose upon the state. In content, the programs envisioned under these acts are not new. The developing world has a long history of workfare and food assistance programs that have been the subject of extensive research (Subbarao, 1997; Ravallion 2003; Besley and Coate 2007, von Braun, 1992, 1995 Barrett, 2002). Yet, India´s legal mandate to implement these as nationwide programs has few precedents.[5]

It is now well recognized that despite robust economic growth, India continues to grapple with persistent and widespread undernutrition, poverty and rising inequalities (Drèze and Sen, 2013, for example). That economic growth, despite its importance, cannot alone deliver nutritional security has been evident for some time, making a case for specific interventions to address nutritional problems (Haddad, et al., 2002; Ruel and Alderman, 2013, for example). Recent thinking suggests that in order to tackle widespread problems of nutrition, it might be necessary to move beyond merely scaling up "nutrition-specific" interventions (i.e., those that address the immediate determinants of nutrition) and devote "new and aggressive focus on coupling effective nutrition-specific interventions…with nutrition sensitive interventions" that address the underlying causes of undernutrition (Ruel and Alderman, 2013, pp.536). The latter typically operate on a massive scale, with the ability of reaching a large number of people vulnerable to undernutrition (Ruel and Alderman, 2013). India's experience with these two mega-programs in addressing the chronic problem of undernutrition will therefore likely hold important lessons and shape policy discussions worldwide on the relevance, efficacy and potential of this approach. The diversity of experiences within India would offer particularly valuable lessons on the contextual conditions that influence the efficacy of these programs.

[2] Social assistance is not restricted to programs under these Acts. Nor are these the only pieces of legislation that use a rights based approach. Combined with other legally backed initiatives including the Right to Information Act and the Right to Education Act as well as other social assistance programs these form a cluster of programs aimed at empowering the poor and represent a concerted effort to make the growth process more inclusive.

[3] Days generated are until financial year 2014-15 and expenditures include current financial year 2015-16 in cumulated in nominal terms valued at the exchange rate in November 2015 (http://mnregaweb4.nic.in/netnrega/all_lvl_details_dashboard_new.aspx)

[4] During 2013-14, an estimated 104.5 million children benefitted from hot cooked nutritious food in 1.16 million schools across the country (http://mdm.nic.in/) and 102 million children and mothers were reported to benefit from supplementary nutrition as part of the ICDS, serviced by 1.26 million centres.

[5] Both Brazil and South Africa do have elements of the right to food (See Souza and Chmielewska, 2011 for a comparative perspective of the three systems), but not of guaranteed employment.

This is relevant also because in India debates on the desirability of these programs persist. On the one hand, advocates believe these Acts do not go far enough in securing the basic rights of people to lead a life of dignity; detractors view these as expensive populist measures that feed corruption and are designed to fail, something India can ill afford. Indeed, the recent change in Government at the centre has cast a deep shadow over the future of both programs.[6] In the fiscal year 2014-15, there has been an implosion of the MGNREGA and the number of days generated and persons employed under the program have hit a historic low, although indications of a recovery of the program were apparent by the middle of 2015. Likewise, there has been limited progress with the implementation of the National Food Security Act (NFSA), although some states are showing a far greater inclination to implement the Act than others where there appears to be a policy impasse. Furthermore, there are strong indications that the preferred route of assistance of the new regime is one where cash transfers eventually replace in-kind transfers (Government of India, 2015).[7] While the fiscal merits of cash versus in-kind support have been widely discussed and indeed have been the prime motivation for new thinking on these safety nets, the extent to which food and nutrition security programs, in their current forms, have aided poverty alleviation and food security has remained in the background. This is despite the recognition that these programs might be key factors contributing to the reduction in child under-nutrition in India (von Grebmer, et al., 2015).

This paper brings together existing literature on both these legislated efforts, i.e., the MGNREGA and the NFSA, offering a narrative review of the evidence on aspects of food security, health and nutrition in rural India. The following questions motivate our review. How far do these interventions advance food and nutritional security? What rigorous and systematic evidence is available on these impacts and pathways? Where are the gaps in research that limit our understanding of the efficacy of these programs? In addressing these questions, a goal of this paper is to examine the potential for synergies across these programs, both at the macro level and at the level of households, specifically in terms of direct and indirect impacts on health, food and nutrition security.

While the NFSA has several constituent programs and many studies have looked at the impacts of each of these, the specific focus in this paper would be the Public Distribution System (PDS), which has been at the heart of these debates, often regrettably at the expense of other schemes.[8] We focus on rural India, given that the MGNRGEA is relevant only for rural areas. Further, the scope of this paper is restricted to impacts on indicators of health and nutrition status and on select intermediate outcomes such as food consumption. Broader reviews of MGNREGA or PDS impacts on incomes, labour markets and wages are available elsewhere. Only research that makes explicit links with food and nutritional security are discussed in this review.

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[6] These sentiments have been expressed in both policy documents and announcements as well as informally. For example, The Government earlier proposed to restrict the MGNREGA to 200 districts in the country along other changes that would increase the component used on materials rather than labour. Twenty-eight economists then wrote an open letter to the Prime Minister urging him to not curtail the MGNREGA. Later, the Prime Minister told the parliament's lower house (Lok Sabha) that he would continue with the MGNREGA and that it would serve as an enduring reminder of the previous government's failures.

[7] In 2014, the Government initiated a cash transfer program in lieu of the in-kind distribution of grain in select union territories in India in what is seen as a precursor to replacing in kind transfers with cash. In the Union Budget of 2015, while allocations to the MGNREGA were held at scale, those for the Integrated Child Development Services (ICDS) were reduced. The Economic Survey, 2014-15 of the Government of India, articulated a vision for cash transfers aimed at "wiping every tear from every eye" (page 21, Volume 1) Economic Survey stating that the combination of unique identity numbers, bank accounts and mobile technology "offer exciting possibilities to effectively target public resources to those who need it most" and suggesting that "success in this area will allow prices to be liberated to perform their role of efficiently allocating resources and boosting long-run growth."(page 21, Vol.1, Economic Survey, Government of India, 2014-15). As of September 2015, the Government has framed guidelines for a cash transfer program.

[8] We accommodate evidence on the other programs that are part of the NFSA in Appendix Table 5.

As such, evidence of impacts of both the MGNREGA and PDS on food and nutritional security is somewhat limited due to the paucity of current and large-scale longitudinal data on health and nutrition of individuals. Second, owing to the structure of the programs already in place, there has been little scope to evaluate the functioning of these programs against alternate forms of assistance.[9] Third, the more significant consequences of the MGNREGA and the PDS, especially the former, are in terms of social impacts on women, for instance, that are not only hard to measure in themselves but also influence nutrition and health of beneficiaries only over a longer span of time. That said, there are several carefully executed research studies that assess the impact of the PDS and MGNREGA on various aspects of wellbeing, some of which negotiate data constraints to establish causal relationships. Since the implementation of both these schemes is highly variable across regions, it is not self-evident that these schemes would in fact have any impact at all in areas where implementation is not very good. Indeed, much of the evidence tends to be from specific states and geographies where implementation has been good and where data are available. Studies discussing these impacts therefore do not necessarily represent the diversity of contexts within India where the program is implemented. Due to these vast implementation differences and their implications for the ability of a `nutrition-sensitive' program to influence health and nutritional status, we document patterns of participation in the MGNREGA and PDS. We combine the use of nationally representative datasets from different rounds of the National Sample Survey (NSS) and draw on existing reviews to obtain a composite picture of the state of these programs in India.

The paper is organized as follows. Following this background is a brief history of the MGNREGA and the NFSA (and especially the PDS), salient features of the Act and an overview of the scale of implementation. Following this, we outline the conceptual pathways through which the two programs are expected to have an impact and the possible synergies between them, both at the macro level and at the household level. We then review the existing literature, mostly published, on impacts of the two programs on various aspects of food consumption, health and nutrition. We identify gaps that persist in research on these impacts and identify potential areas of future research.

[9] Ideally one would want to evaluate the impact on health and nutrition of cash assistance, in kind assistance and a combination of the two to make relative judgements on the efficacy of the different approaches. These are largely rendered impractical in the Indian context since, for example, the PDS already exists in most areas.

2 The Programs: History, Background and the Current Act

Neither the MGNREGA nor the NFSA is entirely new or revolutionary. The Indian state of Maharashtra had long implemented an Employment Guarantee scheme (EGS), since 1972 that in fact provided the inspiration and template for the nationwide program. [10] Even as early as the 1960s, the Third Five Year Plan references the need to provide work for 100 days of employment.[11] Similarly, the NFSA merely consolidated and brought together under one Act a number of programs that had already been converted into legal entitlements by the Supreme Court of India in the Right to Food case. [12] In its consolidation and in some cases, expansion, the NFSA has brought together a cluster of very different programs under a common legislative framework.

The origins of the NFSA go back to 2001 when the threat of severe hunger loomed large in many parts of the country, even as the government had accumulated stocks of about 50 million tonnes (Srinivasan and Narayanan, 2007). In April 2001, the People's Union for Civil Liberties (PUCL), an active civil society group in the north Indian state of Rajasthan, submitted a writ petition to the Supreme Court of India, demanding that the country's food stocks be used without delay to protect people from hunger and starvation. This petition led to a prolonged "public interest litigation" (PUCL vs. Union of India and Others, Writ Petition [Civil] 196 of 2001). Supreme Court hearings were held since then at regular intervals and significant interim orders were issued by the court from time to time regarding the scope and implementation of eight food-related schemes of the Government of India. The litigation provided a springboard for the Right to Food Campaign, which extended its efforts to also secure employment guarantee. (Srinivasan and Narayanan, 2008; Hertel, 2015, for discussions on the Right to Food campaign.). After protracted debate and discussion that included explicit disapproval by at least one expert Committee[13] on account of the fiscal commitments entailed by these programs, the Acts were nevertheless passed – the MGNREGA in 2006 and the NFSA in 2013.

The MGNREGA is a single program with several objectives, while the NFSA involves a cluster of programs aimed at addressing food security and nutritional gaps for different target groups, mothers, pre-school children, school going children, adults and senior citizens. The MGNREGA has more of a national character and aims

> "to provide for the enhancement of livelihood security of the households in rural areas of the country by providing at least one hundred days of guaranteed wage employment in every financial year to every household whose adult members volunteer to do unskilled manual work and for matters connected therewith or incidental thereto." (pg. 1 Government of India, 2005)[14]

[10] Several other workfare programs such as the Food for Work (FFW) have been in place in India that paid cash and grain to those who showed up on public works. But the element of guarantee was absent in these programs. See Dev (1995) for a review of Maharashtra's Employment Guarantee Scheme (EGS).

[11] See Chapter 23, Point 12, http://planningcommission.nic.in/plans/planrel/fiveyr/3rd/3planch23.html.

[12] For a history of the case, see Srinivasan and Narayanan (2008).

[13] For example, the expert committee appointed by the government to review the draft National Food Security Bill (NFSB) prepared by the National Advisory Council (NAC) observed that the 'massive procurement of food grains and a very large distribution network entailing a substantial step up in subsidy' was a problem. A related concern was the foodgrain requirement to support the NFSB. Their estimates suggest that the proposed PDS would require stocks between 54 and 74 million tonnes and at current economic costs of operations, outlays of the order of about Rs 90,000 crore, and deemed these to be damaging to the fiscal health of the country. More recent estimates of costs under different scenarios are available in Kozicka, et al. (2015).

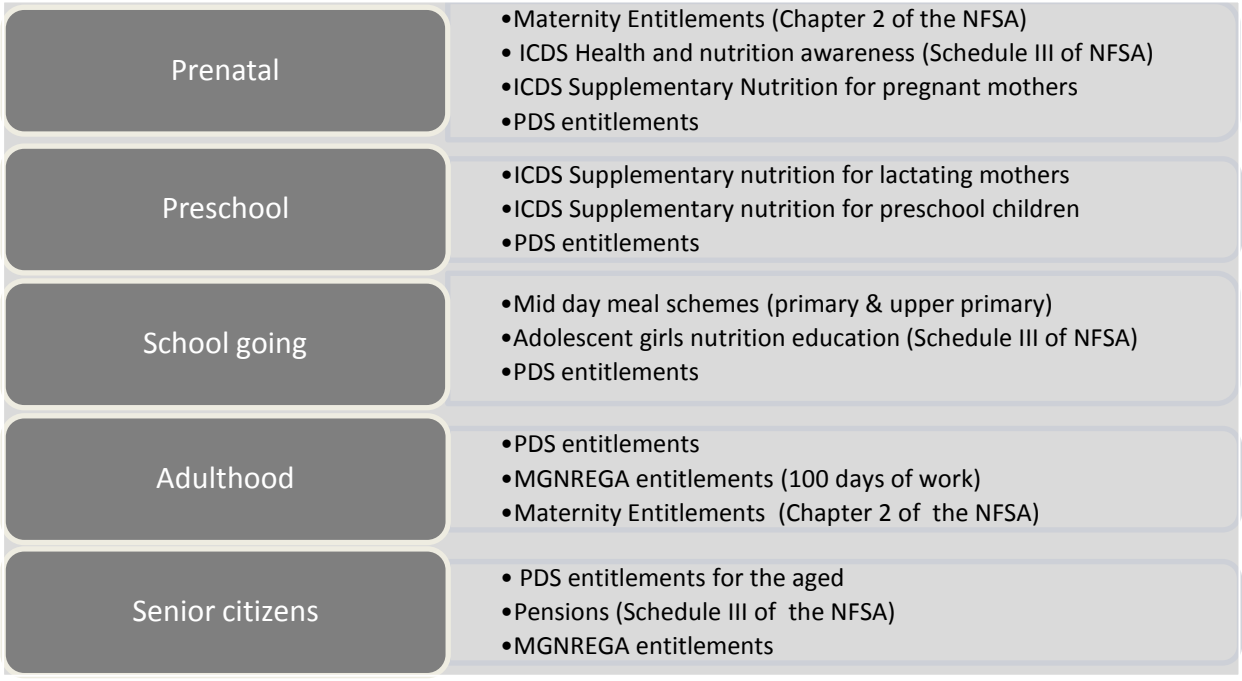
[14] The National Rural Employment Guarantee Act, Gazette of India, No.42 of 2005, September 7, 2005, Ministry of Law and Justice, Government of India.

The MGNREGA tends to be more comparable across states, given the novel institutional framework that the rights based approach to employment guarantee necessitated. Thus, although significant inter-state variations do exist in terms of modalities, priorities and implementation methods, the MGNREGA was not grafted on to pre-existing programs to the extent the NFSA was, except perhaps for the state of Maharashtra. The NFSA focuses on a lifecycle approach and as the Act articulates, it aims 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."(pg.1, Government of India, 2013)[15]

Although much of the recent debates have focussed on the Public Distribution System (PDS) that provides foodgrains (mainly, but not exclusively, rice and wheat) at subsidized prices, the NFSA comprises several other programs over the life cycle, starting with maternity entitlements, infant and child feeding and care through the Integrated Child Development Services (ICDS), school meals through the Mid-Day Meal (MDM) scheme and food related schemes for pensioners and widows and the extremely poor (See Figure 1; Appendix Table 1 for details on entitlements as per the NFSA). Not all of these components have explicit entitlements under the NFSA. For example, pensions and nutritional education find mention in Schedule III of the NFSA.[16]

Figure 1 The Life Cycle Approach to Safety Nets in India



Notes: See Appendix Table 1 for specific entitlements under each program.

The cluster of programs that come under the ambit of the NFSA has diverse goals, target beneficiaries and addresses different aspects that influence nutritional and health outcomes. Maternity entitlements under the NFSA aim to provide cash to pregnant women and mothers of new born children. The goal of such cash transfers is to preserve (in part) the wages that the mother

[15] The National Food Security Act, Gazette of India, September 10 2013, Ministry of Law and Justice, Government of India.

[16] Schedule III suggests that the Government "will strive to progressively realize"(pg. 11, NFSA)…" nutritional, health and education support to adolescent girls" and "adequate pensions for senior citizens, persons with disability and single women"(pg. 17, NFSA)

might forego on account of the pregnancy or childbirth. The Indira Gandhi Matritva Sahyog Yojana (IGMSY) is a cash transfer programs that runs on a pilot basis in 53 districts and is expected to be converted into a universal scheme under the NFSA (Falcao, et.al 2015).[17] These add to pre-existing programs, currently outside the purview of the NFSA, such as the Janani Suraksha Yojana (JSY), to promote institutional deliveries and reduce neonatal, maternal and infant mortality. The ICDS scheme, initiated in 1975, was designed to supplement nutrition for pregnant and lactating mothers and for children in pre-school, provide nutrition education to adolescent girls and women and run pre-school activities for children.[18] The mid-day meal scheme (MDM), mandated under the NFSA, is served in designated categories of schools and seeks to provide one hot meal a day for children during school days.[19] Midday meals were introduced in a systematic way in Tamil Nadu's primary schools as early as 1962–63 and by 1990-91 several other states had a similar program in place. In August 1995, National Program of Nutritional Support to Primary Education provided free food grains for distribution. While transport was the central government's responsibility, all other costs and arrangements were taken care of by the state governments. Several states adopted this system until the Supreme Court orders were issued in 2001 mandating that hot cooked meals be served in schools. Likewise the Public Distribution System too existed even before the NFSA. Food price subsidies in India evolved through three broad phases. Between the 1960s and the early 1990s, the PDS focused largely on urban areas to tackle food scarcity. The Revamped Public Distribution System (RPDS) from 1992 to 1997 sought to improve the program's reach to the poorer rural areas of the country. Later in 1997, the Targeted Public Distribution System (TPDS) modified the scheme by distinguishing consumers above the official state specific poverty line (APL) to those below it (BPL) in both rural and urban areas. In most states, both the extent of subsidy and sometimes, allocations varied across the two categories. Despite this thrust, different states continued to implement it with differences and the NFSA merely proposes a minimal entitlement for the states. In some states, the PDS functions as a universal program, where the poor (BPL households) and non-poor (APL households) are not distinguished. Many states provide additional subsidies on foodgrains allowing consumers to purchase these at prices lower than those mandated under the NFSA. Even the basket of commodities provided under the PDS varies across different states, with some offering just rice and /or wheat, sugar and kerosene, and others offering fortified flour, iodized salt and pulses as well. The NFSA is thus a composite program; each sub-program has its own history, target group and goals. Despite the fact that the NFSA brings all of these programs together under a single umbrella, inter-state differences in entitlements and implementation reflect the differentiated histories of these programs in different states. Together, the NFSA and the MGNRGEA were meant to provide both food and employment enabling vulnerable households to survive systemic and idiosyncratic shocks.

[17] Several states such as Tamil Nadu, Odisha, etc. have their own cash transfer schemes, which are not covered here. In general, very little is known about maternal undernutrition in India and estimates suggest that Indian women at the end of their pregnancy term might weigh less than those sub-Saharan women at the beginning of their pregnancy (Coffey, 2015). Given the importance of the first thousand days since inception, maternity entitlements are therefore a crucial component of the NFSA.

[18] One of the issues with all the supplementary nutrition programs is the concern that these in kind food transfers should only supplement and not supplant the regular meals or should be eaten consumed by those it is intended for. See Appendix Table 5 for a review of the impacts of ICDS.

[19] Children studying in Primary and Upper Primary Classes in Government, Government Aided schools, schools under local administration, EGS and AIE Centres, Madarsa and Maqtabs supported under Sarva Shiksha Abhiyan and NCLP Schools run by Ministry of Labour are eligible for Mid Day Meal.

3 Implementation and Targeting

3.1 Scale of the programs

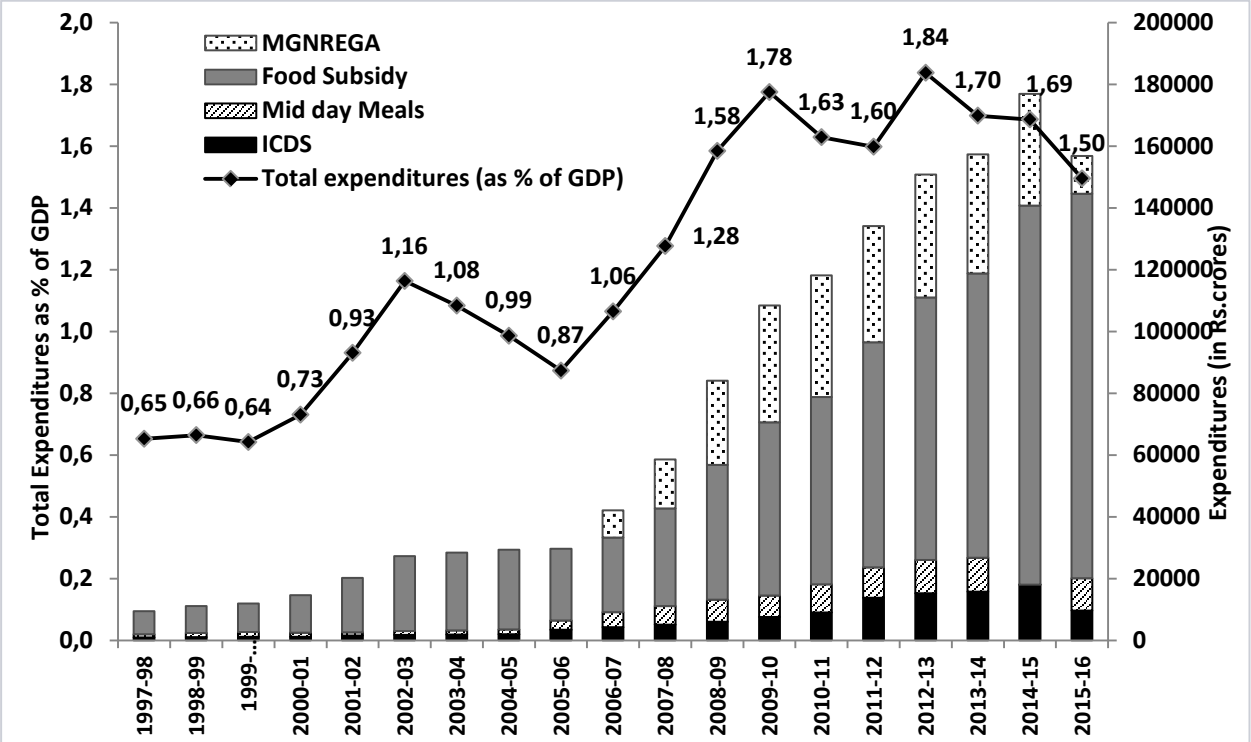
Debates on the NFSA and MGNREGA leading up to their promulgation and since have mostly focussed on their fiscal implications. It is therefore appropriate to lay out the scale of these programs in terms of both allocations as well as extent of beneficiaries. Many writers believe the outlays on these two programs to be too great a burden on the exchequer and a waste of resources on account of leakages (see Bhagawati & Panagariya, 2014; Gulati, et al., 2012, for example).[20] Others have contested these claims (Sinha, 2013; Abreu, et al, 2014, for example). The fiscal allocations for these programs come mainly from the central government, although states can also allocate to these programs. Figure 2 offers a historical split and progression of fiscal allocations to the main elements of the NFSA and the MGNREGA. As of 2013-14, the central government's allocations to the ICDS, Mid Day Meal, PDS and MGNREGA together accounted for just 1.7% of the Gross Domestic Product (GDP).[21] This figure is an overestimate when one considers that much of the food subsidy is also support to farmers from whom grain is procured and an underestimate given that many states spend over and above the central government's expenditures.[22] The budgetary allocations represent a rather small proportion of the country's GDP. This is especially evident when compared with the percentage of GDP spent on social protection by low-income countries (3.4%), upper middle incomes countries (4%), China (5.4%) and significantly lower than the high-income countries (10.2%) where Japan stands out (19%).

[20] The opposition to both these programs reflect several other concerns. For example, some have asked if this is the best way to achieve its goals or whether the PDS can be replaced by cash transfers or food coupons (Kotwal, et al 2011; Kapur, et al 2008, Kapur, 2011). Many who support the MGNREGA favour cash transfers in lieu of food, so that these debates are not simply a matter of exclusively an ideological view. Still others believe that India's policy would have to be more in conformity with the WTO Agreement on Agriculture since the NFSA relies heavily on public procurement of grains (Hoda and Gulati, 2013, for example).

[21] There are suggestions that one should look at the ratio of these expenditures to fiscal revenue or as a share of total public expenditures, but expenditures as proportion of GDP provides a yardstick of comparison across countries. It should also be noted that if one were to exclude the ICDS and Mid-Day Meal, the figure would be less, but if one were to include state allocations the figure would be higher as it would with the inclusion of all the programs that are part of the NFSA. The figure cited here is meant to be a ballpark rather than a precise estimate. See also Himanshu and Sen(2013b) for example on the issue of fiscal allocations

[22] The expenditures on these major programs is less than India's defence expenditure, for instance, which stood at around 2.4%.

Figure 2: Fiscal allocations to select programs



Sources: Union Budget documents; http://mdm.nic.in/;http://mnrega.nic.in; http://dfpd.nic.in/ and http://www.fci.gov.in/. GDP is from Table 1.3BI Gross value added at factor cost, 2011-12 series from 2001-12, Economic Survey 2014-15. Notes: For Mid Day Meal, all reported expenditures till 2008-09 are revised estimates, from 2009-10 to 2012-13 are actual releases; Expenditures from 2006-07 onwards includes the PSK component expenditures from 2009-10 to 2012-13 includes the NIF component as well. No NIF expenditures reported for 2013-14 and 2014-15. Releases reported on the MDM website (http://mdm.nic.in/). For food subsidy, the figure for 2015-16 is a budget estimate, the figures for 2013-14 and 2014-15 include additional allocations under the NFSA. For 2015-16 we have used the 2014-15 figure to compute the total expenditures as percentage of the GDP.

Even with this tiny fraction of the total GDP devoted to these programs, both the MGNREGA and PDS have a sweeping reach, as summarized in Table 1. In rural India, according to data from the National Sample Survey (NSS), in 2011-12, 51.8% were using the PDS as a source of grain (up from 44.9% in 2009-10) and 23.2% of rural households with adult members had worked at least once in the MGNREGA in the year preceding the survey, down marginally from 24.41% in 2009-10.[23] These two mega programs were therefore reaching a quarter of the rural households in the case of the MGNREGA and over half in the case of the PDS, as per these surveys.

The dependence of these households on the PDS is, however, relatively less in the sense that even for the households that access the PDS, only 27.6% of the rice/wheat quantity consumed by the household and 36.31% of quantity purchased actually came from the PDS. These shares have

[23] The official estimate of the number of beneficiaries was already discussed in the introduction, the figures from the NSS present estimates based on household surveys. The National Sample Surveys (NSS) are periodic surveys conducted across India on household consumption expenditure. Quinquennial rounds (called "thick") are complemented by annual rounds (called "thin" rounds) and special purpose surveys. The NSS 68th Round (July 2011 - June 2012) and the NSS 66th Round (July 2009 - June 2010) surveys include schedules on Employment and Unemployment and Household Consumer Expenditure; these are used for the study. These surveys include information on 281,237 individuals in 2009-10 and 280,763 in 2011-12 belonging to the survey households.

increased by 3 and 5 percentage points relative to 2009-10, reflecting greater reliance of the PDS, partly on account of the difference between the market price and the PDS price, which has been widening both due to inflation as well as because of increase in subsidies at the state levels (Khera, 2011; Rahman, 2014). Over this period, the median share of PDS sourced grain in both consumption and purchase increased by 13.3 percentage points and 16.1 percentage points respectively (Table 1).

Table 1: The Reach of the PDS and MGNREGA

	2011-12	2009-10
Households with adult members who have got work through NREGA (%)	23.2	24.4
Rural households buying any rice/wheat from the PDS (%)	51.8	44.9
Share (%) of PDS in total rice/wheat consumption in quantities for PDS users		
Mean	27.7	24.2
Median	13.3	0
Share of PDS in total rice/wheat purchases in quantities (%) for PDS users		
Mean	36.3	31.2
Median	28.6	12.5

Source: Computed from the National Sample Surveys.

3.2 Who participates? Implementation and coverage

If the recognized potential of nutrition-sensitive programs lies partly in their wide reach, the MGNREGA and the PDS certainly possess this characteristic. The figures on the reach of the PDS and MGNREGA however mask significant regional variations, since both programs are influenced substantially by differing eligibility criteria, delivery systems and implementation efficiency at the state level. Comparative studies of implementation across states suggest that these variations are best understood in the context of local political dynamic and supply-side factors.[24] There is also a popular perception that a state that implements one program well also tends to implement others well and that the states that are among the highest spenders in the MGNREGA are not the poorest[25]. Dutta, et al. (2012) point out a negative correlation between poverty head count ratio and days of employment generated. Some critics argue that this is a basis for restricting the program to poor areas (Bhagwati and Panagariya, 2015 for the MGNREGA, for example). It is also well known that the PDS is virtually dysfunctional in the poorest states (e.g. Uttar Pradesh, Bihar) and functions very well in the richer states of Kerala, Tamil Nadu and so on. It has been argued that poor states also tend to have poor implementation capacity (Khera, 2014; Desai, et al., 2015). These patterns reflect a specific problem since poorer states are more likely also to have high undernutrition rates and poor implementation seriously undermines the potential of these programs to achieve (potentially large) impacts.

There are however several good reasons to resist the temptation to make simplistic categorizations of states. The first reason is, even within a state there is often significant variation. For example, in the case of the MGNREGA, while some studies suggest that politics plays a limited role and that MGNREGA spending is largely needs-based (Sheahan, et al., 2014), at a more local level there is emerging evidence that the sarpanch or village head is more likely to allocate work to those residing in the same hamlet as he/she does (Himanshu, et al., 2014) or that workers who support the political party in power tend to both be more likely to get work and get more work when they do get work (Das, 2015; Dey 2012).

[24] http://www.effective-states.org/issue-mgnrega/. Accessed October, 2014.

[25] This is true not just for the PDS and MGNREGA but also of the ICDS and mid-day meals. For details on these issues, see CIRCUS (2006) for the ICDS, Drèze and Khera (2014) for various entitlement programs.

Some states, such as Tamil Nadu, Himachal Pradesh, Kerala and the north-eastern states of Tripura, etc. have higher coverage in terms of the proportion of households accessing different programs, than do states such as Uttar Pradesh, Bihar, Jharkhand. This reflects in part the different eligibility criteria in the case of PDS and implementation efficiency in the case of the MGNREGA. Figure 3 suggests that within a state, there could be differences across districts in terms of the participation in MGNREGA in 2011-12 and PDS access for the same year.[26] In general, the correlation between the proportion of all households participating in the MGNREGA and those buying any rice or wheat from the PDS is low at 0.25 and 0.33 in 2009-10 and 2011-12 respectively. Noteworthy is that poorer districts where one would expect MGNREGA demand to be higher also have low access rates relative to richer districts in states such as Tamil Nadu and Andhra Pradesh. In the case of the MGNREGA in particular, access (or coverage) is a good measure of whether the system works, especially when supply side factors are deemed important.

A second reason to avoid simplistic categories is on account of the tremendous changes that have been taking place since 2005 in the implementation record of several states. A particularly important aspect has been the extent of leakages. In the case of the PDS for instance, Khera (2010) documents trends in the diversion ratios (the quantity that is reported in government budgets as offtake for distribution to consumers under the PDS, that is not reflected in the NSS consumption data as PDS sourced) in different states. This is expressed as a percentage of the reported offtake and thus a higher mismatch would imply greater diversion and vice versa. Khera (2010) classifies states into leaders, laggards and revivers, the last category including states that were poor performers but had improved rapidly over the period 2004-05 to 2009-10. These include states such as Chhattisgarh and Odisha that used to be regarded as poor performers. As Khera (2011) points out for instance, the estimated diversion ratio was around 54 per cent in 2004–05, declining to 41 per cent in 2009–10. It ranges from as low as 7 per cent in Tamil Nadu to between 85 and 95 per cent in Bihar, Jharkhand, Assam and Rajasthan. The diversion rates declined in almost every state, with big improvements in some: down from 23 per cent to 8 per cent in Andhra Pradesh, from 85 to 47 per cent in Jharkhand, from 76 to 30 per cent in Orissa and from 52 to 11 per cent in Chhattisgarh (Drèze & Khera 2011; also Khera 2011a). Granted that the overall scale of leakages is still too high to be acceptable, improvements across states, especially in the poorer regions represent a positive development. An extension of this study to 2011-12 suggests that even states such as Bihar, long considered as chronically poor performers have shown improvements (Rahman, 2015).

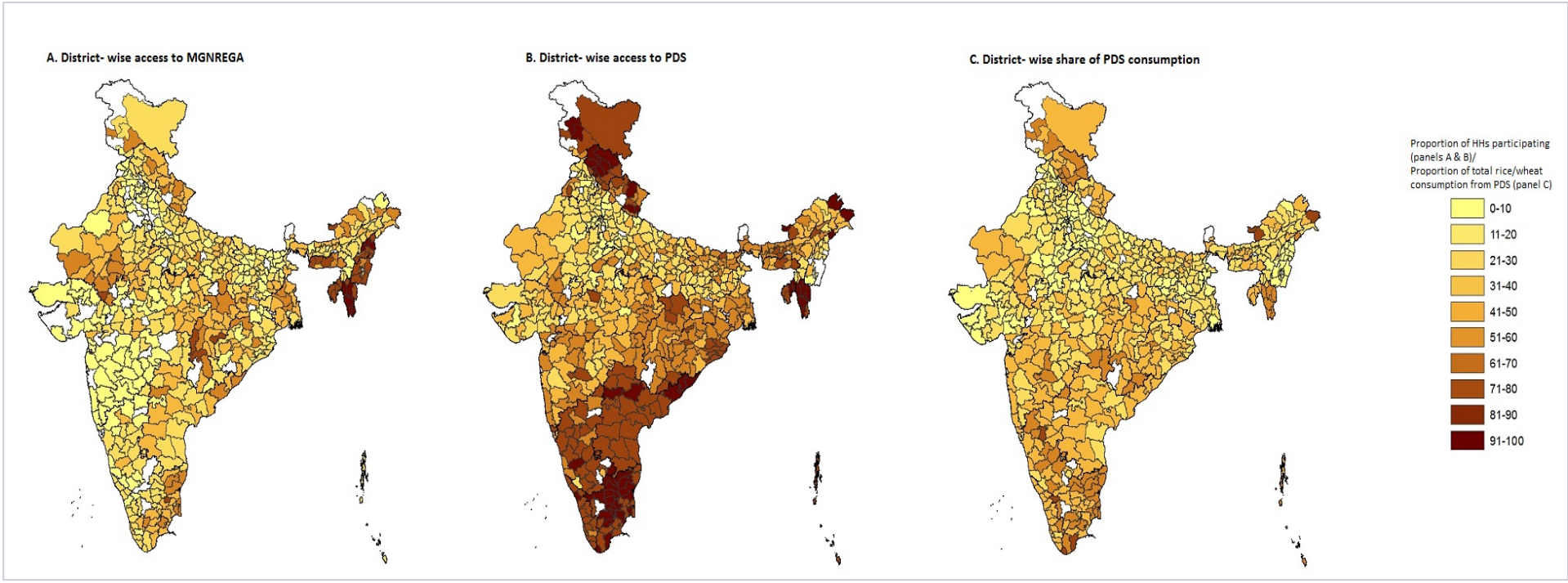
For the MGNREGA, one approach to estimating the extent of leakages is to compare administrative data on extent of MGNREGA employment to estimates of reported days worked on public works programs (and where available, specifically the MGNREGA) to gauge the extent of deviation. Imbert and Papp (2012) find that in 2007-08 only 51% of reported MGNREGA employment is independently confirmed by the survey data. This figure is however 71% in 2009-10 and 80% in 2011-12, suggesting a decline in leakages.[27] There is however continuing evidence that supply side constraints in the form of administrative rationing (where not everyone who seeks work in fact obtains work) and delays in wage payments discourage workers from seeking work (Desai, et al., 2015; Narayanan, et al 2015,

[26] Access is defined as the following following: For MGNREGA, it is the proportion of rural households in the district with at least one member aged 18 or above, that had at least one member getting work through MGNREGA; (the other definition of MGNREGA access was to consider the proportion of rural households in the district with a MGNREGA job card that had at least one member getting work through MGNREGA, but these are not reported). For PDS, it is the proportion of all rural households in the district that consume at least some grain (rice or wheat) procured through the PDS; another metric is the share of the quantity of grains (rice or wheat) consumed from the PDS in each rural household's total consumption of grains averaged across households in the district.

[27] Early perspectives on the PDS and EGS in Maharashtra suggest that while the PDS has a wide reach it has higher leakages. The EGS on the other hand has a more limited reach but also lower leakages (Dev, 1996).

Himanshu, et al, 2015; Drèze and Khera, 2014). The story of MGNRGEA implementation is thus complicated.

Figure 3: District wise access to the MGNREGA and the PDS



Source: Computed from the NSS.

If the PDS and MGNREGA are to have a substantive impact on the underlying drivers of undernutrition, these programs would need to reach the poor and marginalized communities, given evidence from the National Family Health Survey (NFHS), 2005-06 that they are more likely to be undernourished. The question therefore is to what extent do the PDS and MGNREGA actually benefit the vulnerable sections of the population? Existing research on the recent performance of both the PDS and the MGNREGA indicate that they are by and large pro-poor and inclusive of marginalized social groups.

Dutta, et al (2012) and Liu and Barrett (2013) suggest that although there is some administrative rationing in the MGNREGA where those who seek work are not provided work, the pattern of rationing and MGNREGA participation is moderately pro-poor. (Figures 4a, 4b, 4c). This is also true in the most recent year for which NSS data is available (Narayanan, et al., 2015). Pro-poor rationing implies that the rationing rate, which is the difference between the total number of those who seek work and those who obtain work divided by those who seek work, is lower for the poor than for the non-poor. Figure 4a, 4b and 4c plot the local polynomial regression of work seeking, participation and rationing rates vis-à-vis the log monthly per capita expenditure, a proxy for income. The downward slope of seeking and participation suggest both that the self-selecting nature of workfare programs is perhaps relevant in the context of the MGNREGA and that administrative rationing does not explicitly disfavour the poor (Narayanan, et al., 2015).

As for the PDS, there is often a claim that there is considerable mis-targetting and that errors of inclusion and exclusion undermine the intent of the program. Indeed, scholars have pointed out that the self-targeting works less for the PDS than for the MGNREGA (Himanshu and Sen, 2013 for example). Despite these claims, data from the NSS across the 66th and 68th rounds suggest that the poor are far more likely to access the PDS with a considerable proportion of the rich selecting out (Figure 5). Like in the case of the MGNREGA, this figure plots a local polynomial regression for the proportion of households that procure any grain from the PDS along the log monthly per capita expenditure. The negative slope of this function indicates that among those who are relatively poor, a larger proportion of households access the PDS than among those who are not poor. This pattern holds true whether one looks at patterns over the range of landholding sizes or over monthly per capita expenditure levels. It also holds true for the reliance on the PDS in terms of the proportion of quantities consumed and purchased that are sourced from the PDS (not presented here), which decrease progressively as landholding and monthly per capita expenditure levels rise.

Marginalized social groups such as the Scheduled Castes and Tribes have a significantly higher participation rate in the MGNREGA than those who are from communities that have historically been better off (Appendix Table 2). Similarly, households whose members are primarily casual workers in the agriculture and non-agricultural sector also have higher participation rates than those perhaps with land, those who are self-employed or earning a regular salary. All of these suggest that perhaps the MGNREGA does select in those who need it most. Other representative surveys across the country find similar patterns (Desai, Vasisht and Joshi, 2015).

Other important dimensions of marginalization are gender and age. The MGNREGA has often been called a women's program for the disproportionate number of women on the worksites. There is substantial evidence that the program has been very inclusive of women and many states are less likely to ration women out that they do men (Narayanan and Das, 2014, for instance). Figure 6 offers an insight into participation rates of individuals by gender across the different age categories. It is clear that for each age group other than those over 75 years of age, a greater proportion of women's workforce, i.e. women in the age group over 15 years, show up to work than do men in the corresponding age category. While for both men and women it appears that the modal age category is around 40 years, it also appears to be an important source of employment for older women in their late 50s. This conforms to observations from the field as noted in several studies (Sudharshan, 2011; Khera & Nayak, 2008; Jandu,2008; Narayanan, 2008, etc.). These patterns are broadly similar for the PDS as well, whether in terms of mere access or extent of reliance on the PDS for total cereal consumption and purchases. Other studies have suggested progressive targeting, with the poorer

accessing the PDS more than the non-poor Ray (2007) finds that TPDS rice and wheat continue to supply over 50 per cent of the household's calorie intake in rural India. He also finds that the TPDS is of much greater importance to female- headed households and backward classes as it contributes a greater share of total calorie intake and also supplies more calories compared to other households. Given that female-headed households and those belonging to backward classes are also more likely to be poor than not, the PDS does seem to be inclusive in a sense.[28]

[28] Panagariya and More (2014) report that the head count ratio for Scheduled Tribe and Scheduled Caste populations are 43% and 29.4% relative to the national average of 22% using the Tendulkar Poverty Line in 2011-12. Meenakshi, et al. (2000) report higher head count ratios for female-headed households, when adjustments are made for household size and composition.

Figure 4a Work seeking rates in the MGNREGA, 2009-10 and 2011-12

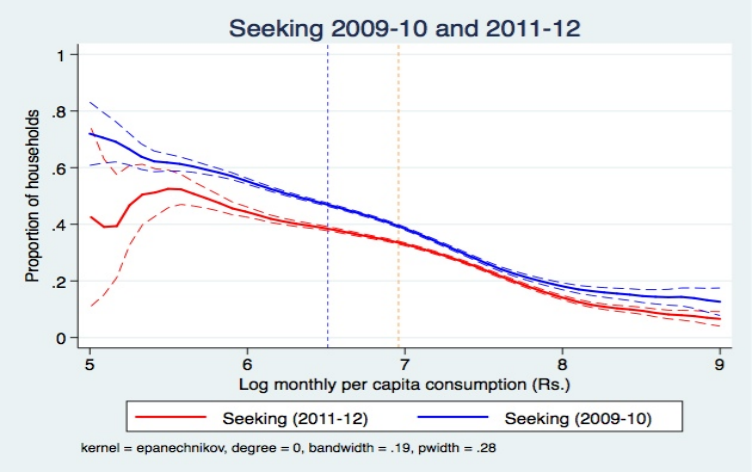


Figure 4b Rationing rates in the MGNREGA, 2009-10 and 2011-12

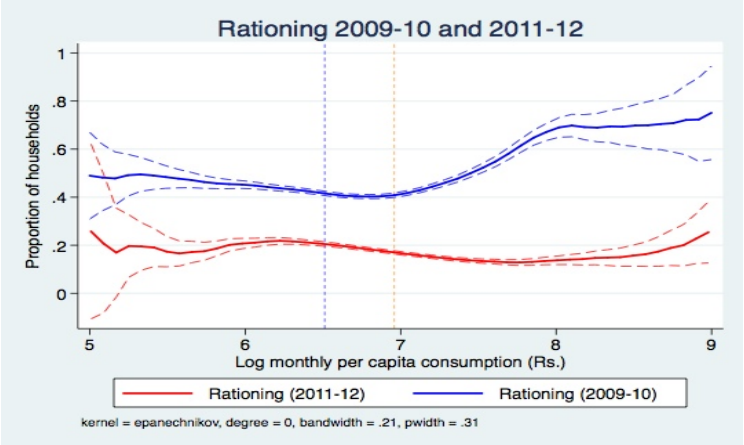
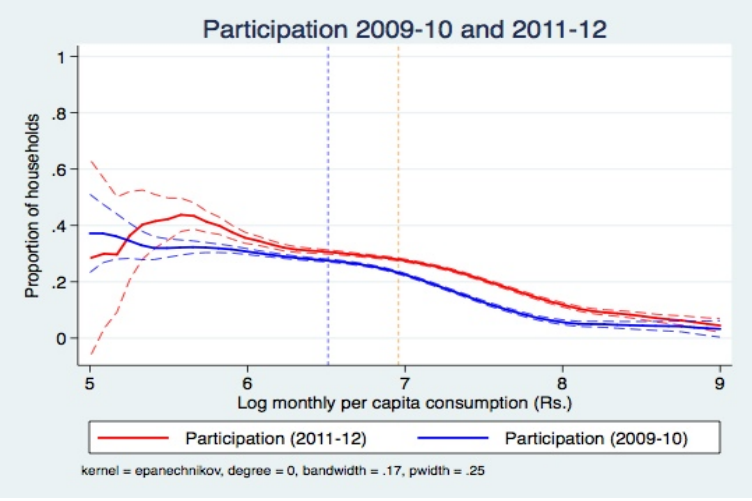
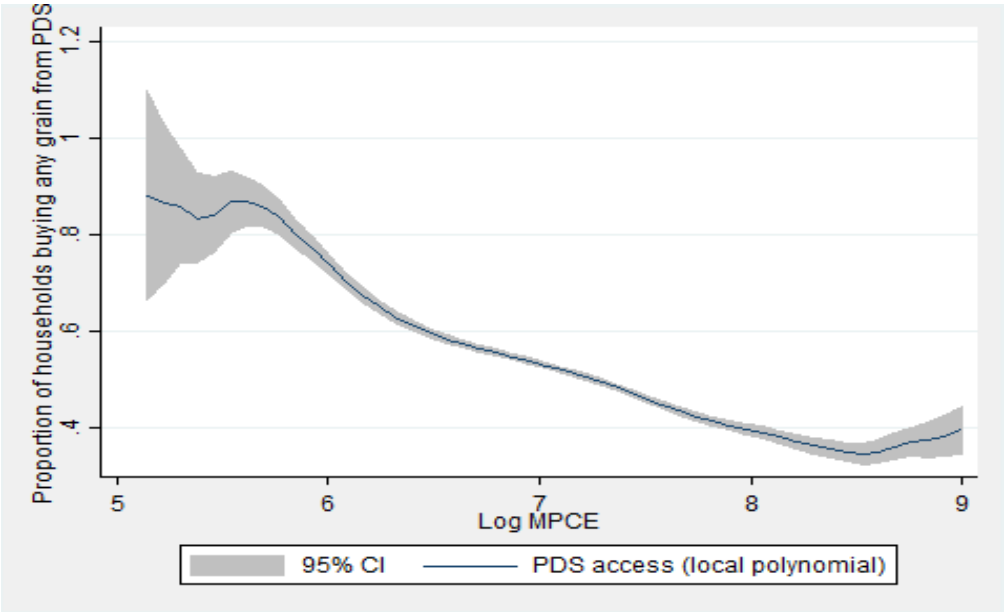


Figure 4c Participation rates in the MGNREGA, 2009-10 and 2011-12



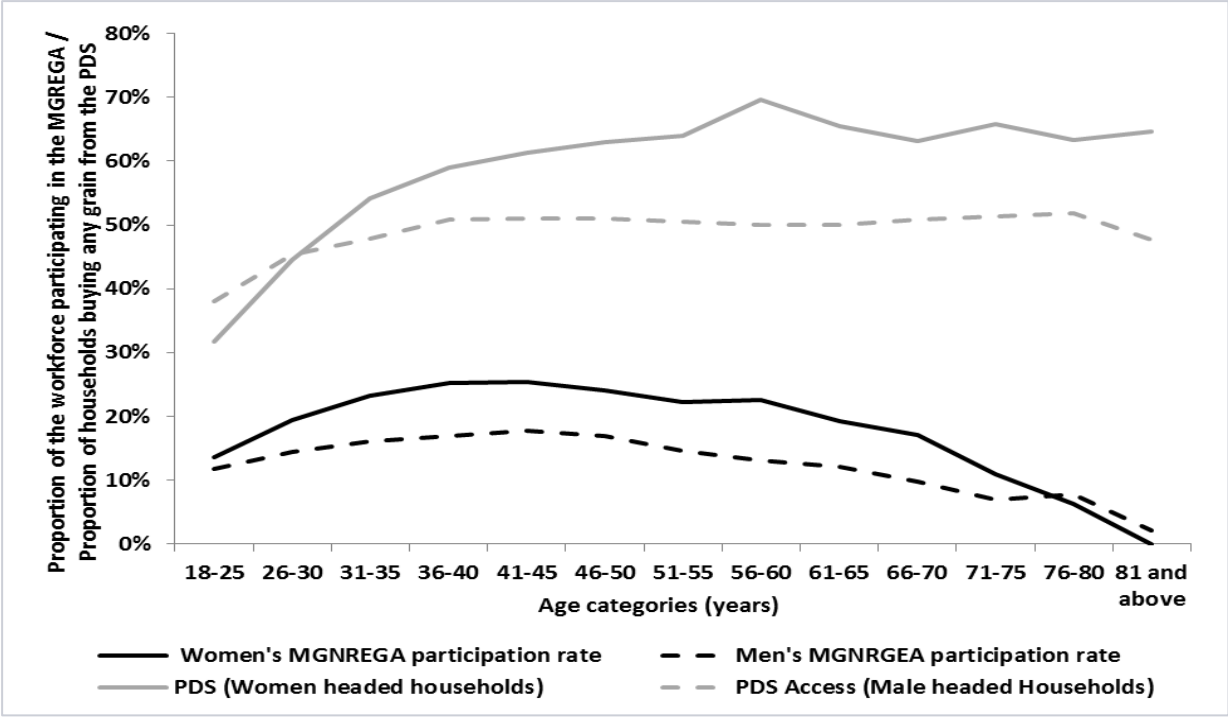
Source: Narayanan, et al (2015)

Figure 4 Access to PDS by log monthly per capita expenditure[29]



Source: Computed from the NSS

Figure 5 Gender-wise age profile of MGNREGA workers and PDS beneficiaries



Source: Computed from the NSS

[29] On the x-axis we have logarithm of the Monthly Per Capita Household Consumption Expenditure (MPCE) that was denominated in Rupees; on the y-axis we have the fitted proportion of all rural households that consume at least some grain (rice or wheat) procured through the PDS.

4 Conceptual Pathways, Synergies and Complementarities: From safety nets to better nutritional status and health

Despite the fact that both the PDS and MGNREGA share proximate goals and attempt to reach the same beneficiaries, there has been little effort by policy makers to think in terms of synergies or complementarities in the programs. Indeed, it has been observed in comparative assessments of safety nets that in India the wide range of programs on food security does not "comprise a common, formalised strategy as in Brazil and South Africa" (Souza and Chmielewska , 2011). While the NFSA does serve as an umbrella for food security programs, so far the synergies between these and the MGNREGA have remained largely unrecognized. Just as there are potential synergistic effects, there could be complementarities as well. These synergies and complementarities operate both at the micro level (at the level of the household) and at the macro level (economy-wide). Figure 7 depicts these pathways and the potentially complex interactions between the PDS and the MGNREGA are discussed below. Only some of these pathways find support in empirical research (discussed in Section 5) and several remain "unresearched".

There exist major challenges in assessing the impacts of the PDS and the MGNREGA on health and nutritional status of beneficiaries. First, a significant impact of the PDS and the MGNREGA could be in terms of offering psychological and economic security or in reducing the transactions costs of securing food and work– the PDS reduces uncertainties associated with the availability of food and the MGNREGA is designed to reduce uncertainties relating to availability of work. Both the measurement of these benefits and their translation into favourable indicators of health and nutritional status are empirically difficult. Second, given the complexity of factors that influence the health and nutrition of individuals, it is not certain that the PDS and the MGNREGA would have marked impacts on the health and nutritional status in the short run or indeed how it relates with these other confounding factors. Finally, the social impacts of these two programs, which field research suggests are large, are impossible to capture in quantitative research (Sudharshan, 2011; Khera & Nayak, 2008; Jandu, 2008; Narayanan, 2008, etc., for example). These include the empowerment of women and landless workers, which is likely to feed positively into better health and nutritional status only in the longer term. The perspectives of women and the landless are recorded in survey based research on the MGNREGA**.** These caveats imply that the documented quantitative evidence offers only a partial perspective of the true long term impacts of these programs.

4.1 Micro level synergies and complementarities

At the micro-level, the MGNREGA links to nutrition and health operate along two main pathways. The first is via earnings, which presumably could be used to make investments in health, food consumption and better quality diets.[30] These could include purchases of foodgrains from the PDS at subsidized prices.

The second pathway, in principle is through the assets created under the MGNREGA. The Act envisages that the MGNREGA would promote livelihood security for the poor through creation of durable assets, improved water security, soil conservation and higher land productivity and provide for drought-proofing and flood management in rural India. To the extent that such assets are indeed created, this too could potentially have an impact not only on income but also more directly on availability of food and diverse diets. This is especially the case with plantation works and nurseries that involve planting of fruit trees, etc. that directly enhance the availability of diverse diets. This aspect of the MGNREGA has a more complicated relationship with the PDS. The PDS is designed to

[30] Desai, et al. (2015) note for instance that 25% of the decline in poverty between 2004-05 and 2014-15 is attributable to the MGNREGA.

secure the availability of calories. Its overall impact on diets could be either negative (where cheap grains crowd out diverse diets) or positive (where subsidies on the major grains frees up purchasing power to buy diverse diets and hence crowds in diets). Where the MGNREGA enables households to access diverse diets with the help of assets created under the MGNREGA, the PDS and the MGNREGA could complement one another, with the PDS providing foodgrains and MGNREGA helping to improve diet quality. For producers who have the possibility of selling grain to the state procurement agencies, there is a possibility that MGNREGA supports food grain production for the PDS. Producers in this case would have the benefit of being able to sell foodgrains to the market or the state procurement agencies and buy relatively cheaper grains from the PDS.

Apart from actual income gains, the MGNRGEA has been recognized for its potential to smooth consumption. Since the MGNREGA is demand driven and because the employment is typically the highest in the lean agricultural season, when few alternatives are available, the MGNREGA could also enable households to avoid periods of hunger by smoothing consumption over time. The PDS plays a similar role in making food available at a time when food availability might be the lowest. Both the MGNRGEA and the PDS could mutually reinforce the positive impacts on short-term nutritional status such as prevalence of underweight children.

In general, therefore, where people use both the MGNREGA and the PDS, not only are the total net transfers, implicit and explicit, higher in terms of impacts, but each program can work in ways that can reinforce or complement the impact of the other (Himanshu and Sen, 2013; Drèze and Khera, 2014). For example, if the PDS has the effect of shifting the consumption basket in favour of cereals, the simultaneous participation in MGNREGA could mute this effect and contribute to increasing the dietary diversity, implying a complementary impact that might be desirable. Likewise the additional calories provided by the PDS could enable workers to be more productive and earn higher wages on MGNREGA sites or otherwise. A related aspect is that as MGNREGA sites involve arduous labour, the availability of subsidized food ensures that the wages they earn are likely to more than compensate for the energies expended on the worksite.

There are other less explicit micro-level pathways through which MGNREGA can impact health and nutrition, working alongside programs that form part of the NFSA. The construction of individual household toilets has been included as a permissible work. This could potentially have direct impacts on sanitation and therefore on the nutritional and health status of individuals.

Another potentially important link is between labour time on MGNREGA works, especially of women, and time spent on childcare. While in theory, MGNREGA worksites are supposed to have childcare facilities, very often they do not, thus compromising either on women's ability to work on these sites or on their ability to take care of their young children. To the extent that the ICDS functions well, and the child is able to attend these centres, access supplementary nutrition and preschool education services, these resolve childcare problems of mothers. Young mothers are more likely to be able to work on NREGA sites (Narayanan, 2008). The MGNREGA can also have more direct impacts on child well being, via reduced labour market participation and migration (reviewed in Dev (2011) for example).

4.2 Macro level synergies and complementarities

That development and poverty alleviation programs have implications that operate on different time scales is well recognized (von Braun, 1992). At the macro level, the synergies and complementarities between the PDS and the MGNREGA operate on a longer time scale. In the longer run, MGNREGA works on private lands such as irrigation, etc. that augment productivity of agriculture, increase resilience and reduce seasonality could eventually decrease the dependence of beneficiaries on the MGNREGA. Several studies document the impact of these assets on productivity, biomass availability and net incomes, all of which represent the potential of the MGNRGEA to impact both food and

nutritional security as well as reduction in dependence on the MGNREGA in the long run (Ranaware, et al 2015, Agarwal, 2010; Bhaskar and Yadav, 2015; Esteves, at al 2013; IIS, 2013; Verma and Shah, 2012). On a similar timescale, to the extent that these safety nets free up household resources that enable them to invest in human capital, such as children's schooling, in addition to nutrition and health inputs (Dasgupta, 2012; Das, 2012). Relatedly, if MGNREGA work is available in the lean season, the reduced need to migrate could imply that investments in children are not compromised or undermined. All of these are likely in the longer run to prompt households to seek better quality employment and also rely less on the PDS for more expensive sources of calories and better diets. All of these impacts might be present even for non-participants if there are general equilibrium wage impacts on account of the MGNREGA locally. These productivity gains, whether via augmenting the resource base or through investment social capital, can both reduce future reliance on these safety nets. While it is expected that safety nets such as the PDS and MGNREGA would always be relevant as long as there exists considerable seasonality in employment, market failures and idiosyncratic shocks that compromise ability of households to cope, it is also possible that as the poorest households grow out of poverty, reliance on the MGNREGA and the PDS could well decline. Hypothetically, therefore, fiscal outlays that would be required would decline even as the potential revenues from productivity gains via taxes expand. There is little research on the macro level synergies and complementarities.

5 Mapping Empirical Evidence

Despite the potential for synergies, the MGNREGA and PDS have until now been discussed independently of one another. This lack of recognition of synergies is also reflected in the data collected at the national level that do not record information in access to both programs for the same household. It is therefore virtually impossible to explore possible synergies and complementarities between the two in a substantive way.

Since the National Rural Employment Guarantee Act (2005) is a relatively new safety net program, there is limited documentation of the Act's impact on health and nutritional outcomes, although there is rich and rigorous evidence on several other aspects of wellbeing. In terms of methodology, a majority of research on the MGNREGA takes advantage of the phased roll out of the program to conduct a difference-in-differences or triple differences approach. Some others use a regression discontinuity framework, using the index of backwardness score of districts that formed the basis for selection into different treatment phases.

On account of the much longer history of the PDS, there is a longer history of evidence on the program. Given the current implementation impasse in some states vis-à-vis the NFSA, the results for PDS strictly speaking predate the NFSA and in some sense provide a rationale rather than an ex post evaluation of the NFSA itself. For the PDS, most approaches use a version of the difference in differences, taking advantage of the variation in eligibility criteria based on whether or not a household possesses a Below Poverty Line (BPL) or Above Poverty Line (APL) ration card. Yet, even for the PDS, the efforts to evaluate impacts on the health and nutritional status have been limited. For both the MGNREGA and the PDS, there have however been studies that track intermediate outcomes, such as food consumption expenditure and calorie or nutrient intake. These tend to be limited to a few states in which the PDS and/or the MGNREGA is implemented well relative to other states.

5.1 Anthropometric outcomes

To the best of our knowledge, two studies assess the impact of food subsidy on anthropometric outcomes in the Indian context. Tarozzi (2005) investigates whether a reduction in the subsidy offered in the TPDS in Andhra Pradesh has negative effects on children's weight-for age using NHFS data and finds that a reduction in subsidy did not affect child nutrition suggesting that relatively large changes in food subsidies can have little or no effect on child nutrition. The author uses data on weight-for-age of children under 4 and finds that one more month in a less favourable PDS regime is associated with a positive but insignificant 0.2 to 2.2 per cent increase in weight for boys and an insignificant 0.8 to 3.3 per cent decrease in weight for girls. However, the survey timing ensured that the difference in program exposure was only 1- 3 months, which may be insufficient time for nutritional impacts to be felt. Elsewhere in Odisha, Chatterjee (2013) revisits the HUNGaMA[31] sample of 793 households in the Koraput district and finds that the PDS in the district does not reduce the likelihood of a child being underweight, stunted or wasted.

For the MGNREGA, there exists more evidence of impacts on anthropometric outcomes and low birth weight. In an analysis of close to 3000 children from the Young Lives dataset for Andhra Pradesh, Uppal (2009) finds a positive impact of the NREGA on child anthropometry but not always statistically significant. Results from the study show that the uptake of NREGA work increases the height-for-age Z score by 0.13- 0.15 standard deviations. While both registering for the NREGA and

[31] HUNGaMA survey- short for HUNGer and MAlnutrtition survey, conducted by the Naandi Foundation in 2011 across 112 rural districts of India to provide estimates of child nutrition covering nearly 20 per cent of Indian children.

taking up NREGA work have positive effects, it is the actual taking up of work that seems to have a statistically significant impact. Using height-for-age Z scores of children who were 6 to 18 months old in 2002 using the same dataset as above, Dasgupta (2012) reports that access to MGNREGA coverage helps households cope with recent drought shocks and protect nutritional status of children, but do not correct long-term past deficiencies in their nutritional status. She reports that the NREGA serves as a buffer against recent exposure to mild drought by increasing the height-for-age z- score by 0.26 standard deviations. In a mixed-methods study of 528 households in Rajasthan, Nair et al (2013) report that households participating in NREGA were less likely to have wasted infants and underweight infants than non- participating households. Results from their path analysis suggest a direct pathway from NREGA to low birth weight. They find adjusted odds of infants being underweight and wasted in households participating in NREGA at 52 per cent and 43 per cent lower compared to non- participant households respectively.

5.2 Food and nutrient intake and expenditures

There are a far greater number of studies that document what might be called "intermediate factors" such as expenditures or intake of food, calories, macro and micronutrients. Cereal consumption and calorie intake of households have been the main metrics assessed in studies of the PDS. The results from these studies seem to suggest a range of limited to modestly positive impact on calorie intake. A clutch of studies use the National Sample Survey (NSS) data and the results reported here come from different rounds (from different years) that exploit different strategies for identification relating to exogenous changes in coverage and subsidy.

Using the shift from RPDS to TPDS and additional changes to food subsidy policy in 2000 to estimate the impact on calories consumed by rural households in 9 states that primarily purchase wheat, Kochar (2005) finds a positive and significant effect of food grain subsidies on caloric intake across different specifications but the magnitude of this effect is small.[32] She finds that the elasticity of caloric intake with respect to the value of the subsidy is 0.06 on average. [33] Kaul (2014)'s estimate of this elasticity for PDS rice users at 0.144 is small too but she reports that the subsidy benefits households in terms of overall calorie intake and not only through cereals provided directly by the TPDS.[34] She goes a step further to predict that the implementation of the National Food Security Act will lead to an increase of 66- 72 kcal in the daily calorie intake of current beneficiaries of the program. She uses the statewise exogenous variation in the extent of subsidy as a source of identification.

Ray (2007) presents calorie- based prevalence of undernourishment (POU) rates in the presence and absence of TPDS in rural India with an all- India average at 57.7 per cent and 65.5 per cent respectively. Himanshu and Sen (2013), use data from the 50th, 61st and 66th rounds of the NSS and show that food subsidies have an additional effect on calorie intake, supporting the hypothesis that PDS improves nutrition by reducing households' risks regarding food access. Comparing out-of pocket monthly per capita expenditure (MPCE) to the implicit subsidy transfer, they find that a PDS transfer equal to 1 per cent of out-of- pocket MPCE increases calorie intake by around twice as much as a 1 per cent increase in out- of- pocket MPCE. They estimate the elasticity of PDS transfers to be at around 1 implying that calorie intake has a much higher elasticity to an increase in per capita

[32] The elasticity of caloric intake with respect to the value of the subsidy is low as a consequence of a low substitution effect and the relatively insignificant share of the actual PDS subsidy in household expenditure.

[33] Despite relying in part on variation across households in the value of the subsidy and the quantity of the subsidized good for which a household is eligible, Kochar is able to estimate BPL status only from observable characteristics and not from data. Thus, any mistake leading to inclusion or exclusion errors in assigning BPL status coupled with low take- up rates in the sample states can bias toward finding no effect of the subsidy (Jensen and Miller, 2011).

[34]The TPDS subsidy, thus, generates an income effect for households and is potentially effective in improving nutrition.

expenditure on PDS if this results from PDS food transfers rather than from equivalent increase in out-of-pocket cash. This suggests that the PDS may improve calorie intake by more than cash equivalent of its transfers. They also find this result consistent with low elasticity of PDS transfers as reported by Kochar (2005) and Kaul (2013). Kaushal and Muchomba (2013) analyse the 50th, 55th and 60th rounds NSS data from 20 states by stratifying rural districts into two types- those where wheat and rice are the staples and those where coarse grains are the staple and they find negligible and insignificant effects of food price subsidy on total calorie intake. The study reports that a 10 per cent increase in value of subsidy increased calorie intake from wheat and rice by 0.3 to 0.6 per cent, from sugar and sugar products by 2 to 3 per cent and decreased intake from coarse grains by 4-8 per cent. In areas where coarse grains are the staple food, they find evidence of substitution away from coarse grains but due to increase in calorie intake from wheat and rice, they find a negligible effect on total calorie intake. The finding in Svedberg (2012) appears to be the only result displaying a negative, albeit small and insignificant, impact where ration card holders consumed 3.6 per cent less rice and wheat than peers without cards, refuting the hypothesis that TPDS has improved food security and nutrition for the poor.

Apart from the studies that have looked at national level data, some studies have analysed the nutritional impact of food subsidies for specific states giving rise to a mixed set of results due to differences in implementation. Exploiting a policy reform due to the formation of a new state and increased availability of rice, Krishnamurthy, Pathania and Tandon (2014) compare districts of Chhattisgarh with those bordering them in other states and find that the share of overall calories composed of grains increased in Chhattisgarh, the difference-in differences estimate being 111 daily PDS rice calories per capita, relative to the border districts and this result appears to be driven by households in Chhattisgarh that were entitled to the largest food subsidies. They also report that with the availability of TPDS rice, households in the state increased their consumption of calories from non- grain sources like pulses, sources of animal based protein, and from produce relative to the comparison group which was 13 percentage points higher. On the other hand, in a study of 388 households in Rajasthan, Khera (2010) finds that while access to TPDS does not have a significant effect on overall cereal consumption, it does significantly increase wheat consumption but at the cost of consumption of nutritionally- superior coarse cereals. Rahman (2015) too finds that the caloric intake and diet quality improved in Odisha's famine prone KBK region (Koraput-Bolangir-Kalahandi) after PDS was universalized in these districts.

Ravi and Engler (2015) find, in their primary survey of select villages in Andhra Pradesh, that the MGNREGA has had significant impacts on extreme poverty within the first few years of implementation. Participants register a significant increase in the monthly per capita expenditure on food by Rs. 25.8 (9.6%) and on non-food consumable by Rs. 11.17 (23%). The program also improved food security by a significant reduction in the number of meals foregone by households per week. The health outcomes impacted by the program include a significant reduction of 12% in the incidence of reported depression. Other indicators of mental health have also shown significant improvements over time although they did not find significant impacts on physical health outcomes. These physical health outcomes were self reported condition.

A handful of studies go beyond calorie intake to assess the nutrient intake of the food basket consequent to participation in these programs. Krishnamurthy et al (2014) find in their study of the TDPS that the relative increase in non-grain consumption in border districts of Chhattisgarh was accompanied by an increase in consumption of protein, calcium and iron by 12.9 percentage point, 26.4 percentage points and 14.2 percentage points respectively. Elsewhere, in Andhra Pradesh, triple difference estimates from a multi-round survey of rural households suggest that NREGA participants improved their caloric and protein intakes, with energy intake going up to 253 kilocalories (kcal) per day from 152 kcal per day prior to their participation. (Deininger and Liu, 2013). Protein intake, meanwhile, more than doubled from 2.07 grams per day to 5.80 grams per day (Deininger and Liu, 2013). Kumar and Joshi (2013) compare NREGA beneficiary households with households that desired

to work but could not get the same (non- beneficiary households) using 66th round NSS data and find that non- beneficiary household had a lower energy intake (2199kcal/capita/day) as well as a lower protein intake (67.6g/capita/day) as compared to calorie intake (2332kcal/capita/day) and protein intake (81.4g/capita/day) of beneficiary households.

Perhaps the only study that evaluates the impact on intakes of calories and micronutrients on account of both the MGNREGA as well as the PDS simultaneously is a study by Jha, Bhattacharyya and Gaiha (2011), that draws on primary household data in Andhra Pradesh, Rajasthan and Maharashtra. They find that PDS participation[35] has positive and significant effects on the consumption of the following: protein (13.2-19.5g) , carbohydrates (71.3-143 g), energy (347-651 units), phosphorous (290-486 units), iron (7-9.6mg), thiamine (0.36-0.76mg), and niacin (3.6-10 mg) in all states, minerals (1.9-2.4 units), calcium (90- 188mg), carotene (154-314 µg), riboflavin (0.16-0.17mg), and vitamin c (8.8-41mg) in two states, and fat (11.5 units) and fiber (2.9 units) only in one state. They also estimate that income from NREGA wages has a positive and significant impact on the intake of protein (0.01g), minerals (0.0001-0.002 units), carbohydrates (0.004- 0.08g), energy (0.02-0.42 units), phosphorus (0.01-0.32 units), iron (0.0002-0.1mg), thiamine (2*10^5- 0.001mg), niacin (0.0003-0.01mg) in all states in the sample, fiber (0.001- 0.003 units) in two states, and calcium (0.14mg), carotene (0.63µg), riboflavin (0.0001mg) and vitamin c (0.01mg) in one state.

In order to compare the effect of a change in PDS participation to that of a change in NREGA wage, the authors report the impact coefficients, in terms of one standard deviation increases in PDS participation and NREGA participation. They report that a standard deviation increase in participation in PDS has significant and positive impacts on all nutrients except fibre in Andhra Pradesh, while the impact effect of increase in NREGA wage has smaller coefficients, many of which are insignificant (positive and significant impact on the intake of protein, minerals, carbohydrates, energy, phosphorus, iron, thiamine, and niacin). In Maharashtra, a standard deviation increase in NREGA wages as well as PDS participation has significant and positive impact on all nutrients but fats. Meanwhile in Rajasthan, one standard deviation increase in PDS participation has a significant and positive effect only on protein, carbohydrates, energy, phosphorous, iron, thiamine and niacin while an increase in NREGA wage standard deviation has a significant and positive impact on all nutrients except fats, calcium, carotene, and vitamin C in Rajasthan.

The authors also assess the impacts on the headcount index of undernutrition of a hypothetical transfer of income[36] through these interventions and report that a transfer of one hundred rupees per capita[37] has the largest effects for calories in Andhra Pradesh (29 per cent) followed by Maharashtra (24 per cent) and then Rajasthan (13 per cent). For protein, Maharashtra has the largest effect (5 per cent) followed by Rajasthan (2.2 per cent) and Andhra Pradesh (2 per cent) while for calcium it is Rajasthan (115 per cent) followed by Maharashtra (3.6 per cent) and Andhra Pradesh (1.9 per cent) and for carotene it is Andhra Pradesh (14.4 per cent), Rajasthan (11 per cent) and Maharashtra (4 per cent). Appendix Table 4 summarizes the findings of the studies discussed above. There appears to be consistently positive evidence on the impact of the PDS and MGNREGA on various inputs that eventually contribute to better health and nutrition. While some impacts seem modest, others seem significant; noteworthy is the potentially diverse impacts across states. Appendix Table 5 also lists selected studies on other programs that are part of the NFSA. Despite the limited evidence demonstrating causal impacts of these programs on health and nutrition, it appears that the impacts on related variables are largely positive. Yet, of all the possible pathways,

[35] As measured by the responses to whether households draw foodgrain/sugar/kerosene from PDS while NREGA participation is measured by the response to if the household is a beneficiary of the program

[36] Proxied by real expenditure

[37] They get approximate measures of slopes of nutritent- income relation at the level of income just adequate to meet the nutritional norm, and of the cdf at the nutrient norm. Their product yields an approximate measure of the change in the headcount index induced by a transfer.

representing synergies and complementarities depicted above, only a few have been picked out for research.

6 Concluding Remarks

This paper set out to understand the impacts of two large-scale programs, the MGNREGA and the PDS on nutrition and health of beneficiaries. Both programs can be characterized as potentially "nutrition-sensitive" programs that aim at addressing the underlying causes of undernutrition, as opposed to nutrition specific programs that directly address nutritional concerns. In the case of the PDS, this is by making foodgrains available at subsidized rates and in the case of the MGNREGA via augmenting incomes, especially during seasons when work is scarce. The potential for synergistic and complementary impacts on health and nutrition underscores the importance of learning about the impacts of these large-scale programs. It is evident that despite the variable implementation across states, both programs tend to reach the intended beneficiaries, i.e., the poor and the marginalized who are likely to also experience greater undernutrition and poor health.

Data challenges have however prevented researchers from conducting studies that assess the ultimate impact of these two large-scale programs on indicators representing nutrition and health. Barring a few, most studies are limited to assessing impacts on intermediary outcomes (like food consumption or time spent on child care, for instance) and when they do comment on the nutritional status of particular subpopulations (such as children) it is often for a very small sample restricted to specific geographies. Yet, these too suggest that there might be a positive impact of these programs on health and nutrition.

It would be fair to say that the more significant impacts of the PDS and the MGNREGA are on aspects that are not only difficult to measure but are also those that impact health and nutritional status of beneficiaries in the long run. These include the psychological and economic security and reductions in transactions costs associated with securing food and work under these Acts, the social impacts, especially the empowerment of women and landless workers. All of these are likely to result in better health and nutritional status only in the long term and it is not clear that existing quantitative evidence reflects these channels fully.

A critical evidence gap exists especially on the potential synergies between the programs. If as evidence suggests, both the MGNREGA and PDS perform well in terms of targeting the poor and vulnerable, it would stand to reason that there might exist synergistic benefits at the household level. Since there is limited data on household access to both schemes, this poses difficulties in exploring synergies at the household level. While more data and research is required to get a clearer understanding of the complex interaction of these safety nets, existing studies offer important insights for policy. First, they provide preliminary evidence that these mega programs have a potential to influence health and nutrition outcomes by addressing the underlying constraints. That both programs are inclusive of those most likely to be vulnerable to undernutrition makes a strong case of better implementation of the programs. Second, there seems to be a clear potential to make these programs more nutrition sensitive not just by incorporating specific elements that would enhance nutrition and directing specific attention to innovations where there exist critical complementarities and synergies.

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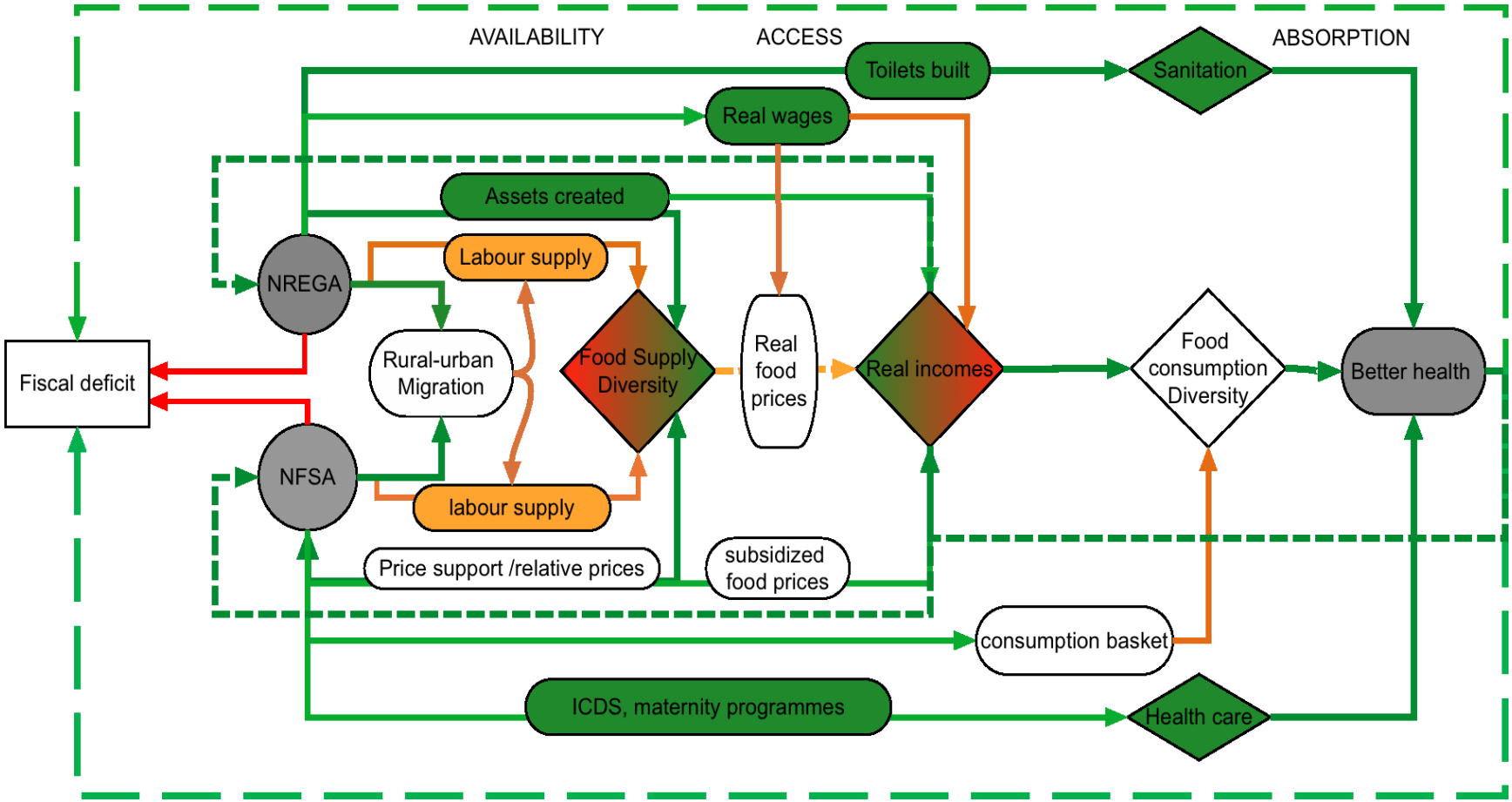
Figure 6 Conceptual Pathways of synergies and complementarities between the MGNREGA, PDS and health outcomes.



Green lines denote positive effects and red lines imply negative effects. Amber lines represent ambivalent effects. Dashed lines suggest longer term macro level impacts. The figure does not attempt to capture social impacts via the empowerment of women or landless workers.

Appendix Table 1 Entitlements under NFSA, MGNREGA and related programs

Target Group	Scheme	Act	Entitlements	Eligibility	Type of Assistance
Pregnant and lactating mothers	Janani Suraksha Yojana	-	Rs. 1400 (700) in LPS (HPS) in rural areas, Rs. 1000(600) in urban areas for the mother and Rs.600 (200) for ASHA workers. Conditionality: delivery in Government health centres or accredited private institutions.	JSY: All SC and ST women in both LPS and HPS delivering in a government health centre or accredited private institutions. In Low Performance states, all pregnant women in HPS States BPL pregnant women, aged 19 years and above.	Cash transfer with conditionality.
	Maternity entitlements	NFSA (Chapter 2)	Not less than Rs. six thousand [IGMSY implemented on a pilot basis, expected to be universalized under the NFSA]	Excepting all pregnant women and lactating mothers in regular employment with the Central or State Governments or Public Sector Undertakings or those who are in receipt of similar benefits under any law for the time being in force.	Cash transfer with eligibility criteria.
	ICDS	NFSA	Take home rations 600 cal, 18/20 gms of protein, pregnancy and until 6 months after childbirth	Identified by the anganwadi	In-kind transfers
Pre-school children	ICDS	NFSA	For 6 mths to 3 years Take home rations 500 cal, 12/15 gms of protein For 3/6 years Morning Snack and Hot Cooked Meal. 500 cal, 12/15 gms of protein. If malnourished, then take home rations additionally, 800 calories, 20-25 gms protein.	Attending anganwadi State differences in the implementation	In-kind transfers
School going children	School Meals	NFSA	Hot cooked meals. At present, a midday meal provides an energy content of 450 calories and protein content of 12 grams at primary stage and an energy content of 700 calories and protein content of 20 grams at upper primary stage.	All enrolled children up to Grade 8 in government schools.	In-kind transfers
Adults	MGNREGA	MGNREGA	A minimum of 100 days of unskilled work per household at minimum wage at a work place within 5 kms of the Gram Panchayat or village. Transport costs for beyond that, unemployment allowance if work not given within 15 days. Access to water, childcare on worksite.	Residing in the rural areas, 18 years and above.	Cash transfer with eligibility criteria.
Adults and children	PDS	NFSA	5 kgs per person per month for priority households *identified by state governments, 35 kgs per household per month for AAY households, and excluded households have no entitlements. The price is Rs. 3 per kg. for rice, Rs. 2 per kg. for wheat**, Rs 1 per kg. for coarse grains.	Priority households defined by the state government, AAY households defined by the state government, based on central government guidelines, and excluded households defined by state governments (25% & 50% of the rural and urban population)	In-/kind transfer at subsidized prices.
Senior Citizens	PDS	NFSA	Annapurna entitlements for grain 10kgs./month foodgrains.	Above 60 years of age	In-kind transfer
	Pensions	Schedule III in the NFSA	For 60-79 Years Rs.200 per month; 80 years and above Rs. 500/- p.m.. For widows, and disabled,Rs. 300/- p.m.	State implementation varies significantly both in coverage and amounts.	Cash transfer with eligibility criteria.

Notes: (1) For mid-day meals, government schools means Government schools, Government-aided schools, Schools run by local bodies, Education Guarantee Schools (EGS), Alternate and Innovative Education (AIE) centres, Madarsas and Maqtabs supported under the Sarva Shiksha Abhiyan, National Child Labour Project (NCLP) school.
(2) Pensions are paid under Indira Gandhi National Old Age Pension Scheme (IGNOAPS), Indira Gandhi National Widow Pension Scheme (IGNWPS) and Indira Gandhi National Disability Pension Scheme (IGNDPS).

Appendix Table 2 PDS and MGNREGA access by occupation and social group

	Proportion of rural households with adults participating in MGNREGA		Percentage of rural households accessing the PDS		Share of PDS rice and wheat in total rice and wheat consumption[(1)]				Share of PDS rice and wheat in total rice and wheat purchases[(2)]			
					Mean		Median		Mean		Median	
	2011-12	2009-10	2011-12	2009-10	2011-12	2009-10	2011-12	2009-10	2011-12	2009-10	2011-12	2009-10
Caste												
Scheduled Tribes	36	41	62	55	37	34	35	29	50	44	50	41
Scheduled Castes	32	33	61	51	33	28	30	11	39	32	36	23
Other Backward Castes	20	21	51	46	27	25	12	0	35	32	29	21
Others	15	15	41	33	19	16	0	0	28	23	0	0
Occupation												
Self-employed in agriculture	21	21	42	33	21	16	0	0	40	32	28	0
Self-employed in non-agriculture	15	15	49	40	24	19	0	0	28	22	11	0
Regular wage/salary employment	10		42		21		0		24		0	
Casual labor - agriculture	38	39	71	64	39	36	37	33	43	39	40	35
Casual labor - non-agriculture	34	31	59	55	32	30	29	23	36	32	31	25
Others	3	6	45	28	33	18	20	0	36	20	24	0

Note: Figures have been rounded off. In 2011-12, the following changes took place in classifying rural households based on occupational categories: an additional category, 'Regular wage/salary earning', was added; households categories of ' agricultural labour' and 'other labourers' were changed to 'casual labour in agriculture' and 'casual labour in non-agriculture', respectively. Moreover, the definitions used to classify households based on their occupations changed slightly in 2011-12. Hence, these categories are only roughly comparable across the two years. (1) We compute the share of the quantity of rice and wheat obtained from the PDS in the household's total quantity consumption of rice and wheat for each household and then compute the mean and median of this share across all households belonging to the respective caste/occupation category. (2) We compute the share of the quantity of rice and wheat obtained from the PDS in the total quantity of rice and wheat purchased by the household, and then compute the mean and median of this share across all households belonging to the respective caste/occupation category. Source: Computed from the National Sample Survey, 66th and 68th Rounds, Employment and Unemployment Surveys and Consumer Expenditure Surveys.

Appendix Table 3 State level indicators for PDS and MGNREGA performance, 2011-12

States (1)	Average number of days generated under the MGNREGA per employed household (2)	PDS Reduction in poverty using Tendulkar poverty lines, Drèze and Khera (2013) (3)		Proportion of households with adult members who have got work through NREGA (4)	Proportion of households accessing PDS for Rice or Wheat (5)	Mean share of PDS in total rice/wheat consumption of PDS users (6)	Median share of PDS in total rice/wheat consumption of PDS users (7)	Proportion of households with at least one child in the primary school going age accessing mid-day meals (8)
		Headcount ratio	Poverty Gap Index					
Andaman and Nicobar				23.2	82.8	57.5	60.0	72.6
Andhra Pradesh	56.5	32.8	40.6	32.6	88.5	33.5	33.3	47.1
Arunachal Pradesh	16.4			36.4	51.8	35.1	16.7	4.5
Assam	26.2	9.2	17.9	23.2	53.8	26.0	12.7	54.0
Bihar	37.7	1.3	4.3	10.5	46.6	24.7	0.0	53.5
Chandigarh					9.0	6.7	0.0	
Chhattisgarh	44.5	17.2	39	56.5	62.8	40.3	46.7	72.9
Dadra & Nagar Haveli				2.1	62.3	26.6	20.6	59.4
Daman and Diu					1.2	0.8	0.0	30.8
Delhi					11.7	5.5	0.0	38.2
Goa	27.8			4.1	71.9	36.3	33.3	24.6
Gujarat	37.9	11.8	15.3	6.7	31.2	15.7	0.0	47.1
Haryana	39.3	13.8	15.1	4.6	17.6	12.6	0.0	19.2
Himachal Pradesh	52.4	36.1	35.3	33.4	90.8	53.6	53.0	65.2
Jammu & Kashmir	44.8	45	35.3	29.8	78.7	51.9	55.2	25.4
Jharkhand	38.6	3.3	13.2	22.1	34.1	20.0	0.0	74.5
Karnataka	42.3	22.2	33.1	9.9	77.1	47.4	50.8	71.6
Kerala	44.6	33	36.7	18.7	83.3	40.5	34.5	39.5
Lakshadweep				27.7	87.0	79.2	83.3	96.8
Madhya Pradesh	42.2	6	13.4	20.6	41.6	23.1	0.0	65.3
Maharashtra	47.2	18.9	30	4.9	49.2	35.5	0.0	68.7

Continued from previous page

States (1)	Average number of days generated under the MGNREGA (2)	Reduction in poverty using Tendulkar poverty lines, Dreze and Khera (2013) (3)		Proportion of households with adult members who have got work through NREGA (4)	Proportion of households accessing PDS for Rice or Wheat (5)	Mean share of PDS in total rice/wheat consumption (6)	Median share of PDS in total rice/wheat consumption (7)	Proportion of households with at least one child in the primary school going age accessing mid-day meals (8)
		Headcount ratio	Poverty Gap Index					
Manipur	61.1			74.4	6.2	1.8	0.0	9.8
Meghalaya	48.8			67.0	67.8	33.9	32.3	50.5
Mizoram	72.5			93.9	97.6	58.4	54.5	69.8
Nagaland	67.4			85.9	19.2	6.7	0.0	1.5
Odisha	32.9	9.6	23.3	23.8	65.4	34.8	33.3	78.5
Puducherry				25.6	83.0	47.0	45.5	27.6
Punjab	26.3	15.8	14.4	7.3	24.9	13.5	0.0	47.0
Rajasthan	46.6	7.6	11.7	41.0	28.5	18.8	0.0	48.7
Sikkim	60.1			58.3	61.0	48.0	58.8	59.2
Tamil Nadu	47.5	44.4	61.3	40.1	93.9	56.8	54.5	48.3
Tripura	86.5			77.4	86.2	45.7	42.6	96.2
Uttar Pradesh	36.3	5.2	11.1	19.1	26.9	15.2	0.0	45.3
Uttaranchal	41.5	17.7	24.1	27.7	70.6	34.3	31.8	71.7
West Bengal	26.5	9.6	11.5	38.3	51.8	15.8	5.6	76.2
All-India	**42.4**	**10.6**	**17.6**	**23.2**	**51.8**	**27.7**	**13.3**	**55.8**

Notes and sources: Column (2) is from http://www.nrega.nic.in/netnrega/home.aspx Column (3) is from Dreze, J., and Khera, R. (2013). Columns (4) to (8) have been computed from the 68th Round of the NSS data (2011-12).

Appendix Table 4 : List of selected studies examining the health and nutrition outcomes of MGNREGA and PDS.

Study	Location	Data set and method	Program	Dimension	Statistical significance (0,+,++)	Economic significance (--,-,0,+,++)
Himanshu and Sen- Parts I and II (2013)	All India	NSS 93-94, 04-05, 09-10 Part I: Desciptive Part II: Regression	Mid-day meals and PDS rations	Poverty reduction		MDM: + PDS: +
				Calorie intake	PDS: ++	PDS: ++
Rahman (2015)	KBK region Odisha	NSS 04-05, 11-12 Difference-in-difference	PDS	Dietary diversity, macronutrient intake	++	++
Kochar (2005)	Major wheat consuming states	NSS 93, 99-00 OLS and IV Regression analysis	PDS	Calorie intake	++	+
Chatterjee (2013)	Koraput-Orissa	Revisited HUNGaMA sample Probit model	PDS	Child anthropometry (wasting stunting, underweight)	0	0
Jha, et al (2011)	Andhra Pradesh, Maharashtra, Rajasthan	Primary survey IV regression	PDS and NREGA	Micronutrient intake	PDS: ++ NREGA:+	++ +
Kaul (2014)	8 states with rice as dominant staple (AP, AS, CG, JH, KA, KL, OR, WB)	NSS 02- 08	PDS	Caloric intake, calories from different food groups, cereal consumption	++	++
Kaushal and Muchomba (2013)	20 states	NSS 93-94, 99-00, 04-05 OLS and IV regressions	PDS	Calorie intake	0	0
Khera (2011)	Rajasthan	Primary survey Multivariate regression	PDS	Cereal consumption	0	0
				Wheat consumption	++	+

Continued from previous page

Study	Location	Data set and method	Program	Dimension	Statistical significance (0,+,++)	Economic significance (--,-,0,+,++)
Ray (2007)	All India	NSS 87-88, 93-94, 99-00, 01-02 Descriptive	PDS	Calorie consumption		++
Krishnamurthy et al (2014)	Chhattisgarh	NSS 99-00, 04-05 Difference-in - difference	PDS	Calorie consumption	++	++
Svedberg (2012)	All India	NSS 2007 Descriptive	PDS	Rice and wheat consumption	0	-
Tarozzi (2005)	Andhra Pradesh	NFHS 92-93 OLS and difference-in-difference	PDS	Child anthropometry (weight-for-age)	Males: 0	+
					Females:0	-
Dasgupta (2012)	Andhra Pradesh	Young Lives survey (3 waves – 2002,06-07,09-10) Panel data regression	NREGA	Child anthropometry (height-for-age and stunting)	Short- term: ++	++
					Long- term: 0	0
Nair et al (2013)	Rajasthan	Primary survey Mixed methods	NREGA	Child anthropometry (underweight, stunting, wasting)	++	++
Uppal (2009)	Andhra Pradesh	Young Lives survey (2 waves- 2002, 06-07) Difference- in-difference	NREGA	Child anthropometry (underweight, stunting, wasting)	+	+
Drèze and Khera (2013)	All India	NSS 09-10 Quantitative;	PDS	Poverty	++	++

Note: For statistical significance ++ or -- refers to significance at the 1% level for positive impact and negative impact respectively, + and _ for significant upto 10% level and 0 if the relationship is not significantly different from 0 Economic significance is a loosely defined term that interprets the authors' own articulation of whether the findings show an impact that is significantly large.

Appendix Table 5: List of selected studies examining the effectiveness and outcomes of select programs other than the MGNREGA and PDS.

Study	Location	Data set and method	Program	Dimension	Summary of results
Jain (2013)	All India	NFHS (DHS)	ICDS	Stunting	Both boys and girls (0-2 years in rural India) who received supplementary feeding daily for a year to be 1 cm (0.4 z-score) taller than those who did not receive it.
Mazumdar et al. (2011)	All India	DLHS Difference-in-Differences	JSY	Neonatal and early neonatal mortality	increased uptake of maternity services but there is no strong evidence that the JSY was associated with a reduction in neonatal or early neonatal mortality
Lim, et al (2010)	All India	DLHS Matching, modified before-after, Difference-in-Differences	JSY	Perinatal and neonatal deaths	Increase in antenatal care and in-facility births; A reduction of 3.7 (95% confidence interval 2.2-5.2) perinatal deaths per 1000 pregnancies and 2.3 (0.9-3.7) neonatal deaths per 1000 live births in matching. In with-versus-without comparison, the reductions were 4.1 (2.5-5.7) perinatal deaths per 1000 pregnancies and 2.4 (0.7-4.1) neonatal deaths per 1000 live births.
Carvalho and Rokicki (2015)	All India	DLHS Exact matching	JSY	Perinatal and neonatal deaths	This is a replication study of Lim, et al. (2010) that confirms their findings.
Carvalho, et al. (2014)		DLHS, Matching	JSY	Immunization, check up and breastfeeding	Increase in immunization rates ranging from 3.1 percentage points for one dose of polio vaccine to 9.1 percentage points in the proportion of fully vaccinated children. Increased post-partum check-up rates and healthy early breastfeeding practices around the time of childbirth
Singh, et al. (2012)	Andhra Pradesh	Young Lives, Instrumental Variable	Midday meals	Stunting, Underweight	MDMS increased weight-for-age by 0.60 standard deviations and increased height-for-age by 0.27 standard deviations, the latter was not statistically significant.
Afridi (2010)	Madhya Pradesh	Primary survey; Difference-in-Differences	Midday meals	Calorie consumption of children	A cost of 3 cents per child per school day reduced the daily protein deficiency of a primary school student by 100 per cent, the calorie deficiency by almost 30 per cent and the daily iron deficiency by nearly 10 per cent.
Kaushal (2013)	All India	NSS 61st (2004-05) and 64th Rounds (2008-09)	Pensions	Expenditure	Pension raised family expenditures (by Rs.37-40 and Rs.92-100 per Rs.100 in pension), lowering poverty. Households spent most of the pension income on medical care and education.
Garroway (2015)	All India	IHDS Survey (2005), PSM	Pensions	Expenditure	Widow pensions increase monthly per capita expenditure by 8% reduce poverty by 2.7%

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