

**UNITED NATIONS
ECONOMIC COMMISSION FOR EUROPE
CONFERENCE OF EUROPEAN STATISTICIANS**

Seminar on poverty measurement
5-6 May 2015, Geneva, Switzerland
Agenda item 5: Multidimensional poverty

**Workfare Guarantee and its Effect on Multidimensional
Food Security in Four Indian Villages**

Prepared by the Heidelberg University¹

Abstract

This paper evaluates multidimensional welfare effects of India's National Rural Employment Guarantee Act (NREGA), a nation-wide rural public works program. Using longitudinal data of four villages, monthly household level data are matched with self-collected daily administrative data on the program's intensity and ex-ante planning, spanning 36 months between 2010 and 2013. A monthly Multidimensional Food Index (MFI) consisting of five major food categories is constructed. Doing so, monthly multidimensional headcount ratios of food deprivation are decomposed by village, landholding size, and labor type. Even though NREGA was designed as a demand driven program, it is established here that the NREGA does not depend much on self-selection in the state of Andhra Pradesh/Telangana. In particular, the ex ante planning of the NREGA at the village level entails a pre-determined assignment of workers to labour groups. Village authorities assign such labour-groups to worksites at given points in time. Wage payments occur after varying time intervals. In this paper, the intensity of monthly group-wise worksites is used as an instrument for monthly NREGA-wage payments. Preliminary empirical findings from the panel IV estimations with household and month fixed effects suggest that the NREGA reduces multidimensional headcount ratios of food deprivation in certain villages.

¹ Christian Oldiges, South Asia Institute.

1 Introduction¹

Despite high growth rates during the last three decades India still has the largest number of undernourished children in the world (Human Development Report, 2013). A third of the Indian population or about 400 million people live on less than \$1.25 per day. According to the Multidimensional Poverty Index (MPI) which includes ten indicators for health, education and living standard more than 50 percent of India's population is multidimensionally poor (Alkire and Seth, 2015). Irrespective of the method, the majority of the poor lives in rural India. The situation is further compounded by the growing gap between rural and urban India, both within and across states. This situation has been a major challenge for governments to tackle since at least the 1990s (Deaton and Drèze, 2002).

Due to the increasing frequency of droughts, price change and untimely rains, rural households suffer intense and regular shocks due to their dependence on agriculture. Furthermore, due to the scarcity of financial markets and the absence of security nets the poor are less able to insure themselves against such shocks and risks.

During 2005 and 2014, the United Progressive Alliance (UPA) government in its two successive terms, introduced several "pro-poor" legislations. One such significant legislation is the National Rural Employment Guarantee Act (NREGA) designed to be "ensuring inclusive growth in rural India" through its "impact on social protection, [and] livelihood security."²

The workfare program guarantees 100 days of employment to every rural household whose members are willing to do unskilled manual labour at the statutory minimum wage. In the financial year of 2011-12 alone, more than 40 million households were employed across the Indian subcontinent. Per workday, workers are paid about Rs. 100 (about \$2) and the Indian exchequer spends about \$10 billion annually on this program, which amounts to about 4 per cent of India's annual budget expenditure.

The NREGA is one of several workfare programs implemented largely in developing countries (Subbarao, 2003). A World Bank report (World Bank, 2013) counts about 150 active public works programs in sub-Saharan Africa, and according to Subbarao (2003), Asian and Latin American countries implemented many programs of this kind between the 1980s and 1990s. The mandatory labor component of such workfare programs has at least two effects. On the one hand it may reduce the net benefits earned by laborers (e.g. Datt and Ravallion, 1995), while on the other hand the inherent self-selection to supply labour has the potential to ensure proper targeting (Besley and Coate, 1992; Basu, 1981). Econometric studies on workfare programs other than the NREGA include Datt and Ravallion (1994, 1995) on the Maharashtra Employment Guarantee Scheme, a predecessor to the NREGA, active in one of India's states during the 1980s, Galasso and Ravallion (2004) on Argentina's Jefes program of 2002, and Berhane et al. (2011)

¹I am very grateful to Sudha Narayanan for her ideas and the research collaboration.

²See MGNREGA Guidelines 2013. http://nrega.nic.in/netnrega/WriteReaddata/Circulars/Operational_guidelines_4thEdition_eng_2013.pdf

on the Ethiopian Productive Safety Net Program (PSNP), which has been active since 2005.

Regarding India's NREGA and its effect on labor market outcomes, several recent econometric studies find that the Act has increased rural wages significantly (Azam, 2012; Berg et al., 2012; Imbert and Papp, 2013). According to these papers, which are largely based on National Sample Survey (NSS) data and difference-in-difference estimations³, the Act resulted in an increase of rural wages between 4 and 8 percent. Female workers and marginalized groups belonging to scheduled castes and scheduled tribes (SC/ST) are among the main beneficiaries. These studies also show that demand for NREGA employment is highly seasonal and that the Act serves as a safety net during the lean season when agricultural work opportunities are scarce. The just-mentioned studies imply large aggregate labor market effects given that the program is India-wide and the rural work force comprises about 300 million people.

Furthermore, work by Klöner and Oldiges (2014) using NSS data gives evidence for large seasonal effects on consumption expenditure for SC/ST households during the spring season. Raghunathan and Hari (2014) study the program's effects on risk taking behaviour of NREGA-participants and find that farmers adopt riskier and higher productivity crops. In contrast to the studies employing difference-in-difference estimations Klöner and Oldiges (2014) and Raghunathan and Hari (2014) follow Zimmermann's (2014) regression discontinuity design (RDD). The latter finds much smaller labor market effects contrasting the earlier studies cited above using the RDD. Since difference-in-difference estimations run the risk of violating the common-trend assumption when Indian districts are concerned, and since an RDD à la Zimmermann (2014) possibly yield rather imprecise estimates the estimation techniques applied in this paper can be considered a superior alternative - though valid only for the states of Andhra Pradesh and Telangana.

In addition, this paper contributes to the literature on welfare impacts of the NREGA by constructing a Multidimensional Food Index (MFI) which varies by month, village, and landholding size. Being unique in its own right, the MFI helps to track food consumption of five major food categories. Applying the Alkire Foster method (Alkire and Foster, 2011), the MFI reveals considerable variation in the probability of being multidimensionally food deprived in one or more of the five food categories.

In order to measure the impact of the NREGA on being multidimensionally food deprived, I combine a monthly household panel from the *International Crop Research Institute for the Semi-Arid Tropics* (ICRISAT) with both self-collected data on ICRISAT households and official NREGA program data. To avoid possible problems of endogeneity and reverse causality when estimating the program's effect on household consumption behaviour I use the monthly variation of the number of group-wise worksites as an instrument for NREGA-wages. For this purpose, I show via personally conducted interviews and self-collected data on ICRISAT households it is verified that each worker is assigned

³The cited studies exploit the phase-wise role-out of the NREGA across Indian districts over a three year time period.

to one labour-group. Further, I show that the assignment to such a labour-group as well as the date of group-wise worksites are random and decided upon solely by the so called Field Assistent (FA). Since the date of wage payments is irregular it can be assumed here that both the month and number of open worksites as well as the date of eventual wage payments are indeed exogenous events for a given labour-group and hence for a given worker.

Within the framework of two-stage least-squares estimations (2SLS) household fixed effects and month fixed effects are employed to estimate the NREGA's effect on household consumption, i.e. the MFI.

Preliminary statistically significant findings reveal that an increase in NREGA wages of 100 rupees (roughly equivalent to a day's labour under the NREGA) may decrease the headcount ratio of being deprived in three or more food categories by up to four percentage points. The result, however, varies by village. Qualitative observations from several months of field work in the sample villages support such empirical findings. According to primary data collection a large proportion of wages is directly consumed.

The structure of the paper is as follows. Section 2 provides a brief overview of the key features of the NREGA and the group-wise planning in Andhra Pradesh and Telangana. Further, established empirical research is presented and the significance of this research is highlighted. Section 3 introduces the panel data as well as the matched datasets and establishes the exogeneity of the instrument employed. The construction and composition of the MFI is presented with supporting summary statistics in Section 4. In Section 5 the two-stage least-squares regression framework is presented, while in Section 6 the main results are discussed. Finally section 7 summarises the paper in conclusion.

2 Background: The NREGA and Group-Wise Planning

Under the NREGA, enacted in 2005, every rural household is entitled to 100 days of work at the statutory minimum wage, which is set by the respective state government. Following a rights-based approach and including the provisions for transparency and accountability the NREGA goes much further than ordinary government schemes (Khera, 2011; Dey et al., 2008). The Right to Information (RTI) Act, also enacted in 2005, goes hand in hand with the NREGA. Using the RTI Act, official NREGA-documents have become transparent and accessible administrative records to the public. This enables NREGA-workers to scrutinize NREGA-records and demand accountability of officials. As a result, several instances of leakage and corruption have been revealed either through civil society or researchers (Drèze and Oldiges, 2007, 2009; Vanaik and Siddhartha, 2008a,b; Niehaus and Sukhtankar, 2013).

As much as workfare programs have been common in several developing countries ever since post-colonial times several versions have been tested in post-independence

India. For instance, the National Food for Work Programme (NFFWP) implemented between 2004 and 2006 in about 150 districts, is the predecessor of the NREGA. Also, the Maharashtra Employment Guarantee Scheme, enacted in 1977 and active until 2006, can be regarded as a forerunner to the NREGA (Drèze, 1990; Ravallion et al., 1993).

The NREGA was originally designed as a demand-driven program, in which workers self-select themselves for manual labour at the minimum wage. In contrast, many studies have shown that the NREGA is in many settings supply-driven (e.g. Chopra, 2014). For example, research on the state of Rajasthan reveals that the allocation of NREGA-funds are often diverted to worksites situated closely to the residence of local leaders like the village head or *Sarpanch* (Himanshu et al., 2015). Related research on Rajasthan shows that competition among political parties influences the flow of NREGA-funds at the block level (Gupta and Mukhopadhyay, 2014). Furthermore, Dutta et al. (2014) establish that rationing of available workdays exists in the state of Bihar, which means that works are solely supply-driven rather than responding to demand.

The NREGA in Andhra Pradesh and Telangana: Modus Operandi

Hailed as the *Andhra Model* the NREGA in the state of ⁴ has received a lot of attention from academia as well as from civil society organisations and the media. Annually generating more person-days than any other state over the past years researchers are generally impressed by the state's performance and its well-functioning state machinery of employment generation (Maiorano, 2014; Drèze and Oldiges, 2009). At the same time the Andhra model is known for its transparency mechanism which entails the mandatory undertaking of so called *social audits* by civil society organizations (Aakella and Kidambi, 2007b,a). By employing mostly female workers and thereby improving educational outcomes for children (Afridi et al., 2012, see), the Andhra model has been praised for its successful implementation and efficiency. At the same time, however, it is known that the Andhra model circumvents certain inbuilt provisions of the Act. In particular, as Maiorano (2014) thoroughly explains the Andhra model is in effect supply-driven rather than demand-driven preventing workers to ask for work with a written application. Therefore, the provision of being provided employment within 15 days after being demanded does not exist as such in Andhra Pradesh. Instead, the entire system is organised in a top-down fashion, from the state's chief minister to the ultimate implementing agent, the *Field Assistant*.

In the context of the village economies studied in this paper, it is important to note the actual modus operandi of the Act. For one, the NREGA is designed to be state-driven so that each state formulates its own guidelines. In the case of Andhra Pradesh and the newly formed state of Telangana the final person in charge in the long chain of administrative planning is the Field Assistant (FA). She is in charge of forming the labour-groups⁵ at the village level. Once assigned to a labour-group by 2010, workers remain in the very group for the following years. The FA is also in charge of supervising

⁴In 2014, the state of Andhra Pradesh was partitioned into two states, Telangana and Andhra Pradesh.

⁵These labour-groups are called Shrama Shakti Sanghas (SSS) and were formed at the end of 2010.

the worksites and posting labour-groups to worksites as per requirement, and as per his judgement. Keeping this in mind, workers in the states of Andhra Pradesh and Telangana cannot demand work as stipulated by the Act. They need to wait for the FA's assignment.

In the following, the uncertainty involved in the timing of NREGA-worksites and the timing of payments is shown. Establishing this feature is crucial to consider the group-wise payments and group-wise timings of worksites as exogenous events to a worker. In particular, it is established here that the timing of wage payments is irregular as well.

Welfare Effects of the NREGA: Existing Research and Contribution

Considering the large amount of research on labor market effects of the NREGA, findings on welfare effects are still scarce. For example, using India-wide data Klonner and Oldiges (2014) find that the Act does increase consumption expenditure for the most marginalised groups, SC/ST communities, during spring. This has considerable poverty alleviating effects reducing consumption-based poverty measures significantly. Deininger and Liu (2013) demonstrate similar evidence using longitudinal data of 4,000 households residing in Andhra Pradesh using data for the years 2004, 2006 and 2008. Employing double and triple differences as well as propensity score matching estimations they find large short-term effects, of Rs. 140 per month, on SC/ST consumption in Phase II and III districts in the state of Andhra Pradesh.

Similarly, but using a smaller panel dataset of 320 households residing in Andhra Pradesh Ravi and Engler (2009) find that the Act did increase consumption expenditure. Employing a propensity score matching procedure one may contest, however, that their identifying assumption are rather strong.

Given these studies and in some cases weak identifying assumptions more empirical evidence is needed. This paper is a contribution of sorts as it provides for a unique identification strategy for the states of Andhra Pradesh and Telangana.

3 Data

Among the so called second generation, the ICRISAT has collected data from four villages in Andhra Pradesh and Telangana which will be used here. Based on a monthly recall the data include information on household demographics, consumption, income, financial transactions besides land holding and agriculture related information.

I combine ICRISAT's monthly household level data with self collected data for the same ICRISAT households. Besides qualitative questions regarding the NREGA, the self collected data include each household's NREGA-job-card number. Via the latter, the monthly data for each ICRISAT-household employed under the NREGA can thus be merged with all official NREGA-related data including the days and dates of work and payment.

The final dataset of NREGA-group members includes 82 ICRISAT-NREGA households residing in four villages interviewed monthly over three years between July 2010

and June 2013. While the two villages of Aurepalle and Dokur belong to the district of Mahbubnagar (Telangana), the villages of JC Agrapharam and Pamidipadu belong to Prakasam district (Andhra Pradesh). Summary statistics by village are presented in Table 1 and monthly variation of consumption expenditure by village are presented in Figure 3. Figures 9 to 12 show the variation of monthly group payments by village. All prices are deflated to 2010 prices using the monthly and state-wise consumer price index for agricultural labourers (CPI-AL) (Government of India, 2013). The following is evident from the figures and the summary statistics: First, consumption follows a stable path across months and years with regular peaks during the festive or harvest season around October. For the village of Dokur a sharp decline in consumption appears to occur. This, however, can be controlled for in the regression analysis using month or village-month fixed effects. Table 2 presents some of the self collected data. It is apparent that NREGA-workers are likely to spend NREGA-wages on normal household expenses but also on loan repayments in the form of payments to *Self Help Groups* or *Chit Funds*.

Delay in Wage Payments: Time between Muster Role Closure and Date of Wage Payment

Based on official data, Figure 4 shows the average number of days a labour-group has to wait for its NREGA wages after a Muster Roll has been closed.⁶ A considerable amount of uncertainty regarding the actual date of payment is obvious. For 35 percent of all groups the average payment does happen within the 15-day-time span as required per the Act, 55 percent of the groups have to wait on average between 15 and 30 days whereas the remaining 10 percent need to wait for more than a month.

This is supported by the primary data collected from ICRISAT NREGA workers residing in the four villages reveal. Table 2 shows the finding, that a large proportion of households (about 40 percent) complain about payments which happen with much delay or more than 15 days after the completion of a Muster Roll (see Narayanan et al. (2015) for an analysis of the primary data).

4 Multidimensional Food Index

Multidimensional poverty in India as measured by Alkire and Seth (2015) varies greatly by state and sub-population. Applying the Alkire and Foster method (Alkire and Foster, 2011), the authors find that about 70 percent of India's rural population were multidimensionally poor in 1999 and 60 percent in 2006. However, the progress in poverty alleviation has not been even. Alkire and Seth (2015, p.97, Table 2) show that the richer states which were able to reduce multidimensional poverty at much higher rates than the relatively poorer ones. In addition, the reduction in the multidimensional poverty headcount ratio (H) for minority groups such as Muslims was only half as much as that

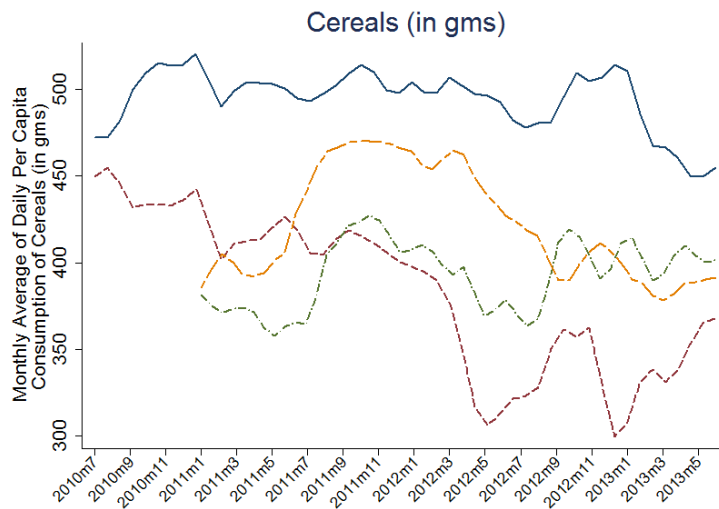
⁶ A Muster Roll is essentially the FA's book keeping to take attendance of workers at the worksite and is usually done on a weekly basis. A big worksite with work over several weeks can have several Muster Rolls.

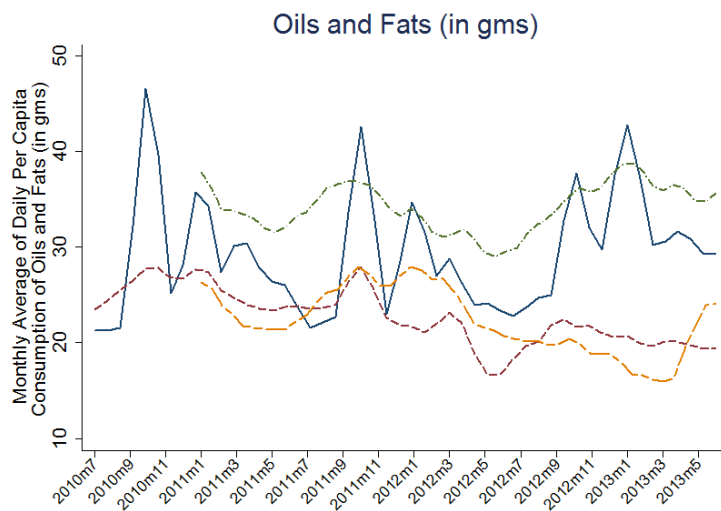
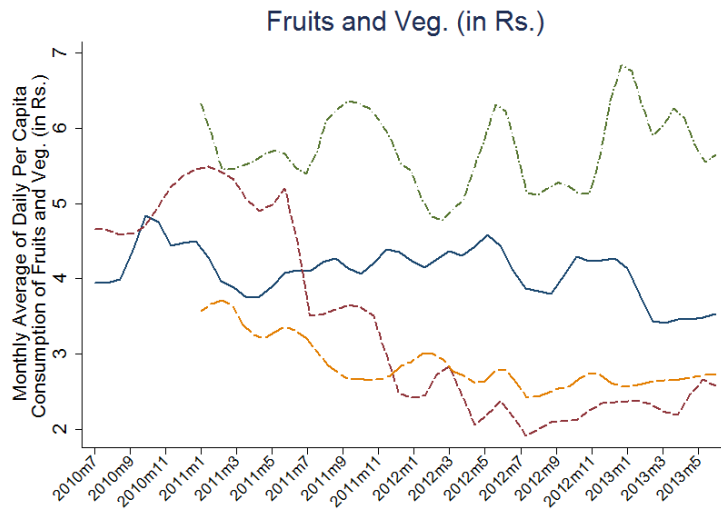
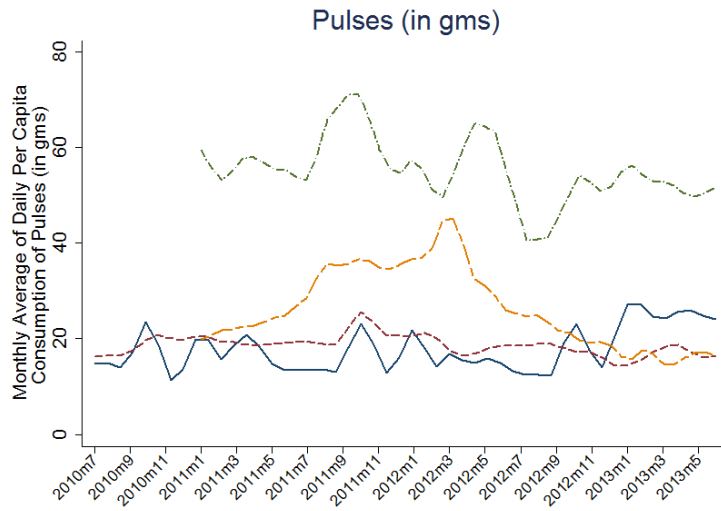
for Hindu families. Similarly, among India's caste groups the sub-population of so called tribal communities is lagging behind all other groups in terms of reducing H and the average intensity of multidimensional poverty (A).

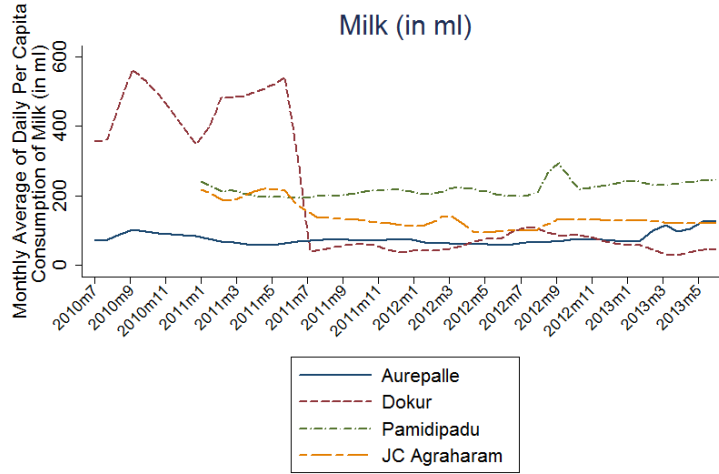
Of particular interest for this paper is the state of Andhra Pradesh. According to Alkire and Seth (2015, p.97, Table 2), Andhra Pradesh accounted for the third highest state-wise reduction in the multidimensional headcount ratio (H), in absolute terms. The latter fell from about 57 percent in 1999 to 42 percent in 2006. At the same time, Andhra Pradesh also achieved the highest reduction in the average intensity of multidimensional poverty (A) which fell by 6 percentage points from about 53 percent in 1999.

Building on the study by Alkire and Seth (2015) and applying the Alkire and Foster method (Alkire and Foster, 2011), this paper contributes to existing research by constructing a monthly varying Multidimensional Food Index (MFI). It includes five food categories, namely: cereals, fruits and vegetables, pulses, oils, and milk. Village-wise monthly variation in daily per capita consumption of the five food categories are given in Figure 1.

Figure 1: Monthly Average of Village-Wise Daily per Capita Food Consumption, by Food Category







Based on VLS data; deflated to July 2010 prices using the CPI-AL
Sample: NREGA-Labour-Group Members.

With the passage of the National Food Security Act (NFSA) in 2013, such an index is of both political and academic interest. Particularly because of the debates taking place on Government food subsidies such as the Targeted Public Distribution System.⁷

Constructing the MFI: Indicators and Indicator Cut-offs

For the purpose of constructing a multidimensional food index which has to rely on reasonable indicator cut-offs, this paper takes into account daily per capita dietary norms for as recommended by the Indian Council of Medical Research (2009). Adjusting the recommendation for sedentary adult men to the nutritional needs of women, children and elderly of a typical household, the following indicator cut-offs are applied (see Table A):

Table A: Min. Daily Per Capita Food Requirement

Food Category	Unit	Quantity
Cereals	grams	230
Pulses	grams	20
Milk	ml	75
Oils & Fat	grams	20
Veg. & Fruits	median	\geq median

Since the data used in this paper measure the purchase of vegetables and fruits in monetary terms (in rupees), we construct the respective indicator cut-off as the monthly village-wise median of per capita expenditure on vegetables and fruits. In the following, we use several poverty cut-offs (k values) and consider households food deprived if they are deprived in more than one, two, three, or four of the five food categories, respectively.

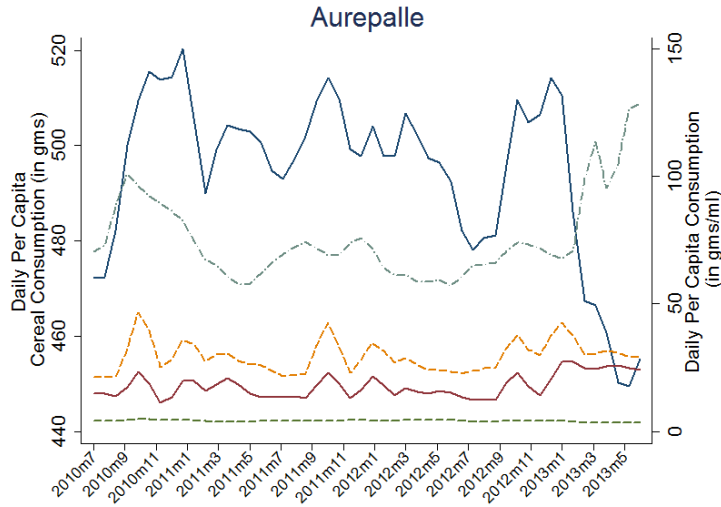
⁷For literature on current debates around the PDS and its potential, see among many other for example: Drèze and Khera (2015, 2013); Chatterjee (2014); Puri (2012).

Counting households being deprived in more than k indicators and taking the mean of the subsample of interest, yields the Headcount Ratio of Food Deprivation, or H_{Fk} . Calculating the average deprivation count of the food deprived (in k indicators) yields A_{Fk} . The product of H_{Fk} and A_{Fk} results in MFI_k , the multidimensional food index or the weighted deprivation score of the multidimensionally food deprived.⁸

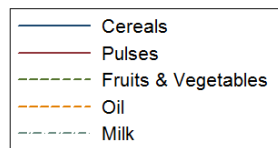
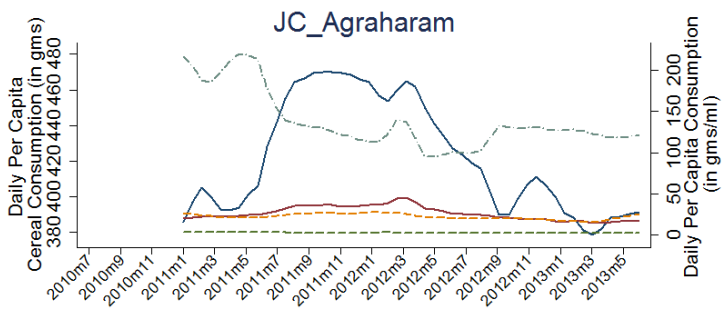
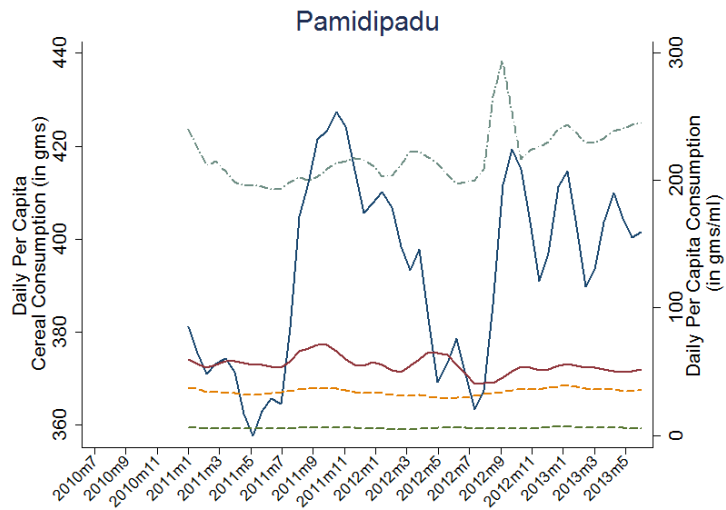
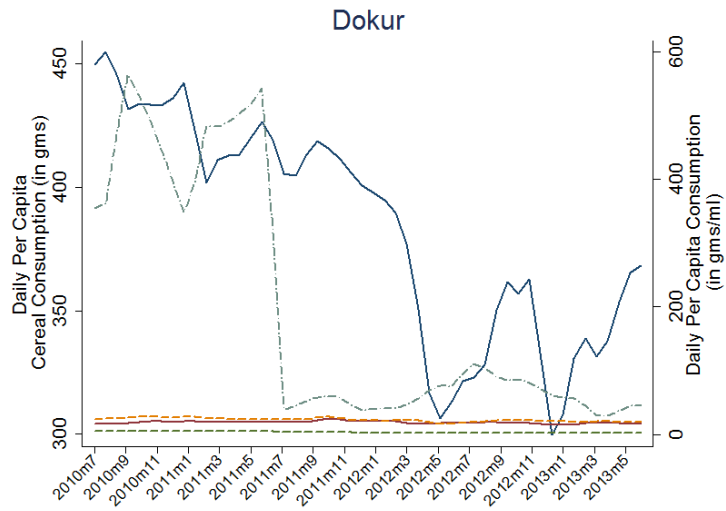
This technique allows us to calculate monthly and village-wise H_{Fk} . At the same time we are able to decompose our sample by landholding size and NREGA group-membership.

To present the key features of the village economies in terms of food deprivation we focus here on monthly, village-wise headcount ratios of food deprivation (H_{Fk}). Figure 2 portrays the monthly variation of village-wise H_{Fk} for a range of 4 k -values and for the sample of NREGA-Labour-Group Members. It is apparent that across the villages of Aurepalle, Dokur and JC Agraharam 80 percent of the households are deprived in at least one of the five food categories. While for the village of Aurepalle a slight downward trend over the years across all k -values can be observed, for Dokur and JC Agraharam a slight upward trend is visible. For Pamidipadu, however, no such trend is apparent and food deprivation at higher k -values is abysmally low in comparison to the other three villages.

Figure 2: Monthly Headcount Ratio of Food Deprivation by Village



⁸At the time of writing this draft (April 2015), monthly and village-wise values for A_{Fk} and MFI_k are not calculated yet.



Based on VLS data; deflated to July 2010 prices using the CPI-AL
 Sample: NREGA-Labour-Group Members.

5 Identification and Model

In the empirical analyses, panel estimations of the following form are calculated for each village:

$$\text{OLS: } y_{igt} = \mu_i + \gamma_t + \beta \text{Wage}_{it} + \delta X_{it} + \epsilon_{it} \quad (1)$$

$$\text{Reduced Form: } y_{igt} = \mu_i + \gamma_t + \beta \text{Instr}_{gt} + \delta X_{it} + \epsilon_{it} \quad (2)$$

$$\text{First Stage: } \text{Wage}_{it} = \mu_i + \gamma_t + \beta \text{Instr}_{gt} + \delta X_{it} + \epsilon_{it} \quad (3)$$

$$\text{IV: } y_{igt} = \mu_i + \gamma_t + \beta \widehat{\text{Wage}}_{it} + \delta X_{it} + \epsilon_{it} \quad (4)$$

, where Instr_{gt} is the instrument of choice. In the following, the intensity, i.e. the number of open worksites for group g in month t is used as the instrument. μ_i is a time invariant household fixed effect, γ_t is a month fixed effect, X_{it} contains control variables for household i in month t . ϵ_{it} is a stochastic error term. Standard errors are clustered at the group-month level.

In the case of pooled estimations, i.e. when both villages are included, village-month fixed effects are used instead of month fixed effects.

All price variables are adjusted to 2010 prices using the Consumer Price Index for Agricultural Labourers (CPI-AL).

6 Discussion of Results

In the following, the regression analysis is restricted to the instrumented effect of NREGA-wages on the MFI, i.e. the four (k) headcount ratios on being multidimensionally deprived in food consumption.

All regressions are restricted to the sample of labour-group members. Hence, only households who have ever been part of any NREGA labour-group are included irrespective of the fact whether and when they visit NREGA-worksites. Further, two samples are of interest: One, any ICRISAT-NREGA worker, and second, those ICRISAT-NREGA workers who are marginal and small landowners, i.e. those who own less than two hectares of land.

For completeness, Tables 3, 4, and 5 present results for the OLS estimation, the Reduced Form and the First Stage as per equations 1, 2, 3, respectively. While the first column in each of the tables shows the overall effect - all four villages are pooled into one regression, the following four columns present village-wise regression results. The same table structure is used for the subsequent tables presenting the IV results as per equation

4. Standard errors are clustered at the group-month level. While the regressions for "All Villages" employ household and village-month fixed effects, the village-wise regressions use household and month fixed effects.

Sample of Small and Marginal Landowners

The results of the Reduced Form (Table 4) are of considerable magnitude and are statistically significant for the case of Aurepalle, showing that monthly group-wise worksites do influence NREGA-wages directly. It is obvious from the First Stage Results (Table 5) that the intensity of monthly group-wise worksites explain about 40 percent of the variation of NREGA-wages. However, the inter-village variation is huge ranging from 73 percent for Aurepalle to just 13 percent for Pamidipadu.

The major finding from the Reduced Form as well as from the Instrumented Variable estimation is that the NREGA does reduce the probability of being jointly deprived in 2 or more food categories. Evidently, this result holds for the village of Aurepalle, where an increase of 100 rupees in wages (a day's labor) leads to a decrease of 3.8 percentage points in the probability of being deprived in 3 or more Food Categories. No statistically significant results can be found for the other villages.

Sample of All Landowning Groups

Even though for the sample of all landowning classes the estimations yield coefficients of similar magnitude and sign, they are not statistically significant.

7 Conclusion

In this paper we employ a unique estimation technique for evaluating India's employment guarantee program, the NREGA, in terms of its impact on multidimensional food security. The 36-month-panel of 82 households covers four villages where the NREGA was active between summer 2010 and summer 2013. Using the monthly group-wise opening of worksites as an instrument for NREGA-wages, the impact of the NREGA on the joint deprivation in five food categories is estimated. Preliminary results reveal a considerable impact for the sample of the most disadvantaged households of a typical Indian village economy: small and marginal landowners owning not more than two hectares of land. For at least one village, statistically significant regression results suggest that the NREGA improves multidimensional food security to some extent.

References

- Aakella, K. V. and S. Kidambi (2007a). Challenging Corruption with Social Audits. *Economic and Political Weekly* 42(5), 345.
- Aakella, K. V. and S. Kidambi (2007b). Social Audits in Andhra Pradesh: A Process in Evolution. *Economic and Political Weekly* 42(47), 18.

- Afridi, F., A. Mukhopadhyay, and S. Sahoo (2012). Female Labour Force Participation and Child Education in India: The Effect of the National Rural Employment Guarantee Scheme. IZA Discussion Paper No. 6593.
- Alkire, S. and J. Foster (2011). Counting and Multidimensional Poverty Measurement. *Journal of Public Economics* 95(7), 476–487.
- Alkire, S. and S. Seth (2015). Multidimensional Poverty Reduction in India between 1999 and 2006: Where and How? *World Development* 72(0), 93 – 108.
- Azam, M. (2012). The Impact of Indian Job Guarantee Scheme on Labor Market Outcomes: Evidence from a Natural Experiment. IZA Discussion Paper No. 6548.
- Basu, K. (1981). Food for Work Programmes: Beyond Roads That Get Washed Away. *Economic and Political Weekly* 16(1), 37–40.
- Berg, E., S. Bhattacharyya, R. Durgam, and M. Ramachandra (2012). Can Rural Public Works Affect Agricultural Wages? Evidence from India. CSAE Working Paper WPS/2012-05.
- Berhane, G., J. Hoddinott, N. Kumar, and A. S. Taffesse (2011). The Impact of Ethiopia’s Productive Safety Nets and Household Asset Building Programme: 2006-2010. IFPRI Working Paper.
- Besley, T. and S. Coate (1992). Workfare vs. Welfare: Incentive Arguments for Work Requirements in Poverty Alleviation Programs. *American Economic Review* 82(1), 249–61.
- Chatterjee, M. (2014). An Improved PDS in a ‘Reviving’ State. *Economic & Political Weekly* 49(45), 49.
- Chopra, D. (2014). "They Don’t Want to Work" versus "They Don’t Want to Provide Work": Seeking Explanations for the Decline of MGNREGA in Rajasthan. ESID Working Paper No. 31 . Manchester, UK: University of Manchester. Available at www.effectivestates.org.
- Datt, G. and M. Ravallion (1994). Transfer Benefits from Public-Works Employment: Evidence for Rural India. *The Economic Journal* 104(427), 1346–1369.
- Datt, G. and M. Ravallion (1995). Is Targeting through a Work Requirement Efficient? Some Evidence for Rural India. In *Public Spending and the Poor: Theory and Evidence*, pp. 413. Johns Hopkins University Press.
- Deaton, A. and J. Drèze (2002). Poverty and Inequality in India: A Re-Examination. *Economic and Political Weekly* 37(36), 3729–3748.
- Deininger, K. and Y. Liu (2013). Welfare and Poverty Impacts of India’s National Rural Employment Guarantee Scheme: Evidence from Andhra Pradesh. World Bank Policy Research Working Paper No. 6543.

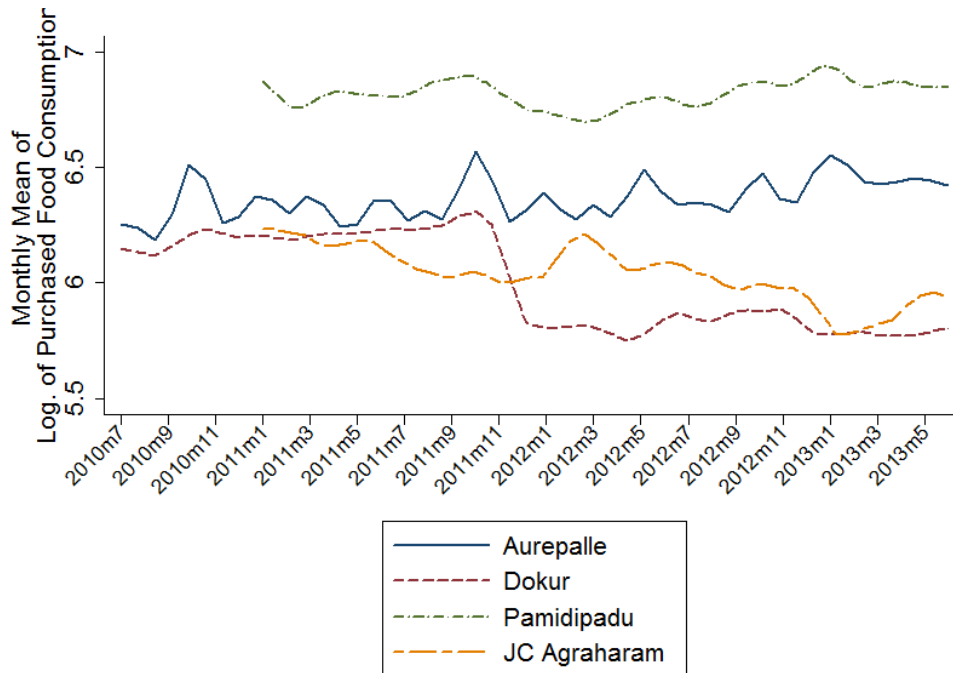
- Dey, N., J. Drèze, and R. Khera (2008). *Employment Guarantee Act: A Primer*. New Delhi: National Book Trust.
- Drèze, J. (1990). Famine Prevention in India. In J. Drèze and A. Sen (Eds.), *The Political Economy of Hunger: Volume 1: Entitlement and Well-being*. Oxford University Press, Oxford.
- Drèze, J. and R. Khera (2013). Rural Poverty and the Public Distribution System. Department of Economics, Centre for Development Economics. Delhi School of Economics. Working Paper No. 235.
- Drèze, J. and R. Khera (2015). Understanding Leakages in the Public Distribution System. *Economic & Political Weekly* 50(7), 39.
- Drèze, J. and C. Oldiges (2007). Commendable Act. *Frontline Vol 24, Issue 14, 14-27 July*.
- Drèze, J. and C. Oldiges (2009). How is NREGA Doing? *Frontline Vol 26, Issue 4, 14-22 February*.
- Dutta, P., R. Murgai, M. Ravallion, and D. Van de Walle (2014). *Right to Work?: Assessing India's Employment Guarantee Scheme in Bihar*. World Bank Publications.
- Galasso, E. and M. Ravallion (2004). Social Protection in a Crisis: Argentina's Plan Jefes y Jefas. *The World Bank Economic Review* 18(3), 367–399.
- Government of India (2013). Consumer Price Index for Agricultural Labourers. Online Documents: <http://labourbureau.nic.in/indtab.html>. Labour Bureau.
- Gupta, B. and A. Mukhopadhyay (2014). Local Funds and Political Competition: Evidence from the National Rural Employment Guarantee Scheme in India. ESID Working Paper No. 42. Manchester, UK: University of Manchester. Available at www.effective-states.org.
- Himanshu, A. Mukhopadhyay, and S. MR (2015). The National Rural Employment Guarantee Scheme in Rajasthan: Rationed Funds and Their Allocation Across Villages. ESID Working Paper No. 35. Manchester, UK: University of Manchester. Available at www.effective-states.org.
- Imbert, C. and J. Papp (2013). Labor Market Effects of Social Programs: Evidence from India's Employment Guarantee. CSAE Working Paper WPS/2013-03.
- Indian Council of Medical Research (2009). Nutrient Requirements and Recommended Dietary Allowances for Indians: A Report of the Expert Group of the Indian Council of Medical Research. National Institute of Nutrition, Indian Council of Medical Research. Jamai-Osmania PO, Hyderabad.
- Khera, R. (2011). *The Battle for Employment Guarantee*. Oxford University Press, New Delhi.

- Klonner, S. and C. Oldiges (2014). Safety Net for India's Poor or Waste of Public Funds? Poverty and Welfare in the Wake of the World's Largest Job Guarantee Program. AWI Discussion Paper Series No. 564 , University of Heidelberg.
- Maiorano, D. (2014). The Politics of the Mahatma Gandhi National Rural Employment Guarantee Act in Andhra Pradesh. *World Development* 58, 95–105.
- Narayanan, S., C. Oldiges, and K. Ranaware (2015). A Tale of Two States: NREGA approaches in Maharashtra and Andhra Pradesh. Mimeo. IGIDR Mumbai.
- Niehaus, P. and S. Sukhtankar (2013). Corruption Dynamics: The Golden Goose Effect. *American Economic Journal: Economic Policy* 5(4), 230–269.
- Puri, R. (2012). Reforming the Public Distribution System: Lessons from Chhattisgarh. *Economic and Political Weekly* 47(5).
- Raghunathan, K. and S. Hari (2014). Providing more than just employment? Evidence from the NREGA in India. *Unpublished Working Paper*.
- Ravallion, M., G. Datt, and S. Chaudhuri (1993). Does Maharashtra's Employment Guarantee Scheme Guarantee Employment? Effects of the 1988 Wage Increase. *Economic Development and Cultural Change* 41(2), 251–275.
- Ravi, S. and M. Engler (2009). Workfare in Low Income Countries: An Effective Way to Fight Poverty? The Case of NREGS in India. Indian School of Business Working Paper. Hyderabad: Indian School of Business.
- Subbarao, K. (2003). *Systemic Shocks and Social Protection: Role and Effectiveness of Public Works Programs*. Social Protection, World Bank.
- Vanaik, A. and Siddhartha (2008a). Bank Payments: End of Corruption in NREGA? *Economic and Political Weekly* 43(17), 33, 35–39.
- Vanaik, A. and Siddhartha (2008b). CAG Report on NREGA: Fact and Fiction. *Economic and Political Weekly* 43(25), 39–45.
- World Bank (2013). *World Development Report 2014: Risk and Opportunity, Managing Risk for Development*. Washington, DC.

A Figures and Tables

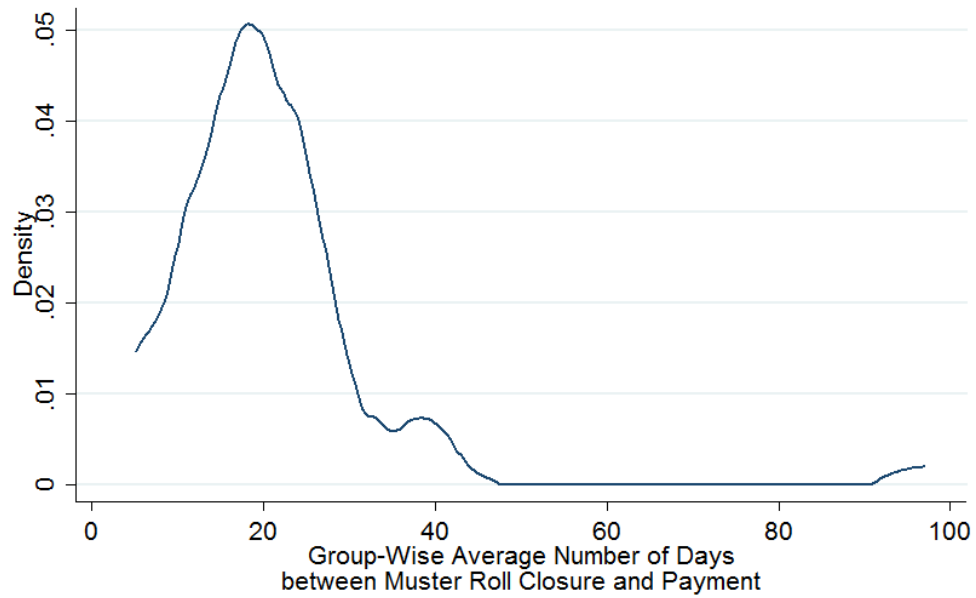
A.1 Figures

Figure 3: Average Monthly Log of Per Capita Purchased Food Consumption Expenditure between 2010 and 2013



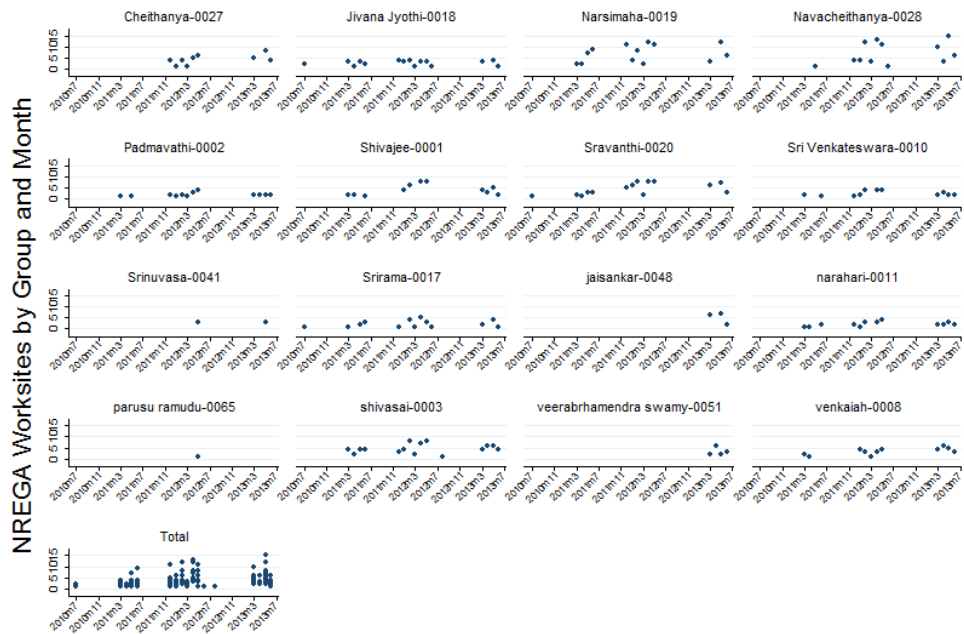
Based on VLS data; deflated to July 2010 prices using the CPI-AL

Figure 4: Group-Wise Average Number of Days between Muster Roll Closure and Payment



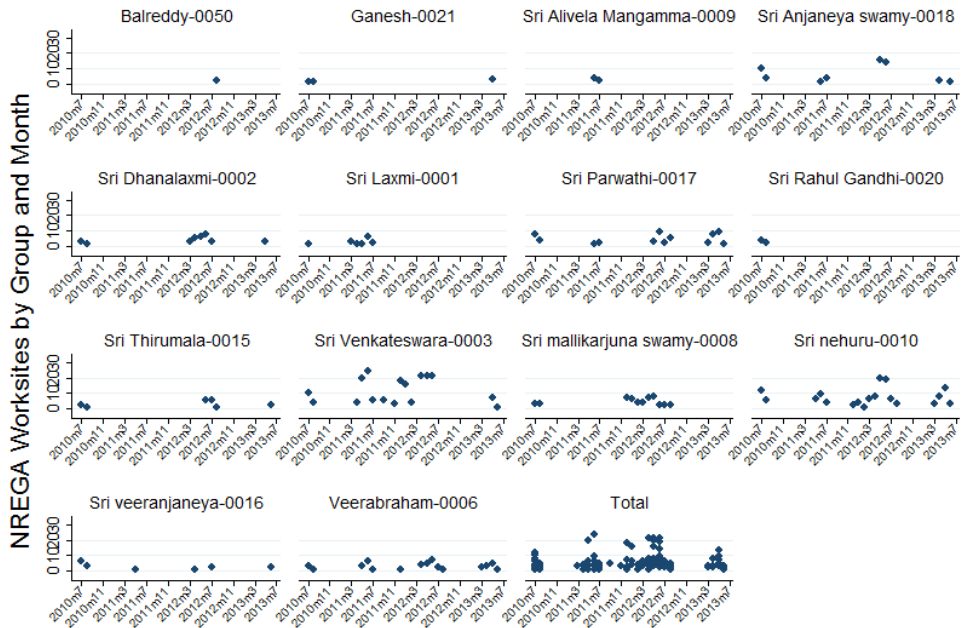
Number of Groups:59
Calculated from official data for the four villages of Aurepalle, Dokur, Pamidipadu, and JC Agraharam.
Only data for labour groups of ICRISAT households are included.
Time period: July 2010 to June 2013.

Figure 5: NREGA Worksites by Group and Month in Aurepalle



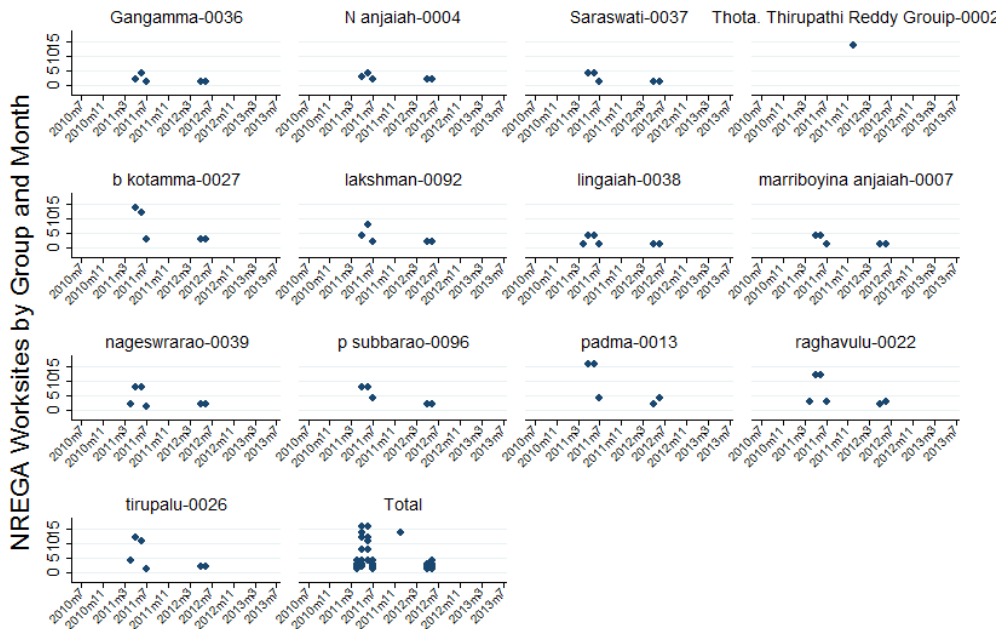
Based on official NREGA data for the sample of ICRISAT Households.

Figure 6: NREGA Worksites by Group and Month in Dokur



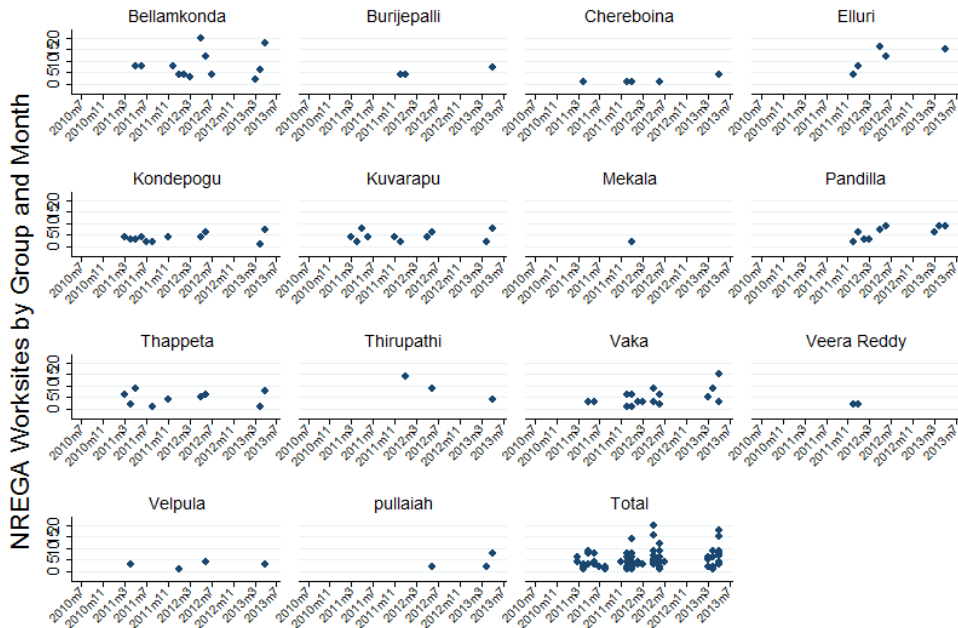
Based on official NREGA data for the sample of ICRISAT Households.

Figure 7: NREGA Worksites by Group and Month in Pamidipadu



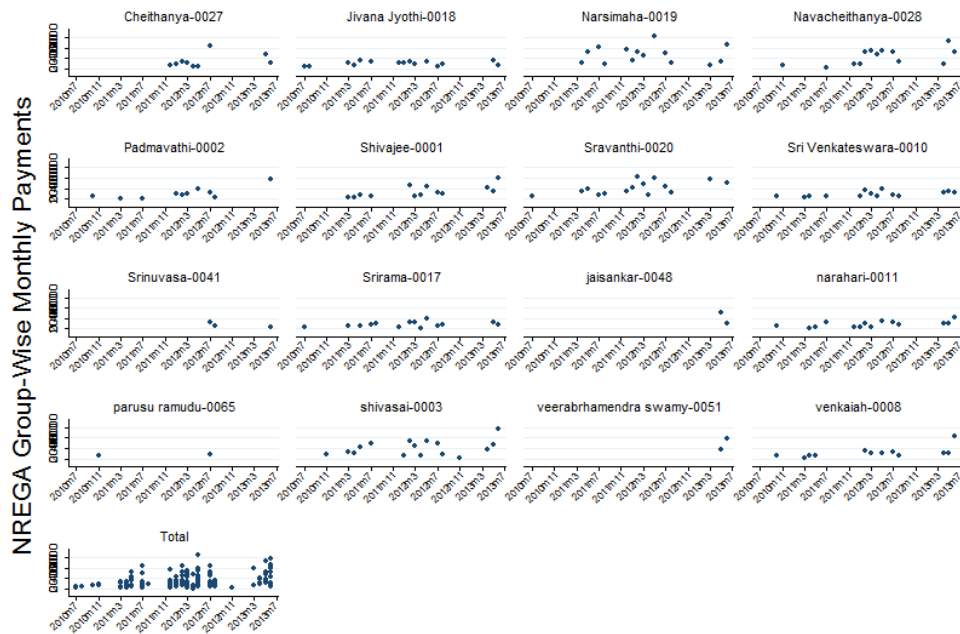
Based on official NREGA data for the sample of ICRISAT Households.

Figure 8: NREGA Worksites by Group and Month in JC Agraharam



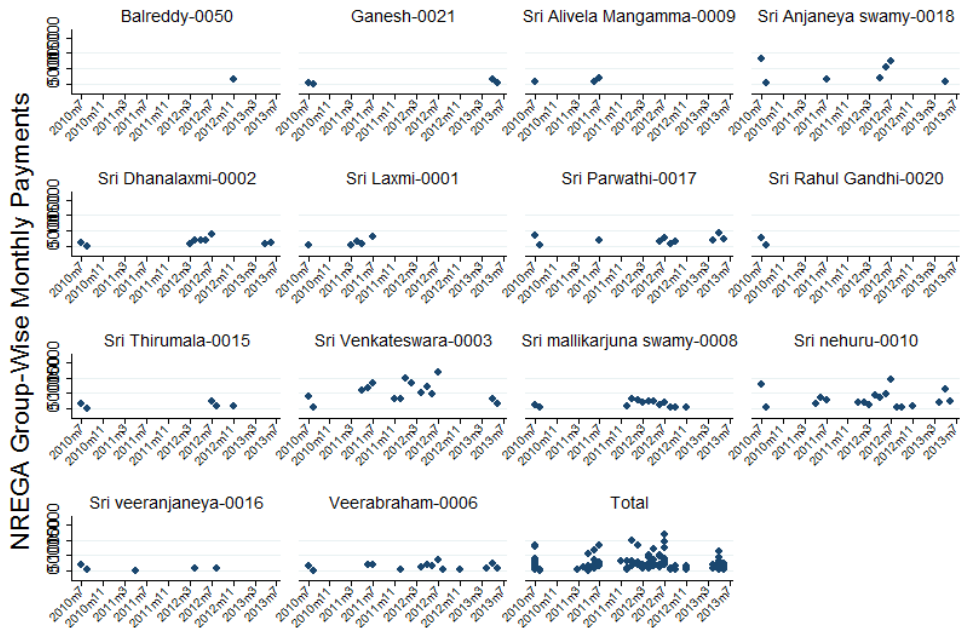
Based on official NREGA data for the sample of ICRISAT Households.

Figure 9: NREGA Group-Wise Monthly Total Payment in Aurepalle



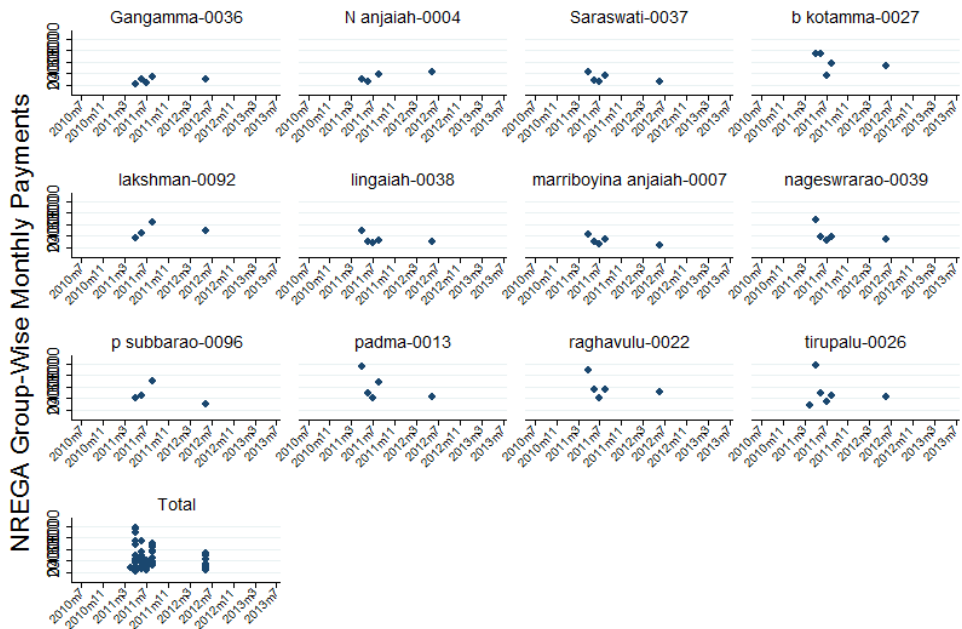
Based on official NREGA data for the sample of ICRISAT Households.

Figure 10: NREGA Group-Wise Monthly Total Payment in Dokur



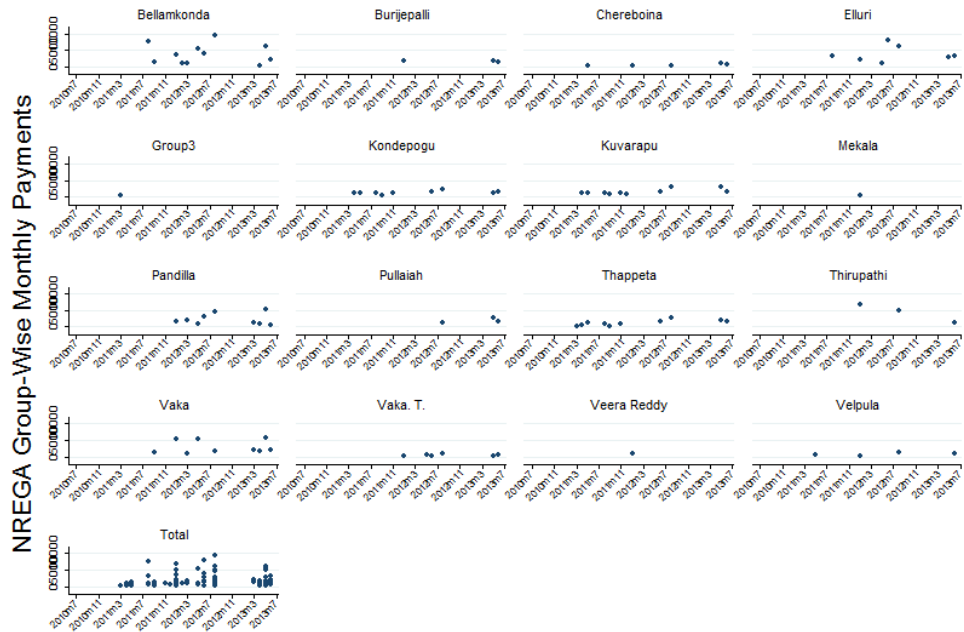
Based on official NREGA data for the sample of ICRISAT Households.

Figure 11: NREGA Group-Wise Monthly Total Payment in Pamidipadu



Based on official NREGA data for the sample of ICRISAT Households.

Figure 12: NREGA Group-Wise Monthly Total Payment in JC Agraharam



Based on official NREGA data for the sample of ICRISAT Households.

A.2 Tables

Table 1: Summary Statistics by Village and Year

	All Villages			Aurepalle			Dokur			Pamidipadu			JC Aghaharam		
	All	Small L.	All	Small L.	All	Small L.	All	Small L.	All	Small L.	All	Small L.	All	Small L.	
	2010-11														
Monthly Per Capita Consumption	2033.38	1660.82	2201.34	1713.87	1720.54	1331.38	3118.73	2640.16	1155.54	1063.98					
Monthly Per Capita Consumption (in logs)	7.29	7.19	7.36	7.20	7.13	7.06	7.79	7.67	6.91	6.84					
Monthly Per Capita Food Consumption	784.16	736.23	824.16	738.50	630.36	600.08	1088.66	1038.20	700.11	660.44					
Monthly Per Capita Food Consumption (in logs)	6.59	6.53	6.65	6.56	6.40	6.36	6.95	6.90	6.47	6.41					
Monthly Loan repaid	2765.79	1744.16	4444.50	2898.21	1765.22	789.86	2746.48	2237.68	151.77	155.70					
Monthly Loan repaid (in logs)	3.59	3.51	2.31	2.37	4.18	3.69	5.67	5.37	3.96	3.92					
Household Size	3.68	3.58	3.28	3.21	4.19	3.86	3.57	3.74	3.83	3.74					
Number of Observations	1677	1107	684	420	516	336	237	189	240	162					
Number of Households	180	122	57	35	43	28	40	32	40	27					
Number of Months	12	12	12	12	12	12	6	6	6	6					
2011-12															
Monthly Per Capita Consumption	1933.32	1646.94	1877.16	1549.12	1591.02	1303.45	2827.01	2473.73	1489.49	1133.61					
Monthly Per Capita Consumption (in logs)	7.26	7.15	7.34	7.19	6.93	6.82	7.74	7.63	7.01	6.89					
Monthly Per Capita Food Consumption	750.97	696.79	789.25	709.61	532.40	475.65	1063.67	1000.22	619.32	545.19					
Monthly Per Capita Food Consumption (in logs)	6.52	6.45	6.62	6.52	6.19	6.10	6.92	6.87	6.35	6.24					
Monthly Loan repaid	2694.98	1830.77	2843.69	2208.64	2023.64	895.14	3810.89	2700.05	2091.18	1262.60					
Monthly Loan repaid (in logs)	4.43	4.26	3.81	3.48	4.37	3.98	5.76	5.47	4.04	4.12					
Household Size	3.59	3.54	3.19	3.05	3.99	3.67	3.40	3.61	3.91	3.96					
Number of Observations	2159	1451	684	420	516	336	479	383	480	312					
Number of Households	181	122	57	35	43	28	41	33	40	26					
Number of Months	12	12	12	12	12	12	12	12	12	12					
2012-13															
Monthly Per Capita Consumption	1936.88	1607.31	2293.27	1719.02	1492.64	1065.11	2586.64	2384.05	1239.74	1055.36					
Monthly Per Capita Consumption (in logs)	7.25	7.15	7.40	7.27	6.96	6.78	7.64	7.57	6.96	6.85					
Monthly Per Capita Food Consumption	736.86	700.91	775.52	722.82	516.52	443.46	1070.27	1030.18	583.37	535.44					
Monthly Per Capita Food Consumption (in logs)	6.51	6.46	6.60	6.54	6.17	6.04	6.94	6.90	6.31	6.23					
Monthly Loan repaid	2313.47	1539.76	3474.22	2313.80	1631.21	1185.94	3064.89	1734.63	585.78	543.60					
Monthly Loan repaid (in logs)	4.60	4.61	5.25	4.86	3.43	3.51	6.46	6.30	3.04	3.30					
Household Size	3.56	3.49	3.15	3.00	3.98	3.72	3.33	3.49	3.96	3.97					
Number of Observations	2183	1463	707	443	516	336	480	384	480	300					
Number of Households	182	122	59	37	43	28	40	32	40	25					
Number of Months	12	12	12	12	12	12	12	12	12	12					

Table 2: Summary Statistics of Primary Data

Percentage of Households responding that	All Villages	Aurepalle	Dokur	Pamidipadu	JC Agraharam
NREGA Income is spent on Normal HH Expenses	81.48	84.62	89.47	87.50	65.00
NREGA Income is spent on SHG or Chit Fund	48.15	61.54	52.63	37.50	35.00
NREGA Income is spent on Food	35.80	26.92	36.84	43.75	40.00
NREGA Income is spent on Medical Expenses	25.93	19.23	31.58	18.75	35.00
NREGA Income is spent on School Fees	4.94	3.85	10.53	0.00	5.00
NREGA Income is spent on Dowry	1.23	0.00	5.26	0.00	0.00
NREGA Income is spent on Transport Expenses	0.00	0.00	0.00	0.00	0.00
NREGA Income is spent on Debt	0.00	0.00	0.00	0.00	0.00
NREGA Income is spent on House related Expenses	0.00	0.00	0.00	0.00	0.00
NREGA-Wages are Delayed	40.74	42.31	57.89	37.50	25.00
Number of Households	82	26	19	17	20

Data: Self collected in September-November 2014 from ICRISAT NREGA households.

Table 3: OLS Results (Instrument: Intensity, Number of Monthly Group-Wise Worksites), Sample: Small And Marginal Landowners, Contemp. NREGA Effect on Food Deprivation

Effect of NREGA-Wage on Food Deprivation (Level-Log)					
All V.	Aurepalle	Dokur	Pamidipadu	JC Agraharam	
DV: Deprived in at least 1 of 5 Food Categories					
$Log.of \widehat{NREGAWage}$	0.215 (0.267)	-0.459 (0.398)	-0.168 (0.485)	3.355 (2.394)	0.619 (0.696)
Observations	1733	504	432	419	378
Households	53	14	12	14	13
Months	36	36	36	30	30
DV: Deprived in at least 2 of 5 Food Categories					
$Log.of \widehat{NREGAWage}$	-0.224 (0.425)	-1.468** (0.660)	0.254 (0.919)	-0.841 (1.402)	-0.038 (1.082)
Observations	1733	504	432	419	378
Households	53	14	12	14	13
Months	36	36	36	30	30
DV: Deprived in at least 3 of 5 Food Categories					
$Log.of \widehat{NREGAWage}$	-0.547 (0.433)	-1.170 (0.773)	-0.891 (1.008)	-0.255 (0.278)	-0.122 (1.036)
Observations	1733	504	432	419	378
Households	53	14	12	14	13
Months	36	36	36	30	30
DV: Deprived in at least 4 of 5 Food Categories					
$Log.of \widehat{NREGAWage}$	-0.652* (0.353)	-1.190* (0.629)	-1.226 (0.853)	-0.163 (0.171)	-0.098 (0.718)
Observations	1733	504	432	419	378
Households	53	14	12	14	13
Months	36	36	36	30	30

Notes: Robust standard errors in parentheses, clustered at the group-month level. * p<0.1, ** p<0.05, *** p<0.01. Additional regressors whose coefficients are not displayed in the table: Month and household fixed effects. For "All Villages" regressions: Village-month fixed effects are used instead of month fixed effects,

Table 4: Reduced Form Results (Instrument: Intensity, Number of Monthly Group-Wise Worksites), Sample: Small And Marginal Landowners, Contemp. NREGA Effect on Food Deprivation

Direct Effect of the Instrument on Food Deprivation (Level-Level)					
All V.	Aurepalle	Dokur	Pamidipadu	JC Agharam	
DV: Deprived in at least 1 of 5 Food Categories					
Monthly Group-wise NREGA Worksites	0.254 (0.326)	-0.147 (0.904)	-0.436 (0.527)	1.463 (0.993)	0.658 (0.538)
Observations	1733	504	432	419	378
Households	53	14	12	14	13
Months	36	36	36	30	30
DV: Deprived in at least 2 of 5 Food Categories					
Monthly Group-wise NREGA Worksites	0.154 (0.463)	-2.483** (1.197)	-0.279 (0.725)	0.951** (0.482)	-0.263 (1.240)
Observations	1733	504	432	419	378
Households	53	14	12	14	13
Months	36	36	36	30	30
DV: Deprived in at least 3 of 5 Food Categories					
Monthly Group-wise NREGA Worksites	-0.806* (0.453)	-2.843** (1.356)	-1.063 (0.855)	0.164 (0.103)	-2.133** (0.970)
Observations	1733	504	432	419	378
Households	53	14	12	14	13
Months	36	36	36	30	30
DV: Deprived in at least 4 of 5 Food Categories					
Monthly Group-wise NREGA Worksites	-0.311 (0.329)	-2.380** (1.138)	-0.470 (0.736)	0.017 (0.024)	-0.301 (0.476)
Observations	1733	504	432	419	378
Households	53	14	12	14	13
Months	36	36	36	30	30

Notes: Refer to Table 3.

Table 5: First Stage Results (Instrument: Intensity, Number of Monthly Group-Wise Worksites), Sample: Small And Marginal Landowners, Contemp. NREGA Effect on Food Deprivation

First Stage: NREGA-Wage on NREGA Worksites (Log-Level)					
All V.	Aurepalle	Dokur	Pamidipadu	JC Agraharam	
DV: NREGA Wage (in Logs)					
Monthly Group-wise NREGA Worksites	0.436*** (0.032)	0.733*** (0.086)	0.428*** (0.051)	0.133** (0.056)	0.302*** (0.056)
Observations	1733	504	432	419	378
Households	53	14	12	14	13
Months	36	36	36	30	30

Notes: Refer to Table 3.

Table 6: IV Results (Instrument: Intensity, Number of Monthly Group-Wise Worksites), Sample: Small And Marginal Landowners, Contemp. NREGA Effect on Food Deprivation

NREGA Wage Effect on Food Deprivation (Level-Log)						
All V.	Aurepalle	Dokur	Pamidipadu	JC Agraharam		
DV: Deprived in at least 1 of 5 Food Categories						
$Log.of\widehat{NREGA}Wage$	0.582 (0.747)	-0.200 (1.234)	-1.020 (1.236)	10.996 (6.718)	2.181 (1.842)	
Observations	1733	504	432	419	378	
Households	53	14	12	14	13	
Months	36	36	36	30	30	
DV: Deprived in at least 2 of 5 Food Categories						
$Log.of\widehat{NREGA}Wage$	0.354 (1.061)	-3.390** (1.656)	-0.653 (1.690)	7.148 (4.602)	-0.870 (4.122)	
Observations	1733	504	432	419	378	
Households	53	14	12	14	13	
Months	36	36	36	30	30	
DV: Deprived in at least 3 of 5 Food Categories						
$Log.of\widehat{NREGA}Wage$	-1.848* (1.040)	-3.881** (1.856)	-2.484 (1.986)	1.230 (0.999)	-7.069* (3.608)	
Observations	1733	504	432	419	378	
Households	53	14	12	14	13	
Months	36	36	36	30	30	
DV: Deprived in at least 4 of 5 Food Categories						
$Log.of\widehat{NREGA}Wage$	-0.714 (0.746)	-3.250** (1.561)	-1.099 (1.700)	0.131 (0.195)	-0.998 (1.565)	
Observations	1733	504	432	419	378	
Households	53	14	12	14	13	
Months	36	36	36	30	30	

Notes: Refer to Table 3.

Table 7: IV Results (Instrument: Intensity, Number of Monthly Group-Wise Worksites), Sample: All Landowning Groups, Contemp. NREGA Effect on Food Deprivation

		NREGA Wage Effect on Food Deprivation (Level-Log)				
All V.	Aurepalle	Dokur	Pamidipadu	JC Agraharam		
DV: Deprived in at least 1 of 5 Food Categories						
$Log.of\widehat{NREGAWage}$	-0.366 (0.656)	-1.499 (1.516)	-1.368 (1.040)	9.715 (7.137)	0.006 (1.796)	
Observations	2711	936	684	509	582	
Households	82	26	19	17	20	
Months	36	36	36	30	30	
DV: Deprived in at least 2 of 5 Food Categories						
$Log.of\widehat{NREGAWage}$	0.062 (0.822)	-2.599* (1.529)	-0.610 (1.458)	5.725 (4.428)	-0.864 (2.529)	
Observations	2711	936	684	509	582	
Households	82	26	19	17	20	
Months	36	36	36	30	30	
DV: Deprived in at least 3 of 5 Food Categories						
$Log.of\widehat{NREGAWage}$	-1.506* (0.808)	-2.720 (1.748)	-2.105 (1.566)	0.086 (1.697)	-3.292 (2.132)	
Observations	2711	936	684	509	582	
Households	82	26	19	17	20	
Months	36	36	36	30	30	
DV: Deprived in at least 4 of 5 Food Categories						
$Log.of\widehat{NREGAWage}$	-0.611 (0.657)	-1.063 (1.408)	-1.188 (1.541)	0.042 (0.181)	-0.867 (0.887)	
Observations	2711	936	684	509	582	
Households	82	26	19	17	20	
Months	36	36	36	30	30	

Notes: Refer to Table 3.