THE HOUSEHOLD RESPONSE TO PERSISTENT NATURAL DISASTERS: EVIDENCE FROM BANGLADESH

Azreen Karim*
School of Economics and Finance
Victoria Business School
Victoria University of Wellington, New Zealand

November, 2016

ABSTRACT

We examine the short-run economic impacts of recurrent flooding on Bangladeshi households surveyed in 2000, 2005 and 2010. In 2010 Household Income and Expenditure Survey (HIES), households answered a set of questions’ on whether they were affected by flood and its likely impacts. We identify two treatment (affected) groups by using the self-reported data and historical rainfall data based flood risk index. We estimate a difference-in-difference (DID) model to quantify the impacts on income, expenditure, asset and labour market outcomes and further extend our analysis to different income and expenditure brackets. Overall, we find robust evidence of negative impacts on agricultural income and expenditure. Intriguingly, the extreme poor (i.e. the bottom 15th quintile) experience significant positive impacts on agricultural income in the self-reported treatment case.

JEL Codes: Q54, Q56, O12, I3, C31.
Key words: Development, Natural Disasters, Persistent, Difference-in-Difference.

*Corresponding email: azreen.karim@vuw.ac.nz; azreenk@gmail.com. I would like to thank my supervisors, Professor Illan Noy and Dr. Mohammed Khaled for providing insightful comments and constructive suggestions in the draft version of this paper. I am also grateful to Dr. Binayak Sen (Bangladesh Institute of Development Studies) and M.G. Mortaza (Asian Development Bank, BRM) for providing useful inputs in the data collection process.
Bangladesh has a long history with natural disasters due to its geography and its location on the shores of the Bay of Bengal. Climate change models predict Bangladesh will be warmer and wetter in the future.\(^1\) This changing climate induces flood risk associated with the monsoon season each year (Gosling et al. 2011). It is now widely understood that climate induced increasingly repeated risks threaten to undo decades of development efforts and the costs would be mostly on developing countries impacting existing and future development (OECD, 2003; McGuigan et al., 2002; Beg et al., 2002). Recent literatures examine the short-run effects of natural disasters on household welfare and health outcomes (Arouri et al., 2015; Lohmann and Lechtenfeld, 2015; Silbert and Pilar Useche, 2012; Rodriguez-Oreggia et al. 2013, Lopez-Calva and Juarez, 2009). However, less advancement has been observed in the use of self-reported data to capture the short-run disaster-development nexus in least developed countries with high climatic risks.\(^2\) In this paper, we ask: ‘what are the impacts on household income, expenditure, asset and labour market outcomes of recurrent flooding in Bangladesh?’

We examine the short-run economic impacts of recurrent flooding on Bangladeshi households surveyed in 2000, 2005 and 2010. In 2010 Household Income and Expenditure Survey (HIES), households answered a set of questions’ on whether they were affected by flood and its likely impacts. Therefore, this paper makes two key contributions in the ‘disaster-development’ literature: First, we develop a difference-in-difference (DID) model and estimate the impacts of recurrent flooding through identification of two different treatment (affected) groups using self-reported information and historical rainfall data based flood risk index for Bangladesh. We further extend our analysis using a quantile regression and quantify the impacts on the ‘ultra’ (extreme) poor.\(^3\) The development responses of the climatic disasters may therefore depend on the novel approach i.e. accuracy in identifying the

\(^1\) See Bandyopadhyay and Skoufias (2015).

\(^2\) Poapongsakorn and Meethom (2013) looked at the household welfare impacts of 2011 floods in Thailand (an upper-middle income country by World Bank definition) and Noy and Patel (2014) further extended this to look at spill over effects.

\(^3\) The term ‘ultra-poor’ was coined in 1986 by Michael Lipton of the University of Sussex and is defined as ‘a group of people who eat below 80% of their energy requirements despite spending at least 80% of income on food’. In this paper, we refer to the households who belong to the bottom 15\(^{th}\) quintile of per capita income/expenditure brackets.
treatment groups using self- and non-self-reported data. Second, we show that there is inconsistency between self- and non-self-reported information based estimates with literature outcomes questioning the designation of survey questions (related to natural shocks) and their usefulness to capture development impacts.

The paper is designed as follows: Section 2 reviews the ‘new’ macro-micro literature highlighting recent insights to explore the nexus between climate disasters and economic development. Section 3 portrays our identification strategy while Section 4 describes the data, provides detailed breakdown of our methodological framework, identifies the key variables and justifies the choice of the covariates with added descriptive statistics. In Section 5, we present and analyse the estimation results with previous literature along with some robustness checks in Section 6. Finally, in Section 7 we conclude with relevant policy implications and also some insight for further advancements.

2. CLIMATE DISASTERS AND DEVELOPMENT: THE ‘NEW’ MACRO-MICRO LITERATURE

The last few years have seen a new wave of empirical research on the consequences of changes in precipitation patterns, temperature and other climatic variables on economic development and household welfare. Climate-related natural disasters are expected to rise as the earth is getting warmer with prospect of significant negative economic growth mostly affecting the poor countries (Felbermayr and Gröschl, 2014; Acevedo, 2014). Vulnerable economies for example, the Pacific islands could expect a growth drop by 0.7 percentage points for damages equivalent to 1 percent of GDP in the year of the disaster (Cabezon et al., 2015). On the causality between catastrophic events and long-run economic growth using 6,700 cyclones, Hsiang and Jina (2014) find robust evidence that national incomes decline compared to pre-disaster trends and the recovery do not happen for twenty years for both poor and rich countries. This finding contrasts with the earlier work of Noy (2009) and Fomby, Ikeda and Loayza (2009) to some extent and carry profound implications as climate change induced repeated disasters could lead to accumulation of income losses over time. Therefore, climate disasters have become a development concern with likelihood of rolling back years of development gains and exacerbate inequality.

---

4 These studies focus on the short-run effects of natural disasters.
Climate resilience has become integral in the post-2015 development framework and recent cross-country ‘micro’ literatures explore the channels through which climate disasters impacted poverty.\(^5\) Two recent studies on rural Vietnam looked at the impacts on climate disasters such as floods, storms and droughts on household resilience and health outcomes (Arouri, Nguyen and Youssef, 2015 and Lohmann and Lechtenfeld, 2015). Arouri et al. (2015) pointed out that micro-credit access, internal remittance and social allowances could strengthen household resilience to natural disasters. However, high resilience might not necessarily reflect low vulnerability as evident in a study conducted on tropical coastal communities in Bangladesh (Akter and Mallick, 2013). Moreover, another study on the Pacific island of Samoa by Le De, Gaillard and Friesen (2015) suggests that differential access to remittances could increase both inequality and vulnerability. Bandyopadhyay and Skoufias (2015) show that climate induced rainfall variability influence employment choices impacting lower consumption in flood-prone sub-districts in rural Bangladesh. Assessing relationship between household heterogeneity and vulnerability to consumption patterns to covariate shocks as floods and droughts, Kurosaki (2015) identified landownership to be a critical factor to cope with floods in Pakistan. A recent study on the Indian state of Tamil Nadu by Balasubramanian (2015) estimates the impact of climate variables (i.e. reduction in ground water availability at higher temperature than a threshold of 34.31\(^\circ\) C) on agricultural income impacting small land owners to get low returns to agriculture. In one particular examination on occurrence and frequency of typhoons and/or floods in Pasay City, Metro Manila by Israel and Briones (2014) reveals significant and negative effects on household per capita income.

This growing ‘Climate-Development’ literature further explores empirical patterns in risk, shocks and risk management by using shock modules in questionnaire-based surveys to complement existing risk management tools. This usage of self-reported information on natural shocks motivated researchers to develop different dimension of identification strategies and compare impact findings using econometric models. Two recent studies by Noy and Patel (2014) and Poapongsakorn and Meethom (2013) investigate household welfare and spill over effects of the 2011 Thailand flood identifying self-reported affected (treatment) group in a difference-in-difference modelling framework. Nevertheless, evidences suggest

\(^5\) Karim and Noy (2016) provide a qualitative survey of the empirical literature on poverty and natural disasters.
careful use of self-reported data in identifying the true impacts which is also one of the highlights in this paper.  

3. IDENTIFICATION STRATEGY

Our objective in this paper is to analyse the short-run impacts of recurrent flooding on household income, expenditure, asset and labour market outcomes through identification of treatment (affected) groups using both self- and non-self-reported data (historical rainfall data based flood risk index). We use the term ‘persistent natural disasters’ to refer to repeated natural disasters (e.g. flood) that occurs almost every year and possess increase risks of occurrence due to rainfall variability. Our estimation strategy compares households surveyed on and before year 2010 (in which shock module was introduced with questionnaire related to natural disasters). Therefore, we define year 2010 as post. Although there was no major flood event in 2010, we identified those sub-districts that were surveyed with shock questionnaire in 2010 and compared them in the earlier years (i.e. 2000 and 2005). The key assumption in our identification strategy is that in the absence of 2010 treatment (self-identified flood impact), the evolution of the outcome of interest (e.g. income, expenditure, asset and labour market outcomes) would have followed the same trend as the control group (i.e. common trend assumption).

We identify two treatment groups using self- and non-self-reported data as a) shock module was introduced in the 2010 Household Income and Expenditure Survey (HIES) and no new surveys have been conducted at the national level since then and b) self-reporting in terms of being affected could be subjective and might bring biased results due to sorting or selective reporting. Self-reported data could not only be a subject of recall error, but also to other forms of cognitive bias like reference dependence (Guiteras, Jina and Mobarak, 2015). The module on shocks and coping responses was first introduced in HIES 2010 to identify households affected by various idiosyncratic and covariate shocks. As our focus in this paper is on covariate shocks i.e. flood, we identify households who have self-reported to be

---

7 See Bandyopadhyay and Skoufias (2015) and Gosling et al. (2011).
8 The decision process of 2015 survey is currently underway according to the information provided by the current Project Director of HIES.
9 See Heltberg, Oviedo and Talukdar (2015) for a discussion on how survey modules falls short of expectations in several ways.
affected by floods only in 2010 survey. The earlier surveys – 2000 and 2005 did not have any shock module and hence identification of self-reported affected groups were not possible. However, Bangladesh as a disaster-prone country, disasters particularly flood is a repeated phenomenon every year. Therefore, a comparison control group could be those households who are not affected by specific natural disasters, if any, in the survey regions in that particular year. Here, we took flood as persistent natural disaster due its repeated occurrence every year mostly during the monsoon period (May-October). Due to absence of shock modules in the dataset in years 2000 and 2005, we identify two ‘treatment’ groups – treatment group A and treatment group B.

To identify our first treatment group i.e. treatment group A, we use a rainfall-based flood risk probability index using historical rainfall dataset from the Bangladesh Meteorological Department (BMD) to identify upazilas/thanas (in particular, the survey areas) which are affected by excessive rainfall more than average rainfall over a long period (1948-2012). The rule of thumb is the survey areas which experienced more than average rainfall compared to the benchmark of average rainfall of 64 years in the corresponding weather station in respective survey years (e.g. 2000, 2005 and 2010), the surveyed households’ falls under treatment group A. The control (not affected) group i.e. control group A are those households who resided in survey areas that did not experience excessive rainfall compared to the average rainfall of 64 years in the corresponding weather station in respective survey years (here, 2000, 2005 and 2010). Figures 1 and 3 presents the evolution of per capita total income and expenditure for treatment and control group A, respectively. These figures were created by averaging the residuals of income and expenditure after controlling for covariates by year and separately for the treatment and control group A. It can be seen that the trajectories in both groups (treatment and control) are quite similar in 2000 and 2005 (pre-treatment years), an indication that the common trend assumption holds in these periods.

The second treatment group i.e. treatment group B is identified through a combination of both self-reported and non-self-reported information due to absence of shock modules before 2010 and prevalence of flooding every year. From 2010 survey, the treatment group is the respondents who have said ‘Yes’ as being affected by natural disasters such as

---

10 See Karim and Noy (2015) for a detailed breakdown of the index construction.
flood. The benefits of using a rainfall-based flood risk criterion are twofold. First, it justifies homogeneity among affected households in terms of a common natural shock i.e. flood. Second, we can compare the development impacts with two different treated groups and the differences could refer to discrepancies in capturing the true impacts using shock modules. The second control group i.e. control group B is also identified through a combination of both self-reported and non-self-reported information due to absence of shock modules in years 2000 and 2005. In 2010, the controls are those households who have responded ‘No’ to being affected by flood. We use the rainfall-based flood risk measure to identify the control households for 2000 and 2005 in control group B. To check for the validity of the common trend assumption using treatment and control group B, we show the evolution of per capita total income and expenditure in figures 2 and 4 respectively. These figures were created by averaging the residuals of income and expenditure after controlling for covariates by year and separately for the treatment and control group B. The trajectories here again validate the common trend assumption in pre-treatment years (e.g. 2000 and 2005).

4. DATA AND METHODOLOGY

(a) Data description

We use Household Income and Expenditure Survey (HIES) of the Bangladesh economy spanning over a time period of 10 years and consists of three (3) waves: 2000, 2005 and 2010. The HIES is the nationally representative dataset conducted by the Bangladesh Bureau of Statistics (BBS) (in affiliation with the Ministry of Planning, Government of Bangladesh and technical and financial assistance from the World Bank) that records information regarding income, expenditure, consumption, education, health, employment and labour market, assets, measures of standard of living and poverty situation for different income brackets in urban and rural areas. The BBS conducts this survey every five (5) years. The latest HIES conducted in 2010 added four (4) additional modules in which one refers to ‘Shocks and Coping’ (Section 6B) in the questionnaire. The BBS HIES is a repeated cross-section dataset with randomly selected households in designated primary sampling units (PSUs). Therefore, the strength of the dataset is large sample size covering a broad range of households. However, limitations are there in capturing the impacts over time. The number of households in year 2000 is 7,440 with 10,080 and 12,240 in year 2005 and year 2010 respectively. We also
use the Bangladesh Meteorological Department (BMD) rainfall dataset from 1948-2012 (i.e. 64 years) for 35 weather stations across the country to identify flood-affected treatment group in respective survey years under consideration.

(b) Methodological framework

We employ the difference-in-difference (DID) estimation framework to estimate the development impacts on affected households due to flood. We start with the following specification:

\[
y_{it} = \beta_0 + \beta_1 \text{post}_{2010} + \beta_2 \text{treated}_i + \beta_3 \text{post}_{2010}. \text{treated}_i + \beta_4 X_{it} + \beta_5 \text{year}_{2005}
\]

\[+ \beta_6 \text{year}_{2005}. \text{treated}_i + u_{it} \tag{1}\]

Where \(\text{post} = 1\) if the observation is from 2010, \(\beta_2\) is the difference between treated and control groups on the baseline, \(X_{it}\) denotes the covariates indicating household \((i)\) and socio-economic characteristics and infrastructural features, \(\beta_5\) is time fixed effect for year 2005, \(\beta_6\) is the interaction term and \(u_{it}\) indicate the error term. The \(\beta_3\) coefficient measures the difference-in-difference (DID) impact of a natural shock on outcome variables (development impact indicators), \(y_{it}\). We use robust standard errors for our hypothesis tests.

We further conduct quantile regression (estimating five different quintiles e.g. 15\(^{th}\), 25\(^{th}\), 50\(^{th}\), 75\(^{th}\) and 85\(^{th}\) quintiles) using the same DID framework to compare our results for different income and expenditure brackets.\(^{11}\)

\[
Qy_{it} = \beta_{0(\alpha)} + \beta_{1(\alpha)} \text{post}_{2010} + \beta_{2(\alpha)} \text{treated}_i + \beta_{3(\alpha)} \text{post}_{2010}. \text{treated}_i + \beta_{4(\alpha)} X_{it} + \beta_{5(\alpha)} \text{year}_{2005}
\]

\[+ \beta_{6(\alpha)} \text{year}_{2005}. \text{treated}_i + u_{it} \tag{2}\]

Where \(Q\) refers to quantile regression, \(\alpha\) denotes selected quintiles (0.15, 0.25, 0.50, 0.75 and 0.85) and all other variables are as previously defined (as the treatment groups are not randomly assigned in our context).\(^{12}\) We also estimate the following semi-logarithmic

\(^{11}\) See Khandker, Bakht and Koolwal (2009).
\(^{12}\) We also regress equation (2) without the control variables and the results are presented in the appendix.
regression model by log-transformation of the dependent and continuous independent variables as robustness checks for our main results.\textsuperscript{13}

\[
\log y_{it} = \alpha_0 + \alpha_1 \text{post}_{2010} + \alpha_2 \text{treated}_i + \alpha_3 \text{post}_{2010} \cdot \text{treated}_i + \alpha_4 X_{it} + \alpha_5 \text{year}_{2005} \\
+ \alpha_6 \text{year}_{2005} \cdot \text{treated}_i + u_{it} \quad (3)
\]

(c) Outcome variables and choice of covariates

Appendix tables 1 and 2 show the list of key outcome variables and the covariates (continuous and categorical) and their descriptive statistics for two different sets of treatment and control groups. Our outcome variables of interest include four sets of development indicators. They are: income (income by category), expenditure (expenditure/consumption by category), asset types and labour market outcomes. Income and expenditure are divided into various sub-groups with statistics shown in per capita household measures. Asset and labour market outcomes are also sub-divided into various categories (also described in appendix tables 1 and 2). The continuous (monetary) variables in each category are inflation-adjusted using consumer price index (CPI) data from the Bangladesh Bank to allow for comparisons across different years.

Alleviating poverty is a fundamental challenge for Bangladesh with the majority of the extreme poor living in rural areas with considerable flood risk bringing annual agricultural and losses to livelihoods (JBIC, 2007; Fadeeva, 2014; Ferdousi and Dehai, 2014). Hence, we control for ‘rural’ that takes the value 1 if the household resides in a rural area and 0 if otherwise reported. The male member as household head is generally considered as ‘bread earner’ and a good amount of literature also highlighted the positive association between female-headed households and poverty especially in developing countries (Mallick and Rafi, 2010; Aritomi et al., 2008; Buvinic and Rao Gupta, 1997). Therefore, a dummy variable has been created indicating 1 if the household head is male and 0, if reported otherwise. Household characteristics such as age structure and number of dependents is critical to analyse poverty status and one might expect larger number of dependents leads to greater poverty (Kotikula et al., 2010; Haughton and Khandker, 2009; Lanjouw and Ravallion, 1995). Education is also related with lower poverty (Kotikula et al., 2010). Community-level characteristic such as

\textsuperscript{13} Since this type of transformation closely follows normal distribution. See Sugiyarto (2007) for more discussion.
access to sanitation and access to safe drinking water is clearly associated with better health outcomes improving poverty status (World Bank, 2014; Duflo et al., 2012) of households with access to electricity also showing a positive trend in living standards (Kotikula et al., 2010). Therefore, three (3) binary variables are created indicating 1 to imply access to these services, 0 otherwise. Ownership status of households such as house and land has also been argued as important determinant of poverty with owners of a dwelling place are found to be less vulnerable to flood risk (e.g. Khatun, 2015; Tasneem and Shindaini, 2013; Gerstter et al., 2011; Meinzen-Dick, 2009; Rayhan, 2010). A description of these variables including summary statistics is also provided in appendix tables 1 and 2.

(d) Descriptive statistics

We provide two sets of descriptive statistics for two different treatment and control groups (treatment group A and treatment group B) in appendix tables 1 and 2 respectively. We present mean and standard deviation for various outcome categories and covariates for both rainfall-based and self-reported treatment (affected) and control (not affected) groups. Most of the income categories especially agricultural (crop and non-crop) income seems to be much higher for the control group compared to treatment for treatment group A with exception in ‘other income’ category. The total income per capita for the control group is on average, almost 80 percent higher compared to the treatment group. The other treatment group i.e. treatment group B intriguingly does not show too much variation in terms of mean income by categories. However, mean of ‘other income’ turns out to be almost 11 percent lower for the controls compared to treatment in treatment group B. The expenditure categories also show almost similar patterns i.e. larger variations between treatment and control groups for treatment group A compared to smaller variation for treatment group B. The expenditure per capita for the control group A is, on average, almost 82 percent higher compared to the treatment group (rainfall-based). Moreover, the education and health expenditure measures show considerably less variation in self-reported treatment group compared to non-self-reported one. The control group A displays on average, almost 76 percent more educational expenditure compared to the treatment group. The proportion of household members in control group A getting access to formal education is around 30 percent more compared to treatment group A. There are substantial variations in terms of
total change in agricultural and other business asset categories between treatment and control groups using both rainfall-based and self-reported identifications. This variation is 27 percent higher for the rainfall-based control group compared to the self-report control group. Observable variations can also be seen in labour market outcomes between treatment and control groups. Both daily and salaried wage for the control group A (rainfall-based) seems to be almost 76 percent higher compared to the treatment group. The self-reported identification (treatment group B) does not seem to vary considerably with respect to labour market outcomes. There are interesting parallel trends in the mean results of the covariates (independent variables) between the two treatment groups. The affected households in treatment group A have more working adults i.e. fewer dependents (around 25 percent) compared to treatment group B. However, the self-reported treatment group owns more land (16.3 percent more) compared to non-self-reported one. Proportion of household members getting access to formal education is almost 16 percent higher in self-reported treatment group compared to rainfall-based treatment identification. Community characteristics such as access to sanitation, safe drinking water and electricity also show parallel trends in their mean outcomes in both treatment group – A and B.

5. ESTIMATION RESULTS

We start by estimating our benchmark difference-in-difference (DID) model with two treatment groups: treatment group A and treatment group B for four development outcomes: income, expenditure, asset and labour market. We compare the results for each category (in terms of aggregate and disaggregated outcome measures) and show the robustness under various income and expenditure brackets.

(a) Income

We report impacts of recurrent-flooding on different income categories i.e. crop, non-crop, business and other income for rainfall-based flood affected and self-reported treated groups in tables 1 and 2 respectively. We find both treated (affected) households experience negative impacts on total income being consistent with previous disaster literatures (e.g. Asiimwe and Mpuga, 2007; Thomas et al., 2010; De La Fuente, 2010). Our results indicate that total income reduces by almost 11 percent more (estimated to be approximately BDT 17,807)
for treatment group A compared to the mean.\textsuperscript{14} A decline in crop income is higher for treatment group A (by BDT 7,428) whereas treatment group B observe comparatively greater reduction in non-crop income (by BDT 26,644) being consistent with evidences that show decline in agricultural income due to rainfall shocks (e.g. Skoufias et al., 2012; Baez and Mason, 2008; UNISDR, 2012). We do not observe any significant negative impacts on business income (non-agricultural enterprise) and other income in both treatment cases. These results could also be justified by previous works done by Attzs (2008) and Patnaik and Narayanan (2010). Among the covariates; male-headed households and formal education seems to have a stronger positive association with total income in addition to community variables such as access to sanitation and access to electricity. Ownership of land show moderate to strong impact on total income. Intriguingly, both average age of households and the number of dependents show a positive association with total income. This might be due to the fact that there exists a relationship between household head and household members who are over 65 years old.\textsuperscript{15} It is more likely that the senior members are household heads and possess control over ownership of land and house.\textsuperscript{16}

The impact on various categories of income - such as crop, non-crop, business and other income - also varies across different time horizons i.e. short- and medium to long-run impacts. The rainfall-based affected group (treatment group A) experiences a fall in both crop and non-crop income (although coefficient of crop income is significant). Similarly, the self-reported affected group also observes a significant fall in both crop and non-crop income. The interesting thing to note here is that treatment group A (rainfall-based) experienced a significant drop of almost BDT 4,559 more in crop income compared to treatment group B (self-reported). However, self-reported impact is of higher magnitude (difference of BDT 14,944) with regards to non-crop income compared to non-self-reported one. The other two categories of income we analyse are more indirect and have medium to long-run impacts on households. Business income in both of these treatment groups are found to be positive (and significant in the self-reported group) with an increase of approximately BDT 13,706 in the self-reported case. The other income category show negative sign (not significant) in both

\textsuperscript{14} 1 US Dollar = 77.88 Bangladeshi Taka (BDT).

\textsuperscript{15} We define household members who are less than 15 and greater than 65 years old as ‘dependents’.

\textsuperscript{16} See Zaman (1999).
treatment cases with less variation. The coefficients of the covariates do not vary substantially in terms of sign and significance between the two treatment groups.

To observe the income distributional effects of repeated-flooding on household income, we estimate both conditional and unconditional quantile regression model at various quintiles (0.15, 0.25, 0.50, 0.75 and 0.85). Tables 9 and 10 displays the quantile treatment effects for income categories conditional on all the covariates as in our baseline model and time fixed effect for both treatment groups – A and B. We observe a contrast in terms of the impacts of repeated-flooding on the ultra-poor (i.e. the bottom 15 percent) between both treatment groups. Total income for the extreme poor are found to be negatively affected for self-reported treated group (treatment group B) whereas income effect is much stronger for the middle 50 percent for treatment group A.\(^{17}\) However, the richer households are not found to be negatively affected in treatment group B compared to a significantly negative effect for richer households (i.e. the top 15 percent) for rainfall-based treated group (treatment group A). Nevertheless, crop income show significantly negative impact (drop by BDT 3,198) on the bottom 15\(^{th}\) quintile for treatment group A while treatment group B revealing a much stronger impact for the middle to higher income brackets (in per capita measures). We observe significant negative impacts (by BDT 319,522) on business income for the ultra-poor for self-reported treated group (treatment group B). Households also experience significant negative impacts in other income category in both treatment cases. However, we also estimate an unconditional quantile regression as traditional estimators might be more appropriate when identified without control variables (Powell, 2016).\(^{18}\)

(b) Consumption / Expenditure

We report impact estimates of various expenditure categories i.e. food, non-food, crop, non-crop, agricultural input, education and health for non-self- and self-reported treatment groups in tables 3 and 4 consecutively. Our results show a significant decline of

\(^{17}\) According to Tesliuc and Lindert (2002); the poor are disproportionately more exposed to natural disasters and agriculture related shocks and income inequality increased by 16% as a result of shocks. Yamamura (2013) also conclude an increase in income inequality in the short-term due to disasters in general.

\(^{18}\) We present our results for unconditional quantile regression in appendix tables 9 and 10 for treatment groups A and B respectively. The difference across various quintiles among income categories between the two treatment groups could possibly be explained through the presence of household heterogeneity issues in our benchmark quantile estimation (equation 2).
around 14 percent compared to the mean for total expenditure (i.e. drop by BDT 22,007) for treatment group A (non-self-reported) being consistent with previous literatures (e.g. Dercon, 2004; Auffret, 2003; Asiimwe and Mpuga, 2007; Jha, 2006; Shoji, 2010; Foltz et al. 2013). Interestingly, treatment group B (self-reported) reveal a positive impact on total expenditure due to flooding. This result could also be justified by coping strategies, safety net and micro-credit borrowing by households. Our focal categories i.e. crop expenditure and agricultural input expenditure (as we assume these categories are directly related to rainfall shocks and flood) show negative impacts in both treatment cases. However, although both categories show sign consistencies, agricultural input expenditure is found statistically significant in treatment group A while treatment group B display statistical significance in crop expenditure. In accordance with income estimates for two treatment groups, the covariates in the expenditure categories also reveal almost similar types of relationship with expenditure outcome categories. In both treatment cases, in addition to male-headed households and formal education, all three community characteristics (e.g. access to electricity, sanitation and pure drinking water) demonstrate strong positive association with total expenditure. We also anticipate similar reasoning for positive outcomes of average age and number of dependents for both treatment group – A and B.

The various categories of expenditure - food, non-food, crop, non-crop, agricultural input, educational and health expenditure - could also be categorized based upon their time horizons e.g. short- and medium to long-run impacts. Expenditure categories as food, non-food and agricultural consumption indicate the short-term impacts whereas education and health expenditures may lead to long-term impacts. The treatment households (A and B) experienced significant contrast in terms of the direct impacts (food and non-food) where the self-reported treatment group observed positive and significant impacts. Both affected groups show contrasting estimates in education and health spending as well. However, the self-reported households experience a rise in educational expenditure (approximately by BDT 2,189) accompanied by a significant decline in health expenditure (approximately by BDT 689). Interestingly, the total expenditure in the self-reported treatment group (B) increases (although not significantly) compared to a significant decline for the non-self-reported group.

19 See Khandker (2007); Demont (2013); Vicarelli (2010).
Similar to income categories, we further extend our analysis by looking at various quintiles for expenditure categories. Tables 9 and 10 also display the quantile treatment effects for expenditure categories conditional on all covariates and time fixed effect for both treatment groups – A and B. We observe a contrast in estimation results for different quintiles for non-self and self-reported treated group. We find significant negative impacts for the bottom 15 percent with a much stronger impact for the middle 50 percent for treatment group A. Intriguingly, we find a significant positive outcome for the bottom 15 percent for treatment group B (also justified by previous work)\textsuperscript{20} which however demonstrate significantly negative impact for the bottom 25 percent (by BDT 301,632) and for the top 15 percent (drop by BDT 47,967). Again, crop expenditure reveals significantly negative impact for the ultra-poor (i.e. the bottom 15\textsuperscript{th} quintile) in treatment group A and B. However, although agricultural input expenditure show negative impacts for treatment group A, it reveals a positive outcome for treatment group B with statistical significance in both cases. We also observe a contrast in educational and health expenditure outcomes for non-self and self-reported treated group as well. Furthermore, we also estimate an unconditional quantile regression in expenditure categories. Appendix tables 9 and 10 portrays the unconditional quantile treatment effects for expenditure categories for treatment groups A and B. \textsuperscript{21}

(c) Asset

Tables 5 and 6 demonstrate the impacts of repeated-flooding on three asset categories: changes in agricultural and other business asset, agricultural input asset value and consumer durable asset value for both affected (treatment) groups. We do not observe much contrast in these categories though. The rainfall-based flood affected group (treatment group A) observe negative impacts (although not statistically significant) on change in agricultural and other business asset (by BDT 6,144) while self-reported treatment group (treatment group B) reveal significant negative impacts (by BDT 103,611) in similar category quite consistent with previous evidences on asset categories (e.g. Mogues, 2011; Anttila-Hughes and Hsiang, 2013). The noticeable aspect to note here is that the impact on the self-reported

\textsuperscript{20} Ibid.
\textsuperscript{21} The difference across various quintiles among expenditure categories between the two treatment groups could again possibly be explained through the presence of household heterogeneity issues in our benchmark quantile estimation (equation 2).
group is BDT 97,467 more compared to the non-self-reported one. Nevertheless, treatment group B reveals significant positive impact on agricultural input asset value compared to a negative value for treatment group A in this category.

(d) Labour market

We present impacts on labour market for both treatment group – A and B in tables 7 and 8 sequentially. Daily wages are not found to be severely affected in both treatment groups (positive impact) with statistical significance for self-reported treatment case (by BDT 101). This somewhat been justified in some previous empirical researches (e.g. Shah and Steinberg, 2012; Banerjee, 2007).22 Interestingly, salaried wage seems 7 percent higher compared to the mean (i.e. by BDT 3,894) in treatment group B with 1 percent drop (compared to the mean) for treatment group A (but in this case without statistical significance). This result is also partially found consistent with the findings of Mueller and Quisumbing (2011). We also observe a contrast in estimates of yearly benefits for both treatment group.

6. ROBUSTNESS CHECKS

As robustness checks, we further examine these impacts by estimating a semi-logarithmic regression model (as specified in equation 3) and compare the results with our benchmark estimation results. In the income category, we observe significantly negative impact on total income (drop by BDT 28,078 compared to the mean) for treatment group A (rainfall-based). The interesting thing to note here is that treatment group B (self-reported) experiences an additional total income decline of BDT 52,581 more (and is significant) compared to the non-self-reported one. Most of this excess decline (approximately BDT 29,442) resulted from crop income for the self-reported treatment group B. However, treatment group A experience a significant drop of BDT 6,572 on average in the non-crop income category. Business income in both treatment groups reveals positive impact (with

---

22 Banerjee (2007) find that floods have positive implications for wages in the long run. Interestingly, Mueller and Osgood (2009) reveal that droughts have significant negative impacts on rural wages in the long run. We are quite agnostic on the general implications of natural disasters on wages due to limitations in this study.
statistical significance in treatment group A) being consistent with our prior estimations. We observe a significant increase of BDT 13,030 on average for treatment group A in business income category. The other income category also reveals a significant increase of BDT 4,146 more (compared to the mean) for rainfall-based treatment group A compared to the self-reported one (treatment group B).

We find consistent patterns in total expenditure category in the semi-logarithmic regression results compare to our baseline model specifications. Similar to total income patterns, the self-reported treatment group B experience an average decline in total expenditure by BDT 46,551 more compared to treatment group A (rainfall-based). The self-reported treatment group reported an additional decline of BDT 8,694 on average in non-crop expenditure due to flood compared to the non-self-reported one. The difference in our focal categories (i.e. crop expenditure and agricultural input expenditure) is strikingly more in agricultural input expenditure for treatment group B (drop by BDT 25,761 on average) compared to treatment group A. Although educational and health expenditure reveals a significantly positive impact, the difference is not too high between the two treatment groups compared to the mean. The food and non-food expenditure categories display significantly declines for both rainfall-based and self-reported treatment cases. Despite households experience significant decline in food and non-food expenditure, flood impacts are reported much higher by the self-reported treatment group B (drop by BDT 15,288 more on average) in non-food expenditure category compared to rainfall-based treatment group A.

The impacts on agricultural input asset value show significantly negative impacts for both treatment cases in our semi-logarithmic regression results. The noticeable aspect here is that the self-reported treatment group reveals an excess decline of BDT 31,626 in agricultural input asset value compared to the non-self-reported one. The category on consumer durable asset value also illustrate significant negative impacts in both treatment cases. Treatment group A experience a significant average decline of BDT 16,0108 which is comparatively higher than for treatment group B (self-reported).

7. CONCLUSION

Our objective in this paper is to estimate the impacts of recurrent flooding on income, expenditure, asset and labour market outcomes. We start with identification of the treatment
(affected) groups with setting two benchmarks i.e. using self- and non-self-reported (historical rainfall data based flood risk index) information. We employ a difference-in-difference estimation model to understand the impacts of disaster on households surveyed on and before year 2010 (defined as post). Our results suggest a sharp decline in agricultural income (crop and non-crop) for both treatment group – A (rainfall-based) and B (self-reported). This significant decline in agricultural income, being consistent with previous literatures reveals a clear message on timely adoption of insurance in the context of increased climatic threat to achieve sustainable poverty goals for the ultra-poor especially in agriculture-based economy like Bangladesh. As per expenditure in concerned, we also observe a negative response to crop and agricultural input expenditure consistent with our theoretical prior in both treatment cases.

We extend our analysis for income and expenditure categories for households of various socio-economic backgrounds. We find a contrast in terms of impact for the ultra (bottom 15 percent) poor in total income and expenditure between treatment group – A and B. We also observe a contrast in educational and health expenditures for both non-self and self-reported treatment group. We further strengthen our results using semi-logarithmic regression model as robustness checks and observe consistencies in most cases with our benchmark estimation results.

The ‘disaster-development’ literature has made considerably less progress on the use of shock modules to empirically estimate the impacts of natural disasters on development outcomes. The recent addition of shock questionnaires in nationally representative household income and expenditure surveys provides an ample scope to identify the self-reported affected groups in repeated natural disasters. This self-identification in the questionnaire could be advantageous to capture the disaster impacts on households’ more precisely when compared to index-based identifications based on geographical exposure. However, questions’ based on ‘yes/no’ responses (i.e. close-ended) might not be sufficient to identify the true development impacts. The selection of the respondents (sample) in this particular set of questionnaire (shock questions on natural disasters) is also questionable depending on criteria.23 There is an obvious need to employ both qualitative and quantitative techniques to understand the degrees of experience in impact analysis.24

24 See Bird (2009).
We do not rule out the fact that the dissimilarities in our results in two benchmark treatment cases might also be due to absence of shock modules in self-reported treatment group (treatment group B) in years 2000 and 2005 in the household data that we use. One possible solution is of course, more respondents in addition to incorporating degrees of actual hazard awareness, experience and preparedness questions’ to identify the real affected group in repeated natural shocks. However, the evidences and the novel approach that we adopt in this paper could justify future research in estimating welfare adaptation costs of climate-induced persistent natural events in developing countries.

REFERENCES


**Figure 1: Pre-treatment trends of per capita total income (Treatment Group A)**

![Graph showing pre-treatment trends of per capita total income for Treatment Group A and Control Group A.]

**Figure 2: Pre-treatment trends of per capita total income (Treatment Group B)**

![Graph showing pre-treatment trends of per capita total income for Treatment Group B and Control Group B.]

- Treatment group A (rainfall)
- Control group A (rainfall)
- Treatment group B (self-report)
- Control group B (self-report)
Figure 3: Pre-treatment trends of per capita total expenditure (Treatment Group A)

Figure 4: Pre-treatment trends of per capita total expenditure (Treatment Group B)
<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>POST (YEAR 2010)</strong></td>
<td>173,513.18***</td>
<td>49,542.34***</td>
<td>60,365.63***</td>
<td>61,746.82***</td>
<td>-8,946.92***</td>
</tr>
<tr>
<td></td>
<td>(11,755.80)</td>
<td>(3,754.90)</td>
<td>(5,937.03)</td>
<td>(8,236.91)</td>
<td>(3,243.78)</td>
</tr>
<tr>
<td><strong>TREATMENT GROUP A</strong></td>
<td>11,237.98**</td>
<td>3,334.38***</td>
<td>708.17</td>
<td>1,650.77**</td>
<td>5,431.69</td>
</tr>
<tr>
<td></td>
<td>(4,902.10)</td>
<td>(508.65)</td>
<td>(1,565.30)</td>
<td>(791.68)</td>
<td>(4,618.95)</td>
</tr>
<tr>
<td><strong>POST * TREATMENT GROUP A</strong></td>
<td>-17,806.84</td>
<td>-7,427.99***</td>
<td>-11,700.08</td>
<td>4,882.17</td>
<td>-2,494.28</td>
</tr>
<tr>
<td></td>
<td>(18,374.86)</td>
<td>(2,615.96)</td>
<td>(15,711.15)</td>
<td>(8,503.48)</td>
<td>(4,706.93)</td>
</tr>
<tr>
<td><strong>RURAL</strong></td>
<td>-1,630.66</td>
<td>2,627.40*</td>
<td>5,300.90</td>
<td>-7,793.94**</td>
<td>-3,571.06***</td>
</tr>
<tr>
<td></td>
<td>(7,084.05)</td>
<td>(1,446.14)</td>
<td>(7,041.19)</td>
<td>(3,954.21)</td>
<td>(828.62)</td>
</tr>
<tr>
<td><strong>MALE HOUSEHOLD HEAD</strong></td>
<td>108,945.46***</td>
<td>5,148.74***</td>
<td>157,383.63***</td>
<td>1,519.88</td>
<td>-16,245.62***</td>
</tr>
<tr>
<td></td>
<td>(16,197.13)</td>
<td>(582.16)</td>
<td>(20,503.23)</td>
<td>(2,706.72)</td>
<td>(2,505.11)</td>
</tr>
<tr>
<td><strong>AVERAGE AGE</strong></td>
<td>2,315.59***</td>
<td>283.44***</td>
<td>1,556.93***</td>
<td>824.99***</td>
<td>336.68**</td>
</tr>
<tr>
<td></td>
<td>(180.45)</td>
<td>(26.78)</td>
<td>(119.46)</td>
<td>(63.94)</td>
<td>(147.27)</td>
</tr>
<tr>
<td><strong>DEPENDENT</strong></td>
<td>7,864.25***</td>
<td>1,256.42***</td>
<td>2,049.30***</td>
<td>4,570.11***</td>
<td>-10.29</td>
</tr>
<tr>
<td></td>
<td>(122.40)</td>
<td>(39.53)</td>
<td>(55.94)</td>
<td>(89.85)</td>
<td>(17.64)</td>
</tr>
<tr>
<td><strong>PROPORTION_FORMAL EDUCATION</strong></td>
<td>20,985.31***</td>
<td>6,013.26***</td>
<td>-6,028.35</td>
<td>15,674.08***</td>
<td>13,960.31***</td>
</tr>
<tr>
<td></td>
<td>(5,623.03)</td>
<td>(1,064.36)</td>
<td>(4,323.55)</td>
<td>(3,171.69)</td>
<td>(3,118.61)</td>
</tr>
<tr>
<td><strong>ACCESS TO SANITATION</strong></td>
<td>27,257.80***</td>
<td>3,278.84***</td>
<td>9,958.72*</td>
<td>5,823.20*</td>
<td>11,177.45***</td>
</tr>
<tr>
<td></td>
<td>(6,113.44)</td>
<td>(1,145.45)</td>
<td>(5,794.88)</td>
<td>(3,353.51)</td>
<td>(525.85)</td>
</tr>
<tr>
<td><strong>ACCESS TO DRINKING WATER</strong></td>
<td>10,073.11</td>
<td>-2,377.53</td>
<td>3,013.07</td>
<td>11,685.06</td>
<td>1,266.68</td>
</tr>
<tr>
<td></td>
<td>(14,602.87)</td>
<td>(3,066.21)</td>
<td>(14,685.96)</td>
<td>(7,606.62)</td>
<td>(1,013.41)</td>
</tr>
<tr>
<td><strong>ACCESS TO ELECTRICITY</strong></td>
<td>13,288.81**</td>
<td>2,802.05**</td>
<td>-3,369.29</td>
<td>4,512.12</td>
<td>10,477.40***</td>
</tr>
<tr>
<td></td>
<td>(6,679.32)</td>
<td>(1,202.26)</td>
<td>(6,473.20)</td>
<td>(3,521.21)</td>
<td>(503.88)</td>
</tr>
<tr>
<td><strong>HOUSE OWNERSHIP</strong></td>
<td>9,691.26</td>
<td>1,710.23</td>
<td>7,507.14</td>
<td>-2,791.68</td>
<td>3,013.80</td>
</tr>
<tr>
<td></td>
<td>(8,678.10)</td>
<td>(1,961.60)</td>
<td>(9,530.13)</td>
<td>(5,167.52)</td>
<td>(2,422.80)</td>
</tr>
<tr>
<td><strong>LAND OWNERSHIP</strong></td>
<td>67.66*</td>
<td>54.50***</td>
<td>-17.08</td>
<td>12.62</td>
<td>18.75***</td>
</tr>
<tr>
<td></td>
<td>(37.87)</td>
<td>(8.81)</td>
<td>(30.92)</td>
<td>(19.14)</td>
<td>(3.39)</td>
</tr>
<tr>
<td>YEAR_2005</td>
<td>-869.04</td>
<td>822.97</td>
<td>3,848.34</td>
<td>8,108.52***</td>
<td>-3,604.57***</td>
</tr>
<tr>
<td>-----------</td>
<td>---------</td>
<td>--------</td>
<td>----------</td>
<td>------------</td>
<td>-------------</td>
</tr>
<tr>
<td></td>
<td>(2,906.62)</td>
<td>(713.53)</td>
<td>(2,423.27)</td>
<td>(2,558.31)</td>
<td>(979.61)</td>
</tr>
<tr>
<td>YEAR2005 * TREATMENT GROUP A</td>
<td>-6,838.77</td>
<td>-2,268.54**</td>
<td>-530.05</td>
<td>-953.83</td>
<td>-4,519.26</td>
</tr>
<tr>
<td></td>
<td>(5,382.66)</td>
<td>(884.05)</td>
<td>(2,106.37)</td>
<td>(3,073.81)</td>
<td>(4,774.07)</td>
</tr>
<tr>
<td>CONSTANT</td>
<td>-194,510.80***</td>
<td>-16,803.71***</td>
<td>-204,620.98***</td>
<td>-37,911.90***</td>
<td>5,233.63</td>
</tr>
<tr>
<td></td>
<td>(24,052.42)</td>
<td>(3,899.24)</td>
<td>(27,747.18)</td>
<td>(9,572.22)</td>
<td>(4,233.48)</td>
</tr>
<tr>
<td>OBSERVATIONS</td>
<td>26,158</td>
<td>19,866</td>
<td>23,452</td>
<td>21,285</td>
<td>26,145</td>
</tr>
<tr>
<td>R-SQUARED</td>
<td>0.55</td>
<td>0.59</td>
<td>0.10</td>
<td>0.58</td>
<td>0.03</td>
</tr>
</tbody>
</table>

Source: Author's calculations.
Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

**Table 2: Impact on household income per capita (Treatment Group B: Self-reported flood affected group)**

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1) TOTAL INCOME</th>
<th>(2) CROP INCOME</th>
<th>(3) NON-CROP INCOME</th>
<th>(4) BUSINESS INCOME</th>
<th>(5) OTHER INCOME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post (Year 2010)</td>
<td>174,941.92***</td>
<td>48,880.68***</td>
<td>75,981.24***</td>
<td>49,576.85***</td>
<td>-9,530.30***</td>
</tr>
<tr>
<td></td>
<td>(14,587.51)</td>
<td>(3,940.08)</td>
<td>(10,370.98)</td>
<td>(9,007.10)</td>
<td>(3,233.50)</td>
</tr>
<tr>
<td>Treatment Group B</td>
<td>11,227.45**</td>
<td>3,330.21***</td>
<td>666.64</td>
<td>1,683.56**</td>
<td>5,436.30</td>
</tr>
<tr>
<td></td>
<td>(4,901.54)</td>
<td>(508.68)</td>
<td>(1,566.91)</td>
<td>(790.73)</td>
<td>(4,619.02)</td>
</tr>
<tr>
<td>Post * Treatment Group B</td>
<td>-14,430.78</td>
<td>-2,868.78*</td>
<td>-26,643.73**</td>
<td>18,588.52***</td>
<td>-4,091.70</td>
</tr>
<tr>
<td></td>
<td>(12,744.96)</td>
<td>(1,738.30)</td>
<td>(10,800.95)</td>
<td>(4,875.60)</td>
<td>(4,737.34)</td>
</tr>
<tr>
<td>Rural</td>
<td>-1,637.52</td>
<td>2,627.25*</td>
<td>5,157.57</td>
<td>-7,679.24*</td>
<td>-3,568.37***</td>
</tr>
<tr>
<td></td>
<td>(7,082.60)</td>
<td>(1,446.77)</td>
<td>(7,034.98)</td>
<td>(3,951.35)</td>
<td>(829.35)</td>
</tr>
<tr>
<td>Male Household Head</td>
<td>109,047.11***</td>
<td>5,143.77***</td>
<td>158,160.77***</td>
<td>419.32</td>
<td>-16,289.08***</td>
</tr>
<tr>
<td></td>
<td>(16,154.64)</td>
<td>(585.46)</td>
<td>(20,533.96)</td>
<td>(2,729.62)</td>
<td>(2,501.01)</td>
</tr>
<tr>
<td>Average Age</td>
<td>2,316.81***</td>
<td>283.24***</td>
<td>1,567.22***</td>
<td>813.35***</td>
<td>336.16**</td>
</tr>
<tr>
<td></td>
<td>(181.05)</td>
<td>(26.66)</td>
<td>(121.47)</td>
<td>(63.97)</td>
<td>(147.27)</td>
</tr>
<tr>
<td>Variable</td>
<td>Coefficient</td>
<td>Std. Error</td>
<td>T-value</td>
<td>P-value</td>
<td>Coefficient</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-------------</td>
<td>------------</td>
<td>---------</td>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>DEPENDENT</td>
<td>7,861.43***</td>
<td>1,256.68***</td>
<td>2,023.99***</td>
<td>4,587.87***</td>
<td>-9.11</td>
</tr>
<tr>
<td></td>
<td>(121.31)</td>
<td>(39.67)</td>
<td>(52.23)</td>
<td>(91.23)</td>
<td>(17.70)</td>
</tr>
<tr>
<td>PROPORTION_FORMAL EDUCATION</td>
<td>20,858.85***</td>
<td>5,932.07***</td>
<td>-6,276.88</td>
<td>15,849.03***</td>
<td>14,016.76***</td>
</tr>
<tr>
<td></td>
<td>(5,608.17)</td>
<td>(1,063.73)</td>
<td>(4,299.89)</td>
<td>(3,169.94)</td>
<td>(3,120.47)</td>
</tr>
<tr>
<td>ACCESS TO SANITATION</td>
<td>27,358.48***</td>
<td>3,377.36***</td>
<td>10,005.34*</td>
<td>5,830.28*</td>
<td>11,131.83***</td>
</tr>
<tr>
<td></td>
<td>(6,130.09)</td>
<td>(1,144.19)</td>
<td>(5,815.42)</td>
<td>(3,348.83)</td>
<td>(528.54)</td>
</tr>
<tr>
<td>ACCESS TO DRINKING WATER</td>
<td>10,479.83</td>
<td>-2,094.55</td>
<td>4,119.71</td>
<td>10,856.93</td>
<td>1,085.87</td>
</tr>
<tr>
<td></td>
<td>(14,556.44)</td>
<td>(3,061.19)</td>
<td>(14,611.56)</td>
<td>(7,609.95)</td>
<td>(1,013.53)</td>
</tr>
<tr>
<td>ACCESS TO ELECTRICITY</td>
<td>13,363.78**</td>
<td>2,859.13**</td>
<td>-3,202.78</td>
<td>4,406.94</td>
<td>10,443.99***</td>
</tr>
<tr>
<td></td>
<td>(6,650.47)</td>
<td>(1,201.57)</td>
<td>(6,431.59)</td>
<td>(3,520.37)</td>
<td>(505.49)</td>
</tr>
<tr>
<td>HOUSE OWNERSHIP</td>
<td>9,680.57</td>
<td>1,697.73</td>
<td>7,340.82</td>
<td>-2,688.16</td>
<td>3,018.32</td>
</tr>
<tr>
<td></td>
<td>(8,676.43)</td>
<td>(1,963.13)</td>
<td>(9,521.82)</td>
<td>(5,159.27)</td>
<td>(2,422.85)</td>
</tr>
<tr>
<td>LAND OWNERSHIP</td>
<td>66.78*</td>
<td>54.02***</td>
<td>-18.89</td>
<td>13.75</td>
<td>19.14***</td>
</tr>
<tr>
<td></td>
<td>(37.80)</td>
<td>(8.79)</td>
<td>(30.85)</td>
<td>(19.13)</td>
<td>(3.38)</td>
</tr>
<tr>
<td>YEAR_2005</td>
<td>-906.35</td>
<td>799.36</td>
<td>3,819.09</td>
<td>8,160.95***</td>
<td>-3,587.77***</td>
</tr>
<tr>
<td></td>
<td>(2,901.95)</td>
<td>(713.60)</td>
<td>(2,421.78)</td>
<td>(2,557.57)</td>
<td>(979.19)</td>
</tr>
<tr>
<td>YEAR2005 * TREATMENT GROUP B</td>
<td>-6,832.13</td>
<td>-2,262.79**</td>
<td>-523.09</td>
<td>-972.75</td>
<td>-4,522.29</td>
</tr>
<tr>
<td></td>
<td>(5,382.82)</td>
<td>(884.17)</td>
<td>(2,111.24)</td>
<td>(3,073.43)</td>
<td>(4,774.18)</td>
</tr>
<tr>
<td>CONSTANT</td>
<td>-195,001.90***</td>
<td>-17,061.08***</td>
<td>-206,287.26***</td>
<td>-36,064.98***</td>
<td>5,450.69</td>
</tr>
<tr>
<td></td>
<td>(24,029.19)</td>
<td>(3,884.59)</td>
<td>(27,789.04)</td>
<td>(9,590.04)</td>
<td>(4,229.92)</td>
</tr>
<tr>
<td>OBSERVATIONS</td>
<td>26,158</td>
<td>19,866</td>
<td>23,452</td>
<td>21,285</td>
<td>26,145</td>
</tr>
<tr>
<td>R-SQUARED</td>
<td>0.55</td>
<td>0.59</td>
<td>0.10</td>
<td>0.58</td>
<td>0.03</td>
</tr>
</tbody>
</table>

Source: Author's calculations.
Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.
<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TOTAL EXPENDITURE</strong></td>
<td>274,945.97***</td>
<td>13,723.54***</td>
<td>168,901.32***</td>
<td>8,831.07***</td>
<td>10,815.29***</td>
<td>38,703.29***</td>
<td>25,347.28***</td>
<td>2,010.88***</td>
</tr>
<tr>
<td><strong>FOOD EXPENDITURE</strong></td>
<td>(9,827.20)</td>
<td>(389.92)</td>
<td>(5,865.01)</td>
<td>(1,071.72)</td>
<td>(2,079.96)</td>
<td>(3,135.96)</td>
<td>(1,517.75)</td>
<td>(345.59)</td>
</tr>
<tr>
<td><strong>NON-FOOD EXPENDITURE</strong></td>
<td>6,165.10***</td>
<td>94.14**</td>
<td>1,803.31***</td>
<td>635.98***</td>
<td>291.67*</td>
<td>3,106.56***</td>
<td>105.73</td>
<td>-159.04***</td>
</tr>
<tr>
<td><strong>CROP EXPENDITURE</strong></td>
<td>(1,207.62)</td>
<td>(42.83)</td>
<td>(677.01)</td>
<td>(211.81)</td>
<td>(172.12)</td>
<td>(693.20)</td>
<td>(157.85)</td>
<td>(40.28)</td>
</tr>
<tr>
<td><strong>NON-CROP EXPENDITURE</strong></td>
<td>-22,007.22**</td>
<td>-289.68</td>
<td>-8,490.77</td>
<td>-1,752.97</td>
<td>178.26</td>
<td>-10,526.75***</td>
<td>-665.00</td>
<td>310.01</td>
</tr>
<tr>
<td><strong>AGRICULTURAL INPUT EXPENDITURE</strong></td>
<td>(9,094.54)</td>
<td>(316.69)</td>
<td>(5,635.41)</td>
<td>(1,227.00)</td>
<td>(1,373.07)</td>
<td>(3,398.52)</td>
<td>(1,522.67)</td>
<td>(411.21)</td>
</tr>
<tr>
<td><strong>EDUCATIONAL EXPENDITURE</strong></td>
<td>-1,949.62</td>
<td>-198.61*</td>
<td>-4,002.73*</td>
<td>361.98</td>
<td>881.22*</td>
<td>1,601.51</td>
<td>-1,914.44***</td>
<td>276.28*</td>
</tr>
<tr>
<td><strong>HEALTH EXPENDITURE</strong></td>
<td>(3,352.70)</td>
<td>(120.52)</td>
<td>(2,065.28)</td>
<td>(611.84)</td>
<td>(497.52)</td>
<td>(1,620.47)</td>
<td>(680.42)</td>
<td>(167.74)</td>
</tr>
<tr>
<td><strong>RURAL</strong></td>
<td>26,166.63***</td>
<td>499.81***</td>
<td>2,138.11***</td>
<td>7,083.41***</td>
<td>3,800.63***</td>
<td>38,681.53***</td>
<td>-660.34</td>
<td>-278.42***</td>
</tr>
<tr>
<td><strong>MALE HOUSEHOLD HEAD</strong></td>
<td>(3,539.30)</td>
<td>(94.50)</td>
<td>(827.96)</td>
<td>(833.64)</td>
<td>(452.37)</td>
<td>(4,681.05)</td>
<td>(540.65)</td>
<td>(53.27)</td>
</tr>
<tr>
<td><strong>AVERAGE AGE</strong></td>
<td>1,845.25***</td>
<td>89.95***</td>
<td>893.38***</td>
<td>266.95***</td>
<td>176.28***</td>
<td>724.06***</td>
<td>305.86***</td>
<td>5.02***</td>
</tr>
<tr>
<td><strong>DEPENDENT</strong></td>
<td>(52.56)</td>
<td>(2.08)</td>
<td>(29.28)</td>
<td>(11.23)</td>
<td>(7.53)</td>
<td>(33.91)</td>
<td>(21.01)</td>
<td>(1.87)</td>
</tr>
<tr>
<td><strong>PROPORTION FORMAL EDUCATION</strong></td>
<td>12,688.46***</td>
<td>796.89***</td>
<td>6,274.01***</td>
<td>1,016.79***</td>
<td>871.56***</td>
<td>2,648.68***</td>
<td>988.69***</td>
<td>100.23***</td>
</tr>
<tr>
<td><strong>ACCESS TO SANITATION</strong></td>
<td>(107.84)</td>
<td>(4.05)</td>
<td>(64.62)</td>
<td>(11.81)</td>
<td>(22.19)</td>
<td>(34.97)</td>
<td>(15.47)</td>
<td>(3.05)</td>
</tr>
<tr>
<td><strong>ACCESS TO DRINKING WATER</strong></td>
<td>16,871.00***</td>
<td>457.77***</td>
<td>7,190.63***</td>
<td>2,306.37***</td>
<td>1,315.42***</td>
<td>3,955.60***</td>
<td>3,912.70***</td>
<td>455.79***</td>
</tr>
<tr>
<td><strong>ACCESS TO ELECTRICITY</strong></td>
<td>(2,335.68)</td>
<td>(80.35)</td>
<td>(1,405.65)</td>
<td>(367.19)</td>
<td>(329.55)</td>
<td>(1,234.88)</td>
<td>(522.10)</td>
<td>(117.78)</td>
</tr>
<tr>
<td><strong>ACCESS TO WATER</strong></td>
<td>8,224.81***</td>
<td>-47.67</td>
<td>3,611.59*</td>
<td>547.09</td>
<td>1,006.50**</td>
<td>4,259.28***</td>
<td>377.89</td>
<td>-212.31</td>
</tr>
<tr>
<td><strong>ACCESS TO ELECTRICITY</strong></td>
<td>(3,122.89)</td>
<td>(110.91)</td>
<td>(1,930.99)</td>
<td>(498.22)</td>
<td>(459.51)</td>
<td>(1,371.73)</td>
<td>(616.26)</td>
<td>(155.74)</td>
</tr>
<tr>
<td><strong>HOUSE OWNERSHIP</strong></td>
<td>5,722.34</td>
<td>214.29</td>
<td>2,291.20</td>
<td>1,717.08</td>
<td>846.83</td>
<td>1,289.88</td>
<td>251.93</td>
<td>182.42</td>
</tr>
<tr>
<td><strong>HEALTH EXPENDITURE</strong></td>
<td>(7,594.16)</td>
<td>(254.14)</td>
<td>(4,612.08)</td>
<td>(1,236.52)</td>
<td>(1,325.04)</td>
<td>(3,519.14)</td>
<td>(1,709.64)</td>
<td>(362.02)</td>
</tr>
<tr>
<td><strong>ACCESS TO ELECTRICITY</strong></td>
<td>11,716.31***</td>
<td>560.80***</td>
<td>8,965.72***</td>
<td>834.00</td>
<td>560.64</td>
<td>-68.49</td>
<td>1,186.30*</td>
<td>271.41</td>
</tr>
<tr>
<td><strong>ACCESS TO WATER</strong></td>
<td>(3,235.46)</td>
<td>(113.91)</td>
<td>(1,991.60)</td>
<td>(509.83)</td>
<td>(472.92)</td>
<td>(1,456.61)</td>
<td>(640.86)</td>
<td>(169.44)</td>
</tr>
<tr>
<td><strong>HOUSE OWNERSHIP</strong></td>
<td>2,671.88</td>
<td>-177.80</td>
<td>319.42</td>
<td>1,435.57</td>
<td>1,082.48</td>
<td>1,441.48</td>
<td>-1,649.23*</td>
<td>204.32</td>
</tr>
</tbody>
</table>
### Table 4: Impact on household expenditure per capita (Treatment Group B: Self-reported flood affected group)

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VARIABLES</strong></td>
<td><strong>TOTAL EXPENDITURE</strong></td>
<td><strong>FOOD EXPENDITURE</strong></td>
<td><strong>NON-FOOD EXPENDITURE</strong></td>
<td><strong>CROP EXPENDITURE</strong></td>
<td><strong>NON-CROP EXPENDITURE</strong></td>
<td><strong>AGRICULTURAL INPUT EXPENDITURE</strong></td>
<td><strong>EDUCATIONAL EXPENDITURE</strong></td>
<td><strong>HEALTH EXPENDITURE</strong></td>
</tr>
<tr>
<td>Post (Year 2010)</td>
<td>265,149.75*** (10,287.16)</td>
<td>12,637.44*** (417.44)</td>
<td>162,053.02*** (6,296.24)</td>
<td>10,003.20*** (1,088.48)</td>
<td>10,786.41*** (2,351.64)</td>
<td>36,939.44*** (3,175.90)</td>
<td>23,847.92*** (1,549.01)</td>
<td>2,559.69*** (476.22)</td>
</tr>
<tr>
<td>Treatment Group B</td>
<td>6,162.48*** (1,207.95)</td>
<td>95.77** (42.82)</td>
<td>1,806.87*** (677.07)</td>
<td>632.16*** (212.11)</td>
<td>292.28* (172.09)</td>
<td>3,101.46*** (693.26)</td>
<td>108.78 (157.63)</td>
<td>-159.86*** (40.29)</td>
</tr>
<tr>
<td>Post * Treatment Group B</td>
<td>7,067.58 (5,639.15)</td>
<td>1,594.94*** (201.67)</td>
<td>8,071.29** (3,465.59)</td>
<td>-2,613.12*** (747.09)</td>
<td>-182.37 (810.32)</td>
<td>-3,949.59* (2,153.44)</td>
<td>-1,391.21 (923.48)</td>
<td>-688.81*** (250.67)</td>
</tr>
<tr>
<td>Rural</td>
<td>-1,870.25 (3,351.87)</td>
<td>-190.64 (120.17)</td>
<td>-3,949.59* (2,064.57)</td>
<td>346.87 (611.54)</td>
<td>881.98* (497.68)</td>
<td>1,612.92 (1,620.78)</td>
<td>-1,900.75*** (680.22)</td>
<td>271.18 (167.43)</td>
</tr>
</tbody>
</table>

Source: Author's calculations.
Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.
<table>
<thead>
<tr>
<th></th>
<th>MALE HOUSEHOLD HEAD</th>
<th>AVERAGE AGE</th>
<th>DEPENDENT</th>
<th>PROPORTION_FORMAL EDUCATION</th>
<th>ACCESS TO SANITATION</th>
<th>ACCESS TO DRINKING WATER</th>
<th>ACCESS TO ELECTRICITY</th>
<th>HOUSE OWNERSHIP</th>
<th>LAND OWNERSHIP</th>
<th>YEAR_2005</th>
<th>YEAR2005*TREATMENT GROUP B</th>
<th>CONSTANT</th>
<th>OBSERVATIONS</th>
<th>R-SQUARED</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Value</strong></td>
<td>25,931.90***</td>
<td>1,841.81***</td>
<td>12,700.11***</td>
<td>16,597.94***</td>
<td>8,598.21***</td>
<td>6,400.27</td>
<td>11,874.90***</td>
<td>2,713.47</td>
<td>126.08***</td>
<td>-9,733.49***</td>
<td>-3,359.16**</td>
<td>-99,987.94***</td>
<td>26,162</td>
<td>0.93</td>
</tr>
<tr>
<td><strong>Std. Error</strong></td>
<td>(3,498.89)</td>
<td>(52.47)</td>
<td>(108.19)</td>
<td>(2,334.34)</td>
<td>(3,120.44)</td>
<td>(6,400.27)</td>
<td>(11,874.90)</td>
<td>(2,713.47)</td>
<td>(126.08)</td>
<td>(9,733.49)</td>
<td>(1,412.45)</td>
<td>(9,382.26)</td>
<td>26,162</td>
<td>0.93</td>
</tr>
<tr>
<td><strong>t-value</strong></td>
<td>7.99</td>
<td>3.53</td>
<td>2.78</td>
<td>6.185</td>
<td>-2.64</td>
<td>1.23</td>
<td>1.58</td>
<td>1.00</td>
<td>0.97</td>
<td>-1.64</td>
<td>-3.23</td>
<td>-11.34</td>
<td>0.97</td>
<td>0.93</td>
</tr>
<tr>
<td><strong>p-value</strong></td>
<td>&lt;0.01</td>
<td>&lt;0.05</td>
<td>&lt;0.16</td>
<td>&lt;0.01</td>
<td>&lt;0.05</td>
<td>&lt;0.05</td>
<td>&lt;0.05</td>
<td>&lt;0.56</td>
<td>&lt;0.16</td>
<td>&lt;0.05</td>
<td>&lt;0.05</td>
<td>&lt;0.01</td>
<td>0.97</td>
<td>0.93</td>
</tr>
</tbody>
</table>

**Source:** Author’s calculations.

**Note:** Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.
<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TOTAL CHANGE IN AGRICULTURAL AND OTHER BUSINESS ASSET</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>POST (YEAR 2010)</strong></td>
<td>-24,575.16**</td>
<td>-21,782.69***</td>
<td>699,645.49***</td>
</tr>
<tr>
<td></td>
<td>(11,627.68)</td>
<td>(5,580.80)</td>
<td>(30,193.69)</td>
</tr>
<tr>
<td><strong>TREATMENT GROUP A</strong></td>
<td>2,215.49</td>
<td>2,906.11**</td>
<td>28,004.98***</td>
</tr>
<tr>
<td></td>
<td>(1,418.26)</td>
<td>(1,305.49)</td>
<td>(3,783.79)</td>
</tr>
<tr>
<td><strong>POST * TREATMENT GROUP A</strong></td>
<td>-6,144.23</td>
<td>-9,866.73</td>
<td>-29,369.54</td>
</tr>
<tr>
<td></td>
<td>(14,637.09)</td>
<td>(6,665.00)</td>
<td>(37,593.50)</td>
</tr>
<tr>
<td><strong>RURAL</strong></td>
<td>-15,002.08**</td>
<td>-6.50</td>
<td>-41,995.48***</td>
</tr>
<tr>
<td></td>
<td>(6,998.56)</td>
<td>(3,678.55)</td>
<td>(14,171.84)</td>
</tr>
<tr>
<td><strong>MALE HOUSEHOLD HEAD</strong></td>
<td>3,328.83***</td>
<td>10,817.53***</td>
<td>33,480.03***</td>
</tr>
<tr>
<td></td>
<td>(1,098.97)</td>
<td>(1,057.23)</td>
<td>(5,701.04)</td>
</tr>
<tr>
<td><strong>AVERAGE AGE</strong></td>
<td>628.46***</td>
<td>234.00***</td>
<td>3,330.81***</td>
</tr>
<tr>
<td></td>
<td>(128.51)</td>
<td>(58.88)</td>
<td>(166.11)</td>
</tr>
<tr>
<td><strong>DEPENDENT</strong></td>
<td>2,278.04***</td>
<td>2,734.02***</td>
<td>25,258.75***</td>
</tr>
<tr>
<td></td>
<td>(136.91)</td>
<td>(64.66)</td>
<td>(332.34)</td>
</tr>
<tr>
<td><strong>PROPORTION_FORMAL EDUCATION</strong></td>
<td>4,585.75</td>
<td>13,888.43***</td>
<td>34,540.15***</td>
</tr>
<tr>
<td></td>
<td>(4,537.68)</td>
<td>(2,927.93)</td>
<td>(9,267.88)</td>
</tr>
<tr>
<td><strong>ACCESS TO SANITATION</strong></td>
<td>3,762.83</td>
<td>1,756.99</td>
<td>36,735.69***</td>
</tr>
<tr>
<td></td>
<td>(5,968.49)</td>
<td>(3,250.93)</td>
<td>(12,854.83)</td>
</tr>
<tr>
<td><strong>ACCESS TO DRINKING WATER</strong></td>
<td>-23,795.35</td>
<td>2,442.58</td>
<td>-58,753.10</td>
</tr>
<tr>
<td></td>
<td>(17,890.77)</td>
<td>(7,733.67)</td>
<td>(36,325.16)</td>
</tr>
<tr>
<td><strong>ACCESS TO ELECTRICITY</strong></td>
<td>-4,866.77</td>
<td>2,751.39</td>
<td>23,898.82*</td>
</tr>
<tr>
<td></td>
<td>(6,187.89)</td>
<td>(3,362.34)</td>
<td>(13,536.43)</td>
</tr>
<tr>
<td><strong>HOUSE OWNERSHIP</strong></td>
<td>8,119.07</td>
<td>11,029.83**</td>
<td>-10,849.16</td>
</tr>
<tr>
<td>VARIABLES</td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-------------------------</td>
<td>-------------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td><strong>TOTAL CHANGE IN AGRICULTURAL AND OTHER BUSINESS ASSET</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL AGRICULTURAL INPUT ASSET VALUE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL CONSUMER DURABLE ASSET VALUE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>POST</em> (YEAR 2010)</td>
<td>39,014.03***</td>
<td>-33,118.44***</td>
<td>787,048.50***</td>
</tr>
<tr>
<td></td>
<td>(12,312.88)</td>
<td>(6,703.46)</td>
<td>(34,962.38)</td>
</tr>
<tr>
<td><strong>TREATMENT GROUP B</strong></td>
<td>2,081.67</td>
<td>2,921.69**</td>
<td>27,852.68***</td>
</tr>
<tr>
<td></td>
<td>(1,417.51)</td>
<td>(1,305.09)</td>
<td>(3,782.49)</td>
</tr>
<tr>
<td><strong>POST * TREATMENT GROUP B</strong></td>
<td>-103,610.87***</td>
<td>14,088.17***</td>
<td>-166,368.01***</td>
</tr>
<tr>
<td></td>
<td>(9,714.95)</td>
<td>(4,442.57)</td>
<td>(24,776.12)</td>
</tr>
<tr>
<td><strong>RURAL</strong></td>
<td>-15,610.62**</td>
<td>111.53</td>
<td>-42,629.63***</td>
</tr>
<tr>
<td></td>
<td>(6,967.65)</td>
<td>(3,677.45)</td>
<td>(14,154.10)</td>
</tr>
<tr>
<td><strong>MALE HOUSEHOLD HEAD</strong></td>
<td>8,650.43***</td>
<td>9,773.22***</td>
<td>36,666.23***</td>
</tr>
</tbody>
</table>

*Source: Author’s calculations.  
Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

**TABLE 6: IMPACT ON TOTAL ASSET OUTCOMES (TREATMENT GROUP B: SELF-REPORTED FLOOD AFFECTED GROUP)**
<table>
<thead>
<tr>
<th></th>
<th>Year 2005</th>
<th>Year2005 * Treatment Group B</th>
<th>Constant</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVERAGE AGE</td>
<td>686.10***</td>
<td>222.15***</td>
<td>3,373.24***</td>
</tr>
<tr>
<td></td>
<td>(129.49)</td>
<td>(58.88)</td>
<td>(168.01)</td>
</tr>
<tr>
<td>DEPENDENT</td>
<td>2,188.95***</td>
<td>2,748.97***</td>
<td>25,136.90***</td>
</tr>
<tr>
<td></td>
<td>(132.69)</td>
<td>(66.11)</td>
<td>(331.52)</td>
</tr>
<tr>
<td>PROPORTION_FORMAL_EDUCATION</td>
<td>4,307.66</td>
<td>13,763.97***</td>
<td>34,304.66***</td>
</tr>
<tr>
<td></td>
<td>(4,502.87)</td>
<td>(2,925.55)</td>
<td>(9,251.67)</td>
</tr>
<tr>
<td>ACCESS TO SANITATION</td>
<td>3,078.17</td>
<td>2,066.00</td>
<td>35,895.94***</td>
</tr>
<tr>
<td></td>
<td>(5,925.03)</td>
<td>(3,248.69)</td>
<td>(12,832.96)</td>
</tr>
<tr>
<td>ACCESS TO DRINKING WATER</td>
<td>-21,705.88</td>
<td>2,644.13</td>
<td>-56,673.77</td>
</tr>
<tr>
<td></td>
<td>(17,853.99)</td>
<td>(7,720.74)</td>
<td>(36,201.54)</td>
</tr>
<tr>
<td>ACCESS TO ELECTRICITY</td>
<td>-4,711.43</td>
<td>2,830.98</td>
<td>24,060.10*</td>
</tr>
<tr>
<td></td>
<td>(6,148.60)</td>
<td>(3,359.83)</td>
<td>(13,502.97)</td>
</tr>
<tr>
<td>HOUSE OWNERSHIP</td>
<td>7,645.44</td>
<td>11,098.94**</td>
<td>-11,298.19</td>
</tr>
<tr>
<td></td>
<td>(9,234.67)</td>
<td>(4,704.59)</td>
<td>(18,277.88)</td>
</tr>
<tr>
<td>LAND OWNERSHIP</td>
<td>40.21</td>
<td>42.91**</td>
<td>138.46</td>
</tr>
<tr>
<td></td>
<td>(45.35)</td>
<td>(20.09)</td>
<td>(105.46)</td>
</tr>
<tr>
<td>YEAR_2005</td>
<td>-914.85</td>
<td>3,203.97*</td>
<td>-23,729.38***</td>
</tr>
<tr>
<td></td>
<td>(2,141.20)</td>
<td>(1,883.95)</td>
<td>(5,025.26)</td>
</tr>
<tr>
<td>OBSERVATIONS</td>
<td>21,285</td>
<td>19,455</td>
<td>26,077</td>
</tr>
<tr>
<td>R-SQUARED</td>
<td>0.07</td>
<td>0.29</td>
<td>0.76</td>
</tr>
</tbody>
</table>

Source: Author's calculations.
Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.
## Table 7: Impact on Labour Market Outcomes (Treatment Group A: Rainfall-based Flood Affected Group)

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TOTAL MONTH PER YEAR</td>
<td>TOTAL DAYS PER MONTH</td>
<td>TOTAL HOURS PER DAY</td>
<td>DAILY WAGE</td>
<td>SALARIED WAGE</td>
<td>YEARLY BENEFITS</td>
</tr>
<tr>
<td>Post (Year 2010)</td>
<td>70.51***</td>
<td>156.70***</td>
<td>58.07***</td>
<td>392.73***</td>
<td>1,290.62</td>
<td>-15,437.51***</td>
</tr>
<tr>
<td></td>
<td>(3.01)</td>
<td>(6.83)</td>
<td>(2.30)</td>
<td>(25.95)</td>
<td>(1,095.69)</td>
<td>(2,004.09)</td>
</tr>
<tr>
<td>Treatment Group A</td>
<td>3.05***</td>
<td>4.92***</td>
<td>0.72*</td>
<td>6.36</td>
<td>-19.79</td>
<td>-243.70</td>
</tr>
<tr>
<td></td>
<td>(0.53)</td>
<td>(1.22)</td>
<td>(0.41)</td>
<td>(5.22)</td>
<td>(216.62)</td>
<td>(462.62)</td>
</tr>
<tr>
<td>Post * Treatment Group A</td>
<td>-2.55</td>
<td>0.52</td>
<td>-0.75</td>
<td>10.58</td>
<td>-202.77</td>
<td>-2,360.76</td>
</tr>
<tr>
<td></td>
<td>(2.99)</td>
<td>(7.05)</td>
<td>(2.30)</td>
<td>(29.80)</td>
<td>(1,191.00)</td>
<td>(2,416.49)</td>
</tr>
<tr>
<td>Rural</td>
<td>0.17</td>
<td>1.29</td>
<td>0.52</td>
<td>5.92</td>
<td>-722.84</td>
<td>-1,789.51</td>
</tr>
<tr>
<td></td>
<td>(1.13)</td>
<td>(2.62)</td>
<td>(0.85)</td>
<td>(13.16)</td>
<td>(542.63)</td>
<td>(1,107.53)</td>
</tr>
<tr>
<td>Male Household Head</td>
<td>9.47***</td>
<td>25.85***</td>
<td>9.82***</td>
<td>-92.65***</td>
<td>4,641.64***</td>
<td>11,768.02***</td>
</tr>
<tr>
<td></td>
<td>(1.34)</td>
<td>(3.54)</td>
<td>(1.27)</td>
<td>(17.11)</td>
<td>(652.69)</td>
<td>(1,569.76)</td>
</tr>
<tr>
<td>Average Age</td>
<td>0.96***</td>
<td>2.14***</td>
<td>0.68***</td>
<td>4.23***</td>
<td>259.70***</td>
<td>416.91***</td>
</tr>
<tr>
<td></td>
<td>(0.02)</td>
<td>(0.06)</td>
<td>(0.02)</td>
<td>(0.27)</td>
<td>(10.72)</td>
<td>(23.64)</td>
</tr>
<tr>
<td>Dependent</td>
<td>8.04***</td>
<td>17.91***</td>
<td>6.16***</td>
<td>39.57***</td>
<td>1,100.74***</td>
<td>1,561.88***</td>
</tr>
<tr>
<td></td>
<td>(0.03)</td>
<td>(0.08)</td>
<td>(0.03)</td>
<td>(0.29)</td>
<td>(13.03)</td>
<td>(22.50)</td>
</tr>
<tr>
<td>Proportion Formal Education</td>
<td>6.47***</td>
<td>13.54***</td>
<td>3.16***</td>
<td>-62.23***</td>
<td>5,274.34***</td>
<td>8,855.72***</td>
</tr>
<tr>
<td></td>
<td>(0.79)</td>
<td>(1.85)</td>
<td>(0.61)</td>
<td>(9.57)</td>
<td>(410.27)</td>
<td>(1,034.96)</td>
</tr>
<tr>
<td>Access to Sanitation</td>
<td>-3.51***</td>
<td>-6.20***</td>
<td>-2.10***</td>
<td>-35.81***</td>
<td>-45.96</td>
<td>-1,902.14*</td>
</tr>
<tr>
<td></td>
<td>(1.03)</td>
<td>(2.40)</td>
<td>(0.78)</td>
<td>(12.19)</td>
<td>(502.32)</td>
<td>(1,021.62)</td>
</tr>
<tr>
<td>Access to Drinking Water</td>
<td>-0.33</td>
<td>3.37</td>
<td>-0.01</td>
<td>-19.56</td>
<td>2,298.36*</td>
<td>2,528.27</td>
</tr>
<tr>
<td></td>
<td>(2.47)</td>
<td>(5.76)</td>
<td>(1.91)</td>
<td>(29.27)</td>
<td>(1,181.80)</td>
<td>(2,439.49)</td>
</tr>
<tr>
<td>Access to Electricity</td>
<td>3.07***</td>
<td>6.62***</td>
<td>1.81**</td>
<td>15.04</td>
<td>2,393.12***</td>
<td>4,787.14***</td>
</tr>
<tr>
<td></td>
<td>(1.07)</td>
<td>(2.49)</td>
<td>(0.81)</td>
<td>(12.89)</td>
<td>(533.11)</td>
<td>(1,080.23)</td>
</tr>
<tr>
<td>House Ownership</td>
<td>-3.20**</td>
<td>-8.67***</td>
<td>-2.96***</td>
<td>3.29</td>
<td>-2,399.71***</td>
<td>-3,239.89**</td>
</tr>
<tr>
<td></td>
<td>(1.39)</td>
<td>(3.24)</td>
<td>(1.05)</td>
<td>(15.27)</td>
<td>(642.38)</td>
<td>(1,315.69)</td>
</tr>
<tr>
<td>Land Ownership</td>
<td>0.01*</td>
<td>0.03</td>
<td>0.01</td>
<td>-0.20***</td>
<td>2.12</td>
<td>1.69</td>
</tr>
<tr>
<td>VARIABLES</td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td></td>
<td>TOTAL MONTH PER YEAR</td>
<td>TOTAL DAYS PER MONTH</td>
<td>TOTAL HOURS PER DAY</td>
<td>DAILY WAGE</td>
<td>SALARIED WAGE</td>
<td>YEARLY BENEFITS</td>
</tr>
<tr>
<td>POST (YEAR 2010)</td>
<td>53.46***</td>
<td>120.79***</td>
<td>46.35***</td>
<td>326.20***</td>
<td>-1,180.90</td>
<td>-20,950.37***</td>
</tr>
<tr>
<td></td>
<td>(3.12)</td>
<td>(7.10)</td>
<td>(2.34)</td>
<td>(27.18)</td>
<td>(1,192.58)</td>
<td>(2,283.23)</td>
</tr>
<tr>
<td>TREATMENT GROUP B</td>
<td>3.08***</td>
<td>4.99***</td>
<td>0.74*</td>
<td>6.57</td>
<td>-13.67</td>
<td>-234.27</td>
</tr>
<tr>
<td></td>
<td>(0.53)</td>
<td>(1.22)</td>
<td>(0.41)</td>
<td>(5.22)</td>
<td>(216.03)</td>
<td>(461.40)</td>
</tr>
<tr>
<td>POST * TREATMENT GROUP B</td>
<td>23.98***</td>
<td>52.64***</td>
<td>17.81***</td>
<td>101.13***</td>
<td>3,894.18***</td>
<td>8,591.28***</td>
</tr>
<tr>
<td></td>
<td>(1.81)</td>
<td>(4.22)</td>
<td>(1.38)</td>
<td>(17.90)</td>
<td>(751.68)</td>
<td>(1,531.00)</td>
</tr>
<tr>
<td>RURAL</td>
<td>0.30</td>
<td>1.57</td>
<td>0.61</td>
<td>6.56</td>
<td>-698.51</td>
<td>-1,734.03</td>
</tr>
<tr>
<td></td>
<td>(1.11)</td>
<td>(2.60)</td>
<td>(0.85)</td>
<td>(13.14)</td>
<td>(542.03)</td>
<td>(1,105.34)</td>
</tr>
<tr>
<td>MALE HOUSEHOLD HEAD</td>
<td>8.59***</td>
<td>23.94***</td>
<td>9.22***</td>
<td>-97.71***</td>
<td>4,464.26***</td>
<td>11,398.44***</td>
</tr>
<tr>
<td></td>
<td>(1.25)</td>
<td>(3.33)</td>
<td>(1.20)</td>
<td>(17.59)</td>
<td>(633.19)</td>
<td>(1,526.12)</td>
</tr>
<tr>
<td>AVERAGE AGE</td>
<td>0.95***</td>
<td>2.12***</td>
<td>0.67***</td>
<td>4.15***</td>
<td>256.92***</td>
<td>411.11***</td>
</tr>
</tbody>
</table>

Source: Author’s calculations.

Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.
<table>
<thead>
<tr>
<th></th>
<th>(0.02)</th>
<th>(0.06)</th>
<th>(0.02)</th>
<th>(0.27)</th>
<th>(10.67)</th>
<th>(23.34)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DEPENDENT</strong></td>
<td>8.06***</td>
<td>17.96***</td>
<td>6.17***</td>
<td>39.66***</td>
<td>1,104.15***</td>
<td>1,569.22***</td>
</tr>
<tr>
<td></td>
<td>(0.03)</td>
<td>(0.08)</td>
<td>(0.03)</td>
<td>(0.29)</td>
<td>(13.10)</td>
<td>(22.68)</td>
</tr>
<tr>
<td><strong>PROPORTION_FORMAL_EDUCATION</strong></td>
<td>6.54***</td>
<td>13.77***</td>
<td>3.20***</td>
<td>-61.36***</td>
<td>5,285.01***</td>
<td>8,826.31***</td>
</tr>
<tr>
<td></td>
<td>(0.79)</td>
<td>(1.84)</td>
<td>(0.60)</td>
<td>(9.55)</td>
<td>(409.22)</td>
<td>(1,032.20)</td>
</tr>
<tr>
<td><strong>ACCESS TO SANITATION</strong></td>
<td>-3.34***</td>
<td>-5.92***</td>
<td>-1.98**</td>
<td>-35.36***</td>
<td>-10.41</td>
<td>-1,776.53*</td>
</tr>
<tr>
<td></td>
<td>(1.03)</td>
<td>(2.38)</td>
<td>(0.77)</td>
<td>(12.17)</td>
<td>(501.07)</td>
<td>(1,018.73)</td>
</tr>
<tr>
<td><strong>ACCESS TO DRINKING WATER</strong></td>
<td>-0.75</td>
<td>2.22</td>
<td>-0.28</td>
<td>-22.73</td>
<td>2,243.35*</td>
<td>2,559.98</td>
</tr>
<tr>
<td></td>
<td>(2.45)</td>
<td>(5.73)</td>
<td>(1.90)</td>
<td>(29.26)</td>
<td>(1,179.10)</td>
<td>(2,430.87)</td>
</tr>
<tr>
<td><strong>ACCESS TO ELECTRICITY</strong></td>
<td>3.05***</td>
<td>6.51***</td>
<td>1.80**</td>
<td>14.72</td>
<td>2,392.89***</td>
<td>4,815.43***</td>
</tr>
<tr>
<td></td>
<td>(1.06)</td>
<td>(2.47)</td>
<td>(0.80)</td>
<td>(12.87)</td>
<td>(532.37)</td>
<td>(1,078.38)</td>
</tr>
<tr>
<td><strong>HOUSE OWNERSHIP</strong></td>
<td>-3.11**</td>
<td>-8.47***</td>
<td>-2.89***</td>
<td>3.74</td>
<td>-2,383.17***</td>
<td>-3,203.86**</td>
</tr>
<tr>
<td></td>
<td>(1.37)</td>
<td>(3.21)</td>
<td>(1.04)</td>
<td>(15.25)</td>
<td>(640.81)</td>
<td>(1,312.54)</td>
</tr>
<tr>
<td><strong>LAND OWNERSHIP</strong></td>
<td>0.01**</td>
<td>0.03*</td>
<td>0.01</td>
<td>-0.19***</td>
<td>2.15</td>
<td>1.51</td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
<td>(0.02)</td>
<td>(0.01)</td>
<td>(0.07)</td>
<td>(2.64)</td>
<td>(5.28)</td>
</tr>
<tr>
<td><strong>YEAR_2005</strong></td>
<td>-1.19**</td>
<td>-6.03***</td>
<td>-2.17***</td>
<td>18.29***</td>
<td>224.58</td>
<td>278.09</td>
</tr>
<tr>
<td></td>
<td>(0.55)</td>
<td>(1.25)</td>
<td>(0.43)</td>
<td>(5.88)</td>
<td>(233.82)</td>
<td>(471.71)</td>
</tr>
<tr>
<td><strong>YEAR2005 * TREATMENT GROUP B</strong></td>
<td>-1.68***</td>
<td>0.20</td>
<td>1.27***</td>
<td>-9.22</td>
<td>-457.70*</td>
<td>265.41</td>
</tr>
<tr>
<td></td>
<td>(0.62)</td>
<td>(1.41)</td>
<td>(0.48)</td>
<td>(6.34)</td>
<td>(274.69)</td>
<td>(623.88)</td>
</tr>
<tr>
<td><strong>CONSTANT</strong></td>
<td>-31.06***</td>
<td>-73.70***</td>
<td>-23.31***</td>
<td>45.22</td>
<td>-12,965.60***</td>
<td>-23,684.80***</td>
</tr>
<tr>
<td></td>
<td>(3.08)</td>
<td>(7.41)</td>
<td>(2.50)</td>
<td>(37.04)</td>
<td>(1,473.13)</td>
<td>(3,116.12)</td>
</tr>
<tr>
<td><strong>OBSERVATIONS</strong></td>
<td>25,506</td>
<td>25,506</td>
<td>25,506</td>
<td>20,738</td>
<td>20,738</td>
<td>20,738</td>
</tr>
<tr>
<td><strong>R-SQUARED</strong></td>
<td>0.97</td>
<td>0.97</td>
<td>0.97</td>
<td>0.88</td>
<td>0.76</td>
<td>0.56</td>
</tr>
</tbody>
</table>

*Source: Author's calculations.*

*Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.*
<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>I 15TH</th>
<th>II 25TH</th>
<th>III 50TH</th>
<th>IV 75TH</th>
<th>V 85TH</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INCOME</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL INCOME</strong></td>
<td>152,021.83***</td>
<td>-572.46</td>
<td>-7,895.24***</td>
<td>-15,835.66*</td>
<td>-40,390.71***</td>
</tr>
<tr>
<td></td>
<td>(2,043.65)</td>
<td>(1,311.80)</td>
<td>(2,131.86)</td>
<td>(9,262.68)</td>
<td>(4,060.23)</td>
</tr>
<tr>
<td><strong>CROP INCOME</strong></td>
<td>-3,198.41***</td>
<td>-3,795.53***</td>
<td>-3,308.52***</td>
<td>-6,388.10***</td>
<td>-5,593.55***</td>
</tr>
<tr>
<td></td>
<td>(383.72)</td>
<td>(360.21)</td>
<td>(619.48)</td>
<td>(1,167.21)</td>
<td>(1,935.75)</td>
</tr>
<tr>
<td><strong>NON-CROP INCOME</strong></td>
<td>445,555.98***</td>
<td>200.23</td>
<td>-2,709.12***</td>
<td>-7,398.63***</td>
<td>-9,205.69***</td>
</tr>
<tr>
<td></td>
<td>(370.68)</td>
<td>(227.58)</td>
<td>(264.23)</td>
<td>(473.76)</td>
<td>(821.47)</td>
</tr>
<tr>
<td><strong>BUSINESS INCOME</strong></td>
<td>-555.30</td>
<td>4,047.79***</td>
<td>635.15</td>
<td>-2,855.96</td>
<td>-3.86</td>
</tr>
<tr>
<td></td>
<td>(805.42)</td>
<td>(833.85)</td>
<td>(1,134.40)</td>
<td>(1,898.68)</td>
<td>(3,298.74)</td>
</tr>
<tr>
<td><strong>OTHER INCOME</strong></td>
<td>-33.74***</td>
<td>133.20*</td>
<td>1,542.76***</td>
<td>2,857.56***</td>
<td>3,360.76***</td>
</tr>
<tr>
<td></td>
<td>(0.66)</td>
<td>(78.39)</td>
<td>(224.47)</td>
<td>(660.63)</td>
<td>(1,175.64)</td>
</tr>
<tr>
<td><strong>EXPENDITURE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL EXPENDITURE</strong></td>
<td>-19,911.78***</td>
<td>-40,648.91***</td>
<td>-49,033.41***</td>
<td>-25,161.09***</td>
<td>-40,409.66***</td>
</tr>
<tr>
<td></td>
<td>(2,297.79)</td>
<td>(2,125.93)</td>
<td>(1,905.56)</td>
<td>(2,127.35)</td>
<td>(2,638.77)</td>
</tr>
<tr>
<td><strong>FOOD EXPENDITURE</strong></td>
<td>-473.48***</td>
<td>-225.12*</td>
<td>-382.37***</td>
<td>-590.81***</td>
<td>-205.07***</td>
</tr>
<tr>
<td></td>
<td>(151.18)</td>
<td>(117.37)</td>
<td>(92.81)</td>
<td>(89.38)</td>
<td>(74.68)</td>
</tr>
<tr>
<td><strong>NON-FOOD EXPENDITURE</strong></td>
<td>-1,220.43</td>
<td>-4,921.23***</td>
<td>-6,813.76***</td>
<td>-3,414.29***</td>
<td>-8,147.88***</td>
</tr>
<tr>
<td></td>
<td>(995.42)</td>
<td>(940.39)</td>
<td>(964.61)</td>
<td>(929.63)</td>
<td>(1,257.81)</td>
</tr>
<tr>
<td><strong>CROP EXPENDITURE</strong></td>
<td>-870.66***</td>
<td>-1,594.03***</td>
<td>-2,603.85***</td>
<td>-2,163.09***</td>
<td>-671.60</td>
</tr>
<tr>
<td></td>
<td>(331.19)</td>
<td>(329.33)</td>
<td>(468.92)</td>
<td>(556.44)</td>
<td>(795.72)</td>
</tr>
<tr>
<td><strong>NON-CROP EXPENDITURE</strong></td>
<td>-940.27***</td>
<td>-1,118.04***</td>
<td>-603.65***</td>
<td>-324.51</td>
<td>-2,049.00***</td>
</tr>
<tr>
<td></td>
<td>(178.68)</td>
<td>(161.28)</td>
<td>(195.40)</td>
<td>(296.19)</td>
<td>(496.29)</td>
</tr>
<tr>
<td><strong>AGRICULTURAL INPUT</strong></td>
<td>-6,964.92***</td>
<td>-7,551.65***</td>
<td>-9,123.63***</td>
<td>-6,533.64***</td>
<td>-8,872.74***</td>
</tr>
<tr>
<td><strong>EXPENDITURE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 10: Impact on various income and expenditure brackets per capita (Treatment Group B: Self-reported flood affected group)

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>I 15th</th>
<th>II 25th</th>
<th>III 50th</th>
<th>IV 75th</th>
<th>V 85th</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INCOME</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total income</td>
<td>-10,148.74***</td>
<td>-13,463.04***</td>
<td>15,987.59***</td>
<td>47,715.77***</td>
<td>89,658.70***</td>
</tr>
<tr>
<td>Crop income</td>
<td>3,259.10***</td>
<td>4,919.58***</td>
<td>-4,849.77***</td>
<td>-14,434.85***</td>
<td>-21,142.78***</td>
</tr>
<tr>
<td>Non-Crop income</td>
<td>10,858.02***</td>
<td>3,373.86***</td>
<td>2,681.22***</td>
<td>-75,458.03***</td>
<td>62,379.60***</td>
</tr>
<tr>
<td>Business income</td>
<td>-319,521.66***</td>
<td>-30,000.50***</td>
<td>-26,655.15***</td>
<td>-50.36</td>
<td>30,561.53***</td>
</tr>
<tr>
<td>Other income</td>
<td>-28.61***</td>
<td>-150.94***</td>
<td>-351.81*</td>
<td>-87.66</td>
<td>-1,098.86</td>
</tr>
<tr>
<td><strong>EXPENDITURE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Source*: Author's calculations.

*Notes*: a This table only presents the coefficient estimates for the Post*Treatment Group A variable, our main estimated parameter. All other controls were included in these regressions, however, and are not presented because of space constraints. Full results are available upon request.

b Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.
<table>
<thead>
<tr>
<th></th>
<th>Expenditure 1</th>
<th>Expenditure 2</th>
<th>Expenditure 3</th>
<th>Expenditure 4</th>
<th>Expenditure 5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TOTAL EXPENDITURE</strong></td>
<td>65,126.04***</td>
<td>-301,631.73***</td>
<td>326,400.32***</td>
<td>-44,274.31***</td>
<td>-47,967.13***</td>
</tr>
<tr>
<td></td>
<td>(1,685.49)</td>
<td>(1,939.23)</td>
<td>(1,657.72)</td>
<td>(1,673.07)</td>
<td>(2,174.96)</td>
</tr>
<tr>
<td><strong>FOOD EXPENDITURE</strong></td>
<td>2,352.46***</td>
<td>2,162.76***</td>
<td>815.03***</td>
<td>754.29***</td>
<td>1,974.11***</td>
</tr>
<tr>
<td></td>
<td>(105.58)</td>
<td>(101.78)</td>
<td>(82.08)</td>
<td>(70.99)</td>
<td>(67.29)</td>
</tr>
<tr>
<td><strong>NON-FOOD EXPENDITURE</strong></td>
<td>28,503.82***</td>
<td>17,501.96***</td>
<td>-34,523.00***</td>
<td>5,224.30***</td>
<td>-27,610.97***</td>
</tr>
<tr>
<td></td>
<td>(861.22)</td>
<td>(803.72)</td>
<td>(857.43)</td>
<td>(755.39)</td>
<td>(962.25)</td>
</tr>
<tr>
<td><strong>CROP EXPENDITURE</strong></td>
<td>-3,521.57***</td>
<td>-182.49</td>
<td>478.49</td>
<td>118.26</td>
<td>-3,564.41***</td>
</tr>
<tr>
<td></td>
<td>(266.82)</td>
<td>(271.01)</td>
<td>(411.19)</td>
<td>(499.72)</td>
<td>(653.23)</td>
</tr>
<tr>
<td><strong>NON-CROP EXPENDITURE</strong></td>
<td>-4,133.14***</td>
<td>-3,969.57***</td>
<td>2,655.39***</td>
<td>3,909.25***</td>
<td>9,722.32***</td>
</tr>
<tr>
<td></td>
<td>(142.20)</td>
<td>(132.51)</td>
<td>(165.48)</td>
<td>(243.52)</td>
<td>(407.32)</td>
</tr>
<tr>
<td><strong>AGRICULTURAL INPUT</strong></td>
<td>13,327.75***</td>
<td>8,584.68***</td>
<td>2,249.37***</td>
<td>-9,722.74***</td>
<td>-45,470.77***</td>
</tr>
<tr>
<td></td>
<td>(447.95)</td>
<td>(519.94)</td>
<td>(537.37)</td>
<td>(871.71)</td>
<td>(1,127.26)</td>
</tr>
<tr>
<td><strong>EDUCATIONAL EXPENDITURE</strong></td>
<td>3,521.72***</td>
<td>-214.33</td>
<td>-2,261.07***</td>
<td>2,731.51***</td>
<td>7,693.01***</td>
</tr>
<tr>
<td></td>
<td>(195.74)</td>
<td>(227.59)</td>
<td>(234.07)</td>
<td>(329.83)</td>
<td>(384.41)</td>
</tr>
<tr>
<td><strong>HEALTH EXPENDITURE</strong></td>
<td>372.00***</td>
<td>358.85***</td>
<td>126.77***</td>
<td>318.98***</td>
<td>1,843.89***</td>
</tr>
<tr>
<td></td>
<td>(15.82)</td>
<td>(19.33)</td>
<td>(22.56)</td>
<td>(42.09)</td>
<td>(78.80)</td>
</tr>
</tbody>
</table>

*Source: Author’s calculations.*

*Notes: *a* This table only presents the coefficient estimates for the Post* Treatment* Group B variable, our main estimated parameter. All other controls were included in these regressions, however, and are not presented because of space constraints. Full results are available upon request.

b* Robust standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1.*
### Appendix Table 1: Key Variables with Descriptive Statistics (Treatment and Control Group A: Rainfall-based Identifications)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Type</th>
<th>Mean Treatment</th>
<th>Mean Control</th>
<th>Standard Deviation Treatment</th>
<th>Standard Deviation Control</th>
<th>Description of Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outcome Variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Per Capita Total Income</strong></td>
<td>Continuous</td>
<td>122609.3</td>
<td>585579.1</td>
<td>350281.8</td>
<td>670960.9</td>
<td>Sum of per capita crop, non-crop, business and other incomes.</td>
</tr>
<tr>
<td><strong>Per Capita Crop Income</strong></td>
<td>Continuous</td>
<td>42914.52</td>
<td>134535.2</td>
<td>80916.75</td>
<td>109717</td>
<td>Per capita income earned through selling of crops.</td>
</tr>
<tr>
<td><strong>Per Capita Non-Crop Income</strong></td>
<td>Continuous</td>
<td>39591.31</td>
<td>175023.1</td>
<td>217985.1</td>
<td>470222.2</td>
<td>Per capita income earned through selling of livestock and poultry, livestock products, fish farming and fish capture and farm forestry.</td>
</tr>
<tr>
<td><strong>Per Capita Business Income</strong></td>
<td>Continuous</td>
<td>95109.46</td>
<td>362796.5</td>
<td>225754.1</td>
<td>329750.4</td>
<td>Per capita net revenues earned from non-agricultural enterprises and rental income from agricultural assets.</td>
</tr>
<tr>
<td><strong>Per Capita Other Income</strong></td>
<td>Continuous</td>
<td>15599.26</td>
<td>15401.97</td>
<td>84804.43</td>
<td>45366.48</td>
<td>Per capita income earned from other assets (e.g. stocks, bonds, jewellery etc.), rent, insurance, charity, gift, remittances, bank interest and social safety net.</td>
</tr>
<tr>
<td><strong>Per Capita Total Expenditure</strong></td>
<td>Continuous</td>
<td>163587.6</td>
<td>902204.4</td>
<td>451583.2</td>
<td>772266.5</td>
<td>Sum of per capita food, non-food, crop, non-crop, agricultural input, education and health expenditures.</td>
</tr>
<tr>
<td><strong>Per Capita Food Expenditure</strong></td>
<td>Continuous</td>
<td>9428.717</td>
<td>53264.84</td>
<td>26657.94</td>
<td>44630.27</td>
<td>Per capita daily and weekly food consumption.</td>
</tr>
<tr>
<td><strong>Per Capita Non-Food Expenditure</strong></td>
<td>Continuous</td>
<td>84195.85</td>
<td>464748.6</td>
<td>235125.7</td>
<td>404613.2</td>
<td>Per capita monthly and annual non-food consumption.</td>
</tr>
<tr>
<td><strong>Per Capita Crop Expenditure</strong></td>
<td>Continuous</td>
<td>27164.83</td>
<td>82950.47</td>
<td>47425.52</td>
<td>59216.15</td>
<td>Per capita crop consumption by household.</td>
</tr>
<tr>
<td><strong>Per Capita Non-Crop Expenditure</strong></td>
<td>Continuous</td>
<td>16060.38</td>
<td>64966.32</td>
<td>38283.58</td>
<td>56794.33</td>
<td>Per capita consumption of livestock and poultry, livestock products, fish farming and fish capture and farm forestry products by household.</td>
</tr>
<tr>
<td><strong>Per Capita Agricultural Input Expenditure</strong></td>
<td>Continuous</td>
<td>59887.13</td>
<td>216886.8</td>
<td>123287.5</td>
<td>165543.5</td>
<td>Per capita expenses on agricultural inputs.</td>
</tr>
<tr>
<td><strong>Per Capita Educational Expenditure</strong></td>
<td>Continuous</td>
<td>20565.26</td>
<td>85667.89</td>
<td>47419.52</td>
<td>70960.43</td>
<td>Per capita expenditure for educational services.</td>
</tr>
<tr>
<td><strong>Per Capita Health Expenditure</strong></td>
<td>Continuous</td>
<td>2226.591</td>
<td>8581.544</td>
<td>7182.878</td>
<td>11793.97</td>
<td>Per capita expenditure for health services.</td>
</tr>
<tr>
<td><strong>Total Change in Agricultural and Other Business Asset (in Real Terms)</strong></td>
<td>Continuous</td>
<td>34085.83</td>
<td>137203.9</td>
<td>223634.9</td>
<td>435505.3</td>
<td>Sum of agricultural assets households bought in the last 12 months and expenditure in capital goods (in non-agricultural enterprises) in the last 12 months.</td>
</tr>
<tr>
<td><strong>Total Agricultural Input Asset Value (in Real Terms)</strong></td>
<td>Continuous</td>
<td>58562.68</td>
<td>188197.2</td>
<td>147132</td>
<td>241979.5</td>
<td>Value of owned equipment and asset used in agriculture.</td>
</tr>
<tr>
<td>covariate</td>
<td>type</td>
<td>1996</td>
<td>1997</td>
<td>1998</td>
<td>1999</td>
<td>mean</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>----------</td>
<td>--------</td>
<td>--------</td>
<td>--------</td>
<td>--------</td>
<td>---------</td>
</tr>
<tr>
<td>Total consumer durable asset value (in real terms)</td>
<td>continuous</td>
<td>351885.9</td>
<td>1888812</td>
<td>1016351</td>
<td>1830325</td>
<td></td>
</tr>
<tr>
<td>Total month per year worked</td>
<td>continuous</td>
<td>103.9289</td>
<td>517.5979</td>
<td>255.4481</td>
<td>417.7093</td>
<td></td>
</tr>
<tr>
<td>Total days per month worked</td>
<td>continuous</td>
<td>233.9744</td>
<td>1155.402</td>
<td>571.3488</td>
<td>932.6239</td>
<td></td>
</tr>
<tr>
<td>Total hours per day worked</td>
<td>continuous</td>
<td>80.24236</td>
<td>398.9724</td>
<td>196.6285</td>
<td>321.3238</td>
<td></td>
</tr>
<tr>
<td>Daily wage (in real terms)</td>
<td>continuous</td>
<td>696.1671</td>
<td>2873.078</td>
<td>1489.233</td>
<td>2067.039</td>
<td></td>
</tr>
<tr>
<td>Salaried wage (in real terms)</td>
<td>continuous</td>
<td>18725.12</td>
<td>77322.4</td>
<td>41691.76</td>
<td>61527.92</td>
<td></td>
</tr>
<tr>
<td>Yearly benefits (in real terms)</td>
<td>continuous</td>
<td>24275.35</td>
<td>98172.85</td>
<td>59626.65</td>
<td>95530.79</td>
<td></td>
</tr>
<tr>
<td>Covariates</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>binary</td>
<td>0.6362126</td>
<td>0.655756</td>
<td>0.4811085</td>
<td>0.475134</td>
<td></td>
</tr>
<tr>
<td>Head of household is male</td>
<td>binary</td>
<td>0.9127907</td>
<td>0.965463</td>
<td>0.2833284</td>
<td>0.196886</td>
<td></td>
</tr>
<tr>
<td>Average age</td>
<td>continuous</td>
<td>26.50556</td>
<td>26.54462</td>
<td>10.01851</td>
<td>6.61305</td>
<td></td>
</tr>
<tr>
<td>Dependent</td>
<td>continuous</td>
<td>11.15075</td>
<td>57.09819</td>
<td>28.11758</td>
<td>46.92759</td>
<td></td>
</tr>
<tr>
<td>Proportion of formal education</td>
<td>continuous</td>
<td>0.4785376</td>
<td>0.777077</td>
<td>0.3603159</td>
<td>0.34971</td>
<td></td>
</tr>
<tr>
<td>Access to sanitation</td>
<td>binary</td>
<td>0.4536468</td>
<td>0.510949</td>
<td>0.4978674</td>
<td>0.499894</td>
<td></td>
</tr>
<tr>
<td>Access to safe drinking water</td>
<td>binary</td>
<td>0.9683555</td>
<td>0.965628</td>
<td>0.1750591</td>
<td>0.182188</td>
<td></td>
</tr>
<tr>
<td>Access to electricity</td>
<td>binary</td>
<td>0.4669435</td>
<td>0.505446</td>
<td>0.4989268</td>
<td>0.499984</td>
<td></td>
</tr>
<tr>
<td>House ownership</td>
<td>binary</td>
<td>0.8113631</td>
<td>0.833399</td>
<td>0.3912362</td>
<td>0.37263</td>
<td></td>
</tr>
</tbody>
</table>

Source: Author’s elaborations.
### Appendix Table 2: Key Variables with Descriptive Statistics (Treatment and Control Group B: Self-reported identifications)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Type</th>
<th>Mean Treatment</th>
<th>Mean Control</th>
<th>Standard Deviation Treatment</th>
<th>Standard Deviation Control</th>
<th>Description of Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outcome Variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Per capita total income</td>
<td>Continuous</td>
<td>373423.5</td>
<td>434201.8</td>
<td>536564</td>
<td>696302</td>
<td>Sum of per capita crop, non-crop, business and other incomes.</td>
</tr>
<tr>
<td>Per capita crop income</td>
<td>Continuous</td>
<td>106895.8</td>
<td>110779.8</td>
<td>108175.3</td>
<td>113151.7</td>
<td>Per capita income earned through selling of crops.</td>
</tr>
<tr>
<td>Per capita non-crop income</td>
<td>Continuous</td>
<td>119383.3</td>
<td>142421.5</td>
<td>234059.7</td>
<td>561244.2</td>
<td>Per capita income earned through selling of livestock and poultry, livestock products, fish farming and fish capture and farm forestry.</td>
</tr>
<tr>
<td>Per capita business income</td>
<td>Continuous</td>
<td>262397.1</td>
<td>285835.9</td>
<td>343133.1</td>
<td>295508.2</td>
<td>Per capita net revenues earned from non-agricultural enterprises and rental income from agricultural assets.</td>
</tr>
<tr>
<td>Per capita other income</td>
<td>Continuous</td>
<td>16123.11</td>
<td>14555.04</td>
<td>78380.95</td>
<td>35069.85</td>
<td>Per capita income earned from other assets (e.g. stocks, bonds, jewellery etc.), rent, insurance, charity, gift, remittances, bank interest and social safety net.</td>
</tr>
<tr>
<td>Per capita total expenditure</td>
<td>Continuous</td>
<td>565384</td>
<td>658288.1</td>
<td>743532.6</td>
<td>766395.6</td>
<td>Sum of per capita food, non-food, crop, non-crop, agricultural input, education and health expenditures.</td>
</tr>
<tr>
<td>Per capita food expenditure</td>
<td>Continuous</td>
<td>33397.13</td>
<td>38612.06</td>
<td>43509.96</td>
<td>44531.1</td>
<td>Per capita daily and weekly food consumption.</td>
</tr>
<tr>
<td>Per capita non-food expenditure</td>
<td>Continuous</td>
<td>291933.9</td>
<td>338133.9</td>
<td>388660.5</td>
<td>398508.1</td>
<td>Per capita monthly and annual non-food consumption.</td>
</tr>
<tr>
<td>Per capita crop expenditure</td>
<td>Continuous</td>
<td>65298.17</td>
<td>69545.04</td>
<td>60440.5</td>
<td>62756.02</td>
<td>Per capita crop consumption by household.</td>
</tr>
<tr>
<td>Per capita non-crop expenditure</td>
<td>Continuous</td>
<td>46754.38</td>
<td>50691.94</td>
<td>54652.11</td>
<td>58273.61</td>
<td>Per capita consumption of livestock and poultry, livestock products, fish farming and fish capture and farm forestry products by household.</td>
</tr>
<tr>
<td>Per capita agricultural input expenditure</td>
<td>Continuous</td>
<td>164668.1</td>
<td>175283.9</td>
<td>167023.6</td>
<td>173735.7</td>
<td>Per capita expenses on agricultural inputs.</td>
</tr>
<tr>
<td>Per capita educational expenditure</td>
<td>Continuous</td>
<td>60773.71</td>
<td>66948.93</td>
<td>71753.8</td>
<td>69686.33</td>
<td>Per capita expenditure for educational services.</td>
</tr>
<tr>
<td>Per capita health expenditure</td>
<td>Continuous</td>
<td>5945.219</td>
<td>7229.639</td>
<td>7618.373</td>
<td>14244.29</td>
<td>Per capita expenditure for health services.</td>
</tr>
<tr>
<td>Total change in agricultural and other business asset (in real terms)</td>
<td>Continuous</td>
<td>73565</td>
<td>142607.6</td>
<td>214724</td>
<td>529612.6</td>
<td>Sum of agricultural assets households bought in the last 12 months and expenditure in capital goods (in non-agricultural enterprises) in the last 12 months.</td>
</tr>
<tr>
<td>Total agricultural input asset value (in real terms)</td>
<td>Continuous</td>
<td>151046.5</td>
<td>151352</td>
<td>246957.3</td>
<td>197233.6</td>
<td>Value of owned equipment and asset used in agriculture.</td>
</tr>
<tr>
<td><strong>Variable</strong></td>
<td><strong>Type</strong></td>
<td><strong>Value 1</strong></td>
<td><strong>Value 2</strong></td>
<td><strong>Value 3</strong></td>
<td><strong>Value 4</strong></td>
<td><strong>Description</strong></td>
</tr>
<tr>
<td>-------------------------------------------------------</td>
<td>-----------</td>
<td>-------------</td>
<td>-------------</td>
<td>-------------</td>
<td>-------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Total Consumer Durable Asset Value (in real terms)</td>
<td>Continuous</td>
<td>1163556</td>
<td>1420042</td>
<td>1565000</td>
<td>1927552</td>
<td>Total asset value of consumer durable goods.</td>
</tr>
<tr>
<td>Total Month per Year Worked</td>
<td>Continuous</td>
<td>334.5448</td>
<td>379.3605</td>
<td>414.1053</td>
<td>414.2008</td>
<td>Total number of months per year worked.</td>
</tr>
<tr>
<td>Total Days per Month Worked</td>
<td>Continuous</td>
<td>747.2892</td>
<td>848.02</td>
<td>923.1851</td>
<td>926.0869</td>
<td>Total number of days per month worked.</td>
</tr>
<tr>
<td>Total Hours per Day Worked</td>
<td>Continuous</td>
<td>257.5589</td>
<td>292.9975</td>
<td>318.1137</td>
<td>319.5673</td>
<td>Total number of hours per day worked.</td>
</tr>
<tr>
<td>Salaried Wage (in real terms)</td>
<td>Continuous</td>
<td>5463.38</td>
<td>6037.16</td>
<td>6134.19</td>
<td>6294.69</td>
<td>Total net take-home monthly remuneration after all deduction at source.</td>
</tr>
<tr>
<td>Yearly Benefits (in real terms)</td>
<td>Continuous</td>
<td>70386.54</td>
<td>75589.07</td>
<td>91639.38</td>
<td>91995.92</td>
<td>Total value of yearly in-kind or other benefits (tips, bonuses or transport) from employment.</td>
</tr>
<tr>
<td>Covariates</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>Binary</td>
<td>0.6320787</td>
<td>0.670638</td>
<td>0.4822535</td>
<td>0.470001</td>
<td>Whether living in a rural area = 1, otherwise 0.</td>
</tr>
<tr>
<td>Head of Household is Male</td>
<td>Binary</td>
<td>0.9431431</td>
<td>0.945613</td>
<td>0.2440097</td>
<td>0.226789</td>
<td>Whether head of the household is male = 1, otherwise 0.</td>
</tr>
<tr>
<td>Average Age</td>
<td>Continuous</td>
<td>26.58561</td>
<td>26.44676</td>
<td>8.317239</td>
<td>7.935949</td>
<td>Average age of household members.</td>
</tr>
<tr>
<td>Dependent</td>
<td>Continuous</td>
<td>35.85337</td>
<td>42.34686</td>
<td>45.34921</td>
<td>47.27546</td>
<td>Age of the household member is &lt;15 and &gt;=65.</td>
</tr>
<tr>
<td>Proportion of Formal Education</td>
<td>Continuous</td>
<td>0.6430289</td>
<td>0.675469</td>
<td>0.3841798</td>
<td>0.380877</td>
<td>Proportion of household members attended school, college, university or madrasa.</td>
</tr>
<tr>
<td>Access to Sanitation</td>
<td>Binary</td>
<td>0.4828722</td>
<td>0.494906</td>
<td>0.4997192</td>
<td>0.499995</td>
<td>Whether the household use sanitary or pacca latrines (water seal and pit) = 1, otherwise 0.</td>
</tr>
<tr>
<td>Access to Safe Drinking Water</td>
<td>Binary</td>
<td>0.9708324</td>
<td>0.960805</td>
<td>0.1682809</td>
<td>0.194066</td>
<td>Whether the household has access to supply water or tube well water = 1, otherwise 0.</td>
</tr>
<tr>
<td>Access to Electricity</td>
<td>Binary</td>
<td>0.5085285</td>
<td>0.462904</td>
<td>0.4999415</td>
<td>0.498642</td>
<td>Whether the household has got electricity connection = 1, otherwise 0.</td>
</tr>
<tr>
<td>House Ownership</td>
<td>Binary</td>
<td>0.8086086</td>
<td>0.847424</td>
<td>0.3934076</td>
<td>0.359593</td>
<td>Whether the household own a house = 1, otherwise 0.</td>
</tr>
<tr>
<td>Land Ownership (in real terms)</td>
<td>Continuous</td>
<td>28.40776</td>
<td>32.6895</td>
<td>91.94583</td>
<td>95.34276</td>
<td>Amount of total operating land (in acres).</td>
</tr>
</tbody>
</table>

*Source:* Author's elaborations.
### Appendix Table 3: Impact on log of household income per capita (Treatment Group A: Rainfall-based flood affected group)

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Log of Total Income</td>
<td>Log of Crop Income</td>
<td>Log of Non-Crop Income</td>
<td>Log of Business Income</td>
<td>Log of Other Income</td>
</tr>
<tr>
<td><strong>Post (Year 2010)</strong></td>
<td>1.569***</td>
<td>1.822***</td>
<td>2.402***</td>
<td>1.890***</td>
<td>-1.002***</td>
</tr>
<tr>
<td></td>
<td>(0.0519)</td>
<td>(0.0756)</td>
<td>(0.0881)</td>
<td>(0.0699)</td>
<td>(0.0859)</td>
</tr>
<tr>
<td><strong>Treatment Group A</strong></td>
<td>0.254***</td>
<td>0.491***</td>
<td>0.135*</td>
<td>-0.0955</td>
<td>-0.0650</td>
</tr>
<tr>
<td></td>
<td>(0.0422)</td>
<td>(0.0583)</td>
<td>(0.0784)</td>
<td>(0.0780)</td>
<td>(0.0587)</td>
</tr>
<tr>
<td><strong>Post * Treatment Group A</strong></td>
<td>-0.229***</td>
<td>-0.527***</td>
<td>-0.166**</td>
<td>0.137*</td>
<td>0.325***</td>
</tr>
<tr>
<td></td>
<td>(0.0455)</td>
<td>(0.0619)</td>
<td>(0.0825)</td>
<td>(0.0796)</td>
<td>(0.0787)</td>
</tr>
<tr>
<td><strong>Rural</strong></td>
<td>-0.0706***</td>
<td>-0.0388**</td>
<td>-0.0132</td>
<td>-0.0465***</td>
<td>-0.234***</td>
</tr>
<tr>
<td></td>
<td>(0.0170)</td>
<td>(0.0190)</td>
<td>(0.0236)</td>
<td>(0.0143)</td>
<td>(0.0276)</td>
</tr>
<tr>
<td><strong>Male Household Head</strong></td>
<td>-0.353***</td>
<td>0.289***</td>
<td>0.359***</td>
<td>0.206***</td>
<td>-0.915***</td>
</tr>
<tr>
<td></td>
<td>(0.0440)</td>
<td>(0.0809)</td>
<td>(0.0784)</td>
<td>(0.0794)</td>
<td>(0.0508)</td>
</tr>
<tr>
<td><strong>Average Age</strong></td>
<td>0.0161***</td>
<td>0.0145***</td>
<td>0.0248***</td>
<td>0.00596***</td>
<td>0.0187***</td>
</tr>
<tr>
<td></td>
<td>(0.00109)</td>
<td>(0.00207)</td>
<td>(0.00199)</td>
<td>(0.00200)</td>
<td>(0.00126)</td>
</tr>
<tr>
<td><strong>Dependent</strong></td>
<td>0.0147***</td>
<td>0.0143***</td>
<td>0.0195***</td>
<td>0.0139***</td>
<td>-0.000778</td>
</tr>
<tr>
<td></td>
<td>(0.000367)</td>
<td>(0.000510)</td>
<td>(0.000525)</td>
<td>(0.000291)</td>
<td>(0.000755)</td>
</tr>
<tr>
<td><strong>Proportion Formal Education</strong></td>
<td>1.316***</td>
<td>0.982***</td>
<td>0.344***</td>
<td>0.825***</td>
<td>0.768***</td>
</tr>
<tr>
<td></td>
<td>(0.0381)</td>
<td>(0.0630)</td>
<td>(0.0685)</td>
<td>(0.0596)</td>
<td>(0.0447)</td>
</tr>
<tr>
<td><strong>Access to Sanitation</strong></td>
<td>0.185***</td>
<td>-0.00214</td>
<td>-0.00889</td>
<td>0.0928***</td>
<td>0.697***</td>
</tr>
<tr>
<td></td>
<td>(0.0143)</td>
<td>(0.0157)</td>
<td>(0.0205)</td>
<td>(0.0124)</td>
<td>(0.0248)</td>
</tr>
<tr>
<td><strong>Access to Drinking Water</strong></td>
<td>0.0140</td>
<td>-0.0249</td>
<td>-0.121**</td>
<td>0.0671*</td>
<td>-0.108*</td>
</tr>
<tr>
<td></td>
<td>(0.0330)</td>
<td>(0.0395)</td>
<td>(0.0526)</td>
<td>(0.0389)</td>
<td>(0.0549)</td>
</tr>
<tr>
<td><strong>Access to Electricity</strong></td>
<td>0.257***</td>
<td>0.0702***</td>
<td>-0.0253</td>
<td>0.0932***</td>
<td>0.785***</td>
</tr>
<tr>
<td></td>
<td>(0.0151)</td>
<td>(0.0168)</td>
<td>(0.0221)</td>
<td>(0.0134)</td>
<td>(0.0260)</td>
</tr>
<tr>
<td><strong>House Ownership</strong></td>
<td>0.0633***</td>
<td>-0.0506**</td>
<td>-0.0155</td>
<td>-0.0291*</td>
<td>0.211***</td>
</tr>
<tr>
<td></td>
<td>(0.0234)</td>
<td>(0.0222)</td>
<td>(0.0289)</td>
<td>(0.0169)</td>
<td>(0.0369)</td>
</tr>
<tr>
<td><strong>Log of Land Ownership</strong></td>
<td>0.116***</td>
<td>0.136***</td>
<td>0.0905***</td>
<td>-0.0321***</td>
<td>0.152***</td>
</tr>
<tr>
<td></td>
<td>(0.00425)</td>
<td>(0.00515)</td>
<td>(0.00574)</td>
<td>(0.00369)</td>
<td>(0.00693)</td>
</tr>
<tr>
<td><strong>Year_2005</strong></td>
<td>-0.0680*</td>
<td>0.136**</td>
<td>-0.258***</td>
<td>0.108</td>
<td>-0.0230</td>
</tr>
</tbody>
</table>
### APPENDIX TABLE 4: IMPACT ON LOG OF HOUSEHOLD INCOME PER CAPITA (TREATMENT GROUP B: SELF-REPORTED FLOOD AFFECTED GROUP)

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LOG OF TOTAL INCOME</td>
<td>LOG OF CROP INCOME</td>
<td>LOG OF NON-CROP INCOME</td>
<td>LOG OF BUSINESS INCOME</td>
<td>LOG OF OTHER INCOME</td>
</tr>
<tr>
<td>POST (YEAR 2010)</td>
<td>1.547***</td>
<td>1.815***</td>
<td>2.312***</td>
<td>1.902***</td>
<td>-0.967***</td>
</tr>
<tr>
<td></td>
<td>(0.0533)</td>
<td>(0.0767)</td>
<td>(0.0884)</td>
<td>(0.0704)</td>
<td>(0.0878)</td>
</tr>
<tr>
<td>TREATMENT GROUP B</td>
<td>0.254***</td>
<td>0.491***</td>
<td>0.135*</td>
<td>-0.0956</td>
<td>-0.0648</td>
</tr>
<tr>
<td></td>
<td>(0.0422)</td>
<td>(0.0583)</td>
<td>(0.0784)</td>
<td>(0.0780)</td>
<td>(0.0587)</td>
</tr>
<tr>
<td>POST * TREATMENT GROUP B</td>
<td>-0.216***</td>
<td>-0.487***</td>
<td>-0.00951</td>
<td>0.0821</td>
<td>0.0573</td>
</tr>
<tr>
<td></td>
<td>(0.0435)</td>
<td>(0.0595)</td>
<td>(0.0801)</td>
<td>(0.0786)</td>
<td>(0.0685)</td>
</tr>
<tr>
<td>RURAL</td>
<td>-0.0702***</td>
<td>-0.0391**</td>
<td>-0.0123</td>
<td>-0.0464***</td>
<td>-0.234***</td>
</tr>
<tr>
<td></td>
<td>(0.0170)</td>
<td>(0.0190)</td>
<td>(0.0236)</td>
<td>(0.0143)</td>
<td>(0.0276)</td>
</tr>
<tr>
<td>MALE HOUSEHOLD HEAD</td>
<td>-0.354***</td>
<td>0.288***</td>
<td>0.353***</td>
<td>0.207***</td>
<td>-0.917***</td>
</tr>
<tr>
<td></td>
<td>(0.0440)</td>
<td>(0.0810)</td>
<td>(0.0780)</td>
<td>(0.0795)</td>
<td>(0.0508)</td>
</tr>
<tr>
<td>AVERAGE AGE</td>
<td>0.0161***</td>
<td>0.0145***</td>
<td>0.0247***</td>
<td>0.00597***</td>
<td>0.0187***</td>
</tr>
<tr>
<td></td>
<td>(0.00109)</td>
<td>(0.00207)</td>
<td>(0.00199)</td>
<td>(0.00200)</td>
<td>(0.00126)</td>
</tr>
<tr>
<td>DEPENDENT</td>
<td>0.0148***</td>
<td>0.0143***</td>
<td>0.0196***</td>
<td>0.0139***</td>
<td>-0.000791</td>
</tr>
<tr>
<td></td>
<td>(0.000369)</td>
<td>(0.000511)</td>
<td>(0.000523)</td>
<td>(0.000292)</td>
<td>(0.000755)</td>
</tr>
<tr>
<td>PROPORTION_FORMAL EDUCATION</td>
<td>1.316***</td>
<td>0.981***</td>
<td>0.343***</td>
<td>0.826***</td>
<td>0.775***</td>
</tr>
</tbody>
</table>

Source: Author’s calculations.

Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient 1</th>
<th>Coefficient 2</th>
<th>Coefficient 3</th>
<th>Coefficient 4</th>
<th>Coefficient 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCESS TO SANITATION</td>
<td>0.185***</td>
<td>-0.00140</td>
<td>-0.00701</td>
<td>0.0917***</td>
<td>0.691***</td>
</tr>
<tr>
<td></td>
<td>(0.0143)</td>
<td>(0.0156)</td>
<td>(0.0204)</td>
<td>(0.0124)</td>
<td>(0.0248)</td>
</tr>
<tr>
<td>ACCESS TO DRINKING WATER</td>
<td>0.0115</td>
<td>-0.0212</td>
<td>-0.121**</td>
<td>0.0625</td>
<td>-0.128**</td>
</tr>
<tr>
<td></td>
<td>(0.0330)</td>
<td>(0.0393)</td>
<td>(0.0524)</td>
<td>(0.0388)</td>
<td>(0.0549)</td>
</tr>
<tr>
<td>ACCESS TO ELECTRICITY</td>
<td>0.257***</td>
<td>0.0709***</td>
<td>-0.0245</td>
<td>0.0924***</td>
<td>0.779***</td>
</tr>
<tr>
<td></td>
<td>(0.0151)</td>
<td>(0.0168)</td>
<td>(0.0221)</td>
<td>(0.0134)</td>
<td>(0.0260)</td>
</tr>
<tr>
<td>HOUSE OWNERSHIP</td>
<td>0.0635***</td>
<td>-0.0507**</td>
<td>-0.0144</td>
<td>-0.0292*</td>
<td>0.211***</td>
</tr>
<tr>
<td></td>
<td>(0.0234)</td>
<td>(0.0222)</td>
<td>(0.0288)</td>
<td>(0.0169)</td>
<td>(0.0369)</td>
</tr>
<tr>
<td>LOG OF LAND OWNERSHIP</td>
<td>0.116***</td>
<td>0.136***</td>
<td>0.0905***</td>
<td>-0.0320***</td>
<td>0.152***</td>
</tr>
<tr>
<td></td>
<td>(0.00425)</td>
<td>(0.00516)</td>
<td>(0.00574)</td>
<td>(0.00369)</td>
<td>(0.00694)</td>
</tr>
<tr>
<td>YEAR_2005</td>
<td>-0.0679*</td>
<td>0.136**</td>
<td>-0.259***</td>
<td>0.109</td>
<td>-0.0194</td>
</tr>
<tr>
<td></td>
<td>(0.0398)</td>
<td>(0.0604)</td>
<td>(0.0690)</td>
<td>(0.0679)</td>
<td>(0.0505)</td>
</tr>
<tr>
<td>YEAR2005 * TREATMENT GROUP B</td>
<td>-0.304***</td>
<td>-0.306***</td>
<td>-0.228**</td>
<td>0.191**</td>
<td>-0.121*</td>
</tr>
<tr>
<td></td>
<td>(0.0508)</td>
<td>(0.0786)</td>
<td>(0.0929)</td>
<td>(0.0910)</td>
<td>(0.0659)</td>
</tr>
<tr>
<td></td>
<td>(0.0759)</td>
<td>(0.115)</td>
<td>(0.128)</td>
<td>(0.116)</td>
<td>(0.104)</td>
</tr>
</tbody>
</table>

**Observations**: 23,749 16,823 18,601 15,186 19,359

**R-squared**: 0.816 0.785 0.780 0.807 0.227

*Source: Author's calculations.*

*Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.*
<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post (Year 2010)</td>
<td>1.997***</td>
<td>3.329***</td>
<td>2.734***</td>
<td>1.246***</td>
<td>1.895***</td>
<td>1.873***</td>
<td>2.241***</td>
<td>2.617***</td>
</tr>
<tr>
<td></td>
<td>(0.0347)</td>
<td>(0.0245)</td>
<td>(0.0358)</td>
<td>(0.0548)</td>
<td>(0.0678)</td>
<td>(0.0684)</td>
<td>(0.0563)</td>
<td>(0.0712)</td>
</tr>
<tr>
<td>Treatment Group A</td>
<td>0.137***</td>
<td>0.0602***</td>
<td>0.0936***</td>
<td>0.107***</td>
<td>0.276***</td>
<td>0.286***</td>
<td>-0.0935</td>
<td>-0.260***</td>
</tr>
<tr>
<td></td>
<td>(0.0218)</td>
<td>(0.0128)</td>
<td>(0.0241)</td>
<td>(0.0393)</td>
<td>(0.0612)</td>
<td>(0.0420)</td>
<td>(0.0570)</td>
<td>(0.0658)</td>
</tr>
<tr>
<td>Post * Treatment Group A</td>
<td>-0.144***</td>
<td>-0.0546***</td>
<td>-0.0750***</td>
<td>-0.127***</td>
<td>-0.268***</td>
<td>-0.315***</td>
<td>0.126**</td>
<td>0.273***</td>
</tr>
<tr>
<td></td>
<td>(0.0256)</td>
<td>(0.0152)</td>
<td>(0.0269)</td>
<td>(0.0426)</td>
<td>(0.0633)</td>
<td>(0.0463)</td>
<td>(0.0588)</td>
<td>(0.0681)</td>
</tr>
<tr>
<td>Rural</td>
<td>-0.0305***</td>
<td>-0.00729</td>
<td>-0.0510***</td>
<td>-0.0124</td>
<td>0.0326*</td>
<td>0.00573</td>
<td>-0.0804***</td>
<td>0.0571***</td>
</tr>
<tr>
<td></td>
<td>(0.0101)</td>
<td>(0.00518)</td>
<td>(0.0109)</td>
<td>(0.0160)</td>
<td>(0.0170)</td>
<td>(0.0199)</td>
<td>(0.0151)</td>
<td>(0.0178)</td>
</tr>
<tr>
<td>Male Household Head</td>
<td>0.122***</td>
<td>0.0383***</td>
<td>-0.0696**</td>
<td>0.258***</td>
<td>0.237***</td>
<td>0.484***</td>
<td>-0.370***</td>
<td>-0.0190</td>
</tr>
<tr>
<td></td>
<td>(0.0249)</td>
<td>(0.0138)</td>
<td>(0.0279)</td>
<td>(0.0629)</td>
<td>(0.0496)</td>
<td>(0.0773)</td>
<td>(0.0504)</td>
<td>(0.0605)</td>
</tr>
<tr>
<td>Average Age</td>
<td>0.00562***</td>
<td>0.00597***</td>
<td>0.00632***</td>
<td>0.0113***</td>
<td>0.0168***</td>
<td>0.0199***</td>
<td>0.0258***</td>
<td>0.0113***</td>
</tr>
<tr>
<td></td>
<td>(0.000736)</td>
<td>(0.000393)</td>
<td>(0.000763)</td>
<td>(0.00146)</td>
<td>(0.00141)</td>
<td>(0.00173)</td>
<td>(0.00214)</td>
<td>(0.00171)</td>
</tr>
<tr>
<td>Dependent</td>
<td>0.0138***</td>
<td>0.0141***</td>
<td>0.0132***</td>
<td>0.0163***</td>
<td>0.0173***</td>
<td>0.0175***</td>
<td>0.0143***</td>
<td>0.0164***</td>
</tr>
<tr>
<td></td>
<td>(0.000294)</td>
<td>(0.000230)</td>
<td>(0.000285)</td>
<td>(0.000380)</td>
<td>(0.000429)</td>
<td>(0.000527)</td>
<td>(0.000344)</td>
<td>(0.000387)</td>
</tr>
<tr>
<td>Proportion Formal Education</td>
<td>1.055***</td>
<td>0.407***</td>
<td>1.084***</td>
<td>0.501***</td>
<td>0.650***</td>
<td>0.656***</td>
<td>2.776***</td>
<td>0.558***</td>
</tr>
<tr>
<td></td>
<td>(0.0223)</td>
<td>(0.0110)</td>
<td>(0.0247)</td>
<td>(0.0460)</td>
<td>(0.0480)</td>
<td>(0.0558)</td>
<td>(0.0465)</td>
<td>(0.0569)</td>
</tr>
<tr>
<td>Access to Sanitation</td>
<td>0.0530***</td>
<td>0.0567***</td>
<td>0.111***</td>
<td>-0.0246*</td>
<td>-0.0155</td>
<td>-0.00304</td>
<td>0.155***</td>
<td>0.0755***</td>
</tr>
<tr>
<td></td>
<td>(0.00853)</td>
<td>(0.00437)</td>
<td>(0.00897)</td>
<td>(0.0130)</td>
<td>(0.0149)</td>
<td>(0.0158)</td>
<td>(0.0135)</td>
<td>(0.0154)</td>
</tr>
<tr>
<td>Access to Drinking Water</td>
<td>0.146***</td>
<td>-0.00973</td>
<td>0.161***</td>
<td>-0.0231</td>
<td>0.0259</td>
<td>0.162***</td>
<td>0.0495</td>
<td>-0.0774*</td>
</tr>
<tr>
<td></td>
<td>(0.0215)</td>
<td>(0.0101)</td>
<td>(0.0210)</td>
<td>(0.0310)</td>
<td>(0.0385)</td>
<td>(0.0394)</td>
<td>(0.0332)</td>
<td>(0.0396)</td>
</tr>
<tr>
<td>Access to Electricity</td>
<td>0.132***</td>
<td>0.0914***</td>
<td>0.171***</td>
<td>0.0520***</td>
<td>0.0304*</td>
<td>0.0747***</td>
<td>0.145***</td>
<td>0.0829***</td>
</tr>
<tr>
<td></td>
<td>(0.00903)</td>
<td>(0.00472)</td>
<td>(0.00956)</td>
<td>(0.0135)</td>
<td>(0.0158)</td>
<td>(0.0170)</td>
<td>(0.0146)</td>
<td>(0.0166)</td>
</tr>
<tr>
<td>House Ownership</td>
<td>-0.0341**</td>
<td>-0.0459***</td>
<td>-0.0570***</td>
<td>-0.114***</td>
<td>-0.0544</td>
<td>-0.134***</td>
<td>-0.118***</td>
<td>-0.0352</td>
</tr>
<tr>
<td></td>
<td>(0.0135)</td>
<td>(0.00720)</td>
<td>(0.0145)</td>
<td>(0.0195)</td>
<td>(0.0207)</td>
<td>(0.0227)</td>
<td>(0.0199)</td>
<td>(0.0234)</td>
</tr>
<tr>
<td>Log of Land Ownership</td>
<td>0.157***</td>
<td>0.0194***</td>
<td>0.0323***</td>
<td>0.177***</td>
<td>0.111***</td>
<td>0.201***</td>
<td>0.0135***</td>
<td>-0.00416</td>
</tr>
</tbody>
</table>
### APPENDIX Table 6: Impact on log of household expenditure per capita (Treatment Group B: Self-reported flood affected group)

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>YEAR_2005</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.00283)</td>
<td>(0.0128)</td>
<td>(0.00268)</td>
<td>(0.00511)</td>
<td>(0.00415)</td>
<td>(0.00564)</td>
<td>(0.00382)</td>
<td>(0.00442)</td>
</tr>
<tr>
<td><strong>YEAR2005 * TREATMENT GROUP A</strong></td>
<td>-0.525***</td>
<td>0.133***</td>
<td>-0.616***</td>
<td>-0.216***</td>
<td>-0.237***</td>
<td>-0.488***</td>
<td>0.199***</td>
<td>-0.0827</td>
</tr>
<tr>
<td></td>
<td>(0.0212)</td>
<td>(0.0112)</td>
<td>(0.0238)</td>
<td>(0.0423)</td>
<td>(0.0532)</td>
<td>(0.0492)</td>
<td>(0.0467)</td>
<td>(0.0585)</td>
</tr>
<tr>
<td><strong>CONSTANT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0435)</td>
<td>(0.0222)</td>
<td>(0.0471)</td>
<td>(0.0859)</td>
<td>(0.0897)</td>
<td>(0.103)</td>
<td>(0.0865)</td>
<td>(0.0997)</td>
</tr>
<tr>
<td><strong>OBSERVATIONS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>24,107</td>
<td>24,107</td>
<td>24,093</td>
<td>18,475</td>
<td>19,951</td>
<td>18,594</td>
<td>19,557</td>
<td>18,425</td>
</tr>
<tr>
<td><strong>R-SQUARED</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.943</td>
<td>0.984</td>
<td>0.942</td>
<td>0.826</td>
<td>0.834</td>
<td>0.841</td>
<td>0.892</td>
<td>0.833</td>
</tr>
</tbody>
</table>

Source: Author’s calculations.
Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>Coefficient</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVERAGE AGE</td>
<td>0.00561***</td>
<td>(0.000736)</td>
<td>0.00596***</td>
<td>(0.000393)</td>
<td>0.00632***</td>
<td>(0.000763)</td>
<td>0.0113***</td>
<td>(0.00146)</td>
<td>0.0168***</td>
<td>(0.00141)</td>
<td>0.0199***</td>
<td>(0.00173)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DEPENDENT</td>
<td>0.0138***</td>
<td>(0.000295)</td>
<td>0.0141***</td>
<td>(0.000231)</td>
<td>0.0132***</td>
<td>(0.000286)</td>
<td>0.0162***</td>
<td>(0.000380)</td>
<td>0.0173***</td>
<td>(0.000430)</td>
<td>0.0175***</td>
<td>(0.000527)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROPORTION FORMAL EDUCATION</td>
<td>1.055***</td>
<td>(0.0223)</td>
<td>0.407***</td>
<td>(0.0110)</td>
<td>1.084***</td>
<td>(0.0247)</td>
<td>0.501***</td>
<td>(0.0460)</td>
<td>0.650***</td>
<td>(0.0480)</td>
<td>0.655***</td>
<td>(0.0558)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACCESS TO SANITATION</td>
<td>0.0532***</td>
<td>(0.00854)</td>
<td>0.0569***</td>
<td>(0.00437)</td>
<td>0.111***</td>
<td>(0.00897)</td>
<td>-0.0244*</td>
<td>(0.0130)</td>
<td>-0.0156</td>
<td>(0.0149)</td>
<td>-0.00239</td>
<td>(0.0158)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACCESS TO DRINKING WATER</td>
<td>0.146***</td>
<td>(0.0215)</td>
<td>-0.0107</td>
<td>(0.0100)</td>
<td>0.159***</td>
<td>(0.0210)</td>
<td>-0.0207</td>
<td>(0.0309)</td>
<td>0.0251</td>
<td>(0.0384)</td>
<td>0.165***</td>
<td>(0.0393)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACCESS TO ELECTRICITY</td>
<td>0.132***</td>
<td>(0.00903)</td>
<td>0.0914***</td>
<td>(0.00471)</td>
<td>0.170***</td>
<td>(0.00955)</td>
<td>0.0523***</td>
<td>(0.0135)</td>
<td>0.0303*</td>
<td>(0.0158)</td>
<td>0.0752***</td>
<td>(0.0170)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HOUSE OWNERSHIP</td>
<td>-0.0340**</td>
<td>(0.0135)</td>
<td>-0.0457***</td>
<td>(0.00719)</td>
<td>-0.0570</td>
<td>(0.0145)</td>
<td>-0.115***</td>
<td>(0.0195)</td>
<td>-0.00544</td>
<td>(0.0207)</td>
<td>-0.134***</td>
<td>(0.0227)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOG OF LAND OWNERSHIP</td>
<td>0.157***</td>
<td>(0.00283)</td>
<td>0.0194***</td>
<td>(0.00128)</td>
<td>0.0323***</td>
<td>(0.00268)</td>
<td>0.177***</td>
<td>(0.00511)</td>
<td>0.111***</td>
<td>(0.00415)</td>
<td>0.201***</td>
<td>(0.00564)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>YEAR_2005</td>
<td>-0.525***</td>
<td>(0.0212)</td>
<td>0.133***</td>
<td>(0.0112)</td>
<td>-0.616***</td>
<td>(0.0238)</td>
<td>-0.216***</td>
<td>(0.0423)</td>
<td>-0.237***</td>
<td>(0.0532)</td>
<td>-0.488***</td>
<td>(0.0492)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>YEAR2005 * TREATMENT GROUP B</td>
<td>-0.121***</td>
<td>(0.0273)</td>
<td>-0.105***</td>
<td>(0.0150)</td>
<td>-0.173***</td>
<td>(0.0305)</td>
<td>0.162***</td>
<td>(0.0470)</td>
<td>-0.195***</td>
<td>(0.0544)</td>
<td>-0.00678</td>
<td>(0.0697)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONSTANT</td>
<td>8.903***</td>
<td>(0.0434)</td>
<td>6.000***</td>
<td>(0.0221)</td>
<td>8.013***</td>
<td>(0.0470)</td>
<td>7.282***</td>
<td>(0.0859)</td>
<td>6.126***</td>
<td>(0.0896)</td>
<td>6.635***</td>
<td>(0.103)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OBSERVATIONS</td>
<td>24,107</td>
<td>24,107</td>
<td>24,093</td>
<td>18,475</td>
<td>19,951</td>
<td>18,594</td>
<td>19,557</td>
<td>19,557</td>
<td>18,425</td>
<td>18,425</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-SQUARED</td>
<td>0.943</td>
<td>0.984</td>
<td>0.942</td>
<td>0.826</td>
<td>0.834</td>
<td>0.841</td>
<td>0.892</td>
<td>0.892</td>
<td>0.833</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Source: Author’s calculations.*

*Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*
### Appendix Table 7: Impact on log of total asset outcomes (Treatment Group A: Rainfall-based flood affected group)

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LOG OF TOTAL CHANGE IN</td>
<td>LOG OF TOTAL</td>
<td>LOG OF TOTAL CONSUMER</td>
</tr>
<tr>
<td></td>
<td>AGRICULTURAL AND</td>
<td>AGRICULTURAL</td>
<td>DURABLE ASSET VALUE</td>
</tr>
<tr>
<td></td>
<td>OTHER BUSINESS ASSET</td>
<td>INPUT VALUE</td>
<td></td>
</tr>
<tr>
<td>POST (YEAR 2010)</td>
<td>0.384***</td>
<td>1.162***</td>
<td>2.639***</td>
</tr>
<tr>
<td></td>
<td>(0.133)</td>
<td>(0.0862)</td>
<td>(0.0471)</td>
</tr>
<tr>
<td>TREATMENT GROUP A</td>
<td>-0.202</td>
<td>0.295***</td>
<td>0.521***</td>
</tr>
<tr>
<td></td>
<td>(0.129)</td>
<td>(0.0732)</td>
<td>(0.0390)</td>
</tr>
<tr>
<td>POST * TREATMENT GROUP A</td>
<td>0.212</td>
<td>-0.275***</td>
<td>-0.455***</td>
</tr>
<tr>
<td></td>
<td>(0.137)</td>
<td>(0.0786)</td>
<td>(0.0423)</td>
</tr>
<tr>
<td>RURAL</td>
<td>-0.0724**</td>
<td>0.000385</td>
<td>-0.137***</td>
</tr>
<tr>
<td></td>
<td>(0.0349)</td>
<td>(0.0234)</td>
<td>(0.0149)</td>
</tr>
<tr>
<td>MALE HOUSEHOLD HEAD</td>
<td>0.706***</td>
<td>0.750***</td>
<td>0.116***</td>
</tr>
<tr>
<td></td>
<td>(0.123)</td>
<td>(0.0946)</td>
<td>(0.0394)</td>
</tr>
<tr>
<td>AVERAGE AGE</td>
<td>0.0155***</td>
<td>0.00282</td>
<td>-0.00328***</td>
</tr>
<tr>
<td></td>
<td>(0.00506)</td>
<td>(0.00253)</td>
<td>(0.00101)</td>
</tr>
<tr>
<td>DEPENDENT</td>
<td>0.0233***</td>
<td>0.0203***</td>
<td>0.0141***</td>
</tr>
<tr>
<td></td>
<td>(0.000596)</td>
<td>(0.000502)</td>
<td>(0.000327)</td>
</tr>
<tr>
<td>PROPORTION_FORMAL EDUCATION</td>
<td>1.292***</td>
<td>1.117***</td>
<td>1.795***</td>
</tr>
<tr>
<td></td>
<td>(0.139)</td>
<td>(0.0795)</td>
<td>(0.0338)</td>
</tr>
<tr>
<td>ACCESS TO SANITATION</td>
<td>0.0620**</td>
<td>0.0625***</td>
<td>0.197***</td>
</tr>
<tr>
<td></td>
<td>(0.0296)</td>
<td>(0.0204)</td>
<td>(0.0124)</td>
</tr>
<tr>
<td>ACCESS TO DRINKING WATER</td>
<td>-0.0698</td>
<td>-0.0142</td>
<td>0.138***</td>
</tr>
<tr>
<td></td>
<td>(0.0795)</td>
<td>(0.0517)</td>
<td>(0.0355)</td>
</tr>
<tr>
<td>ACCESS TO ELECTRICITY</td>
<td>0.0828***</td>
<td>0.0691***</td>
<td>0.447***</td>
</tr>
<tr>
<td></td>
<td>(0.0314)</td>
<td>(0.0214)</td>
<td>(0.0133)</td>
</tr>
<tr>
<td>HOUSE OWNERSHIP</td>
<td>-0.00918</td>
<td>-0.0542**</td>
<td>0.0699***</td>
</tr>
<tr>
<td></td>
<td>(0.0437)</td>
<td>(0.0274)</td>
<td>(0.0199)</td>
</tr>
<tr>
<td>LOG OF LAND OWNERSHIP</td>
<td>0.00984</td>
<td>0.0973***</td>
<td>0.0691***</td>
</tr>
<tr>
<td>VARIABLES</td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>-----------</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td></td>
<td>LOG OF TOTAL CHANGE IN AGRICULTURAL AND OTHER BUSINESS ASSET</td>
<td>LOG OF TOTAL AGRICULTURAL INPUT ASSET VALUE</td>
<td>LOG OF TOTAL CONSUMER DURABLE ASSET VALUE</td>
</tr>
<tr>
<td>POST (YEAR 2010)</td>
<td>0.599***</td>
<td>1.177***</td>
<td>2.636***</td>
</tr>
<tr>
<td></td>
<td>(0.134)</td>
<td>(0.0868)</td>
<td>(0.0482)</td>
</tr>
<tr>
<td>TREATMENT GROUP B</td>
<td>-0.202</td>
<td>0.295***</td>
<td>0.521***</td>
</tr>
<tr>
<td></td>
<td>(0.129)</td>
<td>(0.0732)</td>
<td>(0.0390)</td>
</tr>
<tr>
<td>POST * TREATMENT GROUP B</td>
<td>-0.139</td>
<td>-0.316***</td>
<td>-0.507***</td>
</tr>
<tr>
<td></td>
<td>(0.132)</td>
<td>(0.0753)</td>
<td>(0.0402)</td>
</tr>
<tr>
<td>RURAL</td>
<td>-0.0767***</td>
<td>0.000315</td>
<td>-0.136***</td>
</tr>
<tr>
<td></td>
<td>(0.0347)</td>
<td>(0.0234)</td>
<td>(0.0149)</td>
</tr>
<tr>
<td>MALE HOUSEHOLD HEAD</td>
<td>0.776***</td>
<td>0.752***</td>
<td>0.116***</td>
</tr>
<tr>
<td></td>
<td>(0.126)</td>
<td>(0.0946)</td>
<td>(0.0394)</td>
</tr>
<tr>
<td>AVERAGE AGE</td>
<td>0.0164***</td>
<td>0.00284</td>
<td>-0.00328***</td>
</tr>
<tr>
<td></td>
<td>(0.00507)</td>
<td>(0.00253)</td>
<td>(0.00101)</td>
</tr>
<tr>
<td>DEPENDENT</td>
<td>0.0230***</td>
<td>0.0203***</td>
<td>0.0142***</td>
</tr>
</tbody>
</table>

Source: Author’s calculations.

Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.
<table>
<thead>
<tr>
<th></th>
<th>Observations</th>
<th>R-squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROPORTION_FORMAL_EDUCATION</td>
<td>13,217</td>
<td>0.442</td>
</tr>
<tr>
<td>ACCESS TO SANITATION</td>
<td>15,941</td>
<td>0.751</td>
</tr>
<tr>
<td>ACCESS TO DRINKING WATER</td>
<td>23,807</td>
<td>0.910</td>
</tr>
<tr>
<td>ACCESS TO ELECTRICITY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HOUSE OWNERSHIP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOG OF LAND OWNERSHIP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>YEAR_2005</td>
<td></td>
<td></td>
</tr>
<tr>
<td>YEAR_2005 * TREATMENT GROUP B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONSTANT</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Author’s calculations.

Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.
### APPENDIX Table 9: Impact on various income and expenditure brackets per capita (Treat Group A: Rainfall-based flood affected group)

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>I 15th</th>
<th>II 25th</th>
<th>III 50th</th>
<th>IV 75th</th>
<th>V 85th</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INCOME</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Income</strong></td>
<td>(-8,684.68^{***})</td>
<td>(8,446.09^{***})</td>
<td>(436.31)</td>
<td>(-22,268.13^{***})</td>
<td>(-13,699.11^{***})</td>
</tr>
<tr>
<td></td>
<td>((456.81))</td>
<td>((780.54))</td>
<td>((1,704.79))</td>
<td>((3,094.70))</td>
<td>((5,224.42))</td>
</tr>
<tr>
<td><strong>Crop Income</strong></td>
<td>(-3,849.69^{***})</td>
<td>(-4,090.00^{***})</td>
<td>(1,418.15^{***})</td>
<td>(-3,181.12^{*})</td>
<td>(-6,615.66^{***})</td>
</tr>
<tr>
<td></td>
<td>((430.00))</td>
<td>((4.41))</td>
<td>((449.69))</td>
<td>((1,643.33))</td>
<td>((1,197.43))</td>
</tr>
<tr>
<td><strong>Non-Crop Income</strong></td>
<td>(-146.66)</td>
<td>(1,946.66)</td>
<td>(-3,359.52^{***})</td>
<td>(-635.47^{*})</td>
<td>(-51,378.16^{***})</td>
</tr>
<tr>
<td></td>
<td>((131.02))</td>
<td>((2,223.99))</td>
<td>((116.93))</td>
<td>((353.80))</td>
<td>((1,043.89))</td>
</tr>
<tr>
<td><strong>Business Income</strong></td>
<td>0.00</td>
<td>(7,433.31^{***})</td>
<td>(8,643.20^{***})</td>
<td>(-14,115.48^{***})</td>
<td>(-9,749.66^{**})</td>
</tr>
<tr>
<td></td>
<td>((677.82))</td>
<td>((493.02))</td>
<td>((68.78))</td>
<td>((2,174.70))</td>
<td>((4,201.40))</td>
</tr>
<tr>
<td><strong>Other Income</strong></td>
<td>0.00</td>
<td>43.78^{***}</td>
<td>(2,070.04^{***})</td>
<td>510.03</td>
<td>(-1,762.24)</td>
</tr>
<tr>
<td></td>
<td>((2.01))</td>
<td>((6.56))</td>
<td>((361.38))</td>
<td>((1,290.58))</td>
<td>((2,626.63))</td>
</tr>
<tr>
<td><strong>EXPENDITURE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Expenditure</strong></td>
<td>(-808.53^{***})</td>
<td>(-24,087.06^{***})</td>
<td>(-5,357.88^{***})</td>
<td>(-8,871.79^{***})</td>
<td>(-31,949.62^{***})</td>
</tr>
<tr>
<td></td>
<td>((273.02))</td>
<td>((355.66))</td>
<td>((802.60))</td>
<td>((1,639.79))</td>
<td>((2,694.14))</td>
</tr>
<tr>
<td><strong>Food Expenditure</strong></td>
<td>770.49^{***}</td>
<td>(-125.71^{***})</td>
<td>(-98.26^{***})</td>
<td>1,022.91^{***}</td>
<td>110.73^{***}</td>
</tr>
<tr>
<td></td>
<td>((14.31))</td>
<td>((13.12))</td>
<td>((16.39))</td>
<td>((28.35))</td>
<td>((37.05))</td>
</tr>
<tr>
<td><strong>Non-Food Expenditure</strong></td>
<td>(-2,222.90^{***})</td>
<td>(-10,549.13^{***})</td>
<td>(-2,176.59^{***})</td>
<td>(-2,147.41^{***})</td>
<td>(-13,547.52^{***})</td>
</tr>
<tr>
<td></td>
<td>((88.14))</td>
<td>((110.43))</td>
<td>((236.76))</td>
<td>((624.43))</td>
<td>((964.09))</td>
</tr>
<tr>
<td><strong>Crop Expenditure</strong></td>
<td>1,208.29^{***}</td>
<td>(-71.07)</td>
<td>(-2,361.67^{***})</td>
<td>(-601.92)</td>
<td>(-435.27)</td>
</tr>
<tr>
<td></td>
<td>((230.31))</td>
<td>((281.77))</td>
<td>((445.68))</td>
<td>((707.91))</td>
<td>((731.81))</td>
</tr>
<tr>
<td><strong>Non-Crop Expenditure</strong></td>
<td>708.00^{***}</td>
<td>(-1,222.90^{***})</td>
<td>(-136.89)</td>
<td>(-3,964.10^{***})</td>
<td>(-1,195.00^{***})</td>
</tr>
<tr>
<td></td>
<td>((65.13))</td>
<td>((62.82))</td>
<td>((141.31))</td>
<td>((342.22))</td>
<td>((448.64))</td>
</tr>
<tr>
<td><strong>Agricultural Input Expenditure</strong></td>
<td>582.67^{***}</td>
<td>(-2,991.49^{***})</td>
<td>(-9,122.85^{***})</td>
<td>(-7,339.18^{***})</td>
<td>(-17,790.28^{***})</td>
</tr>
<tr>
<td>VARIABLES</td>
<td>I 15TH</td>
<td>II 25TH</td>
<td>III 50TH</td>
<td>IV 75TH</td>
<td>V 85TH</td>
</tr>
<tr>
<td>----------------------</td>
<td>-----------------</td>
<td>-----------------</td>
<td>-----------------</td>
<td>-----------------</td>
<td>-----------------</td>
</tr>
<tr>
<td><strong>EDUCATIONAL EXPENDITURE</strong></td>
<td>(2.26)</td>
<td>(105.19)</td>
<td>(422.66)</td>
<td>(999.41)</td>
<td>(1,730.57)</td>
</tr>
<tr>
<td></td>
<td>9.34</td>
<td>-233.82***</td>
<td>-397.61**</td>
<td>-1,738.33***</td>
<td>-1,230.27**</td>
</tr>
<tr>
<td></td>
<td>(20.71)</td>
<td>(43.86)</td>
<td>(158.94)</td>
<td>(358.27)</td>
<td>(568.46)</td>
</tr>
<tr>
<td><strong>HEALTH EXPENDITURE</strong></td>
<td>-101.97***</td>
<td>-2.90</td>
<td>-113.02***</td>
<td>-54.37</td>
<td>127.51**</td>
</tr>
<tr>
<td></td>
<td>(2.85)</td>
<td>(5.15)</td>
<td>(13.33)</td>
<td>(38.36)</td>
<td>(62.78)</td>
</tr>
</tbody>
</table>

*Source: Author’s calculations.*

*Notes:* a This table only presents the coefficient estimates for the Post*Treat Group A variable, our main estimated parameter. All other controls were not included in these regressions.

b Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

**APPENDIX TABLE 10: IMPACT ON VARIOUS INCOME AND EXPENDITURE BRACKETS PER CAPITA (TREAT GROUP B: SELF-REPORTED FLOOD AFFECTED GROUP)**
<table>
<thead>
<tr>
<th>Category</th>
<th>Estimate 1</th>
<th>Estimate 2</th>
<th>Estimate 3</th>
<th>Estimate 4</th>
<th>Estimate 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Expenditure</td>
<td>-6,099.71***</td>
<td>-1,940.31***</td>
<td>4,235.44***</td>
<td>-1,780.30***</td>
<td>1,348.30***</td>
</tr>
<tr>
<td>Non-Food Expenditure</td>
<td>-10,082.90***</td>
<td>32,942.18***</td>
<td>-15,039.21***</td>
<td>-29,247.10***</td>
<td>-35,751.58***</td>
</tr>
<tr>
<td></td>
<td>(56.34)</td>
<td>(73.07)</td>
<td>(158.56)</td>
<td>(398.29)</td>
<td>(820.01)</td>
</tr>
<tr>
<td>Crop Expenditure</td>
<td>-6,414.05***</td>
<td>-2,305.74***</td>
<td>-1,614.01***</td>
<td>-6,052.92***</td>
<td>4,804.73***</td>
</tr>
<tr>
<td></td>
<td>(149.49)</td>
<td>(240.00)</td>
<td>(214.63)</td>
<td>(472.92)</td>
<td>(533.45)</td>
</tr>
<tr>
<td>Non-Crop Expenditure</td>
<td>-8,169.34***</td>
<td>-2,509.57***</td>
<td>1,306.45***</td>
<td>-4,544.11***</td>
<td>1,679.67***</td>
</tr>
<tr>
<td></td>
<td>(55.10)</td>
<td>(47.52)</td>
<td>(79.69)</td>
<td>(218.83)</td>
<td>(293.02)</td>
</tr>
<tr>
<td>Agricultural Input Expenditure</td>
<td>8,044.00***</td>
<td>21,020.51***</td>
<td>7,650.48***</td>
<td>9,418.78***</td>
<td>-44,504.28***</td>
</tr>
<tr>
<td></td>
<td>(1.51)</td>
<td>(62.09)</td>
<td>(295.02)</td>
<td>(463.42)</td>
<td>(922.90)</td>
</tr>
<tr>
<td>Educational Expenditure</td>
<td>-6,125.34***</td>
<td>-5,854.16***</td>
<td>3,361.73***</td>
<td>-6,333.33***</td>
<td>-3,001.75***</td>
</tr>
<tr>
<td></td>
<td>(13.17)</td>
<td>(29.73)</td>
<td>(107.00)</td>
<td>(247.74)</td>
<td>(341.57)</td>
</tr>
<tr>
<td>Health Expenditure</td>
<td>-101.97***</td>
<td>-312.23***</td>
<td>276.65***</td>
<td>284.30***</td>
<td>52.51</td>
</tr>
<tr>
<td></td>
<td>(1.81)</td>
<td>(3.75)</td>
<td>(8.94)</td>
<td>(26.09)</td>
<td>(42.43)</td>
</tr>
</tbody>
</table>

*Source:* Author's calculations.

*Notes:* This table only presents the coefficient estimates for the Post*Treat Group B variable, our main estimated parameter. All other controls were not included in these regressions.

*R* Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.