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Do remittances and/or public transfers matter for agricultural investments and food security outcomes among rural households in Zimbabwe?

Advanced policy-focused poverty analysis in Zimbabwe

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Executive Summary

This study investigates whether private transfers, specifically, migrant remittances, and public transfers, that is, government support programs, matter for agricultural and food security outcomes of rural households in Zimbabwe using descriptive statistical methodologies on a recent household survey. The importance of this topic is underpinned by the high incidence of food insecurity in Zimbabwe, relative to other Sub-Saharan African countries, and the recent poor performance of the agricultural sector. The findings reveal agriculture-related public transfers have a positive association with crop diversification. There is also a notable positive association between agriculture-related public transfers and the use of modern agricultural inputs, particularly inorganic fertilizer and improved/hybrid seed. The study thus provides evidence for the positive effect of targeted public transfer government interventions such as the Command Agriculture and Presidential Input Support Programme on the agricultural outcomes of rural households. The results also show that food-related public transfers seem to be channelled towards the poorest households. Therefore, government support in the form of food transfers are indeed going to the neediest households.

The study also shows some differential findings according to the type of land households are located on, and/or their agroecological zone. Hence, rather than providing homogenous support, differentials in agro-ecological zone and access to markets should be taken into account in determining the type of public support and potential effect on agricultural outcomes and food security for rural households.

Other findings suggest that households headed by men are more likely to diversify crop production, use modern agricultural inputs, and own livestock of higher value, relative to female headed households. Thus, the study advocates for the prioritization of female headed households in providing food relief and agricultural interventions. On average, the results suggest no relationship between the receipt of public transfers and the dietary diversity of households.

International migrant remittances are found to not have any statistically significant relationship with the agricultural outcomes of rural households, perhaps owing to the small number of households receiving them. We also find that international remittances are received by richer households, as evidenced by their negative correlation with the food budget shares of households. Domestic remittances are shown to have a negative association with crop diversification but a positive association with the use of modern agricultural inputs, particularly inorganic fertilizer and herbicides. Thus, domestic remittances seem to have an opposing effect to public transfers when it comes to crop production, but complement public transfers when it comes to input use. The study suggests that the complementary role between public and private transfers can be further discussed in the policy arena to better understand it. Strategies to further enhance the role of remittances in supporting the rural agricultural sector should also be devised in consultation with a

range of stakeholders, especially given the prominence of remittances in the National Development Policy framework.

It is notable that despite evidence showing that both domestic remittances and public transfers have statistically significant associations with agricultural outcomes, this does not seem to translate to an increase in nutritional intake as measured by dietary diversity. This highlights the need to further explore how better nutritional outcomes can be achieved in rural Zimbabwe.

I. Introduction

The importance of agriculture in the socio-economic and political context of Zimbabwe cannot be over emphasised. Dominated by smallholder farming, the sector remains a key driver for pro-poor economic growth and sustainable development, poverty reduction, employment creation, and food and nutrition security (FAO 2016). The Transitional Stabilisation Programme (2018) highlights that the contribution of agriculture to the Gross Domestic Product is anticipated to grow from 12.4% in 2018 to 16.4% in 2020 as a result of strategic and innovative policy and practice interventions under the banner of "Smart Agriculture". This growth sets the right pathway for a positive economic and food security outlook. Zimbabwe is regarded as one of the most vulnerable and food insecure countries in the Sub-Saharan Africa region as a result of poor performance of the agricultural sector (AfDB 2019).

A myriad of constraints inhibits the agricultural sector's performance. Chief among these factors include limited access to agricultural finance which is a key driver of investments towards sustainable transformation and commercialisation of the sector as envisioned by the Smart Agriculture initiative. Access to finance stimulates increased use of quality inputs and promotes investment towards climate adaptation that has a positive bearing on agricultural outcomes. Given that the smallholder farming sector remains a key pillar of food production in Zimbabwe but is resource constrained, food security remains a policy concern. The African Development Bank (2016) postulates that putting in place mechanisms that improve access to finance by smallholder farmers has a multiplier effect on increase in crop input use, adoption of agriculture technologies and crop diversification that remains vital in accelerating food production growth in this critical farming sector.

Following a prolonged liquidity crisis in Zimbabwe, financial flow towards agricultural growth has been weak, resulting in low agricultural production and exacerbating the food insecurity situation. Thus, the government of Zimbabwe has directed its policy towards improving access to agricultural finance under the Transitional Stabilisation Programme and new National Agricultural Policy Framework (2018-2030) (still in draft form). These two policy documents identify public, private and diaspora remittances as key funding sources to support the growth of the agricultural sector. Key programmes under public support include the special agricultural production programme coined as Command Agriculture and the Presidential Input Support Programme (MF&ED 2019). Private funding has focused on promoting

bankability of the 99-year leases to unlock commercial bank financing and contract farming. Migrant remittances, which are the focus of this study, have also contributed significantly towards agriculture development.

Migrant remittances are generally acknowledged to contribute significantly to poverty alleviation in recipient countries (Bracking and Sachikonye 2008 and 2010). Remittances have increasingly become an invaluable source of funding not only for agriculture but also across all economic sectors in Zimbabwe. According to TSP (2018), remittances have become the second largest source of national income after exports of goods and services. In the Zimbabwean context where macroeconomic instability and the erosion of local currency persist, remittances have played a pivotal role in providing stable funding for the agricultural sector.

Given the significant growth in migrant remittance inflows, Zimbabwe now recognizes their contribution in the National Developmental Policy framework as evidenced by the formation of the National Diaspora Policy. However, there is limited consensus on the exact relationship between remittances and agricultural outcomes. Limited evidence also still exists on the actual amount of remittances that go towards agricultural investments and the multiplier effects of these. It also remains imperative to demystify the notion that remittances are predominantly consumed rather than invested and measure their significance in reducing the level, depth, and severity of food insecurity in rural households.

A comprehensive understanding of the relationship between remittances and agricultural outcomes for rural households in Zimbabwe has a positive bearing on policy and practice. It can inform on maximizing the benefits from this contemporary source of funding both at micro and macro level. Increased knowledge in this regard stimulates policymakers to streamline policy strategies to refocus remittances towards enhancing agricultural growth in smallholder farming systems and reduce the pressure on the fiscal budget. Against this backdrop, this study analyses the contribution of remittances and public transfers in promoting household food and nutrition security outcomes in Zimbabwe.

The objectives of the study are to investigate whether the receipt of private transfers (specifically migrant remittances) and public transfers matter for the agricultural and food security outcomes of rural households. Specifically, the research considers whether migrant remittances and public transfers matter for: (i) input use in agriculture, (ii) crop diversification/ specialization, and (iii) the value of livestock owned. The research also explores remittance receipt, public transfers, and the food security of rural households. Dietary diversity score and the share of the household budget allocated towards food are used as proxies for food security.

The findings of the research suggest that public transfers correlate positively with input use. In particular, agriculture-related public transfers have a strong and positive correlation with inorganic fertilizer use and improved/hybrid seed use. Agriculture-related public transfers also have a strong and positive correlation with crop diversification. On the other hand,

food-related public transfers have a negative correlation with crop diversification. Food-related public transfers are also shown to be received by the poorest households, that is, those with a large share of their expenditure allocated towards food consumption. This is in contrast to remittances from abroad which are seen to be received by richer households. Domestic remittances are shown to have a negative association with crop diversification but a positive association with modern input use, particularly inorganic fertilizer and herbicides.

The paper proceeds as follows: Section II lays out the theoretical framework and provides a brief review of the literature. Section III presents and briefly discusses the data and summary statistics for the key variables used in the econometric analysis. In section IV the econometric methodologies used to undertake the analysis are discussed. Section V presents and discusses the empirical results. Finally, Section VI provides some concluding remarks and Section VII provides policy recommendations.

II. Theoretical Framework and Literature Review

Several theories have been postulated to create a framework for understanding the effects of migration and the associated remittances on smallholder agricultural households. Most of these theories have attempted to model how losses in labor and the impact on agricultural productivity can be partly offset by remittance income from the migrant members of the rural households. Given the nature of rural economies, particularly the high levels of poverty and liquidity constraints, it can be theorized that remittance income can have a profound effect on rural smallholder households. Our theoretical framework is based on the New Economics of Labor Migration (NELM) (Stark and Bloom 1985, Taylor 1999) which helps decode the complex relationship between migration, remittances and their impact on rural households. The NELM explains how migration is a household decision, which is informed by the desire to mitigate risks by allowing members of the household to migrate to provide income diversification. Within this model, remittances play a crucial role, and represent an important mechanism through which incentives and consequences of migration are interlinked (Taylor and Martin 2001). Remittances into rural farming communities could complement agricultural productivity growth by helping alleviate credit constraints (Rozelle et al. 1999). However, increased out-migration can potentially exacerbate labor constraints especially when production systems are not mechanized. We use the NELM theoretical framework to capture how remittances can potentially shape smallholder farmers' decision making, their levels of investments in agriculture, technology use, asset accumulation, agricultural productivity, and other livelihood outcomes.

Empirical studies explicitly concerned with the nexus of migration, remittances and agriculture have examined the effects of remittance incomes on agricultural productivity. Studies have found evidence that remittances promote agricultural asset accumulation and general investments in production (Böhme 2015, Damon 2010) thereby enhancing agricultural productivity. However, other studies observe that migration can also result in falling productivity and production efficiency (Damon 2010, Rozelle et al. 1999, Sauer et al. 2015). These results can be explained by the fact that it may be difficult to replace experienced

household labor by hiring workers on the market, especially when farm labor markets are missing or incomplete, and that households may attempt to cope with the labor losses by shifting from labor-intensive commercial cash crops toward the production of subsistence food crops (Böhme 2015). However, the negative effects of migration on productivity can be offset by the increased liquidity provided by remittances (Kapri and Ghimire 2020). In this study we investigate how remittances affect input use, assets accumulation (livestock), production diversification and food security outcomes among recipient households.

It is important to note that the overall impact of remittances on rural households may vary across socioeconomic contexts and could be mediated by the migrants' remittance behaviour. Studies have attempted to establish the link between the source of remittance income and the spending behavior of rural households, whether the income is used for consumption or investments. For instance, Ghimire and Kapri (2020) examined the differential impact of earned and unearned remittances on agricultural productivity in Nepal. Employing a three-stage least squares approach to overcome the potential endogeneity problems, their study found that unearned remittances were more effective than earned remittances in increasing agricultural productivity. The assumption is that unearned remittances are often not received on a regular basis, and households tend to obtain them for specific purposes, including investing in agricultural activities. In this study, we move beyond the traditional practice of studying the impact of total remittances on agricultural outcomes. We make a distinction between public and private transfers and examine whether the source of income matters for agricultural and food security outcomes. That is, does the source of transfer (i.e., private vs. public) matter for the food security and agricultural outcomes of households?

Recently public support in the form of agricultural input subsidies have regained popularity among policymakers in many African countries (Holden 2018). A recent study finds the spending on input subsidy programs in ten African countries ranges from $0.6 to $1.0 billion per year or 14% to 26% of public expenditures on agriculture (Jayne et al. 2018). Other public transfers not specifically tied to agriculture may also impact agricultural outcomes and food security. For example, income transfers to poor households may promote short-term food security (Gilligan and Hoddinott 2007). However, some researchers argue transfers targeted towards agriculturally productive investments may prove to be more effective than general income transfers (Hoddinott et al. 2012). For example, it could be argued public support for investments in agriculture may have greater potential benefits than income transfers by more effectively addressing the root causes of food insecurity (Hoddinott et al. op. cit.). Thus, there may be trade-off in designing social protection programmes between expenditures that address short-term food security needs and spending on longer term sustainable improvements in food security.

III. Data and Summary Statistics

The data used come from the 2017 Poverty, Income, Consumption, Expenditure Survey (PICES), including the pre- and post-harvest Agricultural Productivity Module (APM). The unit of observation is the household and we restrict the analysis to the sample of households

located in rural areas and that feature in both PICES and APM datasets. Our agricultural outcome variables of interest are as follows:

Crop diversity/specialization

Three indicators are used to measure crop diversity as follows: crop count; Simpson index (SI); Entropy index (EI). Crop count is simply a count of the number of crops that were grown by the household. The Simpson index is computed as $1-\sum P_i^2$, where $P_i = \frac{A_i}{\sum A_i}$ is the proportion of the □th activity in acreage. If SI is near zero it indicates that the zone or region is near to specialization in the growing of a particular crop, and if it is near to one, then the zone is fully diversified in terms of crops. The Entropy index is a direct measure of diversification having a logarithmic character and is given by: $\sum_{i=1}^{N} P_i * \log(\frac{1}{P_i})$, where $\boldsymbol{P_i}$ represents acreage proportion of the ith crop in total cropped area. The Entropy index increases with diversification. The Entropy index approaches zero when the farm is specialized and $\boldsymbol{P_i}$ equals one (perfect specialization) and takes a maximum value when there is perfect diversification.

Input use in agriculture

Five dummy variables are used to capture input use. The inputs captured are organic fertilizer, inorganic fertilizer, herbicide, pesticide, and improved/hybrid seed use. These assume a value of 1 if the input was used, and 0 otherwise.

Value of livestock owned

This dependent variable represents the value of livestock owned by the household in US dollars, as reported by the household.

Our two food security outcome variables of interest are as follows:

Dietary Diversity Score

The dietary diversity score of the household and is created using FAO 2010 guidelines. The score ranges from 0 to 12 and is a sum of scores for the consumption of 12 categories of food that constitute the food pyramid. Table 1 lists the 12 food categories and the proportion of households who report to have consumed any of the food from each category in the seven days prior to the survey. A score of one is assigned if a household has consumed food from a certain food group, and zero otherwise. The dietary diversity score is computed by adding up the scores across all the food categories. Thus, a household which only consumed staple starch and vegetables over the seven-day period is assigned a score of 2 out of 12. Figure 1 provides a histogram for the dietary diversity score.

Share of the budget spent on food

The second measure of food security is constructed as the share of total annual expenditure allocated to food. From an Engel curve perspective, because food is an essential commodity, as total expenditure increases (that is, as the household becomes better off) the share of the budget allocated to food is expected to decline. Households with relatively low food budget shares are expected to be more food secure as it is relatively easy for them to

respond to rising food prices by reducing the consumption of non-food items. On the other hand, households with higher food budget shares are regarded as less food secure.

The main explanatory variables of interest to the study are:

International remittance receipt
This variable assumes the value of one if the household received any international cash remittances.

Domestic remittance receipt
This variable assumes the value of one if the household received any domestic cash remittances.

Food-related public transfer receipt
This variable captures the receipt of any food-related public transfers by the household. Specifically, whether the household received transfers under any of the following programmes: food mitigation programme, food for work public works programme, other social welfare food benefits (e.g., disaster relief).

Agriculture-related public transfer receipt
This variable is indicative of the household receiving any agriculture-related public transfers under any of the following programmes: smallholder farm input support scheme, receipt of free seed from the government, the receipt of any agriculture input as part of the government input support programs such as presidential input support or vulnerable input support program.

Other public transfer receipt
This variable captures the receipt of any other public transfers by the household. Specifically, basic education assistance module (primary), basic education assistance module (secondary), harmonized social care transfer, general public assistance, assistance medical transfer order, pauper burial, support to children in difficult circumstances, maintenance of disabled persons, maintenance of older persons, community recovery and rehabilitation program, street children, public works program (cash for work), health in cash and in-kind social welfare benefit, education in cash and in-kind social welfare benefit, public early retirement package, public pension benefits, social security benefits, other public transfers.

Figure 2 shows the proportion of households in the sample receiving specific public transfers.

Agriculture-related public transfers have the highest proportion of recipient households with 39.7% of households in receipt of such support. The sample shows 6.2% of households are in receipt of food-related public transfers, and 4.3% of households in receipt of other types of public transfer.

Table 2 presents summary statistics of the agricultural outcome and food security measures, and select explanatory variables for the full sample as well as for households receiving remittances and public transfers, and those not in receipt.

IV. Methodology

The research undertakes descriptive analyses using Ordinary Least Square (OLS) regression and Linear Probability Model (LPM) analysis to estimate factors that determine the agricultural outcomes of rural households using the 2017 Poverty, Income, Consumption, Expenditure Survey (PICES), including the pre- and post- harvest Agriculture Productivity Module (APM) of the survey. Given that the majority of dependent variables are binary in nature, the LPM model is mostly employed.

The following relationship is estimated:

$$Y_i = \alpha + \gamma_j DR_i + \partial_j IR_i + \lambda_j FT_i + \tau_j AT_i + \eta_j OT_i + z_i'\gamma_j + \varepsilon \quad (1),$$

where $\boldsymbol{Y_i}$ is the dependent variable and captures the agricultural outcome. The three main agricultural outcome variables are discussed in section III above and are: Input use in agriculture; Crop diversity/ specialization, and Value of livestock owned.

In the food security model, $\boldsymbol{Y_i}$ captures two food security variables: the dietary diversity score and the share of the total household budget allocated towards food.

The explanatory variables in equation (1) are $\boldsymbol{DR_i}$ which is a dummy variable capturing the receipt of domestic migrant remittances by the household, $\boldsymbol{IR_i}$ which is a dummy variable capturing the receipt of international migrant remittances by the household, $\boldsymbol{FT_i}$ capturing the receipt of food-related public transfers by the household, $\boldsymbol{AT_i}$ capturing the receipt of agriculture-related public transfers by the household, $\boldsymbol{OT_i}$ capturing the receipt of other public transfers by the household, $\boldsymbol{z^i}$ a vector of household and other characteristics, and ε an error term.

We note that $\boldsymbol{DR_i}$, $\boldsymbol{IR_i}$, $\boldsymbol{FT_i}$, $\boldsymbol{AT_i}$, and $\boldsymbol{OT_i}$ and are all likely to be endogenous. This is because there are likely to be observable and/or unobservable variables that influence both the probability of receiving remittances (or public transfers) and the food security and agricultural outcomes of the household. A potential solution is to employ an instrumental variable (IV) approach. The broader migration and development literature offers several suggestions for potential instruments ranging from historical migration rates (Munshi 2003, Hildebrand and McKenzie 2005, Mackenzie and Rappoport 2007, Binzel and Assaad 2011, Vadean et al. 2017, Karymshakov et al. 2017) to geographical variables such as distance to borders or transport infrastructure (Black et al. 2015, Demirgüç-Kunt et al. 2011) to average wages, incomes and unemployment rates at the local level (Amuedo-Dorantes and Pozo 2010) and measures of financial infrastructure (e.g., Amuedo-Dorantes and Pozo 2006, Calero et al. 2009). An alternative approach that potentially deals with endogeneity is a propensity score

matching approach. Accounting for the potential endogeneity of transfers is reserved as an agenda for future research. Therefore, the results obtained are interpreted as associations, rather than causal.

V. Empirical Findings

In this section we discuss the empirical results that are obtained when the various specifications of equation (1) are estimated in determining the relationship between private transfers (in the form of migrant remittances), public transfers and the agricultural and food security outcomes of households located in the rural areas of Zimbabwe.

1. The relationship between remittances, public transfers and agricultural outcomes

Table 3 presents results from OLS models with the following agricultural outcomes: crop diversification, input use and livestock value. Some observations stem from the findings as follows:

1.1. Households receiving agriculture-related public transfers are more likely to diversify crop production.

Table 3 reveals a positive and statistically significant association between the receipt of agriculture-related public transfers and crop diversification.

1.2. Households receiving agriculture-related public transfers are more likely to use modern agricultural inputs.

The receipt of public transfers is associated with a 14.8 percentage point increase in inorganic fertilizer use and a 19 percentage point increase in the use of improved/hybrid seed, on average and ceteris paribus.

The positive relationship between agriculture-related public transfers and crop diversification as well as inorganic fertilizer and improved/hybrid seed use may stem from the nature of transfers provided. Specifically, free seed and inorganic fertilizer are amongst the various types of input provided under the presidential input support program and the vulnerable input support program.

1.3. Households receiving food-related public transfers are less likely to use modern agriculture inputs.

Table 3 reveals negative and statistically significant associations between the receipt of public transfers and inorganic and improved/hybrid seed use.

1.4. Households receiving domestic remittances are less likely to diversify their crops

Table 3 shows negative and statistically significant associations between the receipt of domestic remittances and crop diversification for all the three indicators of crop diversification used in the study.

1.5. Households receiving domestic remittances are more likely to use modern agricultural inputs

The receipt of domestic remittances is associated with a 5.5 and 3.6 percentage point increase in the use of inorganic fertilizer and herbicides, respectively.

1.6. International remittances do not appear to have any significant correlation with agricultural outcomes.

There are largely no statistically significant effects for the international remittances coefficients in table 3.

1.7. The gender of the household head has a significant relationship with agricultural outcomes

Table 3 reveals the gender of the household head has a positive and statistically significant relationship with most of the agricultural outcomes employed in the current study. In particular, male headed households are more likely to diversify their crop production, relative to female headed households. Male headed households are also more likely to use modern inputs. Specifically, there is a 0.3 increase in crop count and a 0.05 increase in the entropy index for male headed households. The probability of using organic and inorganic fertilizer is 8.9 and 4.9 percentage points higher for households with male heads while herbicide and pesticide use is 2.5 and 1.1 percentage points higher. The value of livestock owned is USD 136 higher in male headed households compared to female headed ones, on average and ceteris paribus. This finding is unsurprising for the Zimbabwe context as males are customarily more likely to own livestock (Mupawaenda et al. 2009).

Other findings in table 3 show that households on small scale commercial farming, old resettlement scheme, and communal land are all less likely to diversify their crop production are more likely to use organic fertilizer relative to households on A1 land. Small scale commercial farming households are more likely to use inorganic fertilizer relative to A1 households. Old resettlement scheme and communal households are less likely to use herbicides and pesticides and improved seed. Households on communal land are less likely to use herbicides, pesticides, and improved/hybrid seed, relative to A1 households. The value of livestock owned by households on communal land is USD 198 less than that of households on A1 land, on average and ceteris paribus.

The findings regarding land type suggest there could be heterogeneities in the relationship between remittances, public transfers, and agricultural outcomes. To explore this further, we run separate regression estimates by land type (see table 4).

1.8. The relationship between public transfers, remittances, and agricultural outcomes varies by land ownership

Table 4 provides separate estimates for regressions by land type. We see that the receipt of agriculture-related public transfers is associated with an increase in crop

diversification and an increase in inorganic fertilizer and improved/hybrid fertilizer use for households on communal land. Domestic remittances are associated with a decrease in crop diversification and an increase in inorganic fertilizer use for communal households. International remittances seem to increase crop diversification for communal households. No significant effects are found for households on A1 land for either domestic or international remittances. Agriculture-related public transfers are shown to have a positive correlation with inorganic fertilizer and pesticide use. For households on old resettlement scheme land, domestic remittances seem to have a negative correlation with crop diversification while the receipt of agriculture-related public transfers have a positive association with inorganic fertilizer an improved/hybrid seed use. For small scale commercial farming households, the receipt of remittances or public transfers does not appear to have a notable correlation with agricultural outcomes.

1.9. The relationship between public transfers and agricultural outcomes varies by agro-ecological zone

Next, it could be argued the use of remittances for agricultural inputs may be more likely in more dynamic agricultural settings where land quality and rainfall are generally sufficient to induce an input-based response. For example, households located in isolated and poor-quality areas may receive remittances as a means of survival, rather than for use towards agricultural production. We therefore explore whether there are heterogeneities in the relationship between public and private transfers by the agro-ecological zone. The five agro-ecological zones in Zimbabwe represent unique combinations of homogenous agro-climate, ecology, soil units and agricultural activities. Agricultural suitability is highest in Region 1 and least in Region 5 (FAO 1978). To investigate such heterogeneities, we estimate separate regressions for each of the five agro-ecological zones and report these in table 5.

There do not appear to be any notable correlations between remittances, public transfers and agricultural households in natural region 1. However, we note the small sample size of households in this region. In natural region 2, domestic remittances are positively associated with herbicide use. Agriculture-related transfers have a positive correlation with inorganic fertilizer and improved/hybrid seed use in regions 2, 3, 4, and 5. In addition, agriculture-related transfers also have a positive association with crop diversification in regions 3 and 5.

2. The relationship between remittances, public transfers and food security

We now investigate the relationship between public and private transfers and food security.

2.1. Food-related public transfers are received by poorer households; international remittances are received by less poor households

Table 6 shows both remittances and public transfers have no statistically significant association with dietary diversity score. This is with the exception of food-related

transfer which seem to have a negative association with dietary diversity. However, the effect is quite small.

The receipt of food-related public transfers is shown to have a positive association with the share of the household budget allocated towards food. This suggests food-related public transfers are received by poorer households, as expected. On the other hand, international remittances have a negative association with the share of the budget allocated towards food. That is, households that are less poor are likely to receive international remittances. Again, this is in comport with expectations.

Agriculture-related and other types of public transfers appear not to have any statistically significant association with the food security of households.

2.2. Male headed households have more diverse diets

The finding that male headed households tend to have more diverse diets corroborates with the finding discussed in 1.7. that male headed households are more likely to have more diverse crop production, to employ more modern agricultural inputs, and to own livestock of higher value.

2.3. The relationship between remittances, public transfers, and food security varies by land ownership

In table 7, for households located on communal and A1 land, richer households are more likely to receive international remittances. The receipt of food-related public transfers has a negative correlation with dietary diversity for households on A1 land. Food-related public transfers are shown to be received by poorer households for households located on old resettlement scheme land.

2.4. The relationship between remittances and food security varies by agro-ecological zone

As we did previously, we also explore whether there are heterogeneities in the association between remittances, public transfers and food security based on agro-ecological zone. In table 8 we see a negative association between remittance receipt and food budget shares in natural regions 1, 2 and 5. We also see a positive association between food budget share and food-related public transfers on natural region 4. In region 5, the receipt of domestic remittances is shown to have a negative association with dietary diversity.

Sensitivity checks

We check whether the relationships discussed above are sensitive to differences along the quantile distribution by estimating quantile regressions (see tables 9 and 10). The estimated effects are largely in comport with results obtained using OLS and LPM regressions. For the median, lower and upper-quantile regressions in table 9, the receipt of agriculture-related public transfers is shown to have a positive association with crop diversification, ceteris paribus. At the lower quantile of the distribution, there are statistically significant negative

correlations between domestic remittance receipt and crop diversification. This suggests that for households at the lowest end of the crop diversification distribution, the receipt domestic remittances has an effect on the probability of diversifying crop production. There are no statistically significant associations between public transfers receipt and crop diversification or livestock ownership the lower quantile level.

In table 10, there is a negative association between domestic remittance receipt and dietary diversity for the median and upper quantile regressions. There are not very many significant effects picked up in the estimations in table 10, perhaps owing to not much variation in the food budget share and dietary diversity scores to warrant a disaggregation by quantile.

VI. Conclusions

The findings of our research reveal that the type of public transfer received by households matter for their agricultural outcomes. Specifically, agriculture-related public transfers have a positive association with crop diversification and the use of modern agriculture inputs, particularly inorganic fertilizer and improved/hybrid seed. On the other hand, households receiving food and other types of public transfer tend to specialize rather than diversity their crop production. There are no statistically significant associations between food- and other-types of public transfer and agriculture input use and other outcomes.

The evidence obtained shows international remittances appear to be largely unrelated to the agricultural and food security outcomes of rural households. This is likely a result of the small number of rural households in receipt of international remittances. On the other hand, unlike agriculture-related public transfers, domestic remittances are associated with a decrease in crop diversification. But, similar to agriculture-related public transfers, domestic remittances seem to enable households to use more modern agricultural input, particularly inorganic fertilizer and herbicides. This may suggest that when it comes to agricultural production, domestic remittances and public-transfers have different roles while also being complementary. That is, domestic remittances seem to promote homogenous crop production while agriculture-related public transfers seem to promote crop diversification. But both transfers seem to promote the use of modern agricultural inputs.

Other specific findings show households headed by men are more likely to diversify crop production and to use modern agricultural inputs, relative to female headed households. The value of their livestock is also higher than that of female headed households. This finding ties in with the finding that male headed households are more food secure than female households as they have more diverse diets.

We also find evidence that food-related transfers are received by poorer households. Furthermore, we find the receipt of international remittances to be accruing to less poor households. This is possibly a result of richer households being better placed to send household members abroad.

It is notable that despite public transfers having a positive association with crop diversification, this does not seem to translate to an increase in nutritional intake as measured by dietary diversity. This is also the case for domestic and international remittances.

The findings also reveal heterogeneities in the relationship between remittances and public transfers, and agricultural outcomes and food security depending on the agro-ecological zone. The use of remittances by rural households also seems to vary by zone. Therefore, the role of remittances in contributing towards agricultural productivity and food security in Zimbabwe also varies depending on the location of recipient households.

VII. Policy recommendations

The study recommends the continuation of targeted public transfers. Specifically, agriculture specific government interventions such as the Command Agriculture and Presidential Input Support Programme have a positive correlation with crop diversification and the use of modern agricultural inputs, and should therefore be continued. This study also shows government food security interventions are accruing to poorer households and presents a case for the continuation of such support.

To the extent that public and private transfers are complementary, the study suggests a role for public policy to better understand and facilitate this complementarity in order to maximize the benefit for the agricultural outcomes of rural households. For example, there could be a role for policy to play in the harmonisation of public and private transfers to ensure public transfers are channelled towards inputs that are most needed. The study advocates for space to be created in Zimbabwe's policy arena to better understand and explore the interaction between private and public transfers.

Moreover, given the prominence that remittances are given in the National Development Policy framework and the recognition by the government of the need to support the growth of the agricultural sector, the findings suggest the role of remittances in supporting the agricultural sector should be more explicitly considered and supported. In addition, a proposed agenda for future research is to examine the role of in-kind remittances to determine to what extent they play a role in the agricultural outcomes of rural households.

Another policy recommendation is for the government to prioritize female headed households in providing food relief and other agricultural interventions given their vulnerability to food insecurity.

The fact that both public and private transfers do not have an association with dietary diversity showcases the lack of diverse nutritional intake by households in rural Zimbabwe and calls for a better understanding of how this can be achieved. Perhaps policymakers may wish to consider offering more diverse foods when providing food-related public transfers,

and/or more diverse seed input, in order to promote the diversification of the diets of rural households.

Lastly, we propose that government interventions that support agricultural productivity and food security should not be homogenous but rather take into account variations in agro-ecological zone.

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Table 1: Proportion of Households that Consumed Food Group in Past Seven Days

Food group	Proportion
Staple starch	99%
Tea and salt	98%
Fats	87%
Vegetables	84%
Sugar	73%
Beans and nuts	37%
Meat	30%
Fruit	24%
Milk	20%
Fish	17%
Eggs	11%
Potatoes and starch	11%

Notes to the table: The values in the table show the proportion of households who report to have consumed any of the food from the group in the seven days prior to the survey.

Figure 1: Dietary Diversity Score Histogram

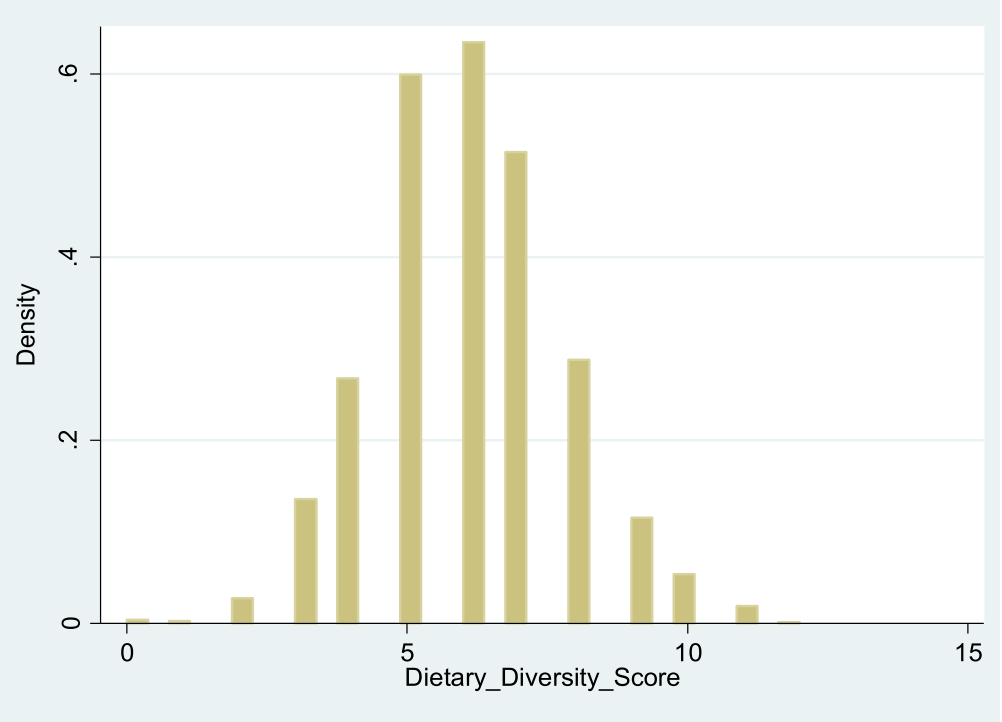

Figure 2: Proportion of households in the sample receiving specific types of public transfer

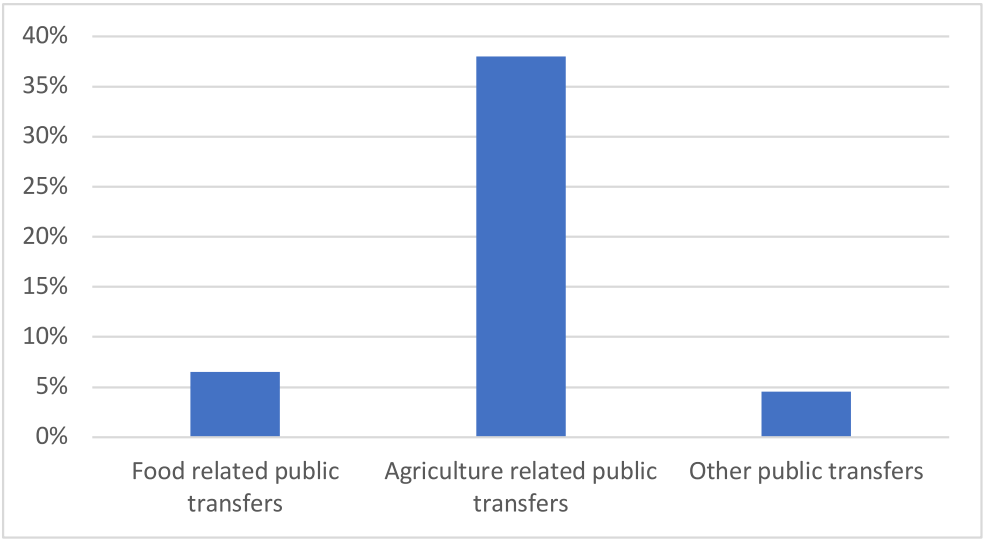

Table 2: Summary statistics

	Full sample		I		II		III		IV	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Crop Count	3.69	2.06	3.27	2.00	3.78	2.06	3.82	2.09	3.58	2.03
Simpson Index	0.48	0.28	0.42	0.30	0.49	0.28	0.50	0.28	0.47	0.28
Entropy Index	0.76	0.48	0.63	0.48	0.79	0.48	0.80	0.49	0.73	0.47
Organic Fertilizer Use	0.50	0.50	0.48	0.50	0.51	0.50	0.49	0.50	0.51	0.50
Inorganic Fertilizer Use	0.63	0.48	0.62	0.49	0.63	0.48	0.65	0.48	0.61	0.49
Herbicide Use	0.07	0.25	0.09	0.29	0.06	0.24	0.07	0.25	0.07	0.25
Pesticide Use	0.02	0.14	0.02	0.15	0.02	0.13	0.02	0.14	0.02	0.14
Improved/Hybrid Seed	0.81	0.39	0.81	0.40	0.82	0.39	0.88	0.33	0.76	0.43
Value of Livestock	740.83	792.44	790.18	842.49	730.46	781.39	790.45	811.19	696.99	773.25
Total foods	6.01	1.70	6.06	1.64	6.00	1.71	5.95	1.63	6.06	1.77
Food share	49.56	16.02	47.45	15.78	50.00	16.04	50.04	16.23	49.13	15.83
=1 if received domestic remittances	0.15	0.36	0.87	0.34			0.15	0.36	0.15	0.36
=1 if received int'l remittances	0.03	0.16	0.16	0.37			0.03	0.16	0.03	0.17
=1 if received food public transfers	0.10	0.30	0.09	0.28	0.11	0.31	0.22	0.41	0.00	0.00
=1 if received agriculture public tran	0.38	0.48	0.35	0.48	0.38	0.49	0.80	0.40		
=1 if received other public transfers	0.06	0.24	0.11	0.31	0.05	0.22	0.13	0.33		
Total cropped area (acres)	11.04	95.15	18.74	179.25	9.42	64.84	11.53	82.55	10.60	105.07
Total consumption expenditure	221.72	153.43	256.79	199.32	214.35	140.88	224.30	158.97	219.44	148.41
Household size	4.98	2.16	5.10	2.29	4.95	2.14	5.09	2.21	4.87	2.12
=1 if head is aged below 30	0.09	0.28	0.08	0.27	0.09	0.29	0.05	0.21	0.13	0.33
= 1 if head aged 30 to 44	0.33	0.47	0.27	0.44	0.34	0.47	0.28	0.45	0.38	0.48
= 1 if head aged 45 to 59	0.26	0.44	0.24	0.43	0.26	0.44	0.27	0.45	0.24	0.43

	Full sample		I		II		III		IV	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
= 1 if head aged 60plus	0.33	0.47	0.41	0.49	0.31	0.46	0.40	0.49	0.26	0.44
=1 if head male	0.64	0.48	0.58	0.49	0.65	0.48	0.61	0.49	0.67	0.47
= 1 if head no education	0.01	0.09	0.01	0.08	0.01	0.09	0.01	0.08	0.01	0.10
= 1 if head has primary education	0.47	0.50	0.51	0.50	0.46	0.50	0.51	0.50	0.44	0.50
= 1 if head has secondary education	0.40	0.49	0.35	0.48	0.40	0.49	0.35	0.48	0.43	0.50
= 1 if head has tertiary education	0.03	0.17	0.03	0.18	0.03	0.16	0.02	0.13	0.04	0.19
Manicaland	0.14	0.34	0.11	0.31	0.14	0.35	0.12	0.32	0.15	0.36
Mashonaland Central	0.12	0.33	0.03	0.18	0.14	0.35	0.12	0.32	0.12	0.33
Mashonaland East	0.13	0.34	0.08	0.27	0.15	0.35	0.10	0.30	0.17	0.37
Mashonaland West	0.13	0.34	0.18	0.39	0.12	0.33	0.14	0.35	0.12	0.33
Mashonaland North	0.11	0.31	0.22	0.42	0.09	0.28	0.12	0.32	0.10	0.31
Mashonaland South	0.12	0.32	0.05	0.23	0.13	0.34	0.15	0.35	0.09	0.29
Midlands	0.11	0.31	0.18	0.38	0.10	0.29	0.11	0.32	0.11	0.31
Masvingo	0.14	0.35	0.14	0.35	0.14	0.35	0.14	0.35	0.14	0.35
=1 if SSCFA	0.04	0.20	0.09	0.28	0.03	0.18	0.04	0.19	0.05	0.22
=1 if ORS	0.28	0.45	0.26	0.44	0.28	0.45	0.26	0.44	0.29	0.45
=1 if Communal Land	0.50	0.50	0.40	0.49	0.52	0.50	0.53	0.50	0.47	0.50
=1 if A1 land	0.18	0.39	0.25	0.44	0.17	0.37	0.18	0.38	0.19	0.39
N	1,923		334		1,589		902		1,021	

Notes to the table: *Columns I, II, III, IV report summary statistics for the full sample, the sample of households receiving remittances, not receiving remittances, receiving public transfers, and not receiving public transfers, respectively.*

Table 3: OLS Regression Estimates

VARIABLES	Crop Count	Simpson Index	Entropy Index	Organic Fertilizer Use	Inorganic Fertilizer Use	Herbicide Use	Pesticide Use	Improved/ Hybrid Seed	Value of Livestock
=1 if received domestic remittances	-0.301**	-0.0333*	-0.116***	-0.0227	0.0553**	0.0355**	-0.00646	-0.000771	-84.07*
	(0.121)	(0.0190)	(0.0305)	(0.0312)	(0.0261)	(0.0172)	(0.00949)	(0.0246)	(49.69)
=1 if received int'l remittances	0.212	0.0753**	0.0833	0.0849	-0.00969	-0.00789	0.0175	0.00323	102.1
	(0.246)	(0.0372)	(0.0654)	(0.0706)	(0.0525)	(0.0260)	(0.0258)	(0.0615)	(117.9)
=1 if received food public trans	0.152	0.0411**	0.0421	-0.00671	-0.100***	-0.0110	-0.00647	-0.0887***	-121.6**
	(0.136)	(0.0196)	(0.0343)	(0.0365)	(0.0334)	(0.0153)	(0.00816)	(0.0314)	(55.00)
=1 if received agricultural public transfer	0.286***	0.0227*	0.0621***	-0.0206	0.148***	0.00850	0.00891	0.190***	24.89
	(0.0892)	(0.0124)	(0.0219)	(0.0228)	(0.0201)	(0.0117)	(0.00692)	(0.0159)	(35.47)
=1 if received other public transfer	-0.0211	-0.00624	-0.0158	-0.0152	0.0309	-0.00951	-0.000667	0.0219	145.3*
	(0.169)	(0.0255)	(0.0462)	(0.0470)	(0.0402)	(0.0186)	(0.0125)	(0.0359)	(86.75)
Total cropped area (acres)	0.000622**	-0.00019***	-0.0003***	0.000150***	5.24e-05	-1.32e-05	-2.59e-07	9.8e-05***	0.376***
	(0.000262)	(6.95e-05)	(0.000108)	(5.49e-05)	(9.61e-05)	(9.63e-06)	(4.52e-06)	(3.69e-05)	(0.0815)
Total consumption expenditure	0.000556*	1.32e-05	8.05e-05	0.000167**	0.000139**	7.20e-05	4.94e-05	7.71e-05	0.831***
	(0.000305)	(4.05e-05)	(6.91e-05)	(7.50e-05)	(6.21e-05)	(4.46e-05)	(3.32e-05)	(5.22e-05)	(0.146)
Household size	0.0507**	0.00505*	0.0127**	0.0111**	0.00150	-0.000896	-0.00203	0.00185	9.608
	(0.0211)	(0.00297)	(0.00525)	(0.00528)	(0.00453)	(0.00285)	(0.00174)	(0.00388)	(8.597)
=1 if head is aged below 30	-0.916***	-0.0741***	-0.152***	-0.250***	-0.122***	0.000619	0.0270	-0.0326	-485***
	(0.156)	(0.0242)	(0.0402)	(0.0434)	(0.0380)	(0.0246)	(0.0166)	(0.0356)	(67.98)
= 1 if head aged 30 to 44	-0.482***	-0.0516***	-0.104***	-0.159***	-0.0527**	-0.00870	0.00200	-0.0819***	-448***
	(0.117)	(0.0166)	(0.0287)	(0.0296)	(0.0263)	(0.0141)	(0.00711)	(0.0237)	(45.72)
= 1 if head aged 45 to 59	-0.151	-0.0254	-0.0436	-0.0737**	-0.0134	0.00397	0.0116	-0.0460**	-268***
	(0.116)	(0.0163)	(0.0281)	(0.0295)	(0.0259)	(0.0151)	(0.00878)	(0.0224)	(50.47)

VARIABLES	Crop Count	Simpson Index	Entropy Index	Organic Fertilizer Use	Inorganic Fertilizer Use	Herbicide Use	Pesticide Use	Improved/ Hybrid Seed	Value of Livestock
= 1 if head male	0.293***	0.00881	0.0521**	0.0892***	0.0491**	0.0254**	0.0110**	0.0588***	136.3***
	(0.0925)	(0.0135)	(0.0232)	(0.0239)	(0.0207)	(0.0103)	(0.00469)	(0.0194)	(37.90)
= 1 if head no formal education	-0.304	-0.0411	-0.0237	-0.218**	0.0330	-0.0461*	-0.0109	-0.00826	-230.2
	(0.389)	(0.0715)	(0.114)	(0.111)	(0.126)	(0.0270)	(0.00953)	(0.0868)	(188.7)
= 1 if head secondary education	-0.0134	0.0274**	0.0206	0.0529**	0.0904***	0.00218	-0.00418	0.0606***	2.311
	(0.0970)	(0.0139)	(0.0239)	(0.0251)	(0.0218)	(0.0127)	(0.00719)	(0.0198)	(39.59)
= 1 if head tertiary education	-0.854***	-0.107**	-0.185***	-0.0251	0.185***	0.0486	0.0456	0.107**	-98.97
	(0.244)	(0.0416)	(0.0623)	(0.0754)	(0.0572)	(0.0425)	(0.0328)	(0.0461)	(113.9)
= 1 if small scale commercial farming land	-0.385*	-0.0482	-0.115**	0.138**	0.151***	0.0464	0.0434	0.0517	168.6
	(0.215)	(0.0303)	(0.0522)	(0.0609)	(0.0410)	(0.0430)	(0.0336)	(0.0361)	(111.9)
= 1 if old resettlement scheme	-0.478***	-0.0281	-0.0850***	0.110***	0.0398	-0.0505**	-0.0310***	-0.0121	87.82
	(0.133)	(0.0186)	(0.0316)	(0.0335)	(0.0292)	(0.0203)	(0.0120)	(0.0244)	(57.25)
= 1 if communal land	-0.355***	-0.0122	-0.00809	0.0933***	-0.0354	-0.0787***	-0.0305***	-0.0976***	-198***
	(0.121)	(0.0167)	(0.0290)	(0.0307)	(0.0270)	(0.0177)	(0.0104)	(0.0242)	(49.96)
Province level fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,917	1,917	1,917	1,923	1,923	1,923	1,923	1,923	1,923
R-squared	0.238	0.166	0.162	0.146	0.311	0.155	0.084	0.133	0.171

Notes to the table: *(i) Standard errors are reported in parentheses. (ii) *, **, *** represent the statistical significance of the differences for the 10 per cent, 5 per cent and 1 per cent significance levels respectively. (iii) Ten province level fixed effects are included in all the specifications. (iv) Columns 4 to 9 have four more observations included in the sample as there are four households that provided responses to input use but have some missing observations for variables that are used to compute crop diversification variables.*

Table 4: OLS Regression Estimates by Land Type

Communal Land									
VARIABLES	**Crop Count**	**Simpson Index**	**Entropy Index**	**Organic Fertilizer Use**	**Inorganic Fertilizer Use**	**Herbicide Use**	**Pesticide Use**	**Improved/ Hybrid Seed**	**Value of Livestock**
=1 if received domestic remittances	-0.450**	-0.0581**	-0.17***	-0.096**	0.0989**	0.0137	-0.00387	-0.0257	-108.1*
	(0.190)	(0.0295)	(0.0488)	(0.0487)	(0.0426)	(0.0164)	(0.00248)	(0.0415)	(58.57)
=1 if received international remittances	0.747**	0.0686	0.157*	0.0941	0.0404	0.00786	-0.00461	0.101	216.9
	(0.380)	(0.0475)	(0.0891)	(0.101)	(0.0804)	(0.00629)	(0.00621)	(0.0824)	(161.7)
=1 if received food public transfers	0.104	0.0220	0.0338	-0.0275	-0.084**	-4.83e-05	-0.00661	-0.0910**	-68.61
	(0.169)	(0.0234)	(0.0425)	(0.0448)	(0.0423)	(0.0142)	(0.00450)	(0.0420)	(63.86)
=1 if received agriculture public transfers	0.490***	0.0696***	0.132***	-0.0216	0.178***	0.0152	0.000865	0.252***	8.993
	(0.127)	(0.0173)	(0.0312)	(0.0325)	(0.0307)	(0.0107)	(0.00337)	(0.0247)	(44.98)
=1 if received other public transfers	0.172	0.00900	0.00516	0.0492	0.0823	0.0203	-0.00330	0.0628	5.528
	(0.240)	(0.0313)	(0.0623)	(0.0665)	(0.0575)	(0.0231)	(0.00229)	(0.0480)	(89.27)
Other control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province level fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	952	952	952	957	957	957	957	957	957
R-squared	0.250	0.156	0.184	0.155	0.291	0.108	0.028	0.160	0.143
A1 Land									
VARIABLES	**Crop Count**	**Simpson Index**	**Entropy Index**	**Organic Fertilizer Use**	**Inorganic Fertilizer Use**	**Herbicide Use**	**Pesticide Use**	**Improved Seed**	**Value of Livestock**
=1 if received domestic remittances	0.335	-0.00752	0.0107	-0.0321	-0.0537	0.0378	-0.0154	-0.0156	-133.9
	(0.276)	(0.0370)	(0.0658)	(0.0701)	(0.0547)	(0.0508)	(0.0352)	(0.0542)	(124.4)
=1 if received international remittances	-0.174	0.0389	0.0786	0.136	-0.0831	-0.0775	0.0540	-0.144	47.30
	(0.393)	(0.0757)	(0.135)	(0.135)	(0.0572)	(0.102)	(0.0968)	(0.130)	(269.8)

VARIABLES	Crop Count	Simpson Index	Entropy Index	Organic Fertilizer Use	Inorganic Fertilizer Use	Herbicide Use	Pesticide Use	Improved/ Hybrid Seed	Value of Livestock
=1 if received food public transfers	-0.353	0.0182	-0.0580	0.146	-0.103	-0.106*	-0.0848***	-0.162*	-457.8***
	(0.299)	(0.0514)	(0.0800)	(0.0912)	(0.0688)	(0.0625)	(0.0257)	(0.0845)	(124.5)
=1 if received agriculture public transfers	0.0966	-0.00998	0.0172	-0.0443	0.0983**	-0.0229	0.0122	0.143***	141.3
	(0.191)	(0.0271)	(0.0491)	(0.0582)	(0.0417)	(0.0420)	(0.0328)	(0.0375)	(106.0)
=1 if received other public transfers	-0.0325	0.0184	0.00874	-0.114	-0.0716	-0.0250	-0.0227	-0.0154	278.6
	(0.369)	(0.0526)	(0.101)	(0.0979)	(0.0779)	(0.0462)	(0.0218)	(0.0877)	(224.3)
Other control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province level fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	353	353	353	353	353	353	353	353	353
R-squared	0.404	0.359	0.303	0.156	0.510	0.223	0.116	0.116	0.209
Old Resettlement Scheme									
VARIABLES	Crop Count	Simpson Index	Entropy Index	Organic Fertilizer Use	Inorganic Fertilizer Use	Herbicide Use	Pesticide Use	Improved Seed	Value of Livestock
=1 if received domestic remittances	-0.431*	-0.0160	-0.134**	0.0166	0.0553	0.0292	-0.00647	0.0189	23.22
	(0.228)	(0.0406)	(0.0565)	(0.0598)	(0.0502)	(0.0313)	(0.00405)	(0.0458)	(112.2)
=1 if received international remittances	0.0481	0.00593	0.0373	-0.0714	-0.110	-0.0300	0.00846	-0.0209	-70.89
	(0.511)	(0.110)	(0.151)	(0.158)	(0.184)	(0.0187)	(0.00815)	(0.112)	(197.4)
=1 if received food public transfers	0.820**	0.110**	0.165**	-0.112	-0.171*	-0.0730***	-0.0127	-0.0120	-87.34
	(0.338)	(0.0533)	(0.0820)	(0.0935)	(0.100)	(0.0269)	(0.0133)	(0.0456)	(175.5)
=1 if received agriculture public transfers	0.0876	-0.0240	0.0130	-0.0114	0.151***	0.0208	0.00623	0.131***	-25.63
	(0.170)	(0.0251)	(0.0413)	(0.0431)	(0.0354)	(0.0237)	(0.0101)	(0.0277)	(70.42)

VARIABLES	Crop Count	Simpson Index	Entropy Index	Organic Fertilizer Use	Inorganic Fertilizer Use	Herbicide Use	Pesticide Use	Improved/ Hybrid Seed	Value of Livestock
=1 if received other public transfers	-0.402	-0.0271	-0.0566	-0.110	0.000102	0.00878	-0.00246	-0.0474	291.3
	(0.381)	(0.0807)	(0.114)	(0.104)	(0.0922)	(0.0409)	(0.00391)	(0.0849)	(219.9)
Other control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province level fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	528	528	528	529	529	529	529	529	529
R-squared	0.302	0.178	0.193	0.191	0.326	0.070	0.036	0.159	0.197
Small Scale Commercial Farming Area									
VARIABLES	Crop Count	Simpson Index	Entropy Index	Organic Fertilizer Use	Inorganic Fertilizer Use	Herbicide Use	Pesticide Use	Improved Seed	Value of Livestock
=1 if received domestic remittances	-0.261	0.0904	0.0321	0.0529	0.0436	0.0153	-0.100	0.0781	-161.4
	(0.485)	(0.0552)	(0.102)	(0.188)	(0.0887)	(0.0942)	(0.0852)	(0.0650)	(267.3)
=1 if received international remittances	-0.375	0.296***	-0.260*	0.581***	0.176	-0.0763	0.0187	-0.226	-824.7
	(0.983)	(0.0789)	(0.155)	(0.172)	(0.175)	(0.107)	(0.0746)	(0.276)	(498.7)
=1 if received food public transfers	1.173	0.255***	0.280*	0.106	-0.182*	-0.0162	0.0385	-0.0330	-95.84
	(0.753)	(0.0836)	(0.162)	(0.268)	(0.0997)	(0.157)	(0.138)	(0.0877)	(377.7)
=1 if received agriculture public transfers	-0.557	-0.111**	-0.203**	-0.0472	0.123*	-0.0313	0.101	0.0630	165.6
	(0.435)	(0.0518)	(0.0885)	(0.139)	(0.0701)	(0.0967)	(0.0688)	(0.0524)	(266.6)
=1 if received other public transfers	-1.130*	-0.00420	-0.0549	-0.263	-0.0830	-0.166	0.574**	0.00248	219.0
	(0.568)	(0.0512)	(0.0971)	(0.334)	(0.234)	(0.144)	(0.265)	(0.108)	(519.3)
Other control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province level fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	84	84	84	84	84	84	84	84	84
R-squared	0.470	0.673	0.568	0.183	0.571	0.507	0.448	0.455	0.400

Notes to the table: *(i) Standard errors are reported in parentheses. (ii) *, **, *** represent the statistical significance of the differences for the 10 per cent, 5 per cent and 1 per cent significance levels respectively. (iii) Ten province level fixed effects are included in all the specifications. (iv) Columns 4 to 9 under the communal land regressions have three more observations included in the sample as there are three households that provided responses to input use but have some missing observations for variables that are used to compute the crop diversification variables. (v) Columns 4 to 9 under the old resettlement scheme regressions have one more observation included in the sample as there is one household that provided responses to input use but has some missing observations for variables that are used to compute crop diversification variables.*

Table 5: OLS Regressions by Natural Region

Natural Region 1									
VARIABLES	**Crop Count**	**Simpson Index**	**Entropy Index**	**Organic Fertilizer Use**	**Inorganic Fertilizer Use**	**Herbicide Use**	**Pesticide Use**	**Improved/ Hybrid Seed**	**Value of Livestock**
=1 if received domestic remittances	-1.047	-0.0502	-0.272*	0.0330	-0.212	0.0504		-0.282	-30.62
	(0.688)	(0.174)	(0.159)	(0.279)	(0.215)	(0.0673)		(0.227)	(297.1)
=1 if received international remittances	-0.154	0.353	0.406	0.108	0.402**	-0.0484		0.277	281.6
	(0.839)	(0.226)	(0.347)	(0.393)	(0.169)	(0.0622)		(0.207)	(348.5)
=1 if received food public transfers	-0.0279	-0.0705	-0.0242	-0.449	0.0972	0.0910		-0.290	-343.9
	(0.783)	(0.168)	(0.261)	(0.290)	(0.195)	(0.0707)		(0.182)	(345.7)
=1 if received agriculture public transfers	-0.232	-0.0522	-0.0878	-0.132	0.358*	0.112		0.281*	196.0
	(0.560)	(0.121)	(0.171)	(0.208)	(0.194)	(0.0934)		(0.155)	(322.9)
=1 if received other public transfers	0.158	-0.116	-0.139	0.0243	-0.0794	-0.142		-0.497*	-824.3**
	(0.845)	(0.228)	(0.334)	(0.451)	(0.241)	(0.112)		(0.245)	(365.9)
Other control variables	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Province level fixed effects	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Observations	54	54	54	54	54	54		54	54
R-squared	0.256	0.357	0.328	0.401	0.549	0.261		0.595	0.525
Natural Region 2									
VARIABLES	Crop Count	Simpson Index	Entropy Index	Organic Fertilizer Use	Inorganic Fertilizer Use	Herbicide Use	Pesticide Use	Improved/ Hybrid Seed	Value of Livestock
=1 if received domestic remittances	-0.0228	-0.0292	-0.0771	0.00684	0.00932	0.132**	-0.00335	0.00273	133.6
	(0.256)	(0.0387)	(0.0588)	(0.0680)	(0.0331)	(0.0599)	(0.0380)	(0.0552)	(107.5)

VARIABLES	Crop Count	Simpson Index	Entropy Index	Organic Fertilizer Use	Inorganic Fertilizer Use	Herbicide Use	Pesticide Use	Improved/ Hybrid Seed	Value of Livestock
=1 if received international remittances	-0.0995	0.0775	-0.0267	-0.161	-0.0612	-0.104	0.0813	-0.165	-261.1
	(0.435)	(0.0720)	(0.116)	(0.122)	(0.0972)	(0.118)	(0.127)	(0.154)	(233.2)
=1 if received food public transfers	-0.290	0.0375	-0.0749	0.114	-0.0893	-0.104	-0.0344	-0.0817	-135.4
	(0.300)	(0.0564)	(0.0815)	(0.0907)	(0.0607)	(0.0750)	(0.0420)	(0.0783)	(140.2)
=1 if received agriculture public transfers	0.0713	0.00193	0.0280	0.0433	0.0567**	0.0333	0.0222	0.138***	38.38
	(0.176)	(0.0248)	(0.0408)	(0.0473)	(0.0238)	(0.0378)	(0.0244)	(0.0328)	(75.53)
=1 if received other public transfers	-0.731*	-0.0447	-0.112	-0.120	0.0883***	0.00527	-0.0105	-0.0102	103.9
	(0.374)	(0.0702)	(0.0831)	(0.136)	(0.0308)	(0.103)	(0.0566)	(0.116)	(211.8)
Other control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province level fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	480	480	480	480	480	480	480	480	480
R-squared	0.152	0.175	0.136	0.218	0.077	0.197	0.134	0.102	0.142
Natural Region 3									
VARIABLES	Crop Count	Simpson Index	Entropy Index	Organic Fertilizer Use	Inorganic Fertilizer Use	Herbicide Use	Pesticide Use	Improved/ Hybrid Seed	Value of Livestock
=1 if received domestic remittances	-0.123	0.0151	-0.0475	-0.0311	0.0546	-0.00152	-0.0149*	-0.0317	-113.4
	(0.258)	(0.0384)	(0.0587)	(0.0662)	(0.0504)	(0.0246)	(0.00849)	(0.0515)	(94.61)
=1 if received international remittances	-0.393	0.0818	-0.0474	-0.0940	-0.328*	-0.143	-0.0216	0.146*	-643.1***
	(0.778)	(0.200)	(0.216)	(0.223)	(0.191)	(0.132)	(0.0294)	(0.0836)	(194.6)
=1 if received food public transfers	0.539	-0.0307	0.0950	0.452***	-0.135	-0.228***	-0.0117	-0.0713	72.76
	(0.751)	(0.0972)	(0.168)	(0.0696)	(0.182)	(0.0876)	(0.0138)	(0.139)	(226.4)

VARIABLES	Crop Count	Simpson Index	Entropy Index	Organic Fertilizer Use	Inorganic Fertilizer Use	Herbicide Use	Pesticide Use	Improved/ Hybrid Seed	Value of Livestock
=1 if received agriculture public transfers	0.382**	0.0252	0.0818*	-0.0320	0.132***	0.0106	0.0177	0.108***	93.06
	(0.181)	(0.0247)	(0.0422)	(0.0460)	(0.0345)	(0.0234)	(0.0134)	(0.0328)	(70.91)
=1 if received other public transfers	0.0273	-0.0118	-0.126	0.0458	0.0120	-0.0372	-0.0194*	0.0156	302.7
	(0.418)	(0.0675)	(0.0958)	(0.122)	(0.100)	(0.0252)	(0.0117)	(0.0763)	(250.9)
Other control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province level fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	441	441	441	441	441	441	441	441	441
R-squared	0.425	0.247	0.302	0.177	0.172	0.241	0.046	0.077	0.262
Natural Region 4									
VARIABLES	Crop Count	Simpson Index	Entropy Index	Organic Fertilizer Use	Inorganic Fertilizer Use	Herbicide Use	Pesticide Use	Improved/ Hybrid Seed	Value of Livestock
=1 if received domestic remittances	-0.288	-0.0251	-0.111**	-0.0561	0.0306	-0.00187	-0.0137*	-0.0107	-155.1**
	(0.181)	(0.0287)	(0.0503)	(0.0466)	(0.0452)	(0.0124)	(0.00738)	(0.0366)	(78.20)
=1 if received international remittances	0.589*	0.0860	0.144	0.236***	-0.0547	0.00306	-0.00657	0.0112	323.5**
	(0.338)	(0.0537)	(0.0898)	(0.0891)	(0.0722)	(0.00617)	(0.00648)	(0.0812)	(164.3)
=1 if received food public transfers	0.281	0.0442	0.0695	-0.120**	-0.0682	-0.00363	-0.00599	-0.0533	-84.58
	(0.185)	(0.0269)	(0.0473)	(0.0467)	(0.0496)	(0.0145)	(0.00505)	(0.0404)	(80.36)
=1 if received agriculture public transfers	0.0201	0.00931	-0.00709	-0.0213	0.247***	0.0201*	0.00794	0.238***	-33.66
	(0.147)	(0.0221)	(0.0384)	(0.0379)	(0.0390)	(0.0118)	(0.00731)	(0.0269)	(62.78)
=1 if received other public transfers	0.00739	0.00374	-0.00154	-0.0106	0.0368	0.00230	0.0143	0.0709	115.3
	(0.234)	(0.0351)	(0.0675)	(0.0635)	(0.0581)	(0.0169)	(0.0159)	(0.0435)	(123.0)
Other control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

VARIABLES	Crop Count	Simpson Index	Entropy Index	Organic Fertilizer Use	Inorganic Fertilizer Use	Herbicide Use	Pesticide Use	Improved/ Hybrid Seed	Value of Livestock
Province level fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	694	694	694	696	696	696	696	696	696
R-squared	0.262	0.206	0.204	0.233	0.224	0.076	0.055	0.184	0.202
Natural Region 5									
VARIABLES	**Crop Count**	**Simpson Index**	**Entropy Index**	**Organic Fertilizer Use**	**Inorganic Fertilizer Use**	**Herbicide Use**	**Pesticide Use**	**Improved/ Hybrid Seed**	**Value of Livestock**
=1 if received domestic remittances	0.675	-0.0356	0.0100	-0.254	0.175			-0.0760	-29.88
	(0.573)	(0.0662)	(0.167)	(0.156)	(0.144)			(0.134)	(323.9)
=1 if received international remittances	0.773	-0.0145	0.109	-0.0926	0.132			0.0745	17.63
	(0.912)	(0.131)	(0.287)	(0.225)	(0.182)			(0.138)	(243.6)
=1 if received food public transfers	0.0860	0.0262	0.0391	0.122	-0.0290			-0.0704	-158.0
	(0.287)	(0.0392)	(0.0704)	(0.0896)	(0.0663)			(0.0819)	(114.6)
=1 if received agriculture public transfers	0.477*	0.0585*	0.156**	-0.0385	0.231***			0.323***	-39.99
	(0.254)	(0.0311)	(0.0628)	(0.0679)	(0.0608)			(0.0536)	(86.63)
=1 if received other public transfers	0.298	0.0215	0.115	-0.0149	-0.0116			0.0692	52.73
	(0.458)	(0.0497)	(0.107)	(0.106)	(0.102)			(0.0993)	(178.9)
Other control variables	Yes	Yes	Yes	Yes	Yes			Yes	Yes
Province level fixed effects	Yes	Yes	Yes	Yes	Yes			Yes	Yes
Observations	246	246	246	250	250			250	250
R-squared	0.472	0.428	0.409	0.144	0.213			0.312	0.208

Notes to the table: *(i) Standard errors are reported in parentheses. (ii) *, **, *** represent the statistical significance of the differences for the 10 per cent, 5 per cent and 1 per cent significance levels respectively. (iii) All control variables included in regressions reported in table 3 are included in all specifications. (iv) Ten province level fixed effects are included in all the specifications. (v) □: The regression could not be estimated due to a large number of zero observations for the dependent variable.*

Table 6: OLS regressions

VARIABLES	Dietary Diversity	Food Budget Share
=1 if received domestic remittances	-0.0426	-1.307
	(0.0991)	(1.001)
=1 if received international remittances	0.188	-6.381***
	(0.207)	(2.074)
=1 if received food public transfers	-0.191*	2.063*
	(0.113)	(1.133)
=1 if received agriculture public transfers	-0.0130	0.483
	(0.0758)	(0.736)
=1 if received other public transfers	0.119	-1.297
	(0.163)	(1.531)
Total cropped area (acres)	0.000152	-0.00604***
	(0.000390)	(0.00139)
Total consumption expenditure	0.00187***	-0.0217***
	(0.000284)	(0.00283)
Household size	-0.0314*	0.986***
	(0.0184)	(0.175)
=1 if head is aged below 30	-0.546***	1.155
	(0.142)	(1.392)
= 1 if head aged 30 to 44	-0.543***	1.368
	(0.0992)	(0.977)
= 1 if head aged 45 to 59	-0.195*	0.759
	(0.101)	(0.960)
= 1 if head male	0.219***	0.0934
	(0.0796)	(0.765)
= 1 if head has no formal education	-0.563*	-2.259
	(0.317)	(3.680)
= 1 if head has secondary education	0.388***	-1.583*
	(0.0844)	(0.826)
= 1 if head has tertiary education	0.997***	-9.868***
	(0.247)	(2.299)
= 1 if small scale commercial farming land	0.289*	-7.424***
	(0.165)	(1.579)

VARIABLES	Dietary Diversity	Food Budget Share
= 1 if old resettlement scheme land	0.0541	-5.878***
	(0.114)	(1.071)
= 1 if communal land	-0.353***	-3.142***
	(0.104)	(0.993)
Province level fixed effects	Yes	Yes
Observations	1,923	1,923
R-squared	0.167	0.128

Notes to the table: *(i) Standard errors are reported in parentheses. (ii) *, **, *** represent the statistical significance of the differences for the 10 per cent, 5 per cent and 1 per cent significance levels respectively. (iii) All control variables included in regressions reported in table 3 are included in all specifications. (iv) Ten province level fixed effects are included in all the specifications.*

Table 7: OLS regressions by land type

Communal Land		
VARIABLES	**Dietary Diversity**	**Food Budget Share**
=1 if received domestic remittances	0.0758	-0.0569
	(0.154)	(1.583)
=1 if received international remittances	0.272	-7.227**
	(0.289)	(2.901)
=1 if received food public transfers	-0.204	1.164
	(0.148)	(1.392)
=1 if received agriculture public transfers	0.0247	1.268
	(0.108)	(1.083)
=1 if received other public transfers	0.151	-2.639
	(0.249)	(2.247)
Other control variables	Yes	Yes
Province level fixed effects	Yes	Yes
Observations	957	957
R-squared	0.178	0.102
A1 Land		
VARIABLES	Dietary Diversity	Food Budget Share
=1 if received domestic remittances	-0.159	-2.014
	(0.219)	(1.913)
=1 if received international remittances	0.283	-10.58***
	(0.425)	(3.551)
=1 if received food public transfers	-0.525**	0.380
	(0.258)	(2.576)
=1 if received agriculture public transfers	0.133	1.083
	(0.178)	(1.692)
=1 if received other public transfers	-0.137	0.772
	(0.301)	(3.265)
Other control variables	Yes	Yes
Province level fixed effects	Yes	Yes
Observations	353	353
R-squared	0.155	0.259
Old Resettlement Scheme		
VARIABLES	Dietary Diversity	Food Budget Share

VARIABLES	Dietary Diversity	Food Budget Share
=1 if received domestic remittances	-0.0192	-2.439
	(0.197)	(2.042)
=1 if received international remittances	0.0462	-0.0900
	(0.488)	(6.838)
=1 if received food public transfers	-0.179	8.592**
	(0.323)	(3.428)
=1 if received agriculture public transfers	-0.152	-2.628*
	(0.157)	(1.420)
=1 if received other public transfers	0.414	-0.357
	(0.386)	(3.469)
Other control variables	Yes	Yes
Province level fixed effects	Yes	Yes
Observations	529	529
R-squared	0.181	0.099
Small Scale Commercial Farming Area		
VARIABLES	**Dietary Diversity**	**Food Budget Share**
=1 if received domestic remittances	-0.362	-1.339
	(0.359)	(3.576)
=1 if received international remittances	-0.150	-3.458
	(0.520)	(4.190)
=1 if received food public transfers	0.604	1.699
	(0.572)	(4.662)
=1 if received agriculture public transfers	0.237	6.734*
	(0.340)	(3.442)
=1 if received other public transfers	0.351	-10.30
	(0.536)	(6.763)
Other control variables	Yes	Yes
Province level fixed effects	Yes	Yes
Observations	84	84
R-squared	0.428	0.546

Notes to the table: *(i) Standard errors are reported in parentheses. (ii) *, **, *** represent the statistical significance of the differences for the 10 per cent, 5 per cent and 1 per cent significance levels respectively. (iii) All control variables included in regressions reported in table 3 are included in all specifications. (iv) Ten province level fixed effects are included in all the specifications.*

Table 8: OLS regressions by natural region type

Natural Region 1		
VARIABLES	**Dietary Diversity**	**Food Budget Share**
=1 if received domestic remittances	-0.425	2.197
	(1.014)	(5.055)
=1 if received international remittances	0.213	-11.49**
	(0.549)	(4.279)
=1 if received food public transfers	-0.0435	6.909
	(0.696)	(6.705)
=1 if received agriculture public transfers	0.226	6.685
	(0.672)	(5.019)
=1 if received other public transfers	-0.593	-3.618
	(0.868)	(5.324)
Other control variables	Yes	Yes
Province level fixed effects	Yes	Yes
Observations	54	54
R-squared	0.292	0.528
Natural Region 2		
VARIABLES	**Dietary Diversity**	**Food Budget Share**
=1 if received domestic remittances	-0.0911	-2.292
	(0.203)	(2.255)
=1 if received international remittances	0.257	-10.35**
	(0.550)	(4.407)
=1 if received food public transfers	-0.191	-4.056
	(0.276)	(2.561)
=1 if received agriculture public transfers	-0.182	-1.525
	(0.174)	(1.555)
=1 if received other public transfers	-0.0121	-4.492
	(0.373)	(3.179)
Other control variables	Yes	Yes
Province level fixed effects	Yes	Yes
Observations	480	480
R-squared	0.110	0.155

Natural Region 3		
VARIABLES	Dietary Diversity	Food Budget Share
=1 if received domestic remittances	0.322	-0.825
	(0.206)	(1.992)
=1 if received international remittances	-0.123	-7.023
	(0.702)	(8.587)
=1 if received food public transfers	-0.335	6.420
	(0.646)	(5.120)
=1 if received agriculture public transfers	-0.173	-0.00398
	(0.133)	(1.393)
=1 if received other public transfers	0.111	0.703
	(0.415)	(3.675)
Other control variables	Yes	Yes
Province level fixed effects	Yes	Yes
Observations	441	441
R-squared	0.190	0.200
Natural Region 4		
VARIABLES	Dietary Diversity	Food Budget Share
=1 if received domestic remittances	-0.120	-1.192
	(0.153)	(1.538)
=1 if received international remittances	0.172	-2.946
	(0.256)	(2.915)
=1 if received food public transfers	-0.195	2.923*
	(0.156)	(1.636)
=1 if received agriculture public transfers	0.152	0.164
	(0.133)	(1.281)
=1 if received other public transfers	0.327	1.412
	(0.233)	(2.223)
Other control variables	Yes	Yes
Province level fixed effects	Yes	Yes
Observations	696	696
R-squared	0.200	0.147
Natural Region 5		
VARIABLES	Dietary Diversity	Food Budget Share
=1 if received domestic remittances	-1.107***	4.089
	(0.423)	(4.429)
=1 if received international remittances	-0.404	-11.87**

VARIABLES	Dietary Diversity	Food Budget Share
	(0.616)	(5.086)
=1 if received food public transfers	0.00442	4.435
	(0.283)	(2.757)
=1 if received agriculture public transfers	0.104	2.990
	(0.218)	(2.096)
=1 if received other public transfers	-0.550	-6.496
	(0.343)	(3.996)
Other control variables	Yes	Yes
Province level fixed effects	Yes	Yes
Observations	250	250
R-squared	0.354	0.204

Notes to the table: *(i) Standard errors are reported in parentheses. (ii) *, **, *** represent the statistical significance of the differences for the 10 per cent, 5 per cent and 1 per cent significance levels respectively. (iii) All control variables included in regressions reported in table 3 are included in all specifications. (iv) Ten province level fixed effects are included in all the specifications.*

Table 9: Quantile Regressions

Median regression						
VARIABLES	**Crop Count**	**Simpson Index**	**Entropy Index**	**Organic Fertilizer Use**	**Inorganic Fertilizer Use**	**Value of Livestock**
=1 if received domestic remittances	-0.225	-0.0352	-0.116**	0	-0	-122.2*
	(0.159)	(0.0227)	(0.0451)	(0.0843)	(0.0300)	(64.45)
=1 if received international remittances	0.266	0.0400	0.0680	-0	0	138.0
	(0.337)	(0.0482)	(0.0958)	(0.179)	(0.0639)	(137.2)
=1 if received food public transfers	0.279	0.0461*	0.108**	0	-0	-150.7**
	(0.184)	(0.0264)	(0.0524)	(0.0981)	(0.0349)	(75.01)
=1 if received agriculture public transfers	0.260**	0.0327**	0.0823**	0	-0	76.19
	(0.115)	(0.0165)	(0.0327)	(0.0612)	(0.0218)	(46.82)
	-0.143	-0.00940	-0.0900	-0	-0	145.8
	(0.233)	(0.0333)	(0.0662)	(0.124)	(0.0442)	(94.87)
Other control variables	Yes	Yes	Yes	Yes	Yes	Yes
Province level fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,917	1,917	1,917	1,923	1,923	1,923
Q1 regression						
VARIABLES	**Crop Count**	**Simpson Index**	**Entropy Index**	**Organic Fertilizer Use**	**Inorganic Fertilizer Use**	**Value of Livestock**
=1 if received domestic remittances	-0.397***	-0.0731**	-0.0936**	0.000298	-0	-18.03
	(0.138)	(0.0336)	(0.0447)	(0.0361)	(0.0364)	(38.93)
=1 if received international remittances	0.00148	0.0980	0.0677	0.000158	-0	221.1***
	(0.294)	(0.0714)	(0.0950)	(0.0769)	(0.0775)	(82.87)
=1 if received food public transfers	-0.00589	0.0397	0.0439	1.54e-06	-0	1.565
	(0.161)	(0.0390)	(0.0520)	(0.0420)	(0.0424)	(45.31)
=1 if received agriculture public transfers	0.225**	0.0393	0.0509	-0.000291	-0	19.97
	(0.100)	(0.0244)	(0.0325)	(0.0262)	(0.0264)	(28.28)
=1 if received other public transfers	-0.116	-0.0271	-0.0558	-0.000364	0	-6.588
	(0.203)	(0.0493)	(0.0657)	(0.0532)	(0.0536)	(57.31)

Q1 regression						
VARIABLES	**Crop Count**	**Simpson Index**	**Entropy Index**	**Organic Fertilizer Use**	**Inorganic Fertilizer Use**	**Value of Livestock**
Other control variables	Yes	Yes	Yes	Yes	Yes	Yes
Province level fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,917	1,917	1,917	1,923	1,923	1,923
Q3 regression						
VARIABLES	**Crop Count**	**Simpson Index**	**Entropy Index**	**Organic Fertilizer Use**	**Inorganic Fertilizer Use**	**Value of Livestock**
=1 if received domestic remittances	-0.181	-0.000336	-0.0919**	0	0	-142.4*
	(0.184)	(0.0162)	(0.0365)	(0.0322)	(0)	(81.28)
=1 if received international remittances	0.290	0.0738**	0.164**	0	-0***	-37.26
	(0.392)	(0.0343)	(0.0776)	(0.0686)	(0)	(173.0)
=1 if received food public transfers	0.339	0.0259	0.0457	0	-0***	-218.0**
	(0.214)	(0.0188)	(0.0424)	(0.0375)	(0)	(94.60)
=1 if received agriculture public transfers	0.269**	0.0145	0.0582**	0	0***	-52.30
	(0.134)	(0.0117)	(0.0265)	(0.0234)	(0)	(59.05)
=1 if received other public transfers	-0.121	-0.00670	-0.0543	0	-0***	188.9
	(0.271)	(0.0237)	(0.0537)	(0.0474)	(0)	(119.7)
Other control variables	Yes	Yes	Yes	Yes	Yes	Yes
Province level fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,917	1,917	1,917	1,923	1,923	1,923

Notes to the table: *(i) Standard errors are reported in parentheses. (ii) *, **, *** represent the statistical significance of the differences for the 10 per cent, 5 per cent and 1 per cent significance levels respectively. (iii) All control variables included in regressions reported in table 3 are included in all specifications. (iv) Ten province level fixed effects are included in all the specifications. iv) Columns 4 to 6 have four more observations included in the sample as there are four households that provided responses to input use but have some missing observations for variables that are used to compute crop diversification variables.*

Table 10: Quantile regressions

Median regression		
VARIABLES	**Dietary Diversity**	**Food Budget Share**
=1 if received domestic remittances	0.0974	-2.369*
	(0.126)	(1.342)
=1 if received international remittances	0.130	-6.187**
	(0.269)	(2.856)
=1 if received food public transfers	-0.0773	1.822
	(0.147)	(1.561)
=1 if received agriculture public transfers	-0.0476	0.0304
	(0.0917)	(0.975)
	0.110	-0.362
	(0.186)	(1.975)
Other control variables	Yes	Yes
Province level fixed effects	Yes	Yes
Observations	1,923	1,923
Q1 regression		
VARIABLES	**Dietary Diversity**	**Food Budget Share**
=1 if received domestic remittances	-0.0129	-2.064
	(0.137)	(1.349)
=1 if received international remittances	0.202	-4.892*
	(0.292)	(2.873)
=1 if received food public transfers	-0.222	0.636
	(0.160)	(1.571)
=1 if received agriculture public transfers	0.103	-0.199
	(0.0997)	(0.980)
=1 if received other public transfers	0.191	-1.313
	(0.202)	(1.987)
Other control variables	Yes	Yes
Province level fixed effects	Yes	Yes
Observations	1,923	1,923
Q3 regression		
VARIABLES	Dietary Diversity	Food Budget Share
=1 if received domestic remittances	0.00137	-1.946
	(0.134)	(1.431)
=1 if received international remittances	-0.0609	-8.141***
	(0.286)	(3.046)

Q1 regression		
VARIABLES	**Dietary Diversity**	**Food Budget Share**
=1 if received food public transfers	-0.104	3.119*
	(0.156)	(1.665)
=1 if received agriculture public transfers	-0.167*	1.572
	(0.0977)	(1.040)
=1 if received other public transfers	0.0552	-0.879
	(0.198)	(2.106)
Other control variables	Yes	Yes
Province level fixed effects	Yes	Yes
Observations	1,923	1,923

Notes to the table: *(i) Standard errors are reported in parentheses. (ii) *, **, *** represent the statistical significance of the differences for the 10 per cent, 5 per cent and 1 per cent significance levels respectively. (iii) All control variables included in regressions reported in table 3 are included in all specifications. (iv) Ten province level fixed effects are included in all the specifications.*

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