Pre-analysis Plan: Development Impacts of Asset Transfers to Vulnerable Populations

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Abstract

This document provides a description of the strategy to explore the impact of productive asset transfers to vulnerable women in Sierra Leone. We use a field experiment to study the impact of a livestock bundle, including productive dual purpose poultry, training, and a starter package of high quality feed, on four primary outcomes: dietary quality, livestock income, farm investment, and mental wellbeing. A second treatment group receives an additional component of the intervention, which we test for marginal effects on these outcomes. We furthermore test for the conditionality of these effects on certain baseline characteristics (recent employment experience, household asset level, and proximity to the nearest major road) and economic preferences elicited at baseline (both risk and time). We also assess within-village spillovers, relying on individual level random assignment to the intervention bundle in treatment villages. The intervention was implemented in 71 communities, with a further 39 assigned to a control group. In the intervention arm, 311 women were randomly selected from a total sample size of 2,596 to receive the bundle. Of the 311 women, 156 received an additional 'demand side' treatment, where recipients were offered the opportunity to sell eggs to a trader at a guaranteed price. This document outlines the hypotheses used for the study.

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1 PAP Timeline

We co-designed a randomised controlled trial to learn about the effectiveness of an asset transfer program targeted to vulnerable women in rural areas of Sierra Leone. This study is conducted in collaboration with the International Growth Centre (IGC). The PIs on this project are Michael Rozelle, Maarten Voors, Erwin Bulte and Niccolò Meriggi.

This pre-analysis plan is filed after treatment assignment, during endline data collection, and before data analysis. Endline data collection ran late 2024, and is expected to finish by 28 February 2025, after we lodge this PAP. This data is held on a secure server, where study field managers and one PI have access for monitoring data quality. For this study, we have received IRB clearance from the the Government of Sierra Leone, Office of the Sierra Leone Ethics and Scientific Review Committee.

2 Study Design

In this experiment, our main intervention consists of the transfer of high-productivity chickens, combined with training, and a starter package of high quality feed to selected food insecure women as part of a package intended to support their livelihoods. We conducted baseline surveys across 110, predominantly rural, communities in western Sierra Leone. Within each community, we conducted baseline surveys with approximately 25 of the most food insecure women, selected on the basis of a short "screening survey" given to women who register their interest in participating in the project. These 110 communities were then randomly assigned to one of three treatment arms by stratifying on **geographical location** (by dividing the 110 communities into 3 clusters by a k-means algorithm, using latitude and longitude of the community centre), **road proximity** (by a dummy variable equal to 1 if the community centre is within 1km Euclidean distance of a major road, and 0 otherwise), and **population** (by a dummy equal to 1 if the community has a population equal to or above the median in our sample):

1. Control
2. Transfer Program
3. Transfer Program + Demand

Within 'treatment communities' (those assigned to either **Transfer Program** or **Transfer Program + Demand**), a further individual-level randomisation was then conducted with subjects who completed the baseline survey to distribute individuals between control and treatment groups,

where the treatment group was to be offered the treatment assigned to their community. This individual-level randomisation was stratified within each community on a dummy variable equal to 1 if the individual's household asset index was above the median within their community at baseline. In each treatment community, 3 women were selected from below this median level, and 2 from greater than or equal to the median.

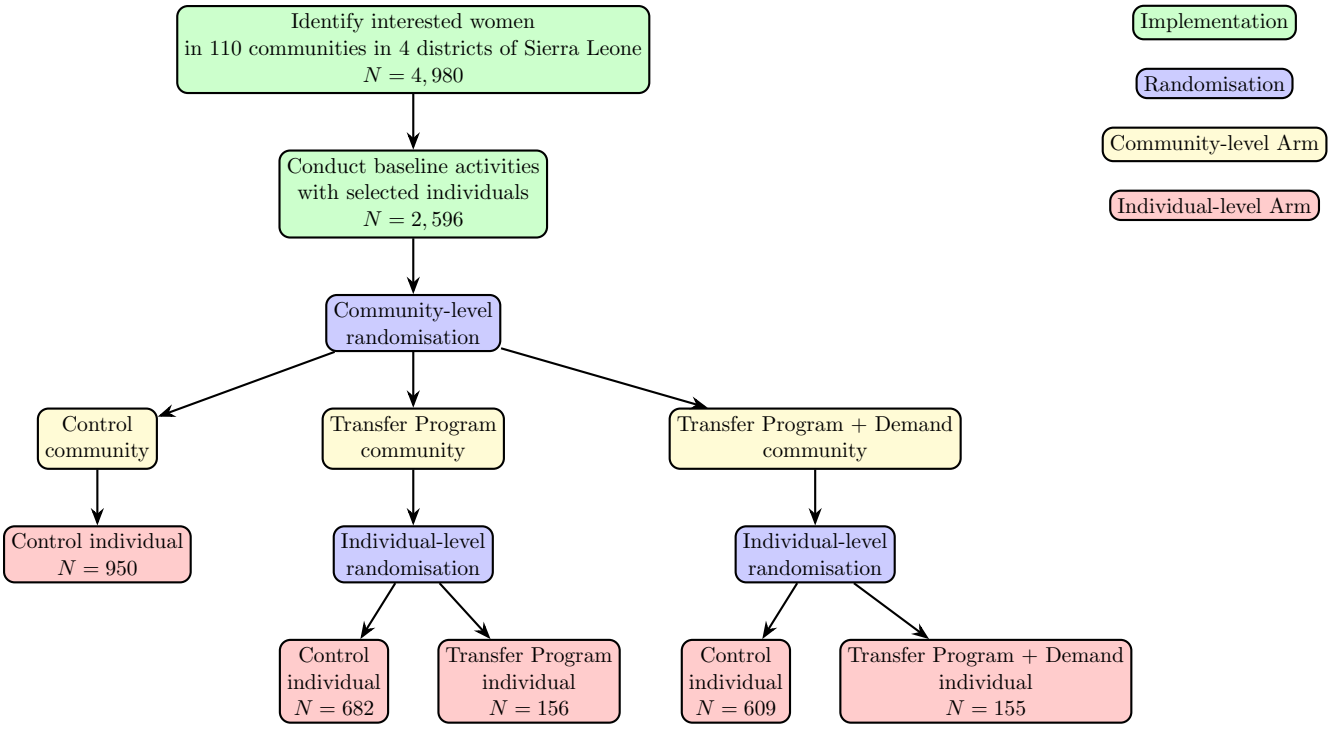
These randomly selected individuals were offered training in poultry rearing, curated by a team of poultry professionals associated with a local implementing partner. This training offered critical advice on how to maximise the health and productivity of the specific breed of chicken supplied through this intervention, but also taught general best practices applicable to backyard poultry farming activity with locally available fowl. Individuals assigned to treatment were then provided with about 13 purpose-bred chickens, reared to approximately 7 weeks of age and given a full course of vaccinations by a commercial poultry farm. Participants in this treatment arm also received three deliveries of high quality poultry feed, appropriate for the number and type of the supplied purpose-bred chickens, for the first three months of the intervention.

The breed of chicken offered as part of this intervention bundle was the **SASSO-T451**, a dual-purpose bird bred for both efficient weight gain and egg-laying. These chickens are advertised by the breeder as "ideal for village conditions", partly due to being "robust" and "easy to manage". The breeder also claims that the hens can reach peak laying rates of 90% in optimal conditions, and that the roosters, even when provided "low-energy feed", can be expected to accumulate a mass of 2.5kg. By these figures, SASSO chickens far outperform the 'local fowl' variety found ubiquitously in study communities – by up to four times the egg-laying rate, and almost twice the body weight. Besides these considerations, SASSO chickens were expected to have a far lower mortality relative to local fowl as a result of their full course of vaccinations and the extensive professional care provided to them in their critical first stage of development. To realise these potentials depends on climatic and environmental conditions, poultry disease prevalence, and poultry management. Hence, as mentioned previously, farmers received an additional training in poultry management and professional-grade feed for the first 3 months of the intervention.

Individuals in the **Transfer Program + Demand** treatment arm received an additional component of the intervention besides the transfer itself (comprising the birds, feed, and training). These individuals were told, at the moment that their chickens were distributed to them, that when their hens began their laying period, the implementation team would make weekly visits to their community to offer to purchase their eggs. At the training as well as at the time of this announcement, the expectation was set that the SASSO hens would not reach the egg-laying stage of their development for at least 3 months after distribution. Treatment subjects in this arm were told that they would be able to sell their SASSO eggs to the implementation team at a constant price per egg. They were also told that the implementation team would visit them directly within the community when offering to purchase the eggs, thereby avoiding transaction costs to the individual. By the start of

June, when delivering the final instalment of professional-grade feed, it was communicated to these individuals that the price offered per egg would be 4 leones (approximately 0.17USD at the time of writing). This price was set at rough equivalence to the price of chicken eggs in regional markets, minus a small nominal cost of transportation. Although the SASSO hens took longer to reach the egg-laying stage than predicted – with most hens beginning to lay by September, rather than July – project team members began implementing the weekly purchase of SASSO eggs in mid-October and continue to make weekly visits to **Transfer Program + Demand** individuals with remaining SASSO hens for this purpose.

Figure 1: Design Flowchart



3 Sampling Frame

Figure 2: Study Sample: Village-level Treatment Randomisation

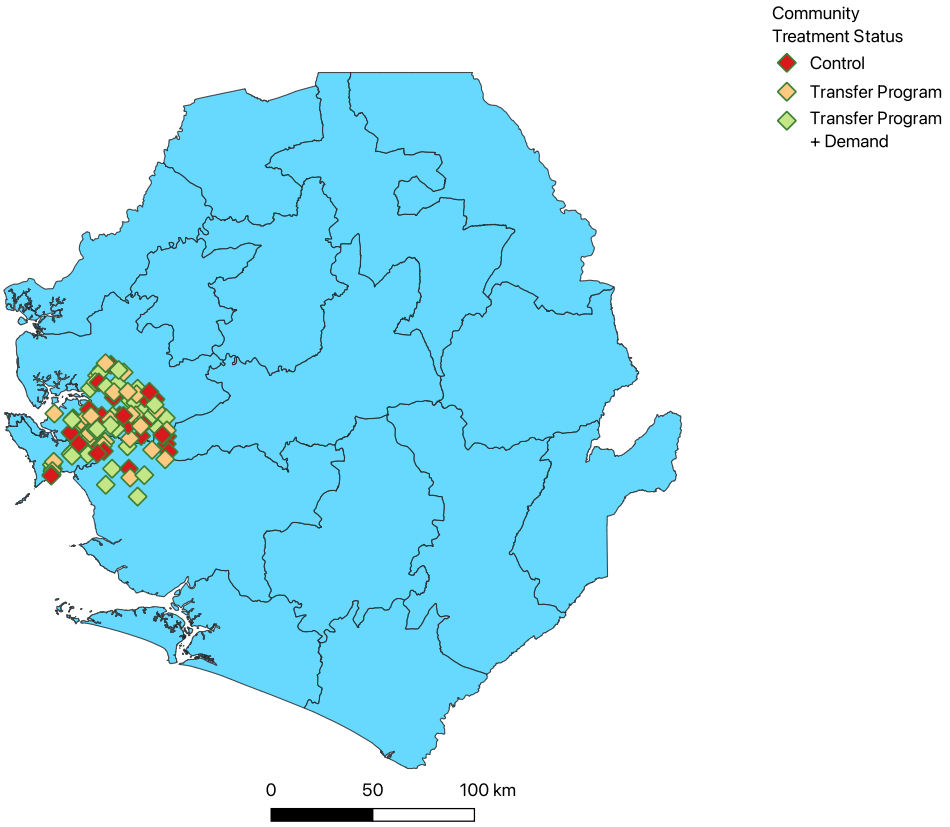
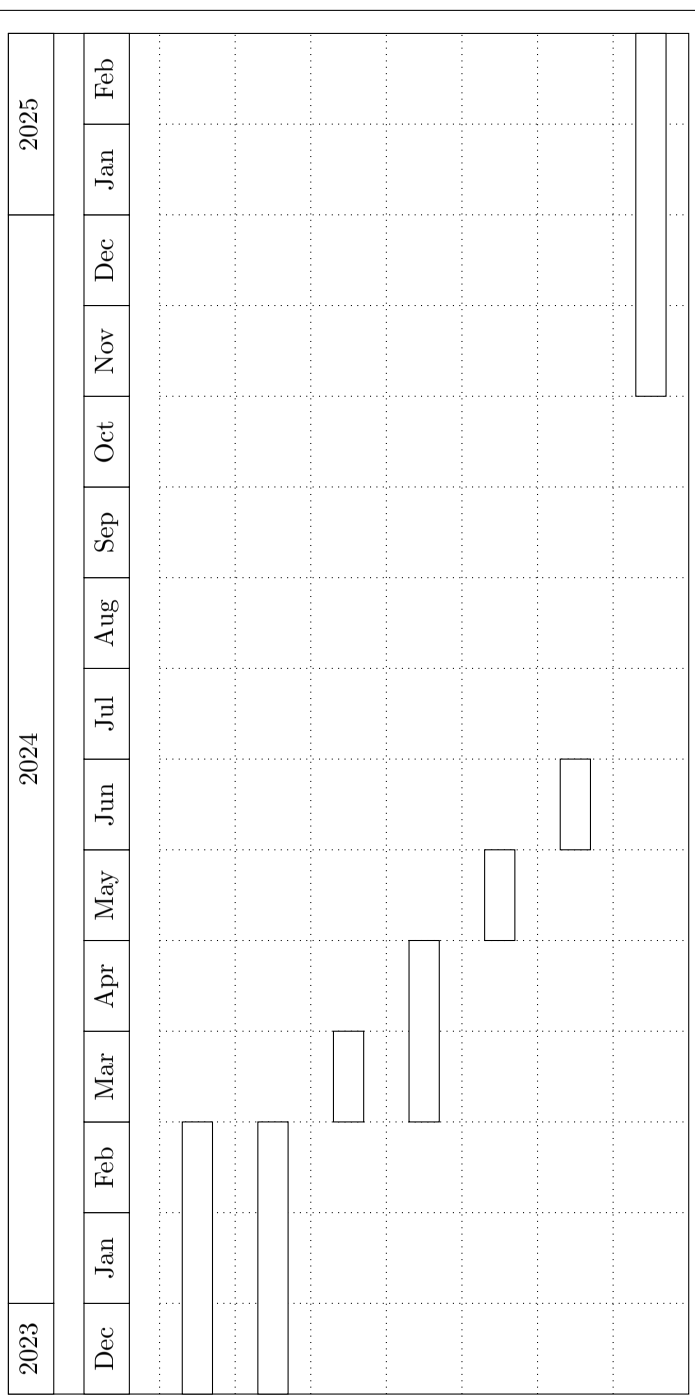


Figure 3: Approximate Study Timeline



4 Hypotheses

The key expectation is that a technology-upgrading asset transfer to poor or otherwise vulnerable individuals leads to greater monetary or non-monetary welfare for that individual and/or their household. We expect three particular dimensions of this welfare gain: **dietary quality, livestock income, and mental wellbeing**.

To achieve a the maximal benefit from an asset transfer program, it may be necessary for recipients to alter their productive behaviour in a manner consistent with maximising the value produced from the asset. This **increase in farm investment** constitutes another primary hypothesis.

Although the asset transfer program may be beneficial as a standalone program, the salience of the income-generating potential of the asset may be marginally stronger for those randomised to the **Transfer Program + Demand** arm of the study. In this arm, subjects were provided a consistent and convenient market for SASSO eggs. Furthermore, these subjects were told well in advance of the laying period that they would receive this additional component of the intervention. Subjects provided the demand component of the intervention may therefore have experienced a greater incentive to maximise the value produced using the asset. We hypothesise that **subjects randomised to the Transfer Program + Demand arm of the study experienced greater treatment effects than those in the Transfer Program arm**.

Some recipients may be better positioned than others to leverage the asset transfer program for their own benefit. We propose that the **treatment effects are are larger for recipients of certain characteristics**. We believe that the effects on welfare (ie. dietary quality, livestock income, and mental wellbeing) and investment are larger for those with greater road access; household asset wealth; and prior entrepreneurial activity – as well as those exhibiting particular economic preferences in behavioural games played at baseline: those exhibiting relatively high patience; and low risk-aversion.

Besides these six primary hypotheses, we also advance two secondary hypotheses. These secondary hypotheses isolate particular outcomes that may only be significantly positively influenced in the event of particularly successful exploitation of the asset. We believe this is the case for **overall individual income**, **the financial inclusion of the individual**, and **food insecurity**.

Our primary hypotheses are summarised in Table 5.1, and secondary hypotheses in Table 5.2. We will focus on estimating an intent-to-treat (ITT) effect to estimate the impact of the asset transfer. See Section 5 for econometric specifications. In all tests of primary and secondary hypotheses, the dependent variable $y_{i,c,EL}$ is a mean effects index calculated for all outcomes within the hypothesis family (Kling, Liebman, and Katz 2007).

4.1 Manipulation Checks

We include a set of manipulation checks to ensure that the intervention was implemented as intended. These manipulation checks ought to follow as a corollary of a successful implementation of the asset transfer program, and do not in themselves constitute primary hypotheses of the research project.

1. The asset transfer program increased the likelihood that the individual owns poultry.
2. The asset transfer program increased the size of the individual's household's poultry flock.
3. The asset transfer program increased the probability that the respondent owns any purpose-bred chicken breed.
4. The asset transfer program increased the probability that the respondent received any kind of poultry management training.

4.2 Primary Hypotheses

1. **The asset transfer program improves the dietary quality of the recipient and/or their household. (Dietary Quality)** (4.2.1)
2. **The asset transfer program increases the income that the recipient or their household derives from livestock. (Livestock Income)** (4.2.2)
3. **The asset transfer program improves the mental wellbeing of the recipient. (Mental Wellbeing)** (4.2.3)
4. **The asset transfer program increases the level of investment that the recipient makes in livestock production. (Investment in Farm Production)** (4.2.4)
5. **Subjects randomised to the Transfer Program + Demand arm of the study experienced larger effects on dietary quality, livestock income, mental wellbeing, and investment. (Demand Treatment)** (4.2.5)
6. **Certain baseline characteristics moderate recipients' welfare gains from and investment response to the asset transfer program. (Moderated Treatment Effects)** (4.2.6)

4.2.1 Dietary Quality

The asset transfer program improves the dietary quality of the recipient and/or their household.

Receiving a productive asset and support to exploit it, beneficiaries of asset transfer programs should access a greater variety of quality foodstuffs either through direct own-production or by exchange using the proceeds this asset generates. This corresponds to category **Dietary Quality** in Table 5.1.

We consider the primary dietary quality outcomes of assignment to receive an asset transfer as:

- Greater animal protein consumption.
- Greater dietary diversity.

4.2.2 Livestock Income

The asset transfer program increases the income that the recipient or their household derives from livestock.

The asset transfer program provides the recipient with high-value livestock and the means to farm it effectively, through training and provision of professional-grade feed. We expect that the recipient is able to convert this asset into significantly greater total income from livestock overall.

- Greater total value of owned livestock.
- Greater income from sales of animal products.
- Greater income from sales of animals.

4.2.3 Mental Wellbeing

The asset transfer program improves the mental wellbeing of the recipient.

Being randomly selected for the asset transfer program may enhance subjects' mental wellbeing in many ways, for example through satisfaction from material welfare benefits owing to production using the asset, or a greater sense of independence from the household head and corresponding self-efficacy.

- Greater life satisfaction.

- Reduced likelihood of extended worry or anxiety.
- Greater self-esteem.
- Greater aspirations for the future.

4.2.4 Investment in Farm Production

The asset transfer program increases the level of investment that the recipient makes in livestock production.

We should expect selected beneficiaries to adapt their productive behaviour to account for the received asset, either in anticipation of future returns or as a result of learning and direct instruction during training. Investing is likely to augment the efficiency of production involving the asset. This corresponds to category **Investment** in Table 5.1.

- Greater likelihood of using poultry coops.
- Greater likelihood of providing daily drinking water to poultry.
- Greater likelihood of providing twice-daily feed to poultry.
- Greater daily time spent managing poultry.
- Greater likelihood of collecting eggs laid by poultry.
- Greater likelihood of following recommended precautions for diseased birds
- A higher willingness-to-pay for SASSO chickens.

4.2.5 Demand Treatment

Subjects randomised to the Transfer Program + Demand arm of the study experienced larger effects on dietary quality, livestock income, mental wellbeing, and investment.

We expect that the certainty of regular future demand for chicken eggs incentivised subjects to adapt their poultry management techniques for a greater long-term success, constituting an appreciable increase in investment, and in turn providing augmented welfare benefits to the recipient marginal to the regular benefits of the asset transfer program.

4.2.6 Moderated Treatment Effects

Certain baseline characteristics moderate recipients' welfare gains from and investment response to the asset transfer program.

Notwithstanding our hypotheses that the asset transfer program will have increased dietary quality, livestock income, and mental wellbeing, whilst also causing recipients to invest more in poultry farming, we expect specific types of recipients to have excelled in achieving these. We focus on the potential for prior employment experience; relative asset wealth; proximity to major roads; a low future discount rate; and low levels of risk-aversion, to augment these effects. These last two variables were experimentally elicited at baseline. This hypothesis corresponds to category **Moderation** in Table 5.1.

We expect that individuals in households with better baseline asset endowments will experience greater improvements in welfare, and a greater farm investment response, relative to those in poorer households. This may reduce the cost, or improve the accessibility, of optimal production techniques involving the transferred asset. These methods can often be costly to learn and practice, and may require some social capital. However, without their implementation, the benefits of the asset transfer may be unduly constrained.

We hypothesise that having a more entrepreneurial mindset (indicated by having previous experience in income-generating employment or self-employment), increases the welfare benefits to and farm investment response by the individual. Prior business experience may enhance the subject's ability to manage the transferred asset productively, for example by having developed an entrepreneurial mind and skill set. It may also increase the recipient's network of business contacts and familiarity with the locations where transactions typically take place.

We believe that recipients living close to a major road will experience greater welfare benefits from the asset transfer program, and invest more in farm production. When living in proximity to a major road, the transaction costs involved in conducting business ought to be relatively low. For rural households particularly, these transaction costs are likely to be highly variable and exert a significant constraining effect on the benefit derived from asset transfer programs. Furthermore, residents of rural areas such as in Sierra Leone are often frequented by itinerant traders who purchase basic goods piecemeal for resale at a significant markup in a wider regional market. Such traders usually drive trucks or other motorised vehicles capable of transporting goods in bulk. Being located along a major road is therefore likely to lead to a greater incidence of visits from itinerant traders, and increase the salience of commercial activity in the asset.

We believe that recipients relatively willing to exercise patience will experience greater

welfare benefits and show an increased farm investment response. They may be more likely to use the productive asset for larger long-term gains as opposed to earning immediate but relatively small payoffs. This behaviour is likely to translate into larger welfare benefits to the individual if they opt for eg. a steady stream of low-level income from their hens' eggs, as opposed to the immediate benefit derived from a rapid sale of all birds. We maintain that this kind of patient planning is also likely to lead to greater investment in production involving the asset.

We propose that participants who are less risk-averse will also experience higher welfare benefits and show a greater investment response to the asset transfer program. Investment in key equipment, such as the poultry coop, is essential for optimal production given the asset transfer program. The same is true for the changes in poultry management techniques recommended in the trainings delivered as part of the intervention. Risk-averse recipients may prefer the sure small-scale payoff of a fire sale of chickens to the somewhat riskier but ultimately far larger future payoff from nurturing chickens to maturity and selling either the birds or their eggs at this more lucrative stage.

Time preferences were elicited at baseline by means of a simple 'multiple price list' game. In each round of the game, participants were presented with a choice between a small, relatively quick cash reward X, fixed at 2NLe (approximately 0.09USD at the time of the game) and a larger, delayed reward Y. Y was systematically increased by a small margin of 2NLe in each round, while X remained constant. The game was played repeatedly until Y reached a maximum value of 22NLe (approximately 0.97USD). This game was played twice, once with a choice between a 1-day or 4-week wait, and a second time with a choice between a 2-week or 6-week wait. For our measure of time preferences, we will take the switch point of the subject from the immediate payout X to future payout Y in the second, 4-6 week game.

Risk preferences were elicited by means of a similar 'certainty equivalent' behavioural game. In this game, participants played a sequential game in which they chose between a certain payoff A ranging from 2NLe-20NLe (approximately 0.09USD-0.88USD) and a risky option B with a fixed probability of 0.5 and value of 20NLe. The certain amount X was adjusted incrementally by 2NLe until reaching equivalence with the risky amount B. We take as our measure of risk preferences the switch point of the individual during this game.

In both the risk and time preference games, one round of the game was selected at random once the game had concluded, and the appropriate payout made according to the rules of the game and the participant's choice in the randomly selected game round.

- Baseline asset endowment.
- Entrepreneurial mindset.

- Proximity to major road.
- Time preferences (low discount rate).
- Risk preferences (low risk-aversion).

4.3 Secondary Hypotheses

We also consider outcomes of secondary importance to this study, which are income, financial inclusion, and food security.

1. **The asset transfer program increases the income of the individual.**
   - The sum value of the individual's income from livestock and employment activities.
2. **The asset transfer program improves the financial inclusion of the targeted individual.**
   - Whether the individual has any personal savings.
   - The value of the personal savings of the individual.
   - Whether the individual possesses a formal bank account.
   - Whether the individual has personally taken a recent loan.
3. **The asset transfer program reduces the food insecurity of the individual.**
   - Reduced incidence of food insecurity-related events.

5 Econometric Specifications

For the primary outcomes, the main test of interest is evaluating effects of the productive asset transfer bundle at the outcome family level. We use an ANCOVA-type model that controls for the outcome at baseline (where available), estimating:

$$Y_{i,c,EL} = \alpha_k + \beta_{1,c} T_{Asset} + \beta_{2,c} T_{AssetDemand} + \delta Y_{i,c,BL} + \epsilon_{i,c} \tag{1}$$

where $y_{i,c,EL}$ is the outcome of respondent i in village c, α_k represents the randomization fixed effects (community proximity to road, community population, and community geographic cluster (see Section 2). Treatment status, which is randomized across villages, is denoted by the indicator variables T_{Asset} and $T_{AssetDemand}$. $Y_{i,c,BL}$ is the outcome at baseline. Our primary focus is on

comparing respondents assigned to treatment to those in control villages. To assess within community spillovers (see below) we also compare outcomes to the 'control-in-treatment' group, ie. respondents in treatment villages that at random did not receive the treatment.

In all estimations, $y_{i,c,EL}$ is a mean effects index calculated for all outcomes within the hypothesis family (Kling, Liebman, and Katz 2007).

We cluster our standard errors at the level of the village, the unit of randomization. We also estimate a variant of Equation 1 in which we pool the treatments into one pooled treatment indicator.

Throughout our analysis, we will adjust for the fact that we are running more than one test on the same dataset by implementing false discovery rate (FDR) corrections. These adjustments run across the first four primary hypotheses (ie. excluding Hypotheses 4.2.5 and 4.2.6) or each hypothesis within as relevant. For all tests, we will also report the "naïve" or "per comparison" p-value.

5.1 Moderated Treatment Effects

Section 4.2.6 details five different dimensions along which we hypothesise moderated returns to welfare and changes in investment for asset transfer programs: initial household asset endowment; employment experience; proximity to major roads; a low future discount rate; and low risk-aversion. For each of these dimensions, we compute a single dummy variable for the purposes of estimation, H:

1. **Asset Endowment:** We construct an asset index consisting of the first principal component of the number of several particular assets measured at baseline. We then generate an individual-level dummy variable equal to 1 if this asset index is larger than or equal to the median within our sample, and 0 otherwise.
2. **Employment Experience:** We generate an individual-level dummy equal to 1 if the subject was working in any wage-earning or self-employed role at baseline, and 0 otherwise.
3. **Road Proximity:** We generate a community-level dummy equal to 1 if the community is $\leq$ 1km in Euclidean distance from a major (A or B) road, and 0 otherwise.
4. **Time Preferences:** We generate an individual-level dummy equal to 1 if the subject had a switch point below the sample median in the multiple price list game.
5. **Risk Preferences:** We generate an individual-level dummy equal to 1 if the subject had a switch point below the sample median in the certainty equivalent game.

To test for conditional effects along these dimensions, we will run five separate regressions using a pooled treatment dummy and an interaction term for the relevant dimension of conditionality as outlined above. These regressions will be of the kind:

$$Y_{i,c,EL} = \alpha_k + \gamma_1 T_{i,c} + \gamma_2 H_{i,c,BL} + \gamma_3 H_{i,c,BL} * T_{i,c} + \delta Y_{i,c,BL} + \epsilon_{i,c} \tag{2}$$

where $T_{i,c}$ is a pooled treatment dummy equal to 1 (or either treatment arm separately), for a respondent i in community c who was assigned to a treatment, and 0 otherwise.

Table 5.1: Primary Outcomes

Category	**Outcome**	**Survey Question(s)**	**Construction**
Dietary Quality	Greater animal protein consumption	How many fish did your household consume in the last 7 days?; Approximately how many eggs has your household consumed in the last 7 days?; How many pounds of meat did your household consume in the last 7 days?	Create an additive index of relevant foods, and scale this to the per-adult-equivalent value for the household.
Dietary Quality	Greater dietary diversity	eg. How many cups of rice did your household consume in the last 7 days?	Create a count variable of the number of distinct food groups eaten by the respondent's household in the past week.
Livestock Income	Greater total value of owned livestock	How many [animal] do you or your household own?; Approximately what price did you get for each of the [animal] you sold?	Create a "total value of owned livestock" outcome by multiplying the number of each animal owned by the household by its imputed value. The value of each animal is computed by taking the median sales price of that animal over the entire study sample. SASSO chickens are valued independently from other breeds.

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Category	Outcome	Survey Question(s)	Construction
Livestock Income	Greater income from sales of animal products	Approximately how much revenue did you get from selling [milk, meat, or manure] in the last month?; How many eggs have you sold in the last month?; What price did you sell each of your eggs for?	Sum income in last month from livestock products (ie. excluding sales of animals themselves).
Livestock Income	Greater income from sales of animals	How many [animal] have you or your household sold in the last 12 months?; Approximately what price did you get for each of the [animal] you sold?	Compute total income from livestock sales as price per animal multiplied by number sold
Investment	Greater likelihood of using poultry coops	Do you have a coop for your chickens?	
Investment	Greater likelihood of providing daily drinking water to poultry	On how many days did you provide your chickens with fresh water during the past 7 days?	Construct dummy indicator equal to 1 if fresh water was provided to chickens on 7/7 days in past week
Investment	Greater likelihood of providing twice-daily feed to poultry	Do you currently feed your chickens any feed?; On a typical day, how many separate times do you feed your chickens?	Construct dummy indicator equal to 1 if feed was provided to chickens exactly twice a day

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Category	Outcome	Survey Question(s)	Construction
Investment	Greater daily time spent managing poultry	Which of the following options best describes the amount of time you spend looking after your chickens on a normal day? I am talking about the time you spend that is solely dedicated to farming your chickens.	Construct dummy indicator equal to 1 if the amount of time spent daily managing poultry is greater than 15 minutes.
Investment	Greater likelihood of collecting eggs laid by poultry	Do you collect any of the eggs that your chickens lay?	
Investment	Greater likelihood of following recommended precautions for diseased birds	What did you do when your chickens became sick?	Construct dummy indicator equal to 1 if respondent answered uniquely 'isolate sick bird from the other chickens', 0 otherwise.
Investment	A higher willingness-to-pay for the asset	How many leones would you be willing to pay to buy a SASSO hen?; How many leones would you be willing to pay to buy a SASSO rooster?	
Mental Well-being	Greater life satisfaction	How satisfied are you with your life overall on a scale from 1 to 5? (from least to most satisfied)	
Mental Well-being	Reduced likelihood of extended worry or anxiety	Did you experience an extended period of time with worry or anxiety during the past 12 months?	

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Category	Outcome	Survey Question(s)	Construction
Mental Well-being	Reduced incidence of emotional distress	During the last 7 days, on how many days did you feel sad?; During the last 7 days, on how many days did you cry?; During the last 7 days, on how many days did you not feel like eating?; During the last 7 days, on how many days did you not feel like working?; During the last 7 days, on how many days did you have trouble sleeping?	Create an index by taking the first principal component of all 'emotional distress' questions
Mental Well-being	Greater aspirations for the future	[Imagining a tree with 10 levels of branches] The bottom branch (branch 1) represents your worst life and the top branch (branch 10) represents your best life - which branch do you hope to reach in your life?	
Moderation	Baseline asset endowment	I will now ask about what assets your household has. I'm going to list some items, and I'd like to know how many your household owns.	Create an index by taking the first principal component of all 'asset' questions
Moderation	Experience in income-generating employment	[Do you] have a self-owned business (self-employed)?; [Are you] currently employed with a business or an organization?	Construct dummy indicator equal to 1 if respondent was either self-employed or employed at baseline, 0 otherwise.

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Category	Outcome	Survey Question(s)	Construction
Moderation	Distance to nearest road	N/A	Use Sierra Leone Census 2015 community-level data, and administrative road shapefiles, to find the Euclidean distance from the community to the nearest A or B road.
Moderation	Time preferences (low discount rate)	N/A	Generate an individual-level dummy equal to 1 if the subject had a switch point below the sample median in the multiple price list game.
Moderation	Risk preferences (low risk-aversion)	N/A	Generate an individual-level dummy equal to 1 if the subject had a switch point below the sample median in the certainty equivalent game.

Table 5.2: Secondary Hypotheses

Category	Outcome	Survey Question(s)	Construction
Income	Value of the individual's income from livestock and employment activities	What was the exact amount [you] made in revenues in the month of [prior month]?; What was the exact amount [you] spent in running costs in the month of [prior month]?; What was the value of [your] cash salary in the month of [prior month]?; How many [animal] have you or your household sold in the last 12 months?; Approximately what price did you get for each of the [animal] you sold?; Who was the owner of the [animal] you sold?; Approximately how much revenue did you get from selling [livestock products] in the last month?; How many eggs have you sold in the last 7 days?; What price did you sell each of your eggs for?	Calculate the sum of profits from self-employment, wages from employment, and revenue from livestock ownership within past month. This requires extrapolating egg sales from one week to one month, and sales of animals from 12 months to a single month.

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Category	Outcome	Survey Question(s)	Construction
Financial Inclusion	Whether the individual has any personal savings	Do you ¡b¿personally¡/b¿ have any savings in cash? I mean any money that you personally have at home or with a trusted relative or friend.; Do you personally have any money currently in osusu?; Do you have a bank account in your own name? I mean an account that belongs to you, with any formal financial institution, such as a bank or microfinance institution.	Construct a dummy indicator equal to 1 if the respondent has personal savings in a formal bank, osusu, or in cash.
Financial Inclusion	The value of the personal savings of the individual.	About how much in total do you currently have saved in this bank account?; How much cash savings do you personally have at home or with a trusted relative or friend?; How much money do you personally currently have in osusu?	Sum total of all savings
Financial Inclusion	Whether the individual possesses a formal bank account	Do you have a bank account in your own name? I mean an account that belongs to you, with any formal financial institution, such as a bank or microfinance institution	
Financial Inclusion	Whether the individual has personally taken a recent loan	Have you personally taken a loan in the last 12 months?	

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Category	Outcome	Survey Question(s)	Construction
Food Insecurity	Reduced food insecurity	eg. During the last week, on how many days has your household eaten foods that you ordinarily would not eat i.e. "less preferred foods"?	Create an index by taking the first principal component of all 'food insecurity incidence' questions

5.2 Indirect effects within villages

Individuals within study communities often live in close proximity. To assess indirect effects, we rely on our individual-level random assignment within treatment villages.

Due to the nature of the intervention, within-cluster spillovers may occur, for example, due to direct receipt of the asset, lower prices for or greater availablity of poultry products (ie eggs and meat), and greater knowledge of poultry production techniques.

Note that, given the relatively small bundle contained in the intervention, we expect that any possible spillover effect, if at all present, is likely to be small. Nonetheless, for completeness, we test for the presence of these spillover effects.

To measure the extent of possible spillovers, we propose to estimate a series of regressions of the format:

$$Y_{i,c,EL} = \alpha_k + \theta_1 T^c_{i,c} + \theta_2 T^i_{i,c} + \delta Y_{i,c,BL} + \epsilon_{i,c} \tag{3}$$

where control-in-treatment subjects are included in the estimation, testing the null hypothesis that $\theta_1 = 0$. $Y_{i,c,EL}$ indicates a primary outcome at endline from the set outlined in this document for individual i in community c. Dummy variable $T^c_{i,c}$ equals 1 if the individual belonged to a community randomly assigned to any treatment intervention, and 0 otherwise. Conversely, $T^i_{i,c}$ is a pooled individual treatment dummy equal to 1 if the individual themselves was randomly assigned to any treatment intervention. Standard errors are clustered at the community level.

5.3 Attrition

We will assess whether attrition of respondents may impact our results, whether by differential attrition across treatment status, or by the baseline characteristics of the individual or their household.

To determine whether treatment status is predictive of attrition, we will estimate the regression:

$$s_{i,c} = \alpha + \phi_1 T_i + \epsilon_{i,c}$$

Where s_i is a dummy variable equal to 1 if an individual was successfully surveyed at baseline and endline, and 0 otherwise (ie. just at baseline). The variable T_i is a pooled treatment dummy equal to 1 if the individual was assigned to any treatment, and 0 otherwise.

Similarly, we assess whether a vector of baseline characteristics $X_{i,c}$ (which comprises all available baseline values of primary outcomes and the aforementioned dimensions of heterogeneity) predicts attrition and differs by treatment status:

$$s_{i,c} = \alpha + \zeta_1 T_{i,c} + \zeta_2 X_{i,c} + \zeta_3 T_{i,c} * X_{i,c} + \mu_{i,c}$$

In both of the above regressions, standard errors are clustered at the community level.

If by evaluating either of these regressions we find significant levels of differential attrition, we will adjust for the potential bias this introduces. We will use Lee bounds on our treatment effect estimates (Lee 2005) as well as presenting estimates reweighted by the inverse probability of being successfully interviewed in the follow-up survey.

As a further check, we will include baseline balance tables in an appendix to the publication. In these tables, we will report treatment and control means for all available primary outcomes and dimensions of heterogeneity, as well as indicating whether these means show significant difference.

References

Kling, Jeffrey R, Jeffrey B Liebman, and Lawrence F Katz (Jan. 2007). "Experimental Analysis of Neighborhood Effects". In: *Econometrica* 75.1, pp. 83–119. ISSN: 0012-9682, 1468-0262. DOI: 10.1111/j.1468-0262.2007.00733.x. (Visited on 02/21/2025).

Lee, David (Oct. 2005). *Training, Wages, and Sample Selection: Estimating Sharp Bounds on Treatment Effects*. Tech. rep. w11721. Cambridge, MA: National Bureau of Economic Research, w11721. DOI: 10.3386/w11721. (Visited on 01/21/2025).