# Impact Evaluation of scaled-up Early Childhood Development activities in Rural Mozambique

## - BASELINE REPORT -

April 2017

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# ACKNOWLEDGEMENT

# Introduction

Early childhood is a crucial phase of growth and development of children and a pivotal window of opportunity to prepare the foundations for life-long learning and fulfillment. Growing international evidence demonstrates the importance of investing in early childhood, especially for children at risk of developmental delay or with a disability.  Nevertheless, many children around the world lack proper early nutrition and early stimulation, generating delays in cognitive and non-cognitive development with long-lasting deleterious consequences throughout their lives.

Forty four percent of children under-5 suffers from chronic under nutrition in Mozambique, which accounts for at least one-third of under-5 child deaths[1]. Similar concerns exist with respect to poor maternal health and nutrition indicators, with high rates of low birth weight and vitamin and mineral deficiencies[2]. Furthermore, since 25% of children are stunted even in the richest quintile, it is likely that, in addition to poverty and food insecurity, suboptimal infant and young child feeding and caring practices as well as inadequate prevention and management of childhood illnesses are driving factors behind the persistent stunting rates. The most critical period for intervention to prevent chronic under nutrition, including vitamin and mineral deficiencies, is -9 months to +24 months, i.e., the first 1000 days of life. Beyond this period many of the adverse effects are irreversible, causing long-term damages to individuals and reinforcing the intergenerational transmission of poverty.

Lack of overall school readiness[3] upon primary school entry (at age 6) is also a major concern in Mozambique, particularly among the poorest children. The 2008 baseline of a World Bank-led and SIEF-financed randomized impact evaluation of a rural community-based early childhood development (ECD) program implemented by Save the Children in 30 communities in the Gaza province of Mozambique highlighted that disadvantaged 3 to 5-year-old children who did not participate in any ECD program scored poorly on a range of child development measures, particularly in the cognitive and linguistic areas. At follow-up impact evaluation two years later in 2010, showed that this ECD program (which included preschool activities for children aged 3-5 and parenting information sessions on health, nutrition, and early stimulation for pregnant mothers and parents of children aged 0-5) had strong positive impacts on children's school readiness and on their likelihood of entering the first grade on time. The program also had positive spill-over effects on the children's caregivers and older siblings.[4]

In 2012, following the above mentioned seminal impact evaluation, the Ministry of Education and Human Development (MINEDH) decided to expand the community-based integrated ECD intervention model to 600 communities throughout five provinces of Mozambique: Gaza, Nampula, Tete, Cabo Delgado and Maputo Province. The World Bank supported this scale-up with a USD $40 million project and provided technical assistance to the government of Mozambique.

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[1] See Pelletier, Frongillo, and Habicht (1994); Caulfield et al. (2004); Bryce et al. (2005), MICS (2008).

[2] For example, 15% of newborns have low birth weight, an important indicator of maternal and newborn health and nutrition, vitamin A deficiency affects 69% of children 6-59 months of age and 14% percent pregnant women. Furthermore, nearly 75% of children 6-23 months of age and over half of pregnant women are anemic (MICS 2008).

[3] School readiness is defined as the degree to which a child is prepared to learn and succeed in school. Children's school readiness depends not only on their cognitive skills upon primary school entry, although these skills are crucial, but also on their physical, mental, and emotional health, as well as ability to relate to others.

[4] The results are summarized in a "*From Evidence to Policy*" note entitled "*Is preschool good for kids?*" (March 2012).  For the full results, see: Martinez, S., Naudeau, S., and Pereira, V. (2012). "*The Promise of Preschool of Africa: A Randomized Impact Evaluation of Early Childhood Development in Mozambique*"

# The ECD and Nutrition Interventions

## Programs descriptions and objectives

### Preschool program

Mozambique's ECD program is aimed at enhancing the capacity of communities and families to foster the development of children five years old or younger through the provision of community-based ECD programs and by enhancing knowledge on child growth and development, parenting, nutrition and healthcare among parents and community leaders. Its specific objectives are:

(i) to expand access to quality Early Childhood Development (ECD) programs among children under six years of age living in rural communities in selected provinces and districts; and

(ii) to establish the foundations for a community-based ECD service delivery system that can be replicated nationwide.

The ECD Program is financed by an additional credit for the Education Sector Support Project. The Education Sector Support Project was originally approved by the World Bank's Board of Directors on April, 2011 and contributes to the overall Education Sector Support Project (ESSP). The additional US$40 million credit to support the scaling up of Early Childhood Development (ECD) activities was subsequently approved on May 1st, 2012.

The ECD Program supports the provision of an ECD Basic Service Package (BSP) to be delivered by a Third Party Provider (TPP) through a community-based delivery model that has already been successfully implemented and tested in rural communities of Mozambique.

MINEDH contracted TPPs to implement and provide ECD services throughout the five provinces, under its supervision and management. Contracting TPPs was deemed preferable at this time, while going forward MINEDH would acquire the capacity and skills to implement ECD programs.

ECD services provided by the TPPs include construction of adapted preschool premises and playground, training of local instructors, acquisition of the pedagogical material, and organization of parenting activities. Third Party Providers commit themselves to implementing a Basic Services Package (BSP) that outlines the minimum requirements to be included in all preschools involved in the Ministry of Education's ECD project. Details about the Basic Service Package can be found in Annex A1.  The community-based service delivery model is  characterized by the following key features: (i) strong community involvement; (ii) ECD teachers (or "*animadoras*") that are recruited at the community level and  paid by the Ministry of Education at district level; (iii) low-cost technological solutions; (iv) well-defined protocols; (v) ongoing monitoring and training ; (vi) parenting classes and regular communication with parents; (vii) linkage with primary schools; and (viii) partnership with district and provincial authorities and primary schools.

Construction of the preschool building is managed by the TPP and follows a design developed in partnership with all service providers and the Ministry of Education. The design includes use of both conventional and non-conventional materials with the aim of providing safe and durable premises at affordable cost. While construction is supervised by qualified construction professionals, communities are invited to participate actively in the work, and are in charge of the maintenance.

The local ECD instructors are selected by the preschool management committee with input from the community development agents. The instructors are recruited with the requirement of having completed a minimum of Grade 7 education level and receive a minimum of 10 days of pre-service training and 5 days of in-service training every year. In addition to this training, service providers

commit to assist the instructors with 5 hours of group or individual coaching per month. In exchange for their participation each instructor receives around 10 USD as a stipend per month.

The curriculum and programs, developed by the Ministry of Education in partnership with the TPPs, aim at promoting learning and development in each of the following areas: social, emotional, physical, language and cognitive skills. Preschool schedules can vary to accommodate parents' activities in the community, while ensuring 15 hours of class per week during a minimum 9 months per year. In practice, preschool often starts at 9h and finishes at 12h and follows the academic calendar of primary schools.

Preschool management is design to be done by Coordination Committee (CCC) which is made up of members of the community. The committee should have at least one primary school teacher as member and is mainly in charge of management of the preschool. The relationship with the primary school and should encourage parental involvement in the functioning of the preschool.

All children aged between 36 and 59 months and living in the participating communities are entitled to enroll in preschool. In cases where subscription exceeds enrollment capacity, a public lottery would take place and non-selected children would remain on a waiting list. While enrollment is free of charge for all families parents and community members are actively encouraged to support the functioning of the preschool by participating in the maintenance of the center (such as cleaning and minor repairs), learning activities, or by providing contributions in kind.

## Nutrition program

In two districts of the province of Nampula, the ECD program is supplemented by a nutrition component. The nutrition interventions include: weight gain monitoring and counseling; supplements of iron-folic acid, vitamin A and other micronutrients; promotion of breastfeeding; deworming; and community-based management of acute malnutrition. These activities are targeted at adolescent girls (i.e., before they become pregnant), pregnant mothers, and children ages 0-23 months. This program is managed by the Ministry of Health under World Bank funding through the Community Nutrition Enhancement Project.

The Community-Based Nutrition (CBN) activities include behavioral change and nutrition education, the supply of essential nutrition commodities to specific target populations, and referral mechanisms for the treatment of severe acute malnutrition. Selected CBN activities have been identified for the various target populations and include: (i) growth monitoring and promotion, including referral services for the treatment of severe acute malnutrition for children; (ii) promotion of exclusive breastfeeding and appropriate complementary feeding, including cooking demonstration, use of micronutrient powder (MNP) and deworming for children; (iii) management of moderate under nutrition, including provision of lipid-based food supplements to targeted children; (iv) early identification and mobilization of pregnant women for ante-natal care, dietary counseling, including provision of iron folic acid tablets, and deworming; (v) provision of iron folic acid tablets and deworming for adolescent girls aged 11-19 years; and (vi) education on safe water, hygiene, sanitation, immunization and referral services for infectious disease control. Dispersible zinc tablet and Oral Rehydration Salt (ORS) is distributed to treat diarrhea in children.

## Implementations and timetable

### Preschool program

The implementation of the ECD project was piloted in selected districts in five provinces. These provinces - namely Gaza, Cabo Delgado, Tete, Maputo Province, and Nampula - have been selected based on the following eligibility criteria:
- Vulnerability and potential for impact
    - Prevalence of malnutrition
    - Lack of access to safe water and sanitation
    - Number of children aged five or younger
    - Percentage of children aged 6 that are not enrolled in 1st grade
- Local capacity
    - Institutional capacity at provincial level
    - Vibrancy of civil society in general and Non-Governmental Organizations (NGOs) in particular
- Representativeness
    - Geographical location
    - Level of maturity of existing community-based ECD programs

The five selected provinces are the ones that best meet all the selection criteria: they exhibit great vulnerability and have a high potential impact; there is substantial government and/or civil society capacity; and they are located in the three distinctive geographical areas of the country: North, Center and South.

The selected districts and provinces are:
- Districts of Xai-Xai and Mandlakazi – Gaza Province;
- Districts of Macomia and Chiúre - Cabo Delgado Province;
- Districts of Eráti and Memba- Nampula Province;
- Districts of Changara and Angónia – Tete Province;
- Districts of Manhiça and Boane – Maputo Province.

Of the five provinces selected to participate in the ECD program, three were selected to take part in the study: **Nampula**, **Tete** and **Cabo Delgado.**

Within each province, six target districts were selected and a subset of eligible communities were identified to meet the criteria for implementation of the program:
1. The community is located in a rural area;
2. The community already has a Primary School;
3. The community has more than 30 children in the age range of 3-5 years old ;
4. There was no other education program for children 3-5 years old in the community during the past 5 years.

The selected TPPs are large NGOs with vast experience in implementing ECD activities and engaging with communities in Mozambique. The TPPs competitively selected by the Ministry of Education to implement the program are:  ADPP in Maputo province, Aga Khan Foundation in Cabo Delgado, and Save the Children in the provinces of Gaza , Nampula and Tete.

The ECD program has been designed to include a progressive implementation over two phases. The first phase of the program at the community level started in 2014, with an objective to reach a total of 150 communities with a functioning ECD center throughout the five provinces. The second phase planned the additional construction of 40 new preschools per province, for a total of 200 new

participating communities. The current Impact Evaluation only concerns phase 2 of the project while phase 1 is seen as a pilot.

Implementation of the second phase started in August 2016 with the first community mobilization activities conducted jointly by the district coordinators of the TPPs and the Ministry of Education, while construction began in December 2016. Preschools centers from phase 2 are expected to open progressively in March/April 2017.

## Nutrition program

Similarly to the ECD program, implementation of the nutrition intervention is made by Third Party Providers under contract with the government of Mozambique. At the end of a parallel competitive tender, Save the Children was also selected by the Ministry of Health to provide the nutrition package in the province of Nampula. In this province, interventions in the communities for the nutrition program began progressively from June 2015 after training the field staff and volunteers between March and May 2016.

Community mobilization and training of the nutrition program took place between March to May 2015 and include: identification of communities/villages; identification and training of Care Group Leaders (CGLs); formation of Care Groups (CGs) and village leader groups and building a rapport with these groups; understanding the specific local context as relevant to the proposed project activities; and, for each CGL, agreement on a suitable location for monthly community-based nutrition activities for the center of operations. The community mobilization phase also includes a Growth Monitoring and Promotion (GMP) and identification and inclusion of pregnant women with a strong element of Behavioral Change and Communication (BCC). These activities involve regular monthly weighing of children under 2 and mobilizing pregnant women to attend regular ante-natal care services and using this process to counsel mothers, identify when there is a problem, what to do about it and organizing monthly community conversation sessions. It also entails providing very selective and targeted food supplements to undernourished children.

Intervention in the communities began effectively on June 2015 with the growth monitoring activities as well as distribution of MNPs.

| Type of Interventions | Provinces in the IE | | |
|---|---|---|---|
| | Cabo Delgado | Nampula | Tete |
| Preschool | Yes | Yes | Yes |
| Nutrition | No | Yes | No |

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# Study Design
## Research questions

The original primary research questions were the following:

1. Can a community-based integrated ECD model (for children aged 0-5 and their parents) that was proven effective when implemented by an NGO at small scale, remain effective when the implementation is: (i) government-led, (ii) at scale, and (iii) implemented in a diverse range of geographic and socio-cultural settings?

2. How does an early nutrition intervention targeted at adolescent girls, pregnant mothers and children aged 0-2 years affect growth, overall development outcomes and learning potential of beneficiary children?

3. What is the value-added and comparative cost effectiveness of doing both types of interventions (integrated ECD and early nutrition) versus only one or the other?

However, deviations from the original design in the implementation of the nutrition program (see sections below for more details), made the research questions 2 and 3 difficult to answer using experimental Randomized Control Trial (RCT) methodology.

## Evaluation design and power analysis
## Selection of communities

The design used for this impact evaluation is that of a clustered randomized control trial (C-RCT) at community levels. Communities were firs selected in each district according to eligibility criteria and then randomly assigned to the one of the four treatment arms in the Province of Nampula and to the ECD treatment or control group in the provinces of Cabo Delgado and Tete. Two districts were selected to participate in the program in each province, namely Chiúre and Macomia in Cabo Delgado; Eráti and Memba in Nampula; and Changara and Angonia in Tete[5]. Communities were allocated randomly to one of the four following groups:
  (i)     Communities with ECD and nutrition intervention;
  (ii)    Communities with only ECD intervention;
  (iii)   Communities with only nutrition intervention
  (iv)    Control communities with no interventions.

As part of the phase 2, the project planned to provide 20 ECD centers per district, except in Cabo Delgado where the district of Macomia will receive 10 ECD centers while Chiùre will receive 30 centers. Remaining eligible communities were kept in case substitution would be needed, after exploratory field visits.

Random assignment of communities was as follows:

1. **Identification**. Prior to the beginning of the interventions, a listing of all eligible communities in selected districts and provinces was carried out based on administrative data available (Census, EMIS data, and information provided by the provinces).

2. **Random Assignment**. For the ECD intervention in the provinces of Cabo Delgado and Tete, eligible communities within a given district were randomly assigned to one of the following four groups:

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[5] Maps of the survey are given on annex A3.

*Phase 1:* Group of 30 communities per province receiving support from the selected third-party providers for launching and managing their preschools in the *first phase* the program;

*Phase 2:* Group of 40 communities per province receiving support from the selected third-party providers for launching and managing their preschools in the *second phase* of the program;

*Control:* Group of communities (their number varies per province, see table 1 for details) not receiving support from the selected third-party providers over the lifetime of the evaluation.

*Substitute:* Extra communities not selected in any of the group above.

For the province of Nampula (the only province concerned by a complementary nutrition program), within each district eligible communities were randomly assigned to one of the following six groups:

➢ *Outside of the evaluation:* Group of communities participating in the phase 1 of the ECD and nutrition programs;
➢ *T1:* Group of communities participating in the phase 2 of the ECD and nutrition programs;
➢ *T2:* Group of communities not participating in the ECD program but participating in Phase 2 of the nutrition program;
➢ *T3:* Group of communities participating in Phase 2 of the ECD program but not participating in the nutrition program;
➢ *Control:* Group of communities not participating in any phase of the ECD or nutrition programs;
➢ *Substitute:* Group of eligible communities not selected in none of the above groups and available in case substitution is needed.

Given the adjustments and delays that took place during the initial phase of the program, while the third-party providers were learning how to best deliver their mandate, Phase 1 communities have not been included in the study. Communities included in Phase 2 serve as the treatment group, and impacts of the preschool program and parenting classes will be assessed by comparing outcomes in Phase 2 communities to Control communities.

*Table 1: Number of community sampled in each district and treatment arms*

|  | Cabo Delgado | | Tete | | Nampula | |
|---|---|---|---|---|---|---|
|  | **Chiúre** | **Macomia** | **Angonia** | **Changara** | **Eráti** | **Memba** |
| ECD only | 30 | 8 | 20 | 20 | 10 | 10 |
| Nutrition only | - | - | - | - | 10 | 10 |
| ECD + Nutrition | - | - | - | - | 10 | 10 |
| Control | 29 | 9 | 20 | 20 | 10 | 10 |
| **Total** | **59** | **17** | **40** | **40** | **40** | **40** |

In the two participating districts of Cabo Delgado, the pool of eligible communities was finally not big enough to have a total of 80 communities after substitutions.

Once the random assignment had been made, all communities of the study, independently of the treatment assignment, were contacted and visited by field staff of the Ministry of Education and TPPs to ensure that communities complied with eligibility criterions and that no major difficulties prevented

access to the sites[6]. After those verifications, a total of 34 communities were not considered either eligible or accessible and had to be substituted randomly with communities available in the substitution group. Communities of substitution were then verified in their turn until the list is stabilized. Substitutions occurred mainly in Cabo Delgado and Nampula, provinces affected by flooding in 2015, making the access to certain communities particularly difficult even during the dry season. There is no evidence supporting a difference in the substitution process between control and treatment.

In total, **236 communities** were eventually selected to participate in the survey.

## Selection of households

With no household listing available at the time of the survey, a census of each community was carried out to identify households with children in the age range of 36 to 59 months (and children aged 0 to 35 months in Nampula). If the community was too big or widespread[7], the census took place only in the Enumeration Area where the Primary School was located. Enumeration Areas are geographical units defined by National Institute of Statistics of Mozambique (INE) as contiguous space or neighborhood containing between 80 and 120 households. Taking the list of households with at least one child in this age range, 24 households per community were selected randomly in Cabo Delgado and Tete. In Nampula, in addition to the 24 selected households, 13 households with at least one child aged between 0 and 35 months and no child between 36 and 59 months were selected in each community. A total of 6,171 households with preschool age children were sampled from the 236 evaluation communities in this baseline study.

*Table 2: Planned sample size per community*

| | N. of households to be selected per community | |
|---|---|---|
| | Hhs with at least a child between 36-59 months | Hhs with at least a child between 1-35 months <u>and</u> no other child between 36-59 months |
| Cabo Delgado | 24 | - |
| Nampula | 24 | 13 |
| Tete | 24 | - |

## Power analysis

Using data from the small-scale NGO led impact evaluation in Gaza province between 2008 and 2010 to estimate the observed standardized effect sizes and Intraclass Correlations (ICC) within communities for different outcomes of interest and using the established number of communities per treatment arm, we can compute the Minimum Detectable Effect (MDE) size for the ECD program (table 3). Without using other covariates, the expected MDE (for the ECD arm) is around one tenth of a standard deviation of the ASQ score observed at endline, for a power between 80% and 90%. Associated plot of power against size effect for different number of cluster and ICC, calibrated on the current baseline standardized ASQ scores, can be found in annex A2[8].

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[6] All communities had to be accessible by a four-wheel drive car loaded with basic construction material.
[7] Defined as with more than 200 households and located more 2km away from the Primary School.
[8] Using "Optimal Design", a free tool that performs such power calculations (see Raudenbush, S. W., et al. (2011): "Optimal Design Software for Multi-level and Longitudinal Research" (Version 3.01) [Software and Documentation]).

*Table 3: Minimum Detectable Effects (MDE) for various domains of child tests using the 2010 IE in Gaza*

| | Signif. Level | No. of Clusters | Cluster size | N | No. Treated | ICC | Mean | Std. Dev. | MDE in SD | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | | | | | | | | | 80% Power | 90% Power |
| Total Score | | | | | | 0.0362 | 282.357 | 64.819 | 0.101 | 0.117 |
| Gross Motor coord. | | | | | | 0.0375 | 56.247 | 10.376 | 0.102 | 0.118 |
| Precise Motor coord. | 0.05 | 236 | 24 | 5664 | 2832 | 0.0255 | 59.123 | 21.664 | 0.094 | 0.109 |
| Communication | | | | | | 0.0362 | 83.383 | 19.276 | 0.101 | 0.117 |
| Problem solving | | | | | | 0.0285 | 83.604 | 25.735 | 0.096 | 0.111 |

The complete universe of our study is composed of households located in one the 592 eligible communities across 6 districts with:

(i)     at least one child aged between 36 and 59 month (all three participating provinces);

(ii)    at least one child aged between 0 and 35 months and no other child between 36 and 59 months (Nampula province only.)

## Deviations from sample design

Random selection of communities had to be updated several times since the original design made in October 2013. Mainly, a new randomization was done in Changara district due to a change in the administrative borders: the original district of Changara was split in two creating a new district called Marara. As the implementation of Phase II was only planed for the district of Changara, new random selection was done in November 2014 for the communities of this district excluding any communities located in Marara. Other replacement of communities was successively done in December 2014, February 2015 and August 2016, based on updates from focal points located in the district and in order to insure compliance regarding the eligibility criteria as well as to ensure a minimum of accessibility conditions.  At each stage substitution was made randomly using a replacement group created *ex-ante*. In Cabo Delgado Province, the pool of replacement communities was not sufficient and 4 communities had to be dropped from the sample. From those 4 communities, 2 were originally part of Phase II. To keep constant the total number of participating communities in in the project, those communities were replaced by communities that are closest to the eligibility criteria: they have Primary Schools, and sufficient numbers of children aged between 3 and 5, but are located to close to the district capital (+/- 3km instead of a minimum 5km) to be eligible. Those communities[9] are then participating in the project but were not sampled in the impact evaluation survey for the sake of comparability.

In Nampula, the nutrition intervention in the communities began progressively from June 2015 after training the field staff and volunteers from March to May. Unfortunately, the last update from Save the Children nutrition team just before the data collection began showed that treatment and control communities included in the nutrition sample had been mixed up without following the original design. This may be due to the fact that the contract of the TPPs did not include the specific communities for intervention, but only a coverage at the district level.

Preliminary checks in the baseline data show that nutrition intervention has reached equally households in the treatment and control group confirming that the RCTs design has not been followed

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[9] Namely, Xinavane and Napala in the district of Macomia, Cabo Delgado.

in the field. The team decided to keep the sample of children aged 0-2 originally designed to measure the impact of the nutrition intervention (original research questions 2 and 3) in the hope of using quasi or non-experimental methods to assess the impact. Since for the nutrition arms the RCT design has not been respected, the TPP, in order to reduce its travel cost, could have been tempted to implement the nutrition program more frequently in communities in which they were already operating for ECD, independently of the original nutrition assignment. To ensure that control and ECD treatment groups have the same probability of receiving the nutrition program, we explore this hypothetical causality between the random ECD assignment and the effective nutrition assignment made by the TPP in Nampula throughout the last section on community characteristics. We found no evidence supporting of such pattern.

## Instruments

The following survey instruments were used:

(i)     a socio-economic questionnaire for the sampled household;
(ii)    a child test for the target child aged between 36 and 59 months within the households;
(iii)   a community leader questionnaire.


A more detailed description of the various instruments is presented below.

| Instruments | Sections of the instruments | N |
|---|---|---|
| **Socio-economic Questionnaire** | 1. Household general information | 6,171 households:<br>- 1,029 HHs with children between 0-2 9, and no other between 3 and 5;<br><br>- 5,142HHs with children between 3 and 5 |
| | 2. Education Information old. | |
| | 3.  Pregnancy and Pre-natal care of target children | |
| | 4. Infant food intake | |
| | 5. Learning environment | |
| | 6. Crops information | |
| | 7. Job section | |
| | 8. Transfer and consumption of the household | |
| | 9. Dwelling condition ad characteristics | |
| | 10. Asset and durable goods | |
| | 11. Parental situation of children | |
| | 12. Anthropometric measures of target children | |
| | 13. Contacts | |
| **Child test -Ages and Stages Questionnaire (ASQ)** | 1. Communications Skills | 5,142 |
| | 2. Gross motor coordination | |
| | 3. Fine motor coordination | |
| | 4. Problem solving skills | |
| | 5. Socio-personal skills | |
| **Community Leader Questionnaire** | 1. Information on the leader | 229 |
| | 2. Information on existing Pre-school centers | |
| | 3. Estimated distances from basic facilities | |
| | 4. Information on local crops | |
| | 5. Social capital in the community | |

The child test used in this study is a modified version of 4 questionnaires of the Ages and Stages Questionnaire (ASQ-2nd edition) (i.e. at 36 months, 42 months, 48 months, and 54 months). The ASQ is a test to measure whether children aged 3 to 5 have reached certain developmental milestones across five domains: communication, gross motor, fine motor, problem solving (similar to cognitive) and personal-social abilities. For each of the domains the questionnaire uses age-specific sections, dividing children aged 36 to 59 months into 4 groups of 6-month age intervals. It can be directly administered by the parent alone, or by an external assessor. In the context of our study, some items were assessed by the enumerator in direct observation of the target child, while items involving child behaviors that are typically delicate to observe in the context of a household visit were answered by the mother or caregiver. The version of the ASQ used in our survey is the same one that was adapted for the impact evaluation survey in Gaza. Different versions of the ASQ have been extensively adapted and used in several different conditions all over the world including for instance in Chile (Urzúa and Veramendi 2011), Ecuador (Handal et al. 2007), Cambodia (Bouguen et al. 2014) and Tanzania (Fernald et al. 2009) [10].

In order to assess the relevance and consistency of the questionnaires, a pilot test was conducted over three days in a rural community in the district of Boane between June 8 and June 10 2016 with two enumerators from INE. A first stage of modifications was carried out on the questionnaires, based on the feedback from this pilot.

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[10] Urzúa, Sergio, and Gregory Veramendi. 2011. "The Impact of Out-of-Home Childcare Centers on Early Childhood Development." Working Paper IDB-WP-240. Inter-American Development Bank.

Handal, Alexis J, Betsy Lozoff, Jaime Breilh, and Siobán D Harlow. 2007. "Effect of Community of Residence on Neurobehavioral Development in Infants and Young Children in a Flower-Growing Region of Ecuador." *Environmental Health Perspectives* 115 (1): 128–33

Bouguen, Adrien, Deon Filmer, Karen Macours, and Sophie Naudeau. 2014. "Preschools and Early Childhood Development in a Second Best World: Evidence from a Scaled-up Experiment in Cambodia." CEPR Discussion Paper No. DP10170.

Fernald, Lia C. H., Patricia Kariger, Patrice Engle, and Abbie Raikes. 2009. "Examining Early Child Development in Low-Income Countries : A Toolkit for the Assessment of Children in the First Five Years of Life." Working Paper No. 74771. Washington, DC: The World Bank.

# Data Collection

Data collection was carried out by the National Institute of Statistics (INE) in collaboration with the Ministry of Education and Human Development of Mozambique (MINEDH) and the World Bank. All questionnaires were designed using Survey Solutions, a Computer Assisted Personal Interviewer application (CAPI) developed by the World Bank and surveyors were equipped with an Android-based mini-tablet computer with a 7 inches touchscreen.

## Training and pre-test

Enumerator training were held in the city of Nampula, between July 14 and August 4, 2016. MINEDH was responsible for all the logistics of the training while INE was responsible for the content and planning. The training delivered to 55 enumerators, of whom 48 were then selected to participate in the data collection. Enumerators were hired locally by INE's provincial delegations in each province in order to ensure that surveyors were fluent in the languages spoken in the communities of the sample. The training covered usage of the tablet and its survey application, administration of household's questionnaire, child test and community leader questionnaire, along with anthropometric measurement techniques and use of GPS devices. Three days of pre-test were conducted in field at the end of the training. The purpose of the pre-test was threefold: (i) to give the opportunity to the candidates to practice using the survey instrument in real-world conditions, (ii) to assess the ability of the candidates to interact with households, (iii) to identify and correct potential errors or inconsistencies remaining in the questionnaires and ensure that the instruments were adapted to the local context.

By the end of the training, all enumerators and supervisors were assessed on their knowledge of enumeration techniques and the content of the questionnaires. Enumerators were then selected based on their performance and province of origin. Six teams of seven enumerators and one supervisor were formed and allocated across each of the six districts. Supervisors were selected among the pool of candidates, and were those who showed the best understanding of the survey instruments and sampling methodology and exhibited the leadership skills needed for managing the team of enumerators in the field during data collection.

## Fieldwork and data cleaning

Data collection was carried out simultaneously in the six districts from September 9 to December 30 2016.

The fieldwork protocol stipulated that MINDEH's staff informed community leaders a few days in advance of the visit of the enumerators. Once the surveyor's team arrived in the community, after meeting the community leader or representatives, the first step was to conduct a census of the community. To this end, supervisors were given maps by the National Institute of Statistics containing the exact limits of the enumeration area and the community. Equipped with the map and accompanied by the community leader or designated local inhabitants, the supervisor would explore the boundaries of the community and localize all the neighborhoods. Afterwards, enumerators were allocated to houses and listed all eligible households in the area. The enumerators listed information about the number of household members and about the existence of a target age child. Once the

census was completed, households with eligible children were selected via a random table by the supervisor. That insured that selection of eligible households was made at random.

Enumerators were then assigned to randomly selected households and carried out the questionnaire and child test. Enumerators were equipped with pedagogical material necessary for the administration of the ASQ: pencil and paper, string and beads, wooden cubes, and small balls made locally from plastic wrap and string. Anthropometric measures were taken at the end of the interview by the supervisor himself using the same equipment and methodology[11] as in the Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Survey (MICS) from UNICEF. The field supervisor was also responsible for carrying out the community leader questionnaire and for the review of all the information collected by the enumerators in her/his team. It took, in average, 2 days for a team of 7 enumerators and one supervisor to census and survey a community.

Once a questionnaire was completed by an enumerator, information would be saved in the tablet device's memory, pending to be reviewed by the field supervisor. At the end of the day, when all the questionnaires contained in the tablet had been validated by the supervisor, the enumerator would synchronize the device and all completed questionnaires would then be sent to an allocated server through internet, using a 3G connection[12]. Once a tablet had been synchronized on the server, data would be appear on a supervisor platform and was reviewed by INE's staff at a central level. Reviewers would in turn accept or reject the questionnaire if mistakes or inconsistencies were detected. If rejected, the questionnaire would be sent back to the tablet of the enumerator with comments about the reason for the rejection. The enumerator would then correct the information and/or provide explanatory notes on odd or impossible answers. After correcting and interview, enumerator would then send the questionnaire back to the reviewer for approval or rejection, a process that continues until the assignments are completed with the highest level of quality, as according to the reviewer. Once the reviewer was satisfied with the interview, data would then be sent to the field coordinator for final approval at headquarter level as represented in Figure 1.

The Survey Solutions application records both data and meta-data. Meta-data includes data on how the questionnaire has been administered by the interviewer. Every action carried out by the interviewer on the tablet is saved in a specific meta-data file along with a specific timestamp for each action.

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[11] See: ICF International. 2012. MEASURE DHS Biomarker Field Manual. Calverton, Maryland, U.S.A.: ICF International.

[12] Most of the communities included in the study had a fair 3G coverage and data could always been synchronized within two days after being collected.

*Figure 1: Overview of the survey workflow*
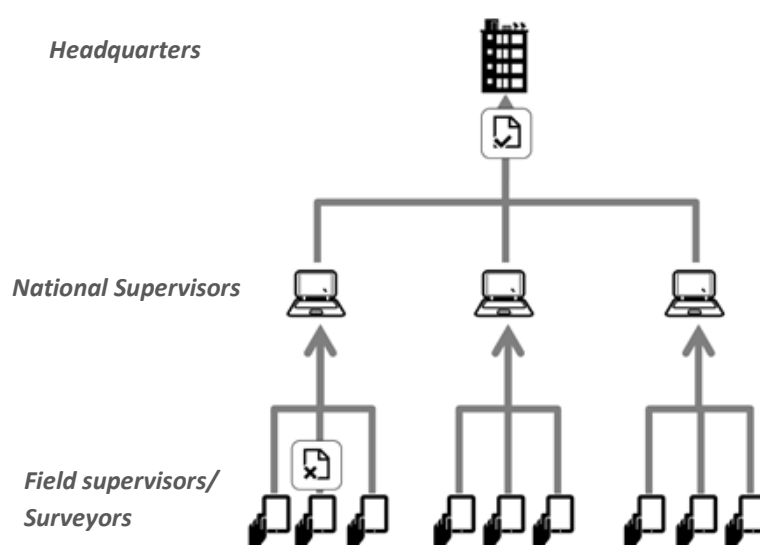


After all questionnaires were reviewed and the fieldwork completed, datasets were downloaded from the server and cleaned from remaining inconsistencies. At this stage, it appeared that one community in the district of Angonia in Tete province had been mixed up with another community of the same name but located in another area. Data collected from this community had to be eliminated from the dataset.

It is worth noting that the surveyors from Tete province performed significantly lower than the rest of the group and that conflict in the province at the time of the field work made the supervision task much more difficult than in the other provinces. Therefore, data from Tete should be handle cautiously.

# Data Analysis

This chapter provides descriptive statistics from the collected data from the household questionnaire, child test, anthropometric measures and community leader questionnaire. The main objectives are to analyze to what extend the randomization of communities was performed successfully and to give a snapshot of the socioeconomic characteristics of the study sample. Since randomized assignments of the nutrition arm of the project were not followed by the implementing NGO, the following sections focus to the balance of the ECD sample between treatment and control groups. This latter sample includes all selected households in the participating districts of the provinces of Cabo Delgado, Nampula and Tete with at least a child between 36 and 59 months. Unless otherwise stated, analyses below concern only this latter sample. We shall mention *nutrition sample* when refereeing to households with at least a child between 0 and 35 months without other children in 36-59 age range in Nampula[13].

Table 4 reports the average number of households successfully sampled in our survey, along with the p-value of the test of comparison of mean between ECD control and treatment arm. The sample size is well balanced across both groups. The average number of interviews per community in the province of Tete is significantly lower than in Cabo Delgado and Nampula, with an average of 5.87 households

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[13] This is actually an abridged way to identify households with ECD target children. Nutrition target children are children between 0 and 36 months in Nampula, even if located in a household with children in preschool age.

less than the 24 required per community. Two reasons could explain this feature: (i) the districts of Angonia and Changara are subject to seasonal activities (e.g. culture of tobacco) leading households to be more often absent during the field visit, (ii) the enumerators did not follow the pre-visit protocol scrupulously[14].

Table 4: Average number of households sampled by communities

|  | Control | Treatment | Overall | p-value | N |
|---|---|---|---|---|---|
| Cabo Delgado | 23.92 | 23.92 | 23.92 | 1.00 | 76 |
| Nampula- ECD sample | 23.20 | 24.10 | 23.65 | 0.40 | 80 |
| Nampula- Nutrition sample | 12.65 | 13.08 | 12.86 | 0.46 |  |
| Tete | 16.39 | 19.83 | 18.13 | 0.50 | 79 |
| Total number of communities | **117** | **118** | **-** | **-** | **235** |

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[14] Interviewers selected in Tete performed globally lower than their colleagues from other provinces.

# Socioeconomic Data

## Household definition and structure

A household was considered as any group of people who share the same dwelling and share at meals or living accommodation regularly. In order to guide the enumerator to identify members of the households, guiding questions were inserted before the roster.

Among households with at least one child aged between 3 and 5, the average household size is 5.09 members (table 5). In Nampula Province, households with at least one child aged between 0 and 2 (and no children aged between 3 and 5), average household size is significantly smaller with 4.73 members on average. These figures are consistent with the last census data of 2007, although slightly lower[15].

*Table 5: Household Size per Province for household having at least a child aged between 3 and 5*

| Province | Mean | Median | min | max | sd | N |
|---|---|---|---|---|---|---|
| CABO DELGADO | 5.12 | 5 | 2 | 18 | 1.62 | 1818 |
| NAMPULA | 4.98 | 5 | 2 | 10 | 1.44 | 1892 |
| TETE | 5.18 | 5 | 2 | 13 | 1.64 | 1432 |
| Total | 5.09 | 5 | 2 | 18 | 1.56 | 5142 |

Figure 2 shows the distribution of household size in the ECD sample. Most of households, 51.4%, have between 4 and 5 members.

*Figure 2: Household Size distribution for households having at least a child aged between 3 and 5*



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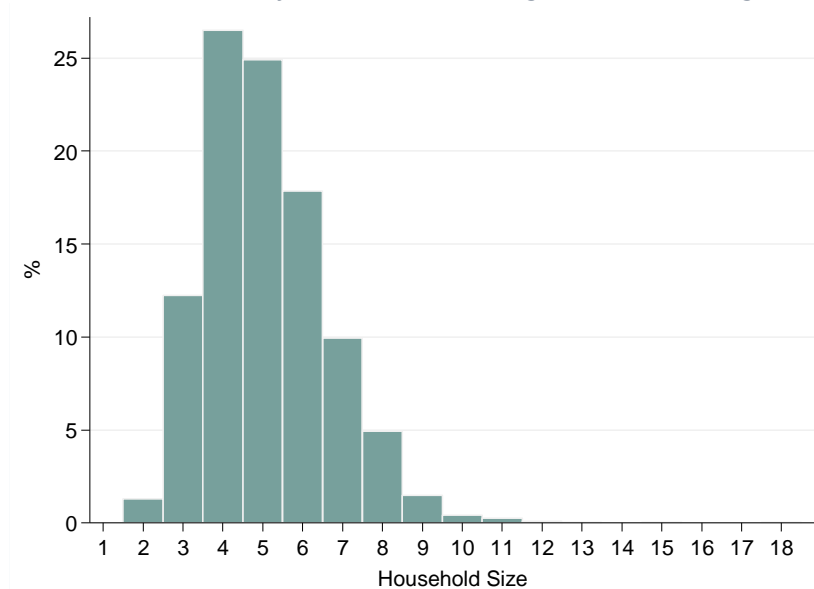
[15] In the districts included in the survey, the average household size in the Population Census in 2007 is 5.3 members in Cabo Delgado, 5.5 in Tete and 5.1 in Nampula, for households with at least a child aged between 3 and 5.

## Head of household characteristics

Table 6 displays characteristics of the head of the households for the ECD sample. The mother of the target child between 3 and 5 is declared to be the head in 13.7% of the households in control communities. This is 2.3 percentage points higher than the treatment communities and significant at 5%-level. Head of household are generally men (in 84.2% of the cases), and are aged 37 years on average. Illiteracy concerns 61.7% of the heads of households as 34% of them were never enrolled in school and around 65% never completed basic primary education. Figure 3, shows the distribution of highest education level reached by the head of the households, by level of education.

The most spoken language in our survey is Makuwa (in 67% of the households), a Bantu language well spread among people living north of the Zambezi River in Mozambique, mainly in Nampula and part of Cabo Delgado, where respectively 99,6% and 86.6% of the households surveyed speaks Makuwa. In Tete, the most common languages of our survey are Nyungwe in Changara (spoken by 84% of the households in this district) and Chinyanja (spoken by 98% of the households).

*Figure 3: Highest Education Level of Head of Household*
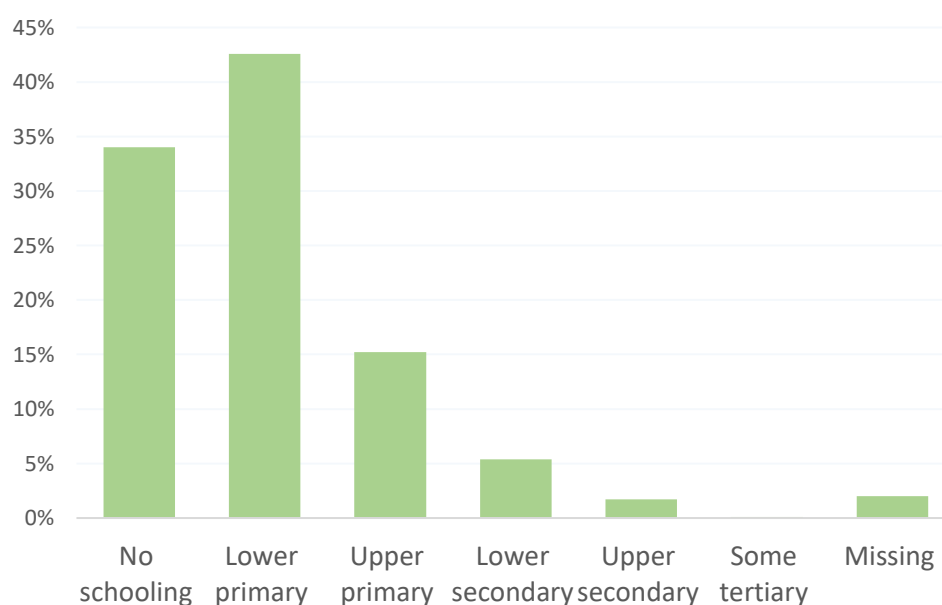
*Table 6: Head of Households Characteristics*

| | (1) Control | (2) Treatment | (3) Overall | (1) vs. (2) p-value | N |
|---|---|---|---|---|---|
| *Household composition* | | | | | |
| Household size | 5.121 | 5.054 | 5.086 | 0.284 | 5142 |
| Number of children aged 0-18 living in the household | 3.096 | 3.029 | 3.061 | 0.241 | 5142 |
| Number of children aged 3-5 living in the household | 1.081 | 1.060 | 1.070 | 0.011 | 5142 |
| *Head of Household characteristics* | | | | | |
| Is the mother of the target child (3-5) | 0.137 | 0.113 | 0.124 | 0.028 | 5142 |
| Female | 0.176 | 0.141 | 0.158 | 0.007 | 5142 |
| Male | 0.824 | 0.859 | 0.842 | 0.007 | 5142 |
| Age | 37.063 | 37.035 | 37.049 | 0.944 | 5046 |
| Is illiterate | 0.618 | 0.617 | 0.617 | 0.966 | 5039 |
| Speaks Portuguese | 0.363 | 0.349 | 0.356 | 0.508 | 5046 |
| *Highest education level* | | | | | |
| No schooling | 0.342 | 0.339 | 0.340 | 0.847 | 5037 |
| Less than lower primary | 0.001 | 0.003 | 0.002 | 0.271 | 4932 |
| Lower primary | 0.432 | 0.420 | 0.426 | 0.405 | 4932 |
| Upper primary | 0.149 | 0.155 | 0.152 | 0.616 | 4932 |
| Lower secondary | 0.049 | 0.059 | 0.054 | 0.205 | 4932 |
| Upper secondary | 0.020 | 0.015 | 0.017 | 0.312 | 4932 |
| Some tertiary | 0.001 | 0.000 | 0.001 | 0.531 | 4932 |
| Missing | 0.018 | 0.023 | 0.020 | 0.261 | 5142 |
| *Marital status* | | | | | |
| Single | 0.060 | 0.051 | 0.055 | 0.287 | 5142 |
| Married | 0.179 | 0.164 | 0.171 | 0.391 | 5142 |
| Marital union | 0.626 | 0.658 | 0.643 | 0.145 | 5142 |
| Polygamous union | 0.077 | 0.072 | 0.074 | 0.587 | 5142 |
| Divorced | 0.007 | 0.010 | 0.009 | 0.249 | 5142 |
| Separated | 0.029 | 0.026 | 0.028 | 0.447 | 5142 |
| Widower | 0.021 | 0.020 | 0.020 | 0.715 | 5142 |
| *Language spoken at home* | | | | | |
| Makuwa | 0.677 | 0.670 | 0.673 | 0.898 | 5137 |
| Cinyanja | 0.110 | 0.163 | 0.137 | 0.312 | 5137 |
| Nhugwe | 0.126 | 0.108 | 0.117 | 0.380 | 5137 |
| Kimwani | 0.034 | 0.013 | 0.023 | 0.404 | 5137 |
| Makonde | 0.027 | 0.018 | 0.022 | 0.437 | 5137 |
| Cinyungwe | 0.006 | 0.019 | 0.013 | 0.420 | 5137 |
| Others  language | 0.020 | 0.009 | 0.014 | 0.172 | 5137 |

*Notes:* The p-values of the orthogonality tests are reported in the fourth column. Residuals of the test are clustered at community level, except for language variables for which the residuals were clustered at district level. The last column from the right indicates the number of non-missing observations used for the tests.

## Respondents' characteristics

Household questionnaires were primarily administered to the caregiver of the target child which was defined as the person in the household spending the most time with the child. In almost 78% of interviews, the respondent was the biological mother of the target child between 3 and 5 years old (table 7). Eighty three percent of the caregivers were female, 81% declared to be illiterate, and 78% declared to not having completed elementary education. Only 16% of caregivers reported to know how to speak Portuguese, the official teaching language in Mozambique. Figures 4 shows the distribution of the caregivers 'age.

*Table 7: Respondent's Characteristics*

|  | (1) | (2) | (3) |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Control** | **Treatment** | **Overall** | **(1) vs. (2) p-value** | **N** |
| *Respondent's characteristics* |  |  |  |  |  |
| Is the mother of the target child (3-5) | 0.775 | 0.776 | 0.776 | 0.926 | 5141 |
| Female | 0.833 | 0.834 | 0.833 | 0.971 | 5141 |
| Male | 0.167 | 0.166 | 0.167 | 0.971 | 5141 |
| Age | 32.272 | 32.072 | 32.169 | 0.526 | 5118 |
| Is illiterate | 0.803 | 0.816 | 0.810 | 0.442 | 5090 |
| Speaks Portuguese | 0.165 | 0.147 | 0.156 | 0.238 | 5039 |
| *Highest education level* |  |  |  |  |  |
| No schooling | 0.456 | 0.466 | 0.462 | 0.621 | 5111 |
| Less than lower primary | 0.002 | 0.005 | 0.004 | 0.115 | 5092 |
| Lower primary | 0.413 | 0.399 | 0.406 | 0.418 | 5092 |
| Upper primary | 0.098 | 0.091 | 0.094 | 0.500 | 5092 |
| Lower secondary | 0.022 | 0.030 | 0.026 | 0.220 | 5092 |
| Upper secondary | 0.007 | 0.007 | 0.007 | 0.824 | 5092 |
| Some tertiary | 0.000 | 0.000 | 0.000 | 0.317 | 5092 |
| Missing | 0.004 | 0.003 | 0.004 | 0.713 | 5141 |

*Notes:* The p-values of the orthogonality tests are reported in the fourth column. Residuals of the test are clustered at community level. The last column from the right indicates the number of non-missing observations used for the tests.

*Figure 4: Distribution of caregivers' age*

## Mothers' characteristics

Table 8 presents characteristics of the target child's mother. Biological mothers of the targeted children are on average 30 years-old and extremely lowly educated. More than 90% of the mothers do not speak Portuguese and more than half never went to school. Mothers in the ECD control group declared speaking Portuguese 2.2 percentage point more than in the treated group (significant at 5% level). However, education level seems well balanced across groups.

*Table 8: Target mother's characteristics*

| | (1) | (2) | (3) | | |
| | **Control** | **Treatment** | **Overall** | **(1) vs. (2) p-value** | **N** |
|---|---|---|---|---|---|
| *Mother's Characteristics* | | | | | |
| Age | 30.492 | 30.365 | 30.426 | 0.586 | 4767 |
| Is illiterate | 0.860 | 0.872 | 0.866 | 0.386 | 4762 |
| Speaks Portuguese | 0.104 | 0.082 | 0.092 | 0.049 | 4703 |
| *Highest education level* | | | | | |
| No schooling | 0.506 | 0.507 | 0.506 | 0.979 | 4783 |
| Less than lower primary | 0.003 | 0.004 | 0.004 | 0.456 | 4773 |
| Lower primary | 0.390 | 0.388 | 0.389 | 0.927 | 4773 |
| Upper primary | 0.079 | 0.070 | 0.074 | 0.338 | 4773 |
| Lower secondary | 0.015 | 0.025 | 0.020 | 0.058 | 4773 |
| Upper secondary | 0.006 | 0.004 | 0.005 | 0.548 | 4773 |
| Some tertiary | 0.000 | 0.000 | 0.000 | 0.317 | 4773 |
| Missing | 0.002 | 0.002 | 0.002 | 0.908 | 4808 |

*Notes:* The p-values of the orthogonality tests are reported in the fourth column. Residuals of the test are clustered at community level. The last column from the right indicates the number of non-missing observations used for the tests.
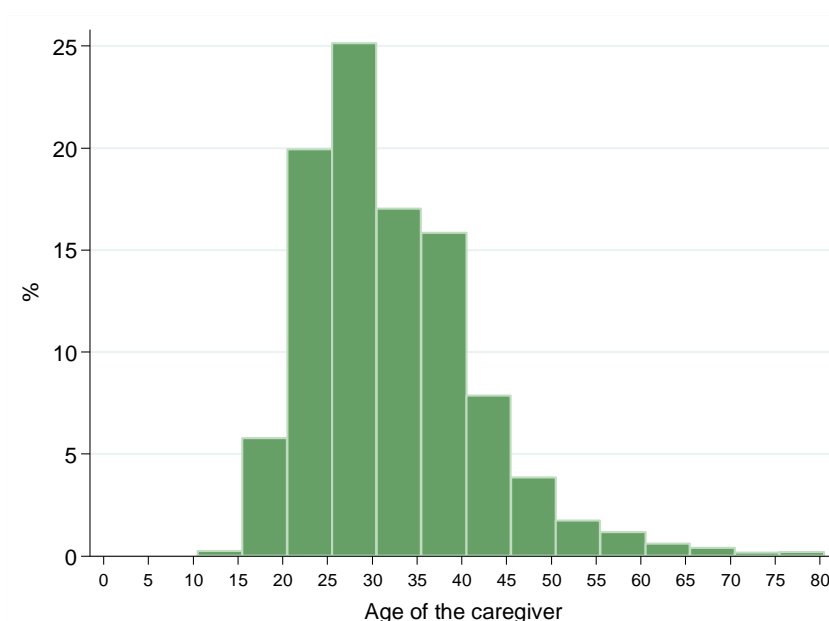
## Children's characteristics

Table 9 displays characteristics of: targeted children, all children between 3 and 5 years old, children from 6 to 12 years old along with the proportion of children aged 6 or 7 currently enrolled at primary school. The sample seems well balanced across gender and treatment status. Enrollment at preschool for children aged 3 to 5 is extremely low as only 30 children within this age range reported having been to preschool. Although theoretical enrollment at preschool should be zero since to be eligible a community has to have no prior ECD program and that at baseline preschools were not open yet, this 0.6% of preschool enrollment might be due to a measurement error or to the fact that children were enrolled in other communities before. Primary school enrolment rates for children aged 6 to 12 is extremely low at 54.7% compared to 89.1% of Net Enrollment Ratio for Mozambique in 2005 (UNESCO, UIS). Moreover, only 37.5% of children aged 6 to 7 are currently enrolled in primary school and 37.9% of the children enrolled at school are studying in a grade appropriates to their age. There is a small and significant (at 5%-level) difference of 0.8 percentage point among children aged 3 to 5 who speak Portuguese across control and treatment groups.

*Table 9: Children characteristics*

|  | (1) | (2) | (3) | | |
|  | **Control** | **Treatment** | **Overall** | **(1) vs. (2) p-value** | **N** |
|---|---|---|---|---|---|
| *Children aged 3 to 5* | | | | | |
| Female | 0.490 | 0.492 | 0.491 | 0.891 | 5503 |
| Male | 0.510 | 0.508 | 0.509 | 0.891 | 5503 |
| Age | 3.558 | 3.536 | 3.546 | 0.158 | 5503 |
| Speaks Portuguese | 0.021 | 0.013 | 0.017 | 0.035 | 5336 |
| Is/was enrolled at preschool | 0.006 | 0.006 | 0.006 | 0.762 | 5499 |
| *Target children aged 3 to 5* | | | | | |
| Female | 0.489 | 0.494 | 0.492 | 0.723 | 5142 |
| Male | 0.511 | 0.506 | 0.508 | 0.723 | 5142 |
| Age | 3.462 | 3.465 | 3.464 | 0.877 | 5142 |
| Speaks Portuguese | 0.021 | 0.013 | 0.017 | 0.051 | 4981 |
| Is/was enrolled at preschool | 0.006 | 0.006 | 0.006 | 0.847 | 5138 |
| *Children aged 6 to 12* | | | | | |
| Female | 0.475 | 0.483 | 0.479 | 0.521 | 6053 |
| Male | 0.525 | 0.517 | 0.521 | 0.521 | 6053 |
| Age | 8.445 | 8.478 | 8.462 | 0.459 | 6053 |
| Speaks Portuguese | 0.056 | 0.050 | 0.053 | 0.536 | 5901 |
| Is/was enrolled at preschool | 0.010 | 0.012 | 0.011 | 0.647 | 6048 |
| Is/was enrolled at School | 0.597 | 0.624 | 0.611 | 0.242 | 6044 |
| Currently enrolled at school | 0.531 | 0.562 | 0.547 | 0.230 | 6053 |
| Appropriate grade for age | 0.370 | 0.387 | 0.379 | 0.519 | 6053 |
| Is illiterate | 0.931 | 0.934 | 0.932 | 0.734 | 6007 |
| *Children aged 6 to 7* | | | | | |
| Currently enrolled at school | 0.361 | 0.389 | 0.375 | 0.365 | 2345 |

*Notes:* The p-values of the orthogonality tests are reported in the fourth column. Residuals of the test are clustered at community level. The last column from the right indicates the number of non-missing observations used for the tests.

*Figure 5: Enrollment Rates by Age and Treatment Status*
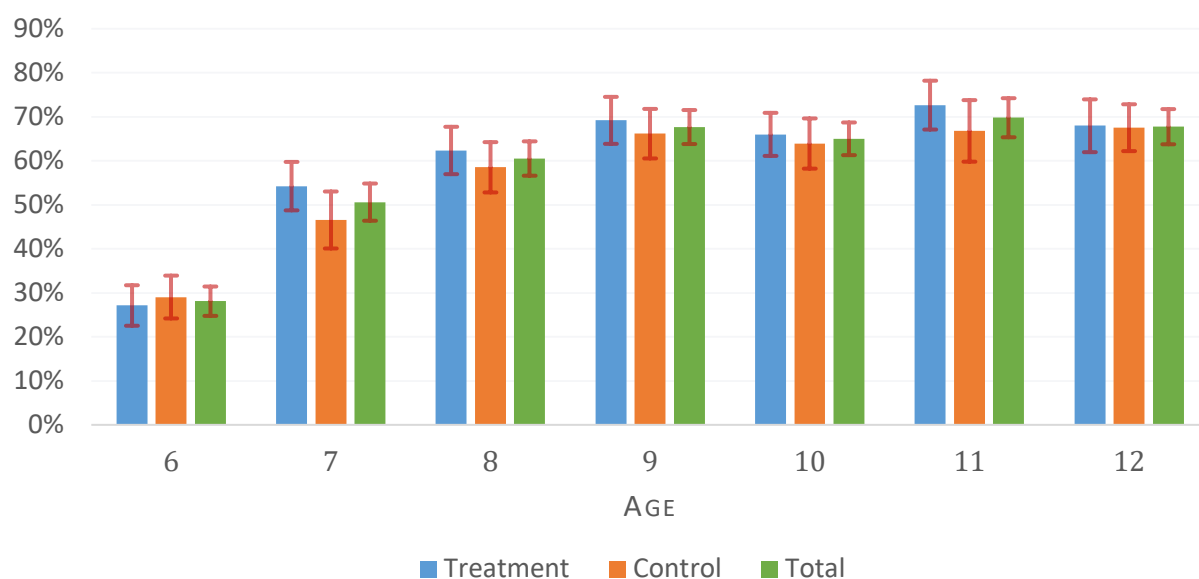
Enrollment rates vary substantially across age and provinces and means in Table 8 are concealing those disparities. Figures 5 shows enrollment rates at primary school by age and treatment status. While school enrollment does not reach 30% for children aged 6 (the official age of entrance), it stabilizes around 70% at age 9. One of the objectives of the ECD program is to enhance school readiness and facilitate early school enrollment by creating a bridge between preschool and primary school. Parents are then encouraged to enrolled their children immediately following completion of preschool.



*Figure 6: Enrollment Rate by Age and Province*
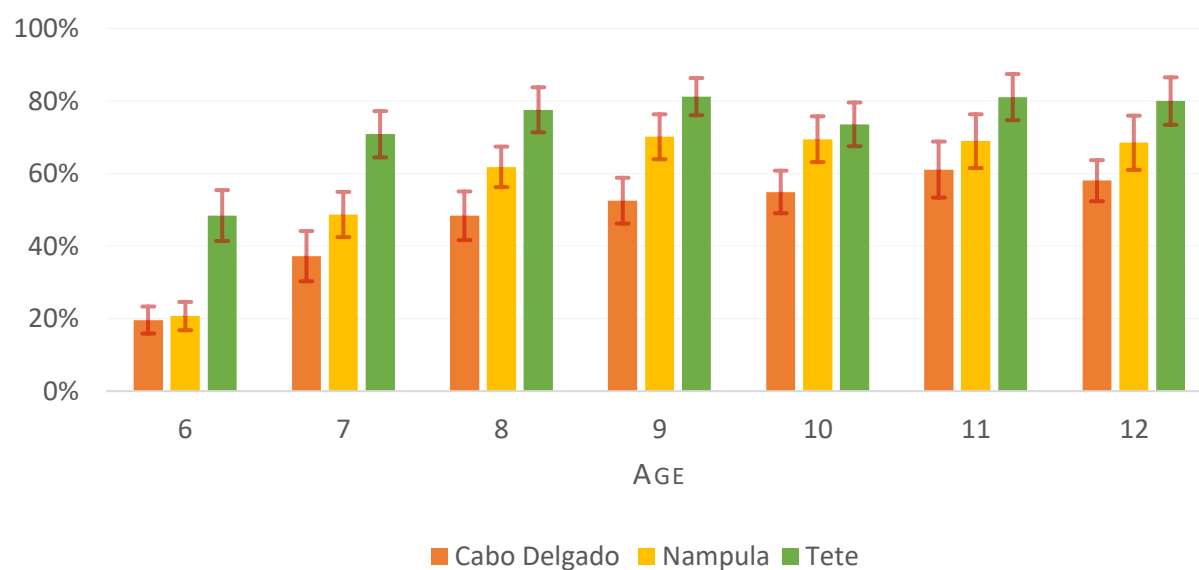
## Child health card

The Mozambican health card contains a rich set of health variables that are recorded during visits to the local health post. The card provides information about pre-natal visits, place of birth and complications during pregnancy, as well as vaccination history. For this study, we did not collect the vaccination history. If necessary, this can be collected at follow up survey, as the card provides the dates of each vaccination.

The respondent was asked to show the target child's health card at the beginning of the interview. If the health card was available, the enumerator filled the questionnaire with the information from the health card. If it was not available, the respondent was called to remember the date of birth, place of delivery, and type of birth. Target children were registered in the civil registry in 43% of households and had a birth card available in 38% (table 9). Civil registration is generally needed to enroll in primary school and to get any official document.

The vast majority of mothers, 90.7%, did prenatal visits during the pregnancy of the target child. The average number of visit was 3.4 and 67.9% of mothers received a treatment to prevent malaria during pregnancy. Mothers from control communities gave birth through vaginal delivery slightly more often (2.2 percentage points significant at 1%-level) than mothers from the treatment group.

*Table 10: Pregnacy and pre-natal care*

|  | (1) | (2) | (3) |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Control | Treatment | Overall | (1) vs. (2) p-value | N |
| Target child birth has been registered | 0.456 | 0.405 | 0.430 | 0.108 | 5141 |
| Birth card of target is available | 0.387 | 0.379 | 0.383 | 0.748 | 5141 |
| Weight at birth | 2.892 | 2.943 | 2.918 | 0.111 | 1297 |
| Gestational Age in weeks | 36.646 | 36.597 | 36.622 | 0.695 | 1115 |
| Gestational Age in months | 9.020 | 9.020 | 9.020 | 0.993 | 914 |
| *Birthplace* |  |  |  |  |  |
| Home | 0.416 | 0.448 | 0.432 | 0.436 | 1970 |
| On the way | 0.024 | 0.032 | 0.028 | 0.291 | 1970 |
| Maternity | 0.560 | 0.518 | 0.539 | 0.305 | 1970 |
| Other place | 0.000 | 0.002 | 0.001 | 0.152 | 1970 |
| *Type of delivery* |  |  |  |  |  |
| Normal | 0.989 | 0.967 | 0.978 | 0.004 | 1970 |
| Caesarean | 0.007 | 0.015 | 0.011 | 0.141 | 1970 |
| Breech | 0.002 | 0.012 | 0.007 | 0.006 | 1970 |
| DK | 0.002 | 0.006 | 0.004 | 0.165 | 1970 |
| *Prenatal consultations and treatments* |  |  |  |  |  |
| Mother did some prenatal visit (yes=1) | 0.908 | 0.905 | 0.907 | 0.839 | 4988 |
| Month of pregnancy for the first pre-natal consultation | 4.448 | 4.448 | 4.448 | 0.989 | 4293 |
| How many prenatal visit did the mother do | 3.379 | 3.527 | 3.455 | 0.107 | 4515 |
| Treatment to prevent malaria during the pregnancy (yes=1) | 0.688 | 0.671 | 0.679 | 0.424 | 4908 |

*Notes:* The p-values of the orthogonality tests are reported in the fourth column. Residuals of the test are clustered at community level. Last column from the right indicates the number of non-missing observations used for the tests.

## Child feeding

Respondents were asked to report the diet of the target child the day before the visit. Interviewers also asked if the child was breastfed during infancy. Target children were almost all breastfed (98.4%). Table 11 reports food intake of target children in treatment and control groups. Data shows significant imbalance of 5.2 percentage points in the consumption of dark leaves in favor of the treatment groups.

*Table 11: Food intake of target child*

|  | (1) Control | (2) Treatment | (3) Overall | (1) vs. (2) p-value | N |
|---|---|---|---|---|---|
| Target child has been breastfed | 0.981 | 0.986 | 0.984 | 0.198 | 5133 |
| *Liquid consumption of Target yesterday (night & day)* |  |  |  |  |  |
| Water | 0.990 | 0.992 | 0.991 | 0.572 | 5138 |
| Infant formula | 0.009 | 0.012 | 0.011 | 0.484 | 4957 |
| Milk (tinned/powdered/fresh) | 0.022 | 0.013 | 0.018 | 0.111 | 4947 |
| Juice | 0.104 | 0.085 | 0.094 | 0.131 | 4957 |
| Clear broth | 0.009 | 0.004 | 0.006 | 0.051 | 4945 |
| Yogurt | 0.004 | 0.002 | 0.003 | 0.468 | 4957 |
| Thin porridge | 0.318 | 0.324 | 0.321 | 0.835 | 4986 |
| Liquids such as soda | 0.041 | 0.051 | 0.046 | 0.281 | 4959 |
| Any other local liquids | 0.112 | 0.096 | 0.104 | 0.306 | 4965 |
| *Food eaten by target child yesterday* |  |  |  |  |  |
| Foods made from grains | 0.979 | 0.983 | 0.981 | 0.480 | 5065 |
| Pumpkin, carrots, squash, or sweet potatoes | 0.093 | 0.079 | 0.085 | 0.459 | 4949 |
| Foods made from roots | 0.193 | 0.199 | 0.196 | 0.817 | 5050 |
| Any dark green leafy vegetables | 0.492 | 0.554 | 0.524 | 0.024 | 5034 |
| Ripe mangos, ripe papayas | 0.275 | 0.270 | 0.273 | 0.894 | 4955 |
| Any other fruits or vegetables | 0.111 | 0.127 | 0.119 | 0.253 | 4964 |
| Liver, kidney, heart, or other organ meats | 0.014 | 0.013 | 0.013 | 0.786 | 4944 |
| Any meat | 0.068 | 0.087 | 0.078 | 0.115 | 4957 |
| Eggs | 0.042 | 0.056 | 0.049 | 0.238 | 4937 |
| Fresh or dried fish, shellfish, or seafood | 0.399 | 0.401 | 0.400 | 0.964 | 5001 |
| Foods made from beans/peas/lentils/nuts/seed | 0.405 | 0.413 | 0.409 | 0.740 | 5003 |
| Cheese, yogurt, or other milk products | 0.010 | 0.008 | 0.009 | 0.441 | 4936 |
| Any oil, fats, or butter | 0.333 | 0.294 | 0.313 | 0.074 | 5028 |
| Any sugary foods such as chocolates, sweets | 0.030 | 0.025 | 0.028 | 0.461 | 4942 |
| Condiments for flavor (chilies/spices/herbs) | 0.405 | 0.337 | 0.370 | 0.062 | 5022 |
| Grubs, snails, or insects | 0.012 | 0.016 | 0.014 | 0.255 | 4940 |
| Foods made with red palm oil/red palm nut | 0.048 | 0.053 | 0.050 | 0.529 | 4971 |
| Other food non-listed | 0.046 | 0.041 | 0.043 | 0.657 | 4906 |
| Number of meals of target child yesterday | 2.391 | 2.387 | 2.389 | 0.920 | 5140 |

*Notes:* The p-values of the orthogonality tests are reported in the fourth column. Residuals of the test are clustered at community level. The last column from the right indicates the number of non-missing observations used for the tests.

Traditional diet in Northern Mozambique is mainly based on cassava, corn and leaves. A typical day, starts with consumption of thin porridge (called *papinha*) and the meal during the day often includes a thick porridge made out of corn (or more rarely cassava) with a sauce made out of leaves (generally cassava or pumpkin leaves). Green peas and beans are also frequently eaten. Figure 7 displays the frequency of consumption of different food groups. The main source of proteins is often fish completed to a lesser extent by green peas. Meat and eggs are consumed more scarcely.

Fish is more highly consumed in Nampula (consumed by 63% of target on the previous day) and Cabo Delgado (37%) compared to Tete (15%) which has no access to the sea. Milk is barely consumed in Cabo Delgado (0.6%) and Nampula (0.5%) and infrequently in Tete (5%). Consumption of fruits such as mango and papaya is common in Cabo Delgado and Nampula (resp. 36% and 37%) and rather uncommon in Tete (3%).

*Figure 7: Food consumed by target child the day before the visit*
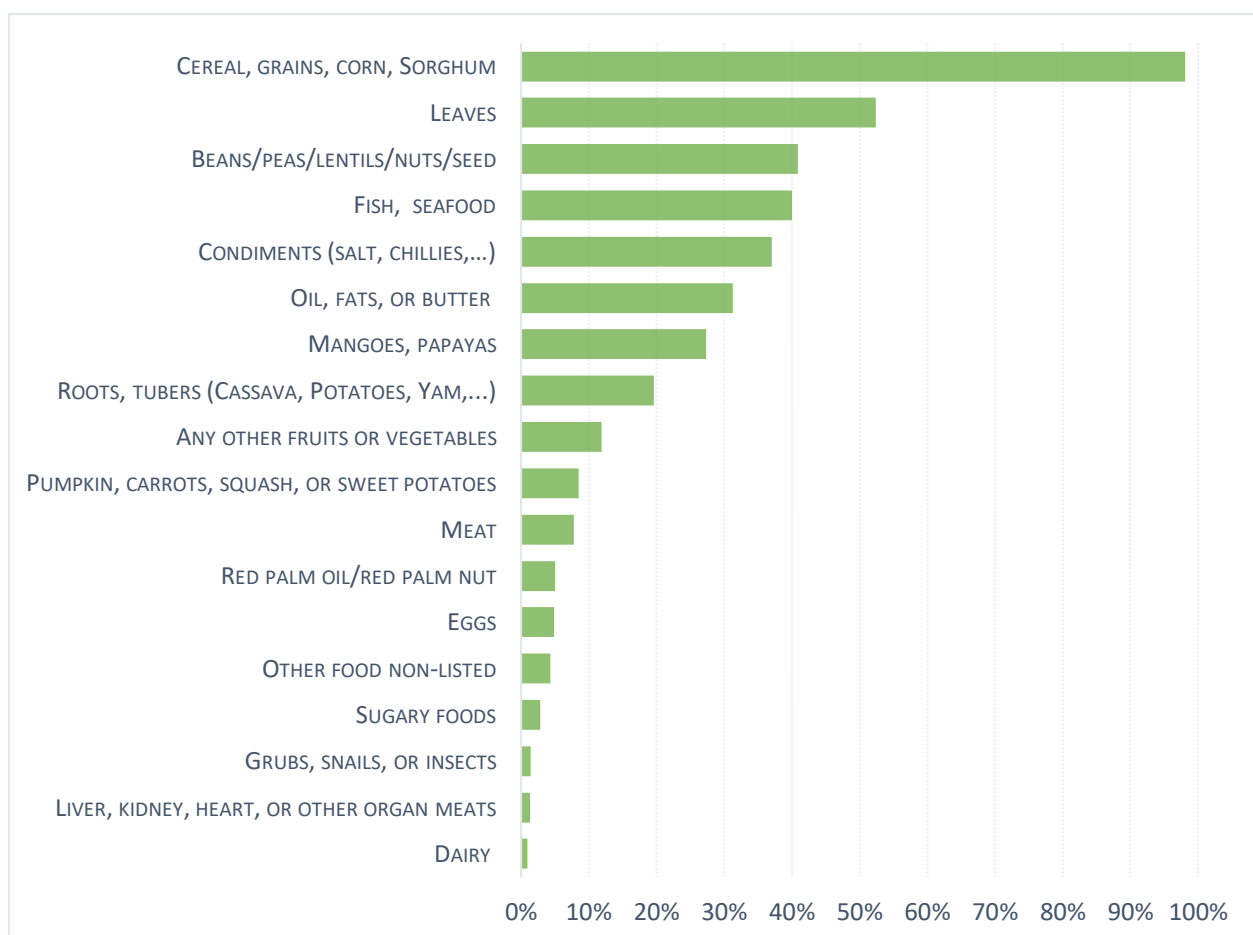
## Child stimulation, family care practices and learning environment

Home environment plays a critical role for proper early stimulation of children. Household care practices during the first five years of life have a strong influence on children's motor, language, cognitive and socio-emotional development trajectories. These developmental domains lay the foundation for children's future development, behavior, and functioning[16].

To assess the quality of stimulation and learning in the home environment of the target children, household questionnaire made use of some Family Care Indicators (FCIs) items. The FCIs were developed for UNICEF's MICS study to measure home stimulation in large populations and were derived from the Home Observations for Measurement of the Environment (HOME)[17].

Frequency of responses of learning environment are displayed in Table 12. Most of children play with objects found in the household (88.6%), with home-made toys (71.3%), and animals from the household (70.6%). Over two-thirds (69.3%) of the children had 'toys for moving around', which are generally home-made balls made by the children themselves, from plastic wrap and string found in the vicinity. Home-made toys are frequent (71.3%) and children largely don't possess toys bought externally (85.1%). In this regard, treatment and control groups differ significantly at 5%-level, with control group declaring in average 3 percentage points more frequently playing with shop-bought toys than children in treatment communities.

Pen/pencils and paper are available in 44% of the households but used by the children to draw or doodle in only 55% of those cases. Inside the household, the most common games with the target child are singing song (57.8%), active games like throwing ball, jumping, or climbing (52.6%) and taking the child to play outside the household (43.9%). More than 15% of caregivers declared that no play activities took place in the household with the target child the previous 3 days before the interview.

Books are absent in most of the households as 56.6% of them reported having no books. Among household with books, the average number owned per family is less than 2 (1.9 books in average). Magazines, children's or illustrated books are rare: only 3.7% of household possessed magazines or newspapers and 5.3% possessed children's books or books that include illustrations.

Almost 30% of caregivers believe that corporal punishment is useful to educate their children, and almost 20% used physical punishment on the target child during the 7 days before the visit.

All variables displayed in Table 11 are well balanced across ECD treatment and control groups.

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[16] See for instance:
Lamb ME, Bornstein MH, Teti DM. Development in infancy: an introduction. 4th ed. Mahwah, NJ: Lawrence Erlbaum Associates; 2002. p. 519 p., and
Bornstein MH, Putnick DL, Heslington M, Gini M, Suwalsky JT, Venuti P, et al. Mother-child emotional availability in ecological perspective: three countries, two regions, two genders. *Dev Psychol*. 2008;44:666–80
[17] See: Kariger P, Frongillo EA, Engle P, Britto PMR, Sywulka SM, Menon P. Indicators of Family Care for Development for Use in Multicountry Surveys. *Journal of Health, Population, and Nutrition*. 2012;30(4):472-486.

### Table 12: Target Child Learning Environment

| | (1) Control | (2) Treatment | (3) Overall | (1) vs. (2) p-value | N |
|---|---|---|---|---|---|
| *Does Target play with…* | | | | | |
| Household objects like plates, cups or pots | 0.901 | 0.872 | 0.886 | 0.078 | 5117 |
| Pets | 0.718 | 0.694 | 0.706 | 0.268 | 5113 |
| Toys bought in a shop | 0.165 | 0.135 | 0.149 | 0.044 | 5055 |
| Home-made toys | 0.718 | 0.707 | 0.713 | 0.630 | 5093 |
| Toys to push or roll | 0.691 | 0.667 | 0.678 | 0.307 | 5100 |
| Ball | 0.686 | 0.700 | 0.693 | 0.458 | 5098 |
| *Play activities with target* | | | | | |
| Read books or look at picture-books with child | 0.131 | 0.110 | 0.120 | 0.080 | 5059 |
| Tell stories to child | 0.427 | 0.407 | 0.417 | 0.427 | 5105 |
| Sing songs with child | 0.575 | 0.581 | 0.578 | 0.839 | 5085 |
| Take child outside home place | 0.418 | 0.459 | 0.439 | 0.154 | 5075 |
| Spend time with child in naming things, counting, drawing | 0.214 | 0.217 | 0.215 | 0.909 | 5066 |
| Practice games ordering objects by size | 0.286 | 0.262 | 0.273 | 0.356 | 5073 |
| Practice active games (e.g. throwing a ball, jumping) | 0.533 | 0.521 | 0.526 | 0.575 | 5057 |
| Practice daily routines | 0.192 | 0.173 | 0.182 | 0.359 | 5068 |
| Practice self-reliance skills activities with the child | 0.359 | 0.350 | 0.354 | 0.746 | 5080 |
| Practice games that show how things are different or equal | 0.312 | 0.275 | 0.293 | 0.173 | 5051 |
| | | | | | |
| Pen and paper available in the household | 0.432 | 0.447 | 0.440 | 0.521 | 5083 |
| Children use this paper/pencil to paint or doodle | 0.510 | 0.525 | 0.518 | 0.577 | 2219 |
| *Books and Magazines available in the household* | | | | | |
| Has some books (including school books) | 0.430 | 0.438 | 0.434 | 0.693 | 5085 |
| Number of books for children/with illustrations | 0.105 | 0.090 | 0.097 | 0.410 | 5127 |
| Number of magazines/newspapers | 0.097 | 0.098 | 0.097 | 0.986 | 5123 |
| *Corporal Punishment* | | | | | |
| Caregivers believe in corporal punishment | 0.290 | 0.296 | 0.293 | 0.716 | 5125 |
| Used corporal punishment, last 7 days | 0.197 | 0.190 | 0.193 | 0.603 | 5111 |
| *Social activity* | | | | | |
| Number of friends of child | 3.956 | 3.967 | 3.962 | 0.912 | 5138 |
| Has friends from another community (yes=1) | 0.174 | 0.185 | 0.180 | 0.684 | 5053 |

*Notes:* The p-values of the orthogonality tests are reported in the fourth column. Residuals of the test are clustered at community level. The last column from the right indicates the number of non-missing observations used for the tests.

## Crops and farming

Agriculture is the backbone of Mozambique's economy, contributing for more than a quarter of its GDP and absorbing 80% of its labor force. The overwhelming majority of producers are subsistence farmers. Land is the property of the State and cannot be sold or otherwise alienated, mortgaged, or encumbered. The Land Law, however, grants private persons the right to use and benefit from the land known as *Direito do Uso e Aproveitamento da Terra* (DUAT). In rural area the vast majority of household have access to land to cultivate under customary law, often without the land being registered through a formal DUAT[18].

Table 13 shows proportions of crop access and usage among households. In this survey, more than 98% of the household have access to parcels of land to cultivate. Households in treatment communities have access to land slightly more often than the control group. Although significant at 5%-level, the difference is rather small with 1.4 percentage points between both groups. A parcel is generally defined as half a hectare (50m x 100m) or less frequently a hectare[19].

Figure 8 shows frequencies of crops grown during the last 12 months by the households. Agricultural fields are mainly used to grow corn (in 86% of households with crop), cassava (67%), peanut (66%) and bean (62%). Cassava and manioc are mostly yielded in Nampula (95%) and Cabo Delgado (86%) and is actually much less frequent in Tete (5%). In return, Tete produces more potatoes, cucumber and pumpkin than Cabo Delgado and Tete. Agricultural products from the crops are intended for household consumption and to sell for 60% of the household and exclusively intended to domestic consumption in 40% of the households.

It is worth noting that two participating districts in Tete, Angonia and Changara, benefit from very different climates: Angonia has a tropical humid climate and Changara is considered as hot semi-arid. In Nampula and Cabo Delgado the climate is considered tropical wet and dry[20].

*Figure 8: Crops grown by households*



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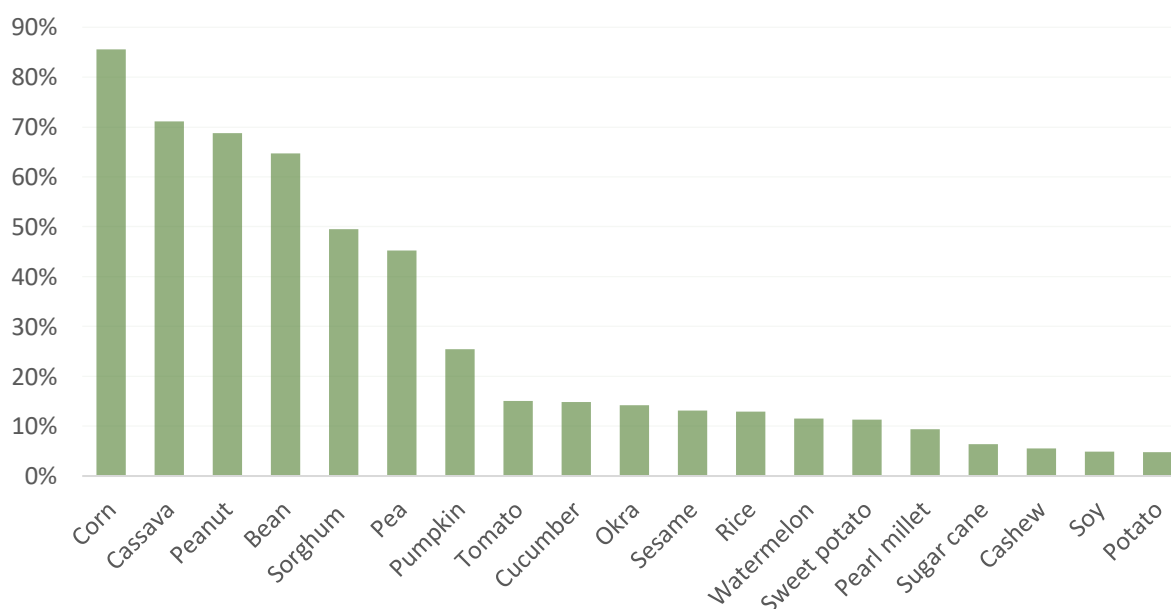
[18] Yet land rights can be formally acquired throughout local community occupation governed by customary law.
[19] See: Censo Agro-pecuário INE, 2009/2010.
[20] According to the Köppen climate classification.

*Table 13: Crops access and usage*

| | (1) | (2) | (3) | (1) vs. (2) p-value | N |
|---|---|---|---|---|---|
| | **Control** | **Treatment** | **Overall** | | |
| Household has crops | 0.975 | 0.989 | 0.982 | 0.025 | 5140 |
| Number of crops | 1.970 | 1.911 | 1.939 | 0.317 | 5047 |
| *Cultures cultivated last 12 months* | | | | | |
| Corn | 0.847 | 0.871 | 0.859 | 0.285 | 5049 |
| Manioc/Cassava | 0.685 | 0.652 | 0.668 | 0.515 | 5049 |
| Peanut | 0.662 | 0.659 | 0.661 | 0.914 | 5049 |
| Bean | 0.633 | 0.617 | 0.625 | 0.678 | 5049 |
| Sorghum | 0.499 | 0.471 | 0.485 | 0.442 | 5049 |
| Pea | 0.427 | 0.442 | 0.435 | 0.724 | 5049 |
| Pumpkin | 0.266 | 0.238 | 0.251 | 0.108 | 5049 |
| Tomato | 0.139 | 0.169 | 0.154 | 0.077 | 5049 |
| Cucumber | 0.150 | 0.127 | 0.138 | 0.233 | 5049 |
| Okra | 0.130 | 0.136 | 0.133 | 0.733 | 5049 |
| Sesame | 0.126 | 0.116 | 0.121 | 0.624 | 5049 |
| Rice | 0.131 | 0.122 | 0.127 | 0.705 | 5049 |
| Watermelon | 0.110 | 0.105 | 0.107 | 0.666 | 5049 |
| Sweet potato | 0.106 | 0.122 | 0.115 | 0.344 | 5049 |
| Pearl millet | 0.087 | 0.090 | 0.088 | 0.806 | 5049 |
| Sugar cane | 0.059 | 0.076 | 0.068 | 0.098 | 5049 |
| Cashew | 0.042 | 0.055 | 0.049 | 0.218 | 5049 |
| Soy | 0.056 | 0.058 | 0.057 | 0.875 | 5049 |
| Potato | 0.038 | 0.072 | 0.056 | 0.083 | 5049 |
| *Production usage* | | | | | |
| Household consumption only | 0.368 | 0.409 | 0.390 | 0.158 | 5042 |
| To sell only | 0.006 | 0.005 | 0.005 | 0.703 | 5042 |
| Both | 0.626 | 0.586 | 0.605 | 0.168 | 5042 |

*Notes:* The p-values of the orthogonality tests are reported in the fourth column. Residuals of the test are clustered at community level. Last column from the right indicates the number of non-missing observations used for the tests.

## Employment and income

Most of the households in our survey live from subsistence farming, occasionally selling agricultural products at local markets or through cooperatives. Table 14 presents the current work situation and income of the head and adult members of the households. More than three quarters of the heads of households and adult household members are working on their own crops. In the treatment communities, this proportion rises to 78.1 percent being 5.2 percentage points higher than in the control group (at 72.9%). This difference is significant at 5 %-level.

*Table 14: Work situation and income of household's members*

|  | (1) Control | (2) Treatment | (3) Overall | (1) vs. (2) p-value | N |
|---|---|---|---|---|---|
| **Household Head** | | | | | |
| *Current work situation* | | | | | |
| Currently not working | 0.065 | 0.056 | 0.061 | 0.402 | 5130 |
| Work on the households crops | 0.729 | 0.781 | 0.756 | 0.039 | 5130 |
| Work on other crops without getting paid | 0.014 | 0.009 | 0.011 | 0.183 | 5130 |
| Work on non-farming activities | 0.180 | 0.145 | 0.162 | 0.098 | 5130 |
| Work on non-farming activities without getting paid | 0.011 | 0.009 | 0.010 | 0.373 | 5130 |
| Hours worked the last 7 days | 36.5 | 35.4 | 35.9 | 0.288 | 4567 |
| Income of the last 30 days [MZN] | 1953.7 | 1513.9 | 1724.9 | 0.039 | 4598 |
| **All adult members** | | | | | |
| *Current work situation* | | | | | |
| Currently not working | 0.146 | 0.125 | 0.135 | 0.166 | 10583 |
| Work on the households crops | 0.730 | 0.782 | 0.757 | 0.010 | 10583 |
| Work on other crops without getting paid | 0.008 | 0.006 | 0.007 | 0.272 | 10583 |
| Work on non-farming activities | 0.108 | 0.082 | 0.094 | 0.040 | 10583 |
| Work on non-farming activities without getting paid | 0.009 | 0.006 | 0.007 | 0.093 | 10583 |
| *Reason for not working* | | | | | |
| Lack of jobs | 0.065 | 0.079 | 0.072 | 0.467 | 1292 |
| Off-season | 0.095 | 0.117 | 0.105 | 0.482 | 1292 |
| Studies | 0.049 | 0.055 | 0.052 | 0.672 | 1292 |
| Too young to work | 0.119 | 0.102 | 0.111 | 0.587 | 1292 |
| Too old to work | 0.036 | 0.050 | 0.043 | 0.251 | 1292 |
| Was sick | 0.135 | 0.172 | 0.152 | 0.102 | 1292 |
| Holidays | 0.031 | 0.024 | 0.028 | 0.560 | 1292 |
| Have to take care of children | 0.221 | 0.186 | 0.204 | 0.145 | 1292 |
| Was pregnant | 0.092 | 0.084 | 0.088 | 0.633 | 1292 |
| Other reasons | 0.157 | 0.131 | 0.145 | 0.317 | 1292 |
| Hours worked the last 7 days | 34.4 | 33.6 | 34.0 | 0.454 | 8673 |
| Income of the last 30 days [MZN] | 1604.6 | 1181.0 | 1382.5 | 0.044 | 8764 |
| **Household** | | | | | |
| Total income of the last 30 days [MZN] | 2793.6 | 2094.9 | 2431.3 | 0.058 | 5142 |
| Proportion of households with no monetary income | 0.414 | 0.461 | 0.438 | 0.148 | 5142 |

*Notes:* The p-values of the orthogonality tests are reported in the fourth column. Residuals of the test are clustered at community level. Last column from the right indicates the number of non-missing observations used for the tests.

A large proportion of households in the survey had no monetary income during the previous 30 days before the visit. This is the case for 43.8% of the households eligible for ECD program. Average work time of the head of household and other member are respectively 36 and 34 hours per week. Average income of the previous 30 days of work of the head is 1,726 Meticais, being equivalent to around 25 USD at the time of the survey. Households' total income is in average of 2,793 Meticais (around 40 USD) in the control group, 2,094 Meticais in the treatment group, around 25% lower, statistically significant at 10%-level. However, it is necessary to specify that collection of revenue data is particularly difficult in our survey context. Recollection is arduous since paid work is not common in rural areas and monetary revenue mostly varies according to the harvest period, quantity and capacity to generate a surplus available to sell as well as access to markets[21]. For those reasons, monetary income is highly volatile across periods and places and shall be interpreted cautiously.

Figure 9 displays the distribution of total income earnings received by households during the 30 days preceding the interview, among households with monetary revenues. The red solid line represents the median income of 2,000 Meticais (around 29 USD) while the dotted line represents the income mean of 4,327 Meticais (around 60 USD).

*Figure 9: Distribution of income among households with some earnings the previous month*



Total income of household [Metical]
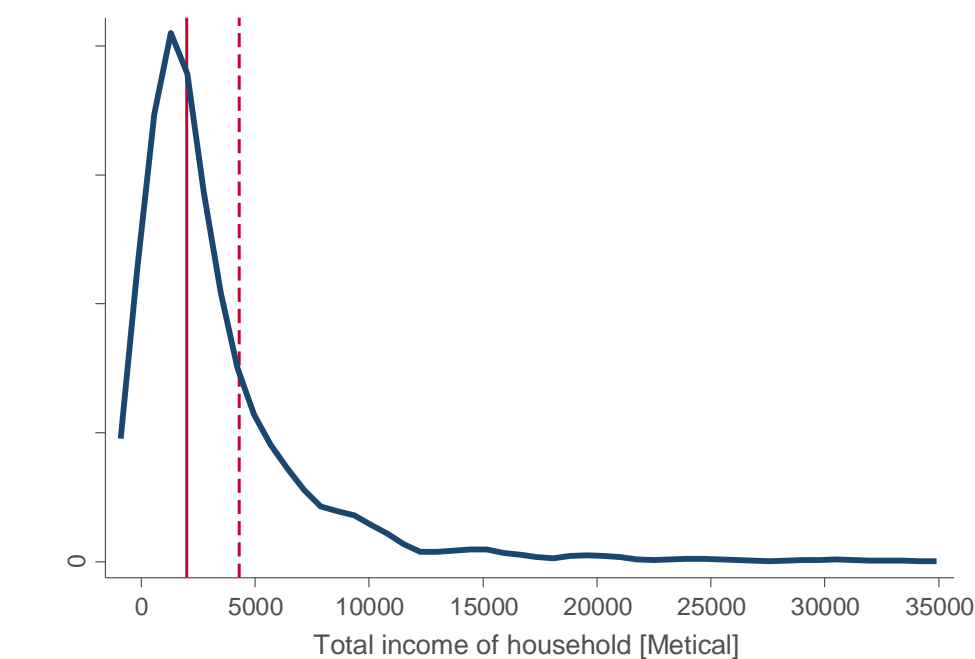
Using an epanechnikov kernel with a bandwidth of 900.

The main reason given for not being currently working is to take care of children (for 20% of the jobless members). For the caregiver, this is even more pronounced as 30 percent of jobless caregivers are not working to take care of the children.

Figure 10 shows the estimated probability of not working to take of children instead. Probabilities are estimated through a logit model conditioned on polynomial function of age.

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[21] For instance, some of the highest incomes have been recorded in Tete during tobacco harvest where crops were bought by cooperative and agro-industrial companies, while in Cabo Delgado cotton stock was still to be bought.

Figure 10: Probability of taking care of children conditioned by age and gender
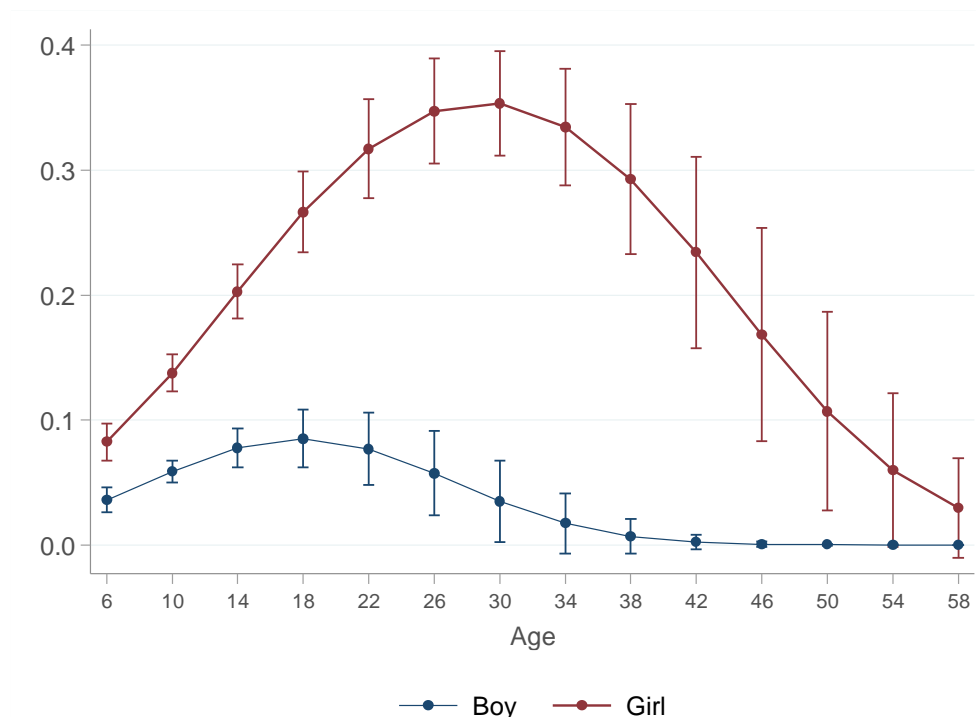


## Child labor

Figure 11 and 12 plot the prevalence of child labor per age category and respectively, treatment status and gender as well as their associated 95% confidence intervals. Greater prevalence is found among 15 year old children, where 35% of children aged 15 are currently working irrespective of their treatment status and gender. Moreover, among those children who are not working, more than 20% would do so if they were not taking care of younger children. Almost 15% of children between 5 and 15 years old are currently working in our survey, mostly in the family plantation.

Figure 11: Proportion of working children by age and treatment status
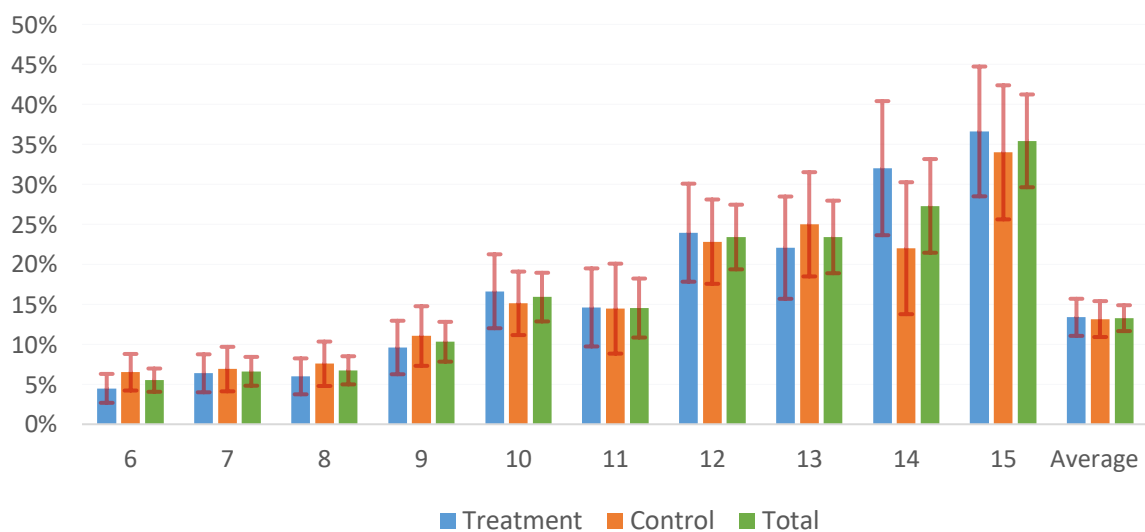
*Figure 12: Proportion of working children per age and gender*
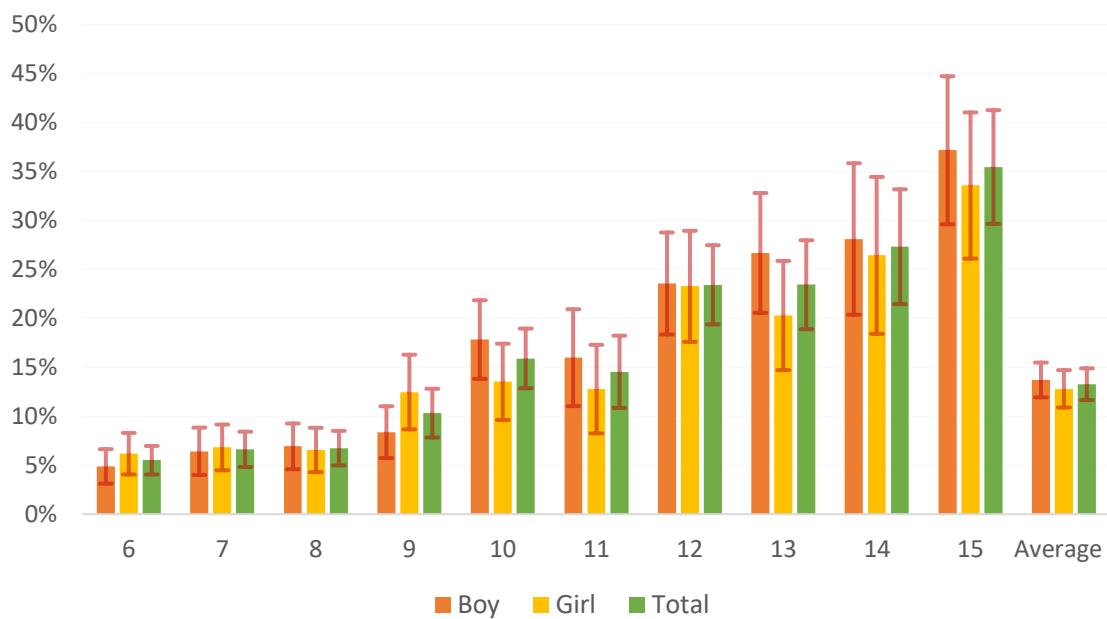
## Transfer and remittances

Table 15 presents the proportions of households benefitting from remittances and transfers and reports their nature. One out of ten households ten declared receiving transfers from a household or family member working away from home. This transfer is generally non-monetary: 59% of households receiving transfers receive goods only. The amount of money received during the previous 6 months is relatively limited with an average of 887 Meticais (around 13 USD) and a median of 500 Meticais (around 7 USD).

A small proportion of households (4%) received some kind of support from outside of the family during the last 6 months preceding the interview. This support is predominantly (54.2%) food received by NGOs, friends, neighbors or relatives.

*Table 15: Remittances and types of transfers received by the household*

|  | (1) | (2) | (3) |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Control | Treatment | Overall | (1) vs. (2) p-value | N |
| Household receives remittances from relatives | 0.112 | 0.095 | 0.103 | 0.098 | 5131 |
| Goods | 0.578 | 0.597 | 0.587 | 0.712 | 530 |
| Goods and money | 0.220 | 0.186 | 0.204 | 0.389 | 530 |
| Money | 0.202 | 0.217 | 0.209 | 0.728 | 530 |
| Value received during the last 6 months  [MZN] | 1117.3 | 622.4 | 886.8 | 0.018 | 219 |
| Received support from outside of the family during the previous 6 months | 0.040 | 0.044 | 0.042 | 0.636 | 5142 |
| Book | 0.030 | 0.017 | 0.023 | 0.606 | 216 |
| Medicine | 0.040 | 0.034 | 0.037 | 0.852 | 216 |
| Food | 0.556 | 0.530 | 0.542 | 0.821 | 216 |
| Money | 0.212 | 0.214 | 0.213 | 0.984 | 216 |
| Other | 0.263 | 0.359 | 0.315 | 0.325 | 216 |
| *Source of the support* |  |  |  |  |  |
| NGO | 0.293 | 0.385 | 0.343 | 0.341 | 216 |
| Government | 0.192 | 0.197 | 0.194 | 0.951 | 216 |
| Church | 0.010 | 0.009 | 0.009 | 0.907 | 216 |
| Relatives | 0.364 | 0.265 | 0.310 | 0.227 | 216 |
| Friends/Neighbors | 0.313 | 0.308 | 0.310 | 0.955 | 216 |

*Notes:* The p-values of the orthogonality tests are reported in the fourth column. Residuals of the test are clustered at community level. Last column from the right indicates the number of non-missing observations used for the tests.

## Consumption and expenditure

Table 16 presents households' consumption of selected food items consumed by the members during the previous 7 days of the visit.

More than a third of households (35%) consumed some meat during the last week. Households in treatment communities were slightly more likely to have consumed meat than in control communities (respectively 33% and 37%, significant at 5%-level). Among household who consumed meat, poultry and goat meat have been the consumed the most frequently (once a week on average for chicken and 0.8 times a week for goat meat). Two third of households (67%) had consumed some fish, more than 3 times a week on average. However, fish consumption varies greatly across provinces: 87% of households had consumed fish in Nampula and 66% in Cabo Delgado, while only 41% of households had consumed fish in Tete. Other source of animal protein includes eggs, which have been consumed in one household out of three during the week preceding the interview.

Carbohydrates are consumed mostly through maize flour (4.5 times per week in average), Manioc or cassava (4 times/week), sweet potatoes (2.4 times/week), beans (2.7 times a week) and rice (1.2 times/week).

*Table 16: Household food consumption during the previous 7 days*

|  | (1) Control | (2) Treatment | (3) Overall | (1) vs. (2) p-value | N |
|---|---|---|---|---|---|
| Consumed some meat (yes=1) | 0.328 | 0.368 | 0.349 | 0.047 | 5142 |
| *Frequency of consumption* |  |  |  |  |  |
| Beef | 0.290 | 0.221 | 0.252 | 0.361 | 1740 |
| Goat | 0.896 | 0.777 | 0.831 | 0.198 | 1756 |
| Pork | 0.518 | 0.706 | 0.622 | 0.085 | 1744 |
| Poultry | 1.052 | 1.010 | 1.029 | 0.696 | 1752 |
| Bush meat | 0.577 | 0.697 | 0.643 | 0.283 | 1751 |
| Consumed some fish (yes=1) | 0.668 | 0.667 | 0.668 | 0.983 | 5142 |
| How many times | 3.454 | 3.161 | 3.302 | 0.128 | 3418 |
| *Frequency of consumption of…* |  |  |  |  |  |
| Eggs | 0.337 | 0.330 | 0.333 | 0.864 | 4992 |
| Dairy products | 0.093 | 0.089 | 0.091 | 0.883 | 4988 |
| Rice | 1.282 | 1.167 | 1.222 | 0.488 | 5051 |
| Corn/maize flour | 4.457 | 4.615 | 4.539 | 0.688 | 5091 |
| Manioc/Cassava | 4.096 | 3.856 | 3.971 | 0.488 | 4935 |
| Beans | 2.786 | 2.697 | 2.740 | 0.468 | 5090 |
| Sweet potatoes | 2.392 | 2.407 | 2.400 | 0.914 | 843 |

*Notes:* The p-values of the orthogonality tests are reported in the fourth column. Residuals of the test are clustered at community level. Last column from the right indicates the number of non-missing observations used for the tests.

Table 17 shows frequency and average expenditures in meticais of the households for selected groups of items of everyday life. More than a quarter of the households had expenditure on clothes (27.7%) and health (26.2%). The vast majority of households (90.1%) reported some expenses on soap over the last month before the visit. When made, expenditures are generally of a small amount: around 100 meticais (+/- 1.45 USD) for soap, phone credit or health expenditure.

Education expenditures are generally absorbed by the purchase of school material such as notebook and book (for 25.6% of the households) and pen or pencil (for 27.6%). Even though educational reform in 2004/2005 abolished school fees for primary education and providing free textbooks to schools, 7.5% of households with at least one child enrolled in school are actually paying fees, for an average of 360 Meticais per year (about 5 USD). School uniforms are rarely worn in rural areas due to their prohibitive cost for the household. Only 10% of households with children attending school bought uniform last year. However, if done, the average spending on uniform is significant for the household budget (around 400 Meticais, almost 6 USD). Households' consumption and expenditures seem well balanced across treatment and control communities

*Table 17: Household expenditures in selected items*

| | (1) | (2) | (3) | (1) vs. (2) p-value | N |
|---|---|---|---|---|---|
| | **Control** | **Treatment** | **Overall** | | |
| *Household had spending on* | | | | | |
| **Over the last 30 days:** | | | | | |
| Phone credit (yes=1) | 0.212 | 0.211 | 0.211 | 0.949 | 5082 |
|    Value spent [MZN] | 24.703 | 22.446 | 23.534 | 0.513 | 5027 |
| Petrol | 0.084 | 0.076 | 0.080 | 0.682 | 5104 |
|    Value spent | 16.279 | 15.277 | 15.761 | 0.791 | 5094 |
| Gas | 0.019 | 0.014 | 0.017 | 0.404 | 5084 |
|    Value spent | 0.245 | 0.220 | 0.232 | 0.811 | 5081 |
| Soap | 0.908 | 0.894 | 0.901 | 0.216 | 5095 |
|    Value spent | 79.966 | 70.897 | 75.274 | 0.086 | 4961 |
| Clothes last 30 days | 0.287 | 0.268 | 0.277 | 0.357 | 5102 |
|    Value spent | 187.494 | 162.623 | 174.549 | 0.255 | 5055 |
| Health expenditures | 0.250 | 0.274 | 0.262 | 0.257 | 5133 |
|    Value spent | 37.534 | 23.616 | 30.312 | 0.157 | 5105 |
| **Over the last 6 months:** | | | | | |
| Mosquito net | 0.043 | 0.034 | 0.038 | 0.226 | 5125 |
|    Value spent | 3.425 | 2.587 | 2.990 | 0.337 | 5117 |
| **Over the last year:** | | | | | |
| School fees | 0.033 | 0.042 | 0.037 | 0.320 | 5124 |
|    Value spent | 13.607 | 10.811 | 12.158 | 0.525 | 5107 |
| Notebooks/books | 0.248 | 0.263 | 0.256 | 0.499 | 5084 |
|    Value spent | 24.364 | 23.106 | 23.710 | 0.780 | 5037 |
| Pencils/Pen | 0.266 | 0.284 | 0.276 | 0.450 | 5080 |
|    Value spent | 8.511 | 7.780 | 8.131 | 0.523 | 5037 |
| Uniforms | 0.052 | 0.051 | 0.052 | 0.946 | 5114 |
|    Value spent | 20.659 | 18.460 | 19.520 | 0.652 | 5104 |

*Notes:* The p-values of the orthogonality tests are reported in the fourth column. Residuals of the test are clustered at community level. Last column from the right indicates the number of non-missing observations used for the tests

## Access to water, sanitation facilities and dwelling characteristics

Access to safe water is one of biggest challenges in Mozambique. In rural areas, water is critical for both domestic and agricultural uses. However, access to an improved water source is estimated to be at 37% for populations in rural areas[22]. Lack of access to safe water and sanitation can affect a child's nutritional status in many ways. Existing evidence supports at least three direct pathways: via diarrheal diseases, intestinal parasite infections and environmental enteropathy. It might also have an indirect impact on early childhood development trajectory by necessitating walking long distances in search of water and sanitation facilities and diverting a caregiver's time away from child care.[23]

Table 18 and Figures 13 and 14 present the proportion of households with access to different types of water and sanitation facilities.

Virtually no households have a water connection at home while more than half of the households (53%) collect water from an improved water source (public tap, borehole with hand pump, or protected well). Almost one in five households collects water from a nearby stream or river, which is considered unsafe.

The primary sources of water remain available all year for 70% of the families, while 7% of them declared having an access only during six month or less per year. Water rarely undergoes particular treatment to ensure that it is safe and secure to drink: only 7% of households treated the water to drink.

*Figure 13: Type of water supply*
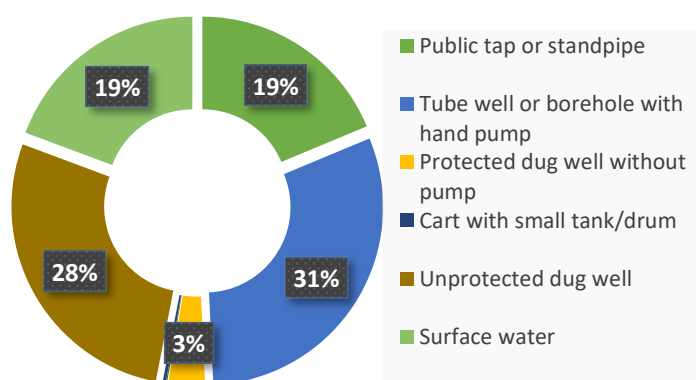


*Figure 14: Distribution of sanitation facilities*
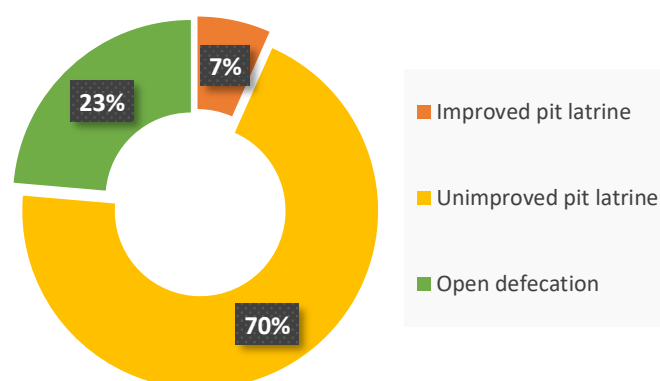


Only 7% of the households use improved sanitation that hygienically separates human excreta from human contact. Almost one quarter (23%) are not using any sanitation facilities and practice open defecation.

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[22] According to "*Progress on sanitation and drinking water – 2015 update and MDG assessment.*", UNICEF and WHO 2015.

[23] See: Fenn B, Bulti A.T, Nduna T, Duffield A, Watson F (2012). "*An evaluation of an operations research project to reduce childhood stunting in a food-insecure area in Ethiopia.*" Public Health Nutr. 15(9):1746–54.

*Table 18: Household water access and sanitation facilities*

| | (1) Control | (2) Treatment | (3) Overall | (1) vs. (2) p-value | N |
|---|---|---|---|---|---|
| **Household water supply** | | | | | |
| Piped water onto premises | 0.000 | 0.000 | 0.000 | 0.317 | 5142 |
| Public tap or standpipe | 0.185 | 0.188 | 0.187 | 0.915 | 5142 |
| Tube well or borehole with hand pump | 0.305 | 0.305 | 0.305 | 0.991 | 5142 |
| Protected dug well without pump | 0.032 | 0.036 | 0.034 | 0.553 | 5142 |
| Protected spring | 0.002 | 0.000 | 0.001 | 0.208 | 5142 |
| Cart with small tank/drum | 0.001 | 0.004 | 0.003 | 0.346 | 5142 |
| Unprotected dug well | 0.290 | 0.263 | 0.276 | 0.438 | 5142 |
| Surface water | 0.186 | 0.200 | 0.193 | 0.671 | 5142 |
| Rainwater | 0.000 | 0.001 | 0.001 | 0.178 | 5142 |
| **Water availability** | | | | | |
| All year | 0.714 | 0.677 | 0.695 | 0.187 | 5142 |
| Most of the year | 0.214 | 0.239 | 0.227 | 0.245 | 5142 |
| Half of the year | 0.058 | 0.073 | 0.066 | 0.226 | 5142 |
| Less than 6 months/year | 0.014 | 0.011 | 0.012 | 0.572 | 5142 |
| **Treatment of water** | | | | | |
| Treats water to make it safer to drink (yes=1) | 0.072 | 0.070 | 0.071 | 0.886 | 5084 |
| *Treatment method* | | | | | |
| Boiling | 0.136 | 0.157 | 0.147 | 0.666 | 361 |
| Add bleach/chlorine | 0.500 | 0.508 | 0.504 | 0.906 | 361 |
| Strain through a cloth | 0.028 | 0.038 | 0.033 | 0.759 | 361 |
| Water filter | 0.006 | 0.032 | 0.019 | 0.114 | 361 |
| Other | 0.017 | 0.038 | 0.028 | 0.391 | 361 |
| **Sanitation facilities** | | | | | |
| Toilet connected to a septic tank | 0.001 | 0.001 | 0.001 | 0.711 | 5142 |
| Improved pit latrine | 0.059 | 0.071 | 0.066 | 0.328 | 5142 |
| Unimproved pit latrine | 0.683 | 0.703 | 0.693 | 0.482 | 5142 |
| Open defecation | 0.253 | 0.219 | 0.235 | 0.231 | 5142 |
| Other | 0.004 | 0.006 | 0.005 | 0.455 | 5142 |

*Notes:* The p-values of the orthogonality tests are reported in the fourth column. Residuals of the test are clustered at community level. Last column from the right indicates the number of non-missing observations used for the tests.

Table 19 displays dwelling characteristics of the households. More than one household out of four (27%) shares their premises with another family or household. Households belonging to control communities are slightly more likely (4 percentage points) to share their premises than in treatment communities (at 5%-level), irrespective of the house size. The average number of rooms is 2.8 excluding the kitchen and the bathroom. Houses are predominantly made out of traditional and local materials: walls are built with sticks towed with mud or adobe, and roof are made in thatch, leaves or bamboo in 86% of households' main house, as shown in figure 15 and figure 16.

*Table 19: Dwelling Characteristics and energy use*

| | (1) | (2) | (3) | (1) vs. (2) p-value | N |
|---|---|---|---|---|---|
| | **Control** | **Treatment** | **Overall** | | |
| Premises are shared with other households (yes=1) | 0.291 | 0.250 | 0.269 | 0.036 | 5115 |
| Number of different houses or separate dwellings | 1.637 | 1.636 | 1.636 | 0.991 | 5142 |
| Number of rooms (excluding the kitchen and bathroom) | 2.783 | 2.749 | 2.765 | 0.696 | 5142 |
| Number of rooms in the house used for sleeping | 2.068 | 1.994 | 2.030 | 0.141 | 5142 |
| *Type of main housing coverage* | | | | | |
| Ceramic tiles | 0.008 | 0.008 | 0.008 | 0.885 | 5142 |
| Zinc roofing sheet | 0.131 | 0.119 | 0.125 | 0.518 | 5142 |
| Thatch/Palm leaf/Bamboo | 0.855 | 0.868 | 0.862 | 0.520 | 5142 |
| Others | 0.001 | 0.002 | 0.002 | 0.538 | 5142 |
| *Type of walls in main house* | | | | | |
| Thatch/Palm leaf/Bamboo | 0.057 | 0.049 | 0.053 | 0.541 | 5141 |
| Adobe/Adobe Blocks | 0.342 | 0.368 | 0.356 | 0.511 | 5141 |
| Concrete blocks | 0.010 | 0.007 | 0.009 | 0.405 | 5141 |
| Brick | 0.086 | 0.065 | 0.075 | 0.237 | 5141 |
| Sticks towed with mud | 0.500 | 0.510 | 0.505 | 0.810 | 5141 |
| Others | 0.002 | 0.001 | 0.001 | 0.632 | 5141 |
| *Type of floor in main house* | | | | | |
| Earth/Sand | 0.674 | 0.733 | 0.705 | 0.066 | 5142 |
| Beaten earth/ Dung floor/ Adobe | 0.257 | 0.215 | 0.236 | 0.142 | 5142 |
| Cement | 0.067 | 0.051 | 0.059 | 0.188 | 5142 |
| *Main source of energy used for cooking* | | | | | |
| Charcoal | 0.014 | 0.009 | 0.011 | 0.294 | 5142 |
| Coal | 0.004 | 0.005 | 0.004 | 0.983 | 5142 |
| Fire wood | 0.973 | 0.955 | 0.964 | 0.085 | 5142 |
| Agricultural residues | 0.001 | 0.002 | 0.001 | 0.287 | 5142 |
| Others | 0.006 | 0.027 | 0.017 | 0.002 | 5142 |
| *Main source of energy used for lighting* | | | | | |
| Electricity | 0.016 | 0.003 | 0.009 | 0.094 | 5142 |
| Solar Panel/Generator | 0.086 | 0.089 | 0.087 | 0.820 | 5142 |
| Lantern using Oil/Paraffin/Gasoline | 0.087 | 0.082 | 0.084 | 0.795 | 5142 |
| Candles | 0.017 | 0.015 | 0.016 | 0.744 | 5142 |
| Batteries | 0.501 | 0.520 | 0.511 | 0.627 | 5142 |
| Fire wood | 0.161 | 0.149 | 0.155 | 0.522 | 5142 |
| Others | 0.133 | 0.143 | 0.138 | 0.646 | 5142 |
| *Cooking place in the household* | | | | | |
| Outdoors | 0.284 | 0.272 | 0.278 | 0.636 | 5142 |
| Inside the house, without division | 0.175 | 0.175 | 0.175 | 0.995 | 5142 |
| Inside the house with a division | 0.279 | 0.277 | 0.278 | 0.940 | 5142 |
| Out of house/ Separate compartment | 0.262 | 0.276 | 0.269 | 0.592 | 5142 |

*Notes:* The p-values of the orthogonality tests are reported in the fourth column. Residuals of the test are clustered at community level.

Last column from the right indicates the number of non-missing observations used for the tests.
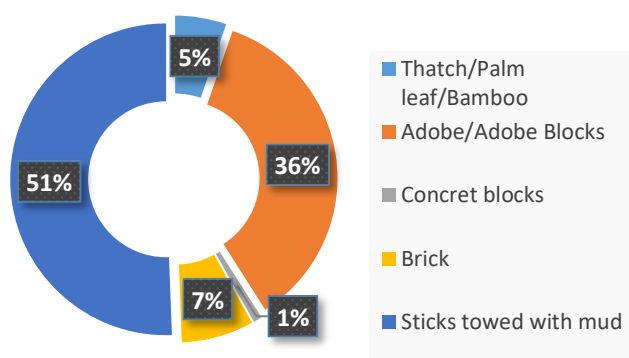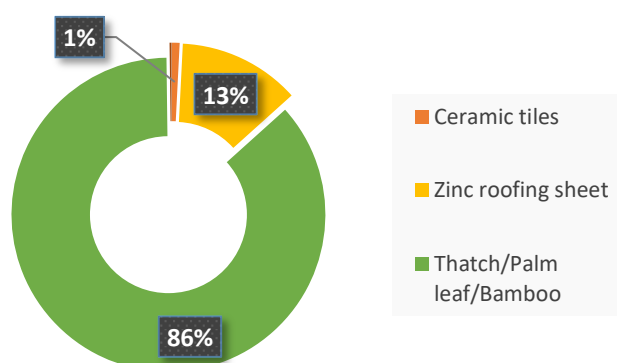
*Figure 15: Wall composition of household's house*

Legend:
- Thatch/Palm leaf/Bamboo
- Adobe/Adobe Blocks
- Concret blocks
- Brick
- Sticks towed with mud



*Figure 16: Roof characteristics of household's house*

Legend:
- Ceramic tiles
- Zinc roofing sheet
- Thatch/Palm leaf/Bamboo

Fire wood is used as the main source of energy to cook in 96% of the households and more than a quarter of household cook in the open-air. At night, households use mainly torches or lamps connected to a battery for lighting (51%). Other sources of energy for lighting include fire wood (15%) and to a lesser extent solar panels (9%) and lanterns fueled with paraffin or gasoline (8%).

Households' dwelling characteristics as well as water and sanitations access are well balanced between treatment and control communities.

## Assets, durable goods and wealth index

Household questionnaires included a section on asset ownership, listing a set of basic preselected durable goods possessed by the members of the household. Figure 18 displays the average occurrence of those items by province, and table 19 shows average number of each of those goods in possession of the household. Asset ownership is particularly well balanced across control and treatment groups (see table 21)

In the context of our study, collection of the accurate income, consumption and expenditure data would require a more extensive household survey as they are subject to time volatility, and the information is difficult to gather and remember by the household members. Also, indicators of monetary income do not capture the fact that people may have income in kind, such as crops or livestock which are traded, and measuring income can be difficult for the self or transitory employed (e.g. agricultural work, mining), due to accounting issues, seasonality and economic shocks. In contrast, asset ownership (e.g. owning a bicycle or radio) and dwelling characteristics are easily measurable and subject to less bias and are smoother over time. Thus, a proxy indicator of wealth status or socio-economic status can be constructed more practically using data on durable goods, and then be compared between treatment arms. Following Filmer and Pritchett 2001, we constructed a linear index from asset ownership indicators, using principal-components analysis (PCA) to derive weights[24].

The main limitation of this index is that some goods or assets may have a different relationship with socioeconomic status (SES) or wealth across sub-groups (e.g. provinces); for example, ownership of coconut trees or boats may be more reflective of wealth in coastal areas, or possession of certain type of livestock might be more related to cultural or religious beliefs rather than actual wealth.

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[24] Filmer, D. & Pritchett, L. H. *"Estimating wealth effects without expenditure data—or tears: An application to educational enrollments in states of India."* Demography, vol. 38 no. 1, 2001, pp. 115-132.

Most of the households owned at least one hoe (98%), machete (82%), traditional woven straw mats called *esteira* (77%), and mosquito nets (68%). More than one household out of three (34%) owns a radio, one out of four (26%) owns a mobile phone, and 24% have solar panels (generally a small size panel connected to a car battery). Livestock ownership such as cows, pigs, and goats are more widespread in Tete province for both cultural and climatic reasons, while, cashew tree, papayas and coconut trees are relatively uncommon in that province compared to Nampula and Cabo Delgado (just like bed ownership).

To construct our wealth index we used data on expenditures and consumption, dwelling characteristics as well as asset ownership that were fairly common within all three provinces[25], and display a correct Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy.

The final set of variables used in the PCA includes : consumption of meat, roof characteristics (dummy variable for zinc roofing sheet), wall and floor characteristics (dummy for cement walls), primary source of energy for lighting (dummy for solar panel), number of rooms (total and number used for sleeping), education spending, soap expenses, number of machetes, hoes, axes, goats, chicken, bikes, motorbikes, *esteira,* tables, chairs, radio, clock, mosquito net, pen/pencil, solar panel, sound system and mobile phone. Scree plot of eigenvalues of the principal components is given in Figure 17. We used the scoring factor of the first component to weigh each asset and goods of the household creating a unique wealth index.

*Figure 17: Scree plot of eigenvalues after PCA*
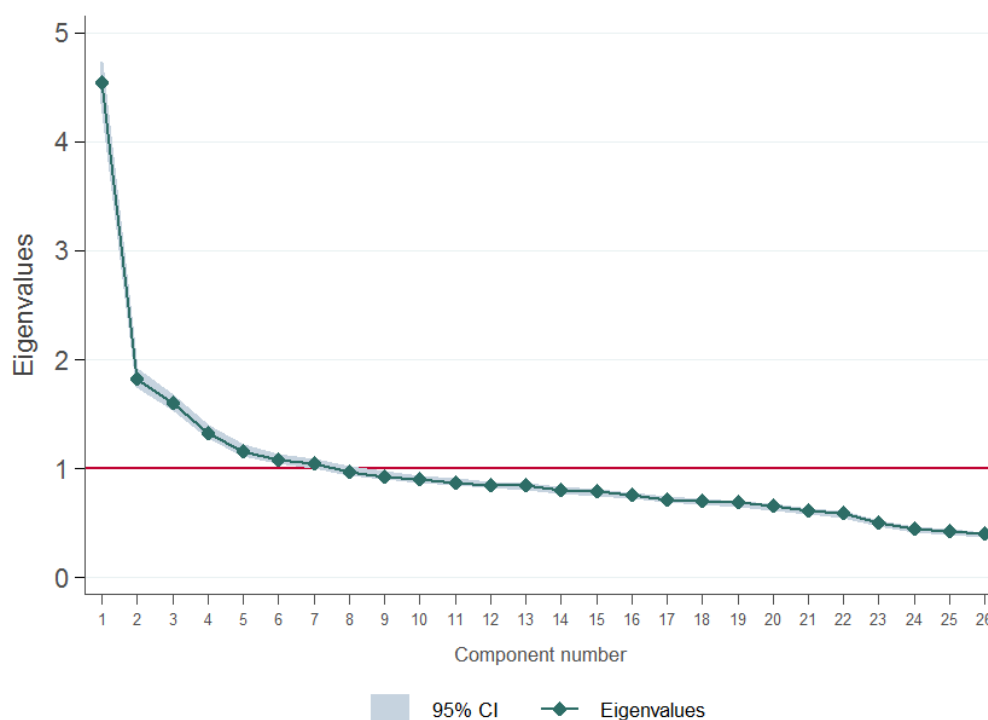
Figure 18: Household asset ownership
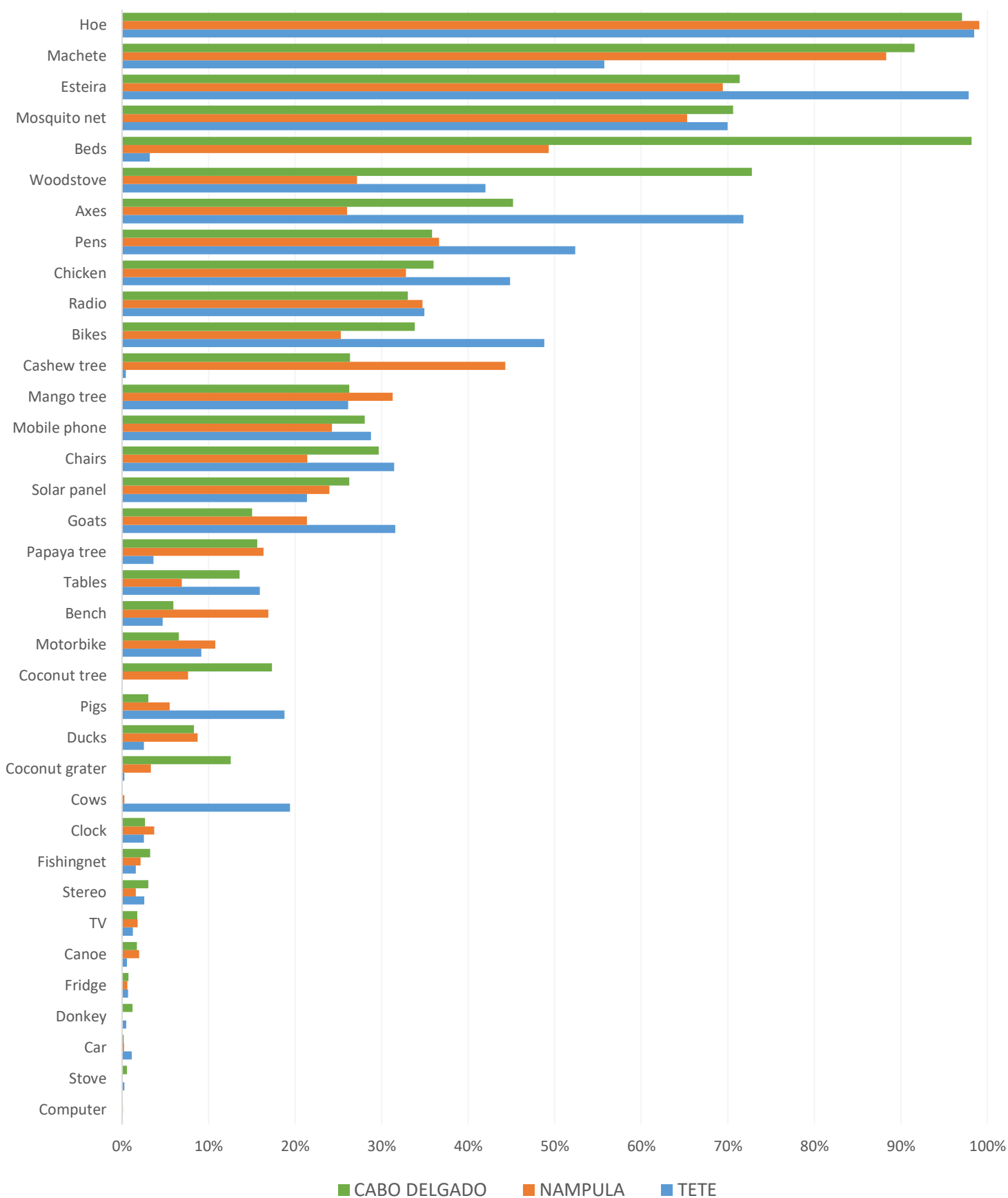
*Table 20: Average number of durable goods owned by the household*

| | (1) Control | (2) Treatment | (3) Overall | (1) vs. (2) p-value | N |
|---|---|---|---|---|---|
| Machete | 1.18 | 1.19 | 1.19 | 0.76 | 5140 |
| Hoes | 2.59 | 2.63 | 2.61 | 0.42 | 5140 |
| Axes | 0.72 | 0.73 | 0.72 | 0.83 | 5139 |
| Cashew trees | 4.05 | 4.19 | 4.12 | 0.84 | 5085 |
| Mango trees | 1.20 | 1.19 | 1.20 | 0.96 | 5127 |
| Papaya trees | 0.40 | 0.34 | 0.37 | 0.36 | 5142 |
| Coconut trees | 0.48 | 0.27 | 0.37 | 0.13 | 5142 |
| Goats/sheep | 1.09 | 1.05 | 1.06 | 0.79 | 5139 |
| Pigs | 0.31 | 0.26 | 0.28 | 0.32 | 5142 |
| Cows | 0.41 | 0.36 | 0.38 | 0.67 | 5141 |
| Chicken/Turkey | 1.85 | 2.10 | 1.98 | 0.27 | 5127 |
| Ducks | 0.27 | 0.24 | 0.25 | 0.49 | 5141 |
| Donkeys | 0.01 | 0.01 | 0.01 | 0.75 | 5142 |
| Fishing nets | 0.06 | 0.03 | 0.05 | 0.18 | 5142 |
| Canoes | 0.02 | 0.01 | 0.02 | 0.45 | 5142 |
| Bikes | 0.37 | 0.41 | 0.39 | 0.17 | 5142 |
| Motorbikes | 0.10 | 0.09 | 0.09 | 0.10 | 5142 |
| Car | 0.01 | 0.01 | 0.01 | 0.65 | 5142 |
| Esteiras (traditional woven straw mats) | 1.66 | 1.78 | 1.72 | 0.21 | 5140 |
| Tables or desks | 0.15 | 0.16 | 0.15 | 0.51 | 5142 |
| Chairs | 0.93 | 0.87 | 0.90 | 0.40 | 5142 |
| Bench | 0.16 | 0.19 | 0.17 | 0.32 | 5142 |
| Coconut Grinders | 0.08 | 0.05 | 0.06 | 0.29 | 5142 |
| Radio | 0.38 | 0.40 | 0.39 | 0.42 | 5142 |
| Clocks (wall, wrist, pocket) | 0.03 | 0.03 | 0.03 | 0.84 | 5142 |
| Beds (single, double, children or bunks) | 1.83 | 1.66 | 1.74 | 0.40 | 5142 |
| Mosquito nets | 1.59 | 1.54 | 1.56 | 0.60 | 5142 |
| Pens/pencils | 1.18 | 1.22 | 1.20 | 0.68 | 5045 |
| Stoves (gas or electric) | 0.00 | 0.01 | 0.00 | 0.49 | 5142 |
| Stoves (wood or charcoal) | 0.54 | 0.51 | 0.53 | 0.62 | 5142 |
| Fridge or Freezer | 0.01 | 0.00 | 0.01 | 0.12 | 5142 |
| TV | 0.03 | 0.02 | 0.02 | 0.19 | 5142 |
| Solar Panels | 0.29 | 0.30 | 0.29 | 0.90 | 5142 |
| Stereo sound systems | 0.03 | 0.02 | 0.03 | 0.23 | 5142 |
| Computers | 0.00 | 0.00 | 0.00 | 0.32 | 5142 |
| Mobile phones | 0.35 | 0.36 | 0.36 | 0.59 | 5142 |

*Notes:* The p-values of the orthogonality tests are reported in the fourth column. Residuals of the test are clustered at community level. Last column from the right indicates the number of non-missing observations used for the tests.

Distribution of the index is shown in Figure 19, for treatment and control groups using kernel density local estimates. A Kolmogorov-Smirnov test of equality of distribution shows no statistical difference across treatment arm (*p-value*=0.281). We sort individuals by the asset index and establish cut-off values for quintiles of the population. We then assign households to a group on the basis of their value

on the index. Table 19, reports average values of expenditure, and assets for each of the five quintiles, with 1 being the "poorest" and 5 the "richest".

*Table 21: Ownership of durable assets and housing characteristics by 1ˢᵗ component quintile*

| | Quintiles | | | | | Total |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | |
| *Dwelling characteristics* | | | | | | |
| Roof in zinc sheet | 0.002 | 0.020 | 0.059 | 0.120 | 0.421 | 0.124 |
| Wall in cement bricks | 0.000 | 0.000 | 0.001 | 0.000 | 0.040 | 0.008 |
| Cement floor | 0.000 | 0.000 | 0.003 | 0.044 | 0.248 | 0.059 |
| Use solar panel | 0.000 | 0.008 | 0.017 | 0.111 | 0.283 | 0.084 |
| No. of rooms for sleeping | 1.457 | 1.799 | 2.000 | 2.269 | 2.608 | 2.027 |
| No. of rooms total | 1.881 | 2.487 | 2.824 | 3.139 | 3.570 | 2.780 |
| *Expenditures and consumption* | | | | | | |
| Spending in soap | 43.26 | 61.52 | 71.68 | 85.86 | 113.57 | 75.17 |
| Education spending | 5.90 | 19.26 | 35.42 | 55.93 | 200.49 | 63.37 |
| Consumed meat last week | 0.1531 | 0.2970 | 0.3422 | 0.4337 | 0.5494 | 0.3551 |
| *Number of assets* | | | | | | |
| Machete | 0.780 | 1.050 | 1.156 | 1.361 | 1.541 | 1.178 |
| Hoe | 1.862 | 2.297 | 2.552 | 2.790 | 3.481 | 2.596 |
| Axes | 0.292 | 0.531 | 0.772 | 0.871 | 1.147 | 0.722 |
| Goats | 0.188 | 0.377 | 0.821 | 1.214 | 2.666 | 1.053 |
| Chicken | 0.420 | 0.967 | 1.773 | 2.465 | 4.321 | 1.989 |
| Bikes | 0.078 | 0.216 | 0.401 | 0.544 | 0.709 | 0.389 |
| Motorbike | 0.001 | 0.012 | 0.043 | 0.079 | 0.329 | 0.093 |
| Esteira | 0.811 | 1.378 | 1.715 | 2.089 | 2.585 | 1.716 |
| Tables | 0.002 | 0.016 | 0.040 | 0.124 | 0.573 | 0.151 |
| Chairs | 0.041 | 0.211 | 0.488 | 0.974 | 2.777 | 0.898 |
| Radio | 0.035 | 0.195 | 0.371 | 0.539 | 0.830 | 0.394 |
| Clocks | 0.000 | 0.005 | 0.015 | 0.029 | 0.114 | 0.033 |
| Mosquito net | 0.689 | 1.201 | 1.548 | 1.902 | 2.396 | 1.547 |
| Pens | 0.271 | 0.715 | 1.023 | 1.350 | 2.698 | 1.211 |
| Solar panel | 0.007 | 0.058 | 0.170 | 0.394 | 0.805 | 0.286 |
| Sound system | 0.000 | 0.002 | 0.004 | 0.018 | 0.100 | 0.025 |
| Mobile phone | 0.043 | 0.129 | 0.253 | 0.401 | 0.920 | 0.349 |

*Notes:* Dwelling characteristics are dummy variables except for the number of rooms in the main house of the household, as well as consumption of meat that takes the value 1 if consumed some, and 0 otherwise. Number of assets shows the average number of a specific asset owned within each quintile.

Among each quintile we test the differences in the "wealth" index between control and treatment groups (table 22). We found no evidences of difference of mean in each of the "wealth" quintiles as well as in the whole population.
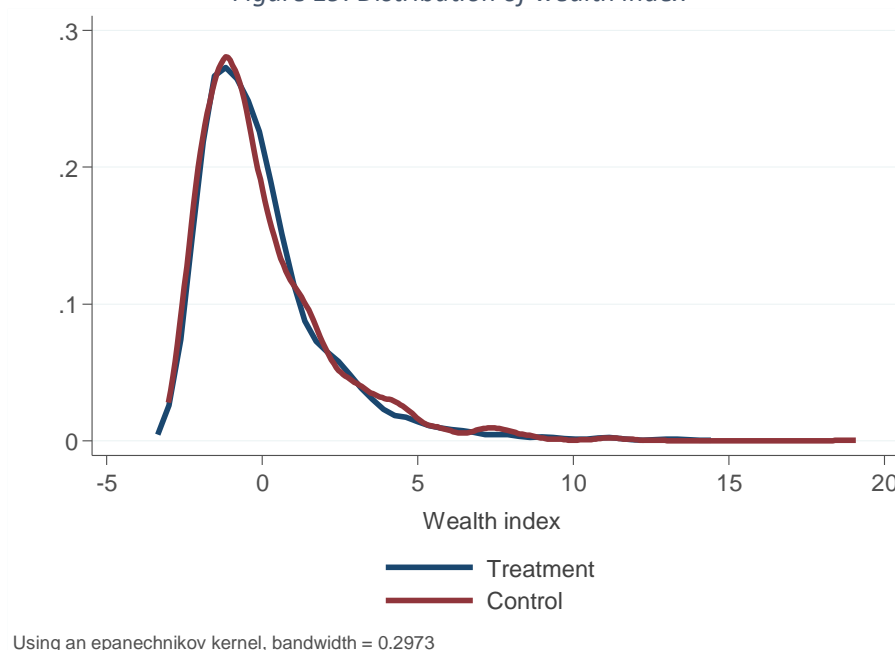
*Figure 19: Distribution of wealth index*

Using an epanechnikov kernel, bandwidth = 0.2973

*Table 22: Mean of wealth index by quintile*

|  | (1) | (2) | (3) |  |  |
|---|---|---|---|---|---|
|  | **Control** | **Treatment** | **Overall** | **(1) vs. (2) p-value** | **N** |
| Poorest | -2.089 | -2.063 | -2.076 | 0.273 | 973 |
| Second | -1.250 | -1.263 | -1.257 | 0.314 | 973 |
| Middle | -0.529 | 0.508 | -0.518 | 0.143 | 973 |
| Fourth | 0.504 | 0.482 | 0.492 | 0.385 | 973 |
| Richest | 3.356 | 3.367 | 3.361 | 0.949 | 972 |
| Total | 0.015 | -0.030 | 0.000 | 0.790 | 4,864 |

*Notes:* The p-values of the orthogonality tests are reported in the fourth column. Residuals of the test are clustered at community level. Last column from the right indicates the number of non-missing observations used for the tests.

The composite index of wealth is highly related to some other characteristics that are not included in its construction such as income or education. Figure 20, displays the level of education of the head of household categorized by wealth quintiles. Richest households tend to have better educated heads.

*Figure 20: Highest education level of head of household by wealth quintile*
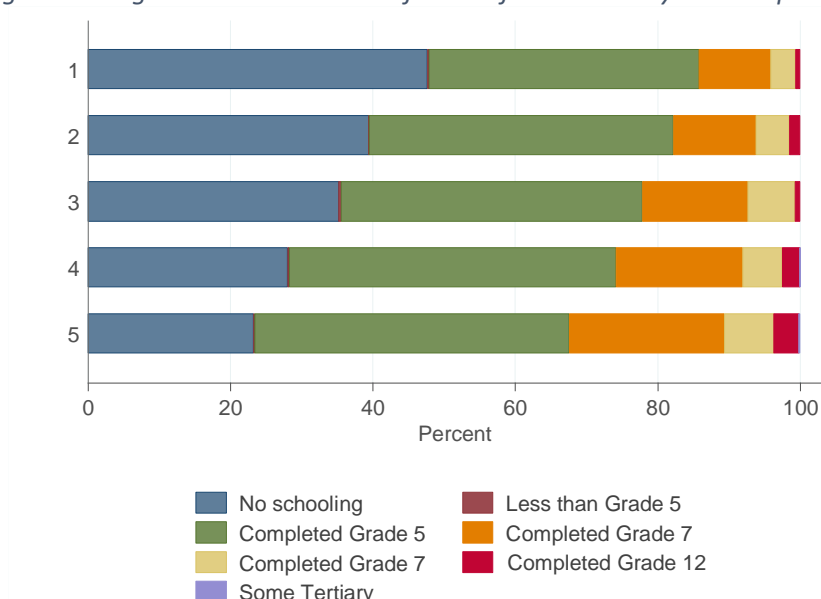


Anthropometrics Data

Overall child health can be reflected in the child's nutritional status and physical growth. In a well-nourished population, there is a reference distribution of height and weight for children under the age of five Undernutrition in a population can be gauged by comparing the children of this population to the reference population. The reference population used in this report is the WHO standard of 2006[26] . Each of the nutritional status indicators can be expressed in standard deviation units (z-scores) from the median of the reference population. More than half of child deaths throughout the world are related to undernutrition. Undernourished children are more likely to die from common childhood illnesses, and those who survive may repeatedly fall ill, have growth deficiencies and have reduced mental development. Three quarters of the children who die from causes related to undernutrition have only slight or moderate undernutrition and do not necessarily show signs of their high vulnerability[27].

We measured both height and weight of all targeted children during the households visit. Those measures completed with age and gender, enable us to compute the main anthropometrics indicators that are: Height-for-age, weight-for-age, weight-for-height, and body-mass-index-for-age. Table 22 reports anthropometrics and nutritional characteristics of children between 3 and 5 in the survey.

Weight-for-age is an important indicator for measuring incidence of undernutrition and is influenced by both the height of the child (height-for-age) and his or her weight (weight-for-height), however its composite nature makes interpretation complex. Children whose weight-for-age is between two and three standard deviations below the median of the reference population are considered moderately underweight for their age, while those whose weight-for-age is more than three standard deviations

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[26] WHO growth standards, methods and development may be consulted at:
<http://who.int/childgrowth/standards/en/>.
[27] According to *"Final report of the Multiple Indicator Cluster survey"*, UNICEF/INE, 2008.

below the median are classified as severely underweight for their age. Underweight concerns 16% of children between 3 and 5 years old in our survey, among whom 2.8% are severely underweight.

Height-for-age is a measure of linear growth. Children whose height-for-age is between two and three standard deviations below the median of the reference population are considered as short for their age and are classified as having moderate chronic undernutrition (stunting). Those whose height-for-age is more than three standard deviations below the median are classified as suffering from severe chronic undernutrition (severe stunting). Low height-for-age may reflect chronic undernutrition resulting from failure to receive adequate food over long and repeated periods, from recurrent or chronic illness, or from early exposure to adverse conditions such as illness and/or inappropriate feeding practices. Mozambique is facing high prevalence of stunting with 44% of children under five suffer from chronic malnutrition. In our survey the prevalence is even higher as 57% of the children between 3 and 5 are measured as stunted, and almost one child out of four (24%) is severely stunted.

Low weight-for-height translates as wasting or thinness and generally indicates a recent and severe process of weight loss, often associated with acute starvation or severe illness. Children whose weight-for-height is between two and three standard deviations below the median of the reference population are classified as suffering from moderate acute undernutrition (also called wasting), while those whose weight-for-height is more than three standard deviations below the median are regarded as suffering from severe acute undernutrition (severe wasting). In our survey 3% of children suffered from wasting while 1% suffered from severe wasting. Low-weight-for-age compared to weight-for-height might be an indicator of lack of protein and amino acids or micronutrients intake.

The Body-Mass-Index (BMI) is defined as the body mass divided by the square of the body height. One can use the z-score of the BMI for age to measure the distance in standard deviation from the median of the reference population for a particular age and gender. Low BMI-for-age may indicate malnutrition, eating disorder, or health issues.

Highly significant differences between treatment and control groups exit for weight, weight-for-age weight-for-height, BMI-for-age as well as stunting prevalence and wasting. Those gaps mainly originate from the province of Tete and anthropometrics measures are much more balanced in Cabo Delgado and Nampula. Difficulties in management of measurement materials have reported in Tete and might be the source of those variations. The measures in this province should be thus taken with caution.

*Table 23: Anthropometric characteristics of target children aged 3-5*

| | (1) | (2) | (3) | (1) vs. (2) | |
| --- | --- | --- | --- | --- | --- |
| | **Control** | **Treatment** | **Overall** | **p-value** | **N** |
| **Total** | | | | | |
| Height (in cm) | 93.277 | 93.469 | 93.377 | 0.406 | 5082 |
| Weight (in kg) | 13.839 | 14.079 | 13.963 | 0.000 | 5082 |
| Weight-for-age z-score | -1.189 | -1.042 | -1.113 | 0.000 | 5078 |
| Height-for-age z-score | -2.154 | -2.081 | -2.116 | 0.140 | 5061 |
| Weight-for-height z-score | 0.164 | 0.311 | 0.240 | 0.004 | 5073 |
| BMI for age z-score | 0.359 | 0.500 | 0.432 | 0.009 | 5072 |
| Stunted (yes=1) | 0.589 | 0.556 | 0.572 | 0.080 | 5061 |
| Severely stunted (yes=1) | 0.249 | 0.232 | 0.240 | 0.313 | 5061 |
| Wasting (yes=1) | 0.041 | 0.023 | 0.032 | 0.025 | 5073 |
| Severe wasting (yes=1) | 0.014 | 0.007 | 0.010 | 0.060 | 5073 |
| **Cabo Delgado** | | | | | |
| Height (in cm) | 94.050 | 94.015 | 94.033 | 0.921 | 1810 |
| Weight (in kg) | 14.028 | 14.117 | 14.072 | 0.343 | 1812 |
| Weight-for-age z-score | -1.101 | -1.045 | -1.073 | 0.238 | 1810 |
| Height-for-age z-score | -2.014 | -2.019 | -2.016 | 0.936 | 1808 |
| Weight-for-height z-score | 0.153 | 0.238 | 0.195 | 0.181 | 1808 |
| BMI for age z-score | 0.331 | 0.420 | 0.376 | 0.184 | 1808 |
| Stunted | 0.547 | 0.526 | 0.537 | 0.429 | 1808 |
| Severely stunted | 0.192 | 0.204 | 0.198 | 0.585 | 1808 |
| Wasting | 0.030 | 0.012 | 0.021 | 0.011 | 1808 |
| Severe wasting | 0.010 | 0.003 | 0.007 | 0.135 | 1808 |
| **Nampula** | | | | | |
| Height (in cm) | 92.163 | 92.235 | 92.200 | 0.822 | 1867 |
| Weight (in kg) | 13.869 | 13.876 | 13.872 | 0.945 | 1866 |
| Weight-for-age z-score | -1.164 | -1.145 | -1.154 | 0.693 | 1864 |
| Height-for-age z-score | -2.414 | -2.347 | -2.380 | 0.312 | 1852 |
| Weight-for-height z-score | 0.442 | 0.417 | 0.429 | 0.682 | 1866 |
| BMI for age z-score | 0.666 | 0.641 | 0.653 | 0.696 | 1866 |
| Stunted | 0.666 | 0.661 | 0.663 | 0.860 | 1852 |
| Severely stunted | 0.322 | 0.302 | 0.312 | 0.460 | 1852 |
| Wasting | 0.009 | 0.019 | 0.014 | 0.181 | 1866 |
| Severe wasting | 0.001 | 0.007 | 0.004 | 0.077 | 1866 |
| **Tete** | | | | | |
| Height (in cm) | 93.788 | 94.344 | 94.095 | 0.107 | 1405 |
| Weight (in kg) | 13.524 | 14.283 | 13.943 | 0.000 | 1404 |
| Weight-for-age z-score | -1.350 | -0.911 | -1.108 | 0.000 | 1404 |
| Height-for-age z-score | -1.979 | -1.831 | -1.897 | 0.085 | 1401 |
| Weight-for-height z-score | -0.226 | 0.266 | 0.046 | 0.000 | 1399 |
| BMI for age z-score | -0.048 | 0.420 | 0.210 | 0.000 | 1398 |
| Stunted | 0.540 | 0.464 | 0.498 | 0.023 | 1401 |
| Severely stunted | 0.223 | 0.181 | 0.200 | 0.112 | 1401 |
| Wasting | 0.104 | 0.040 | 0.069 | 0.012 | 1399 |
| Severe wasting | 0.040 | 0.010 | 0.024 | 0.018 | 1399 |

*Notes:* The p-values of the orthogonality tests are reported in the fourth column. Residuals of the test are clustered at community level. Last column from the right indicates the number of non-missing observations used for the tests.

## Child Test

To measure children's cognitive and extra-cognitive abilities we made use of an adapted version of the Ages and Stages Questionnaire (ASQ). The ASQ is a test to measure whether children aged 3 to 5 have reached certain developmental milestones across five domains of ability that are considered to a play key role in early development: communication and receptive language, gross motor, fine motor, problem solving (similar to cognitive) and personal-social abilities. For each of the domains the questionnaire uses age-specific sections, dividing children aged 36 to 59 months into 4 groups of 6-month age intervals. It can be directly administered by the parent alone, or be administered by an external assessor. In the context of our study, some items were assessed by the enumerator directly in contact with the target child, while items involving child behaviors that are typically delicate to observe in the context of a household visit were answered by the mother or caregiver.

To score the test, we used a general structural equation model to estimate the latent factor (i.e. ability) for each of the sections of the ASQ. Total score of the test was made by aggregating all the scores of the five sections of the test.

Figure 21 displays the distributions of the total scores for the control and treatment groups. A Kolmogorov-Smirnov test for equality of distribution shows no statistical difference of distribution between treatment arms (*p-value= 0.573).*

*Figure 21: Distribution of ASQ score by treatment status*



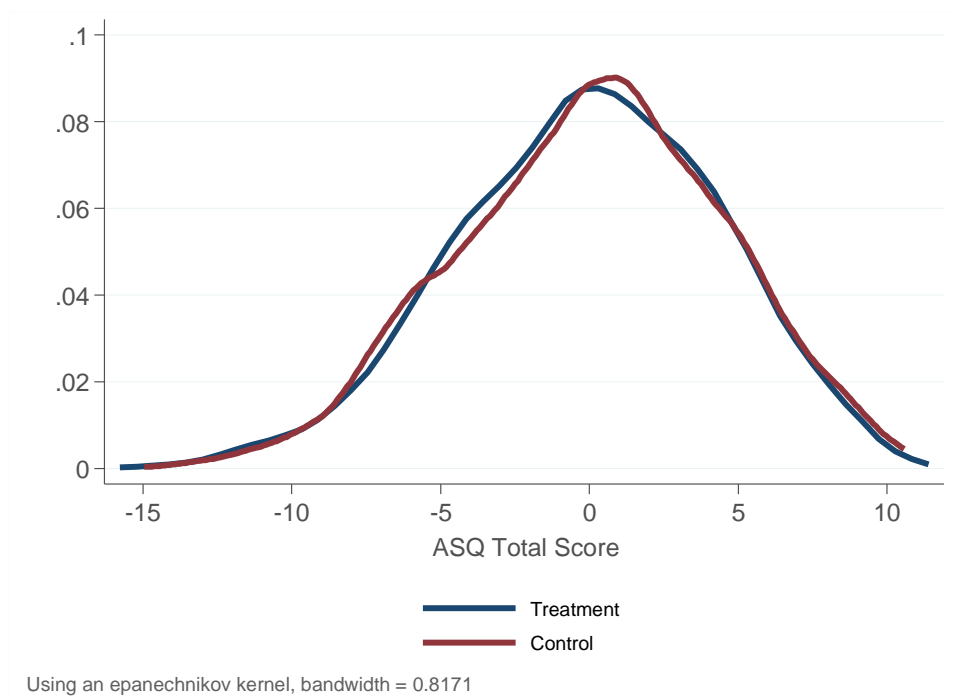Using an epanechnikov kernel, bandwidth = 0.8171

Table 24 presents the average total score from the structural model. By construction, scores are centered on zero for each domain of a given age category. There is no evidence of statistical difference between treatment and control, either in the total score or for each of the domains.

### Table 24: ASQ score, total and by section

| | (1) | (2) | (3) | | |
| --- | --- | --- | --- | --- | --- |
| | **Control** | **Treatment** | **Overall** | **(1) vs. (2) p-value** | **N** |
| Total ASQ | 0.076 | -0.021 | 0.026 | 0.575 | 5142 |
| Communication | 0.004 | -0.006 | -0.001 | 0.864 | 5142 |
| Gross motor | 0.010 | 0.006 | 0.008 | 0.924 | 5142 |
| Fine Motor | 0.035 | 0.006 | 0.020 | 0.738 | 5142 |
| Problem solving | 0.023 | -0.022 | 0.000 | 0.214 | 5142 |
| Socio-personal | 0.005 | -0.007 | -0.001 | 0.786 | 5142 |

*Notes:* The p-values of the orthogonality tests are reported in the fourth column. Residuals of the test are clustered at community level. Last column from the right indicates the number of non-missing observations used for the tests.

Figure 22, displays total score of ASQ per wealth quintile, with children from "richer" households performing much better than their peers in "poorer" households. However, there is no difference in terms of score between the second and third quintile.

### Figure 22: ASQ total score by wealth quintile
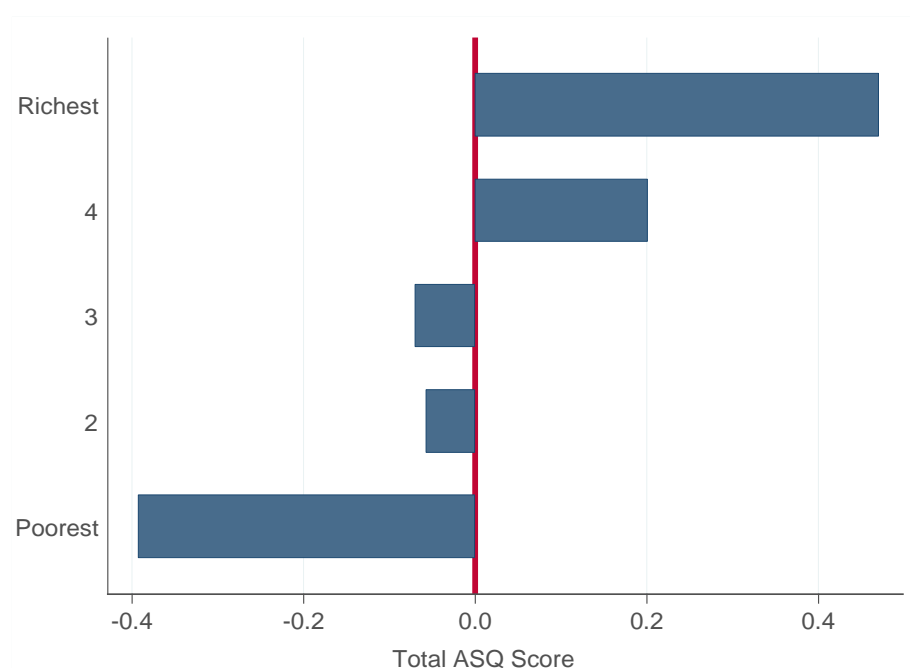
## Communities Characteristics

We report in this section data from the community leader questionnaire. Over the 236 participating communities, community leader questionnaire data are only available for 228 communities (one community in Tete has been mixed up with a non-eligible community and was dropped from the sample).

Community leader and community characteristics are presented in table 25. Community leaders are in the vast majority of cases (97.4%) men, of 54 years-old on average. Most of them (89%) went to school but few of them actually concluded the primary school cycle, and the average grade achieved at school is 4.4. Communities are generally located nearby a river or lake as 60% of the community leaders cited surface water as one of the main sources of water. All communities should have a primary school as it is one of the eligibility criteria. However, one observation declared no primary school in the community. After checking into the official data from the Ministry of Education, this is very likely to be mistake from the interviewer.

No control communities declared having a preschool, while 1.7% of treatment declared having a preschool. The data collection was done during the community mobilization of the preschool program and even if the preschool itself did not start in treatment communities, it is possible that a few community leaders were tempted to say that the preschool already exists. This is supported by the fact that more than 20% of the treatment communities already had in place a preschool committee to manage and organized the ECD center, including the construction of the facilities.

We explore in table 25 whether the non-random assignment of the nutrition program in Nampula is linked to the random assignment of ECD communities. Community leaders of 61.5% of communities which are due to benefit from a preschool declared the presence of a functioning nutrition program in their community while 48.7% of the community leaders in control communities declared having such a program in their community. This difference of 12.8 percentage points is however not significant at 10% confidence level[28].

Around one community out of four (25.5%) have in put in place Village Saving and Loan Association (VSLA) which provides a mechanism allowing groups of households to pool incomes into a single saving fund which can then be borrowed at a low interest rate.

Only a very small fraction of the leaders declared having a group to support Orphan and Vulnerable Children (OVCs) in the village.

However, availability of social programs or citizen committees varies greatly across provinces. Figure 23 displays the percentage of communities with specific programs and committees, by province. In Nampula, education committees where parents and community members manage relationship and activities with primary schools, exists in all communities of our sample, while those committees are functioning in only 44% of communities in Cabo Delgado where health committees are almost twice more frequent than in other provinces of our study.

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[28] When asked directly to households with at least one child between 0 and 2 years old if they know of a nutrition program being implemented in their community, there is less than one percentage point of difference between ECD communities and control communities. There is no evidence that the nutrition program has been more likely to be implemented in ECD communities than in communities that will not take part in the ECD program.

*Figure 23: Percentage of communities with specific programs and committees, by province*
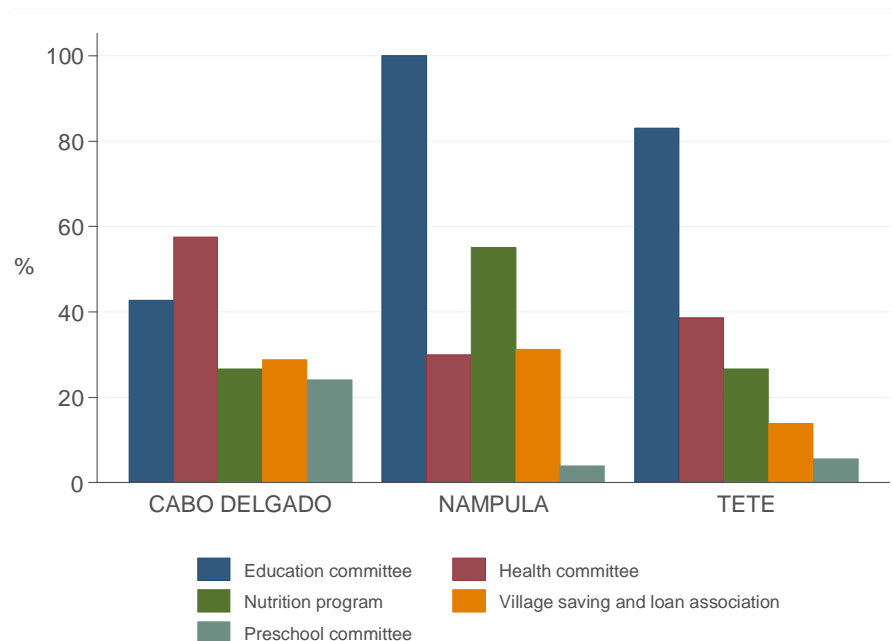


*Figure 24: Percentage of communities with specific facilities available, by province*
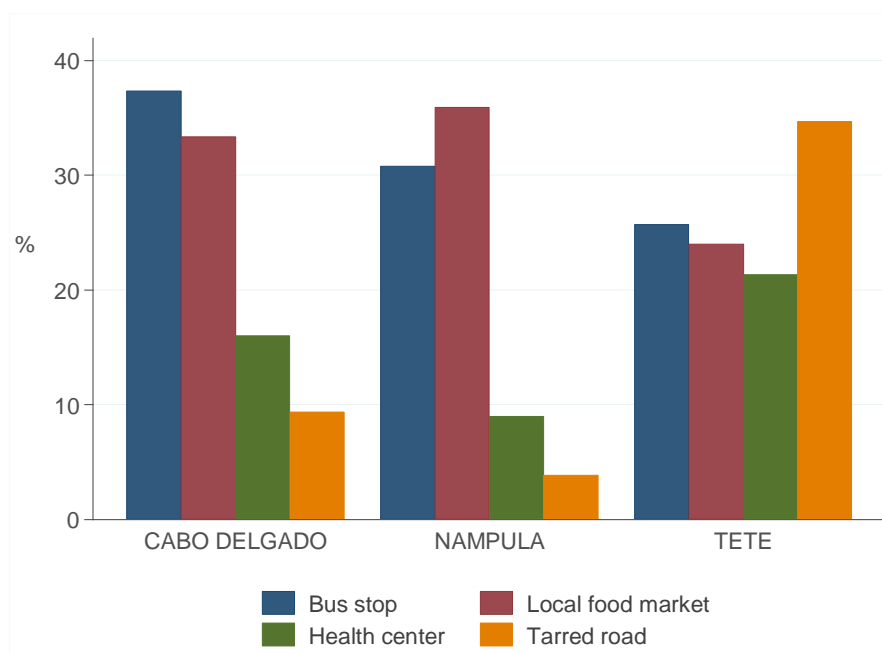
*Table 25: Community Characteristics*

| | (1) Control | (2) Treatment | (3) Overall | (1) vs. (2) p-value | N |
|---|---|---|---|---|---|
| *Community leaders' characteristics* | | | | | |
| Age (in years) | 54.3 | 53.6 | 53.9 | 0.605 | 228 |
| Male (yes=1) | 0.991 | 0.957 | 0.974 | 0.108 | 228 |
| Went to school (yes=1) | 0.884 | 0.897 | 0.890 | 0.762 | 228 |
| Highest education grade | 4.446 | 4.362 | 4.404 | 0.829 | 228 |
| *Water source available in the community* | | | | | |
| Public tap or standpipe | 0.473 | 0.405 | 0.439 | 0.303 | 228 |
| Tube well or borehole with hand pump | 0.295 | 0.397 | 0.346 | 0.107 | 228 |
| Protected dug well without pump | 0.107 | 0.112 | 0.110 | 0.906 | 228 |
| Protected spring | 0.009 | 0.026 | 0.018 | 0.332 | 228 |
| Surface water | 0.527 | 0.672 | 0.601 | 0.025 | 228 |
| Unprotected dug well | 0.411 | 0.388 | 0.399 | 0.727 | 228 |
| Rainwater | 0.170 | 0.138 | 0.154 | 0.509 | 228 |
| *Facilities available in the community (yes=1)* | | | | | |
| Bus stop | 0.259 | 0.365 | 0.313 | 0.085 | 227 |
| Tarred road | 0.098 | 0.216 | 0.158 | 0.015 | 228 |
| Local food market | 0.339 | 0.284 | 0.311 | 0.374 | 228 |
| Preschool | 0.000 | 0.017 | 0.009 | 0.164 | 228 |
| Primary school | 1.000 | 0.991 | 0.996 | 0.327 | 228 |
| Secondary school | 0.027 | 0.017 | 0.022 | 0.632 | 227 |
| Police station | 0.063 | 0.052 | 0.057 | 0.727 | 228 |
| Health center | 0.170 | 0.138 | 0.154 | 0.509 | 228 |
| *Social program and committees available (yes=1)* | | | | | |
| Nutrition program for infant | 0.313 | 0.414 | 0.364 | 0.113 | 228 |
| Nampula only | 0.487 | 0.615 | 0.551 | 0.261 | 78 |
| Micro-credit/Village Saving and Loan Associations | 0.276 | 0.236 | 0.255 | 0.520 | 208 |
| OVCs group | 0.032 | 0.047 | 0.040 | 0.595 | 199 |
| Education committee | 0.758 | 0.739 | 0.748 | 0.754 | 206 |
| Preschool committee | 0.010 | 0.207 | 0.116 | 0.000 | 207 |
| Health committee | 0.483 | 0.371 | 0.423 | 0.118 | 194 |

# Annexes

## A1: Basic Service Package

The minimum requirements to consider a preschool center (*escolinha*) functioning are divided into the following 9 themes and further described in detail below:
- Parents and Families
- Curriculum and Program
- Teaching Methods
- Materials
- Teachers
- Preschool Environment
- Preschool Management
- Coordination with local Health Services
- Local Government

### PARENTS AND FAMILIES

*Involve and work with parents, families and the community*

- Hold community awareness campaigns regarding the importance of ECD and preschools

- Carry out focus group discussions and key informant interviews with children, parents, teachers, health workers, and community leaders to understand the specific ECD needs and parents' interest in specific issues for the "parenting" meetings

- Hold "parenting" meetings once a month to share information regarding the development and education of the children

- "Parenting" meetings are open to all community members with children aged 0-8, including pregnant mothers

- Parents of eligible children must commit to attending "Parenting" meetings

- "Parenting" meetings are led by project staff and community facilitators

- Each parenting session has a theme based on need and requests from community

- These themes include:
  - Engagement in the preschool
  - Child development domains
  - Gender equality, children's rights and citizenship
  - Health hygiene and nutrition
  - Emergent literacy and math
  - Child rights and positive discipline
  - Families and communities must commit to contributing to the preschool (in kind contributions- cleaning, providing materials, etc., or monetary contributions)
  - Involve parents and families in the construction and maintenance of the preschool infrastructure
  - Involve parents in maintaining the proper safety and hygiene of the preschool
  - Involve parents in the learning of the children (i.e. have them participate in preschool activities, invite them to tell a story to the students, etc.)
  - Involve parents in developing the preschool daily schedule
  - Involve parents in developing and monitoring preschool regulations
  - Allow and encourage parents to participate and attend some of the trainings for the teachers
  - Measure changes in children's skills, teacher and parent attitudes, knowledge and practices through assessments that include all community stakeholders

## CURRICULUM AND PROGRAM

*Use a curriculum and program that promotes learning and development in each of the following areas: social, emotional, physical, language and cognitive*

- Use the curriculum and program created by MINEDH
- Have at least 15 hours of ECD services a week
- Have at least 9 months of ECD services a year (if/when a full calendar year is included within the duration of the contract, including any contract extension)
- Children eligible for the program are between 36 and 59 months old
- Create and use a daily program that includes outdoor and indoor activities
- Create and use a daily program that includes teacher-directed learning and self-initiated learning
- Use Patriotic Education
- Focus on oral development through the use of language, songs, dances, stories, images, objects, symbols, etc.
- Use local and national languages to facilitate communication
- Use a program which reflects gender equality, children's rights and citizenship
- Include weekly activities to develop sensory motor skills
- Create an environment of inclusive learning

## TEACHING METHODS

*Guarantee developmentally, culturally and linguistically appropriate and effective teaching methods*

- Differentiate teaching methods based on the need and capabilities of each child
- Use teaching methods which reflect gender equality
- Provide regular mentoring and coaching to committees and teachers using program monitoring tools
- Provide ongoing assessment to gain information on children's learning and development
- Use teaching methods which are appropriate given the local realities
- Develop mutual and respectful relationships between teachers

## MATERIALS

*Use appropriate learning materials*

- Materials must include chalkboard, writing utensils and books
- Materials must be appropriate and compatible with the age of the students
- Produce majority of learning materials from local resources
- Emphasis should be placed on learning materials that reflect gender equality, children's rights and citizenship
- Majority of the books in preschool must be child-friendly and centered around children's stories and child-related content

## LOCAL INSTRUCTORS (EDUCADORES/FACILITADORES)

*In coordination with local community leaders, select and recruit instructors and provide them with the training, skills and knowledge to promote children's development*

- Instructors should come from the local community
- Instructors must be qualified, responsible, committed to ECD and not have any form of criminal background
- Instructors should be between 18 and 50 years old
- Instructors must have attended school until the 7th grade (or display the skills/knowledge equivalent to a 7th grade graduate)
- Instructors must pass a basic math and Portuguese test

- Instructors agree to work at least 3.5 hours a day/ Monday – Friday (3 hours for the classes and at least half an hour to prepare and wrap up each day
- Instructors must sign a contract agreeing to the basic subsidy which will be provided by the Ministry of Education
- Instructors cannot be members of Community Coordination Committee (CCC) of the preschool
- Instructors must be willing to participate in training and other learning opportunities
- Instructors must receive 10 days of pre-service training
- Instructors must receive 5 days of training per year (workshops, learning days, etc.)
- Instructors must receive 5 hours of training per month (individual and group coaching)
- Trainings tropics include:
  - Child development domains
  - Setting up a school classroom with learning corners
  - Implementing the daily routine, including emergent math and literacy
  - Producing learning materials from local resources, reflecting gender equality, children's rights and citizenship
  - Children's participation
  - Classroom management
  - Health, hygiene and nutrition
  - Positive discipline
  - Facilitating parenting meetings
  - Transitions to primary school

## *PRESCHOOL ENVIRONMENT*
*Create a safe and healthy environment that provides appropriate indoor and outdoor physical environments*
- Ensure 1 staff member for every 15 children
- Learning and play areas must have 1.5 square meters per child
- Infrastructure must accommodate people with physical disabilities
- The preschool infrastructure should adhere to the construction standards provided by the Ministry of Education
- Indoor and outdoor infrastructure must be made from a combination of traditional and contemporary materials
- Indoor infrastructure must have appropriate light and ventilation and protected from the rain
- Indoor infrastructure must provide a clean and dry place for children to sit
- Outdoor play equipment must be appropriately designed for small children
- Outdoor play area must have shade, and play equipment must be on soft sand or grass
- Classrooms should have the minimum requirements to accommodate all children (i.e. mats, chairs, benches, etc.) and walls should be decorated a child-friendly manner
- Premises must have potable water, proper sanitary conditions and gender separate latrines
- Children and staff must wash hands regularly, especially after using the latrine
- Preschool must have access to garbage pits

## *PRESCHOOL MANAGEMENT*
*Preschools have a management structure that ensures strong administration*
- Each preschool has an ECD Community Coordination Committee (CCC) which is made up of members of the community
- CCCs have 10 members
- The members of the CCC should have an equal representation of gender and include a teacher from the closest primary school

- Positions on the CCC should include a president, vice-president, treasurer, health official, construction official and human resources official
- Positions on the CCC must have clearly defined roles and responsibilities
- Teachers of the preschool may not be part of the CCC
- CCC meetings are held at least once a month to guide the functioning of the preschool
- The CCC must have and follow a sustainability plan for the preschool
- The CCC should:
    - Ensure transparent management of the preschool
    - Record the minutes of meetings and disseminate them as needed
    - Organize the files and archives of the preschool
    - Develop and implement the Preschool Development Plan
    - Ensure active participation of various social actors involved in preschool
    - Encourage and ensure that parents contribute to the functioning of the school
    - Guarantee sound management of the contributions and funds of the preschool
    - Develop tools to monitor attendance at preschool (of both students and teachers)
    - Ensure that proper hygiene and cleanliness exist at preschool
    - Ensure that children participate in health campaigns
- The CCC should create a strong relationship and connection between the Director of the closest primary school and the leaders of the preschool to coordinate the transition and enrollment of children from the preschool to the Primary School
- The CCC will receive training in the following areas:
    - Child development domains
    - Gender equality, children's rights and citizenship
    - Community mobilization to support preschool activities
    - Planning and carrying-out activities related to functioning of preschool
    - Links to wraparound health services and birth registration
    - Reporting on activities
    - Transitions to primary school

## CONNECTIONS TO HEALTH SERVICES
*Create connections between ECD services and health services*
- The ECD project must include liaisons with local health activists
- Each preschool must have access to a school health package
- Each preschool must have access to a basic first aid kit
- Each child in the preschool should have the yellow health card
- Teachers must be trained on how to encourage parents to send their children to the preschool (i.e. the benefits of ECD intervention)
- Teachers must be trained in creating parent awareness regarding their child's health (i.e. vaccinations, infectious diseases, how to fill in the national height and weight card, etc.).
- The preschool (through "parenting" meetings or through teachers) must provide parents with information on providing children with a balanced diet
- Health services should and TPP should sensitize parents on better nutrition using local foods

## LOCAL GOVERNMENT
*Work, involve and train members of the local government in ECD activities*
- Create a Memorandum of Understanding between the community of the preschool, the government and the TPP to formally define each of their roles and responsibilities for the ECD program
- Inform local government officials of ECD best practices
- Inform local government officials of any difficulties or challenges facing the preschool
- Promote the exchange of experiences and practices with the district level government

- Hold a training for all government technicians from the provincial, district and local levels regarding the implementation of the ECD program (once a year)
- Training topics include:
    o Child development domains
    o Gender equality, children's rights and citizenship
    o Preschool learning program
    o Monitoring and coaching system
    o Transitions to primary school

## A2: Power Analysis

*Table 1-A2: Minimum Detectable Effects (MDE) for various domains of child tests using current ASQ score*

| | Signif Level | No of Clusters | Cluster size | N | No Treated | ICC | Mean | Std. Dev. | MDE in SD | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | | | | | | | | | 80% Power | 90% Power |
| Total Score ASQ | | | | | | 0.0407 | 0.026 | 4.429 | 0.459 | 0.531 |
| Communication | | | | | | 0.0338 | -0.001 | 1.641 | 0.163 | 0.188 |
| Gross Motor | 0.05 | 236 | 24 | 5664 | 2832 | 0.0279 | 0.008 | 1.217 | 0.116 | 0.134 |
| Precise Motor | | | | | | 0.0647 | 0.020 | 2.000 | 0.235 | 0.272 |
| Problem solving | | | | | | 0.0356 | 0.000 | 0.972 | 0.098 | 0.113 |
| Socio-personal | | | | | | 0.0375 | -0.001 | 1.206 | 0.123 | 0.142 |

*Figure 25: Power vs. Effect Size for total sample*
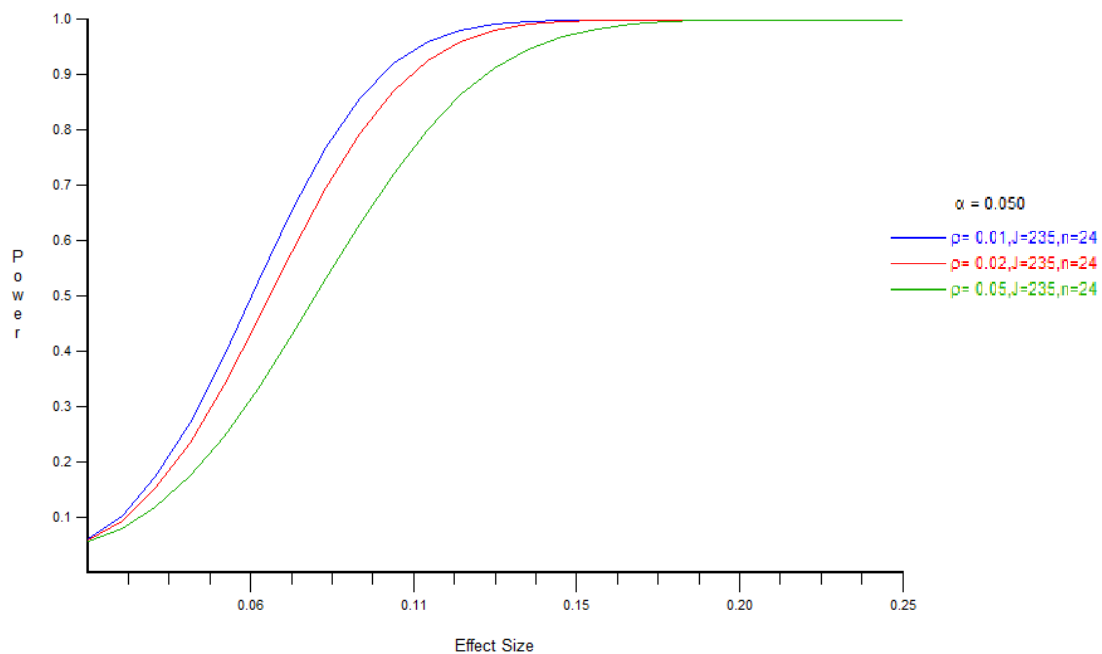


$\alpha$ : Significance level
$\rho$: Intraclass correlation (ICC)
$j$: Number of clusters
$n$: Cluster size

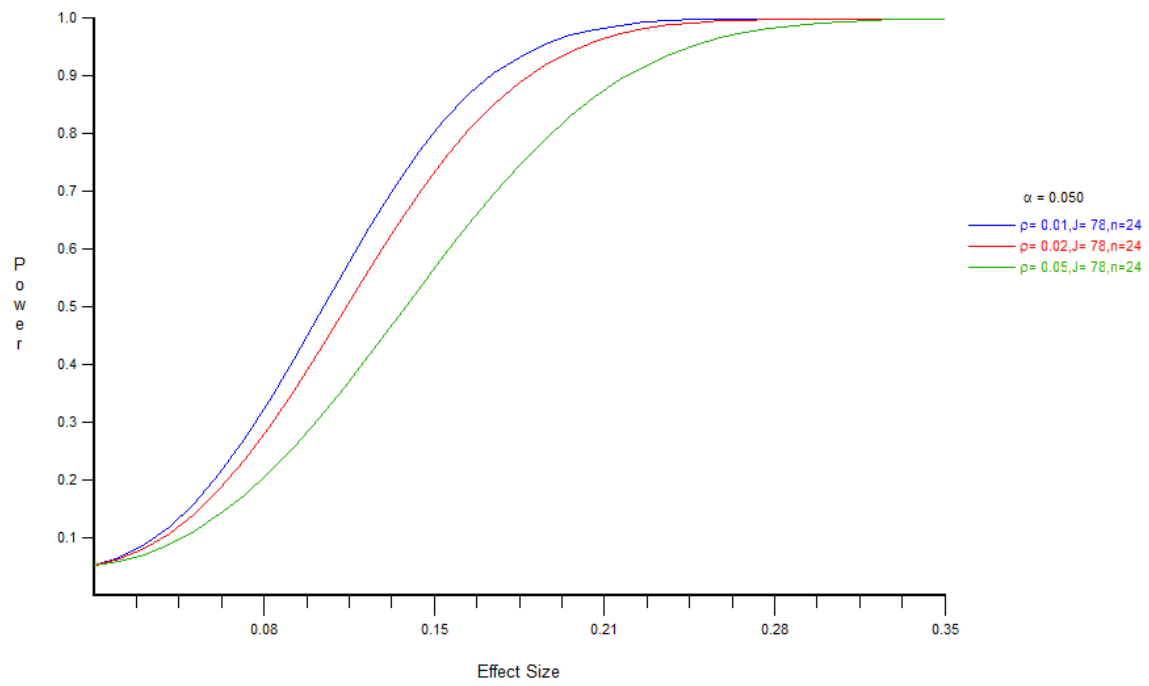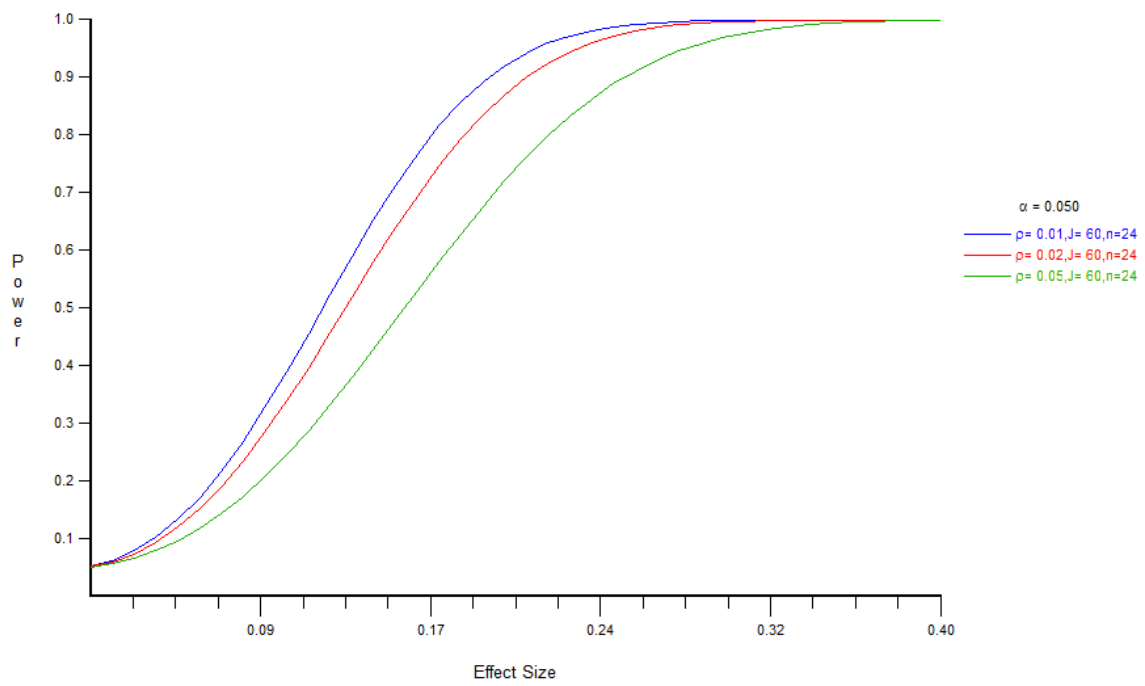*Figure 26: Power vs. Effect Size for sample at province level*



*Figure 27: Power vs. Effect Size by intervention arm*

Figure 28: Map of the survey districts and provinces