Anthropometrics and Child Development Survey in Madagascar (Enquete ADE 2007)[1]

Survey information and Status Report
April 2007[2]

BACKGROUND

There is a strong consensus that improvements in the nutritional status of infants and children matter not only for their direct health concerns, but also for its welfare implication on their physical and mental development later in life. Severe malnutrition is an important factor in explaining deficits in cognitive development, and that, in turn, cognitive development in early childhood has persistent impacts, in terms of schooling performance and productivity as adults.

The Government of Madagascar is the first African country to have implemented a large scale community based nutrition program for a sustained period of time (Seecaline). The program started in 1999, and was phased out to cover 60% of the districts in the country. The program aims at improving the nutritional status of children under the age of three, and of pregnant and lactating mothers in the targeted project areas. The focal point of the program are growth monitoring activities, around which a community nutrition agent mobilizes the community to participate to hygiene and nutritional education sessions, counseling as well as cooking demonstrations. In order to maximize outreach, the implementation of the program was contracted out to local NGOs.

The ex-post evaluation of the Seecaline program was initiated after the program was in place. It has been prepared in close collaboration with the technical counterparts of the program in Madagascar. The current evaluation is being used to feed back into the design of the future intervention. The program is now ready to scale up to all districts in the country.

A nationally representative baseline survey was fielded in 1997/98 before the program over a 3-month period between April and July in 108 districts of the country.[3] The survey is representative of the population of households with pregnant women and children aged 0 to 5 years old. The implemented agency for the survey was the *Direction de la Demographie et des Statistiques Sociales* (DDSS) at the *Institute Nationale de la Statistique*, the Malagasy statistical institute (INSTAT). This baseline survey was used to target the intervention in all districts with a malnutrition rate above the national average.

In 2004, an Anthropometrics Survey was fielded by INSTAT-DDSS during the same time period of the baseline survey. The 2004 survey is nationwide, covering both urban and

[1] The survey is a collaborative effort by PNNC-Seecaline, the World Bank and UNICEF.

[2] This note has been prepared by Emanuela Galasso. Technical inputs were provided by Kathleen Beegle (on tracking), Gero Carletto (on fieldwork organization) and Nithin Umapathi (on sampling).

[3] The survey was administered to 420 clusters, and a total of 14148 households (12814 households with children under 5). The baseline questionnaire was very thin, including only anthropometrics outcomes, education of the mother, and occupation of the head of household.

rural areas, in all 111 districts of Madagascar, and was designed to be a longitudinal panel at the community level.[4] The survey was administered to about 6,000 children and their respective households. About one third of the communities ended up being covered by the program as of 2004.[5]

The survey includes detailed sections on anthropometrics, pre-natal care, incidence and treatment of illnesses for children and their mothers, infant care and nutritional practices. A special survey module was administered in females in participating villages, as well as the community nutrition agents. In addition, a survey to the NGO providers was fielded, in order to capture key aspects of the quality of the service provided, proxied by their physical and human resources, and organizational structure.

OVERVIEW OF THE 2007 SURVEY

OBJECTIVES:

The main objective of the 2007 anthropometrics survey is to measure long-term effects of the community nutrition intervention: we want to test how the gains in nutritional outcomes translate into long term gains on cognitive development and school preparedness.

The current survey in 2004 is not a panel at the individual level, and does not include any measure of cognitive development. By 2007, we will have a panel that spans 10 years, before and after the program. By 2007, all children 0-36 months old in the 2004 survey will be at 36-60 months old, with a subset of them ready to enter primary age school. Children who are currently 4-5 years old will be 7-8 years old in 2007: for them one can measure their school progression, as well as school attainment. Resurveying the same children three years apart provides a unique opportunity to test whether the medium term gains in terms of improved nutritional outcomes do translate in long lasting impacts, as measured improved cognitive development and educational attainment for participating households.

SAMPLE SIZE OF THE PANEL SURVEY:

Sampled clusters: A subset of 150 communities from the 2004 survey (about 1/3) is proposed to be resurveyed in 2007.

Given the budget constraints and the focus of the survey, the follow-up 2007 is composed by a random sub-sample of 75 (out of 154) participating communities in 2004 and a sample of 75 matched comparison non-participating communities as of 2004. The sub-sample of non-participating communities was selected to be as similar as possible to participating communities with respect to average malnutrition rates at baseline, remoteness indicators, commune infrastructure, incidence of cyclones and droughts.

[4] All 420 communities in the baseline survey were interviewed longitudinally in 2004, and 26 additional communities were added to include 3 additional districts to have nation-wide representativeness.

[5] More precisely, a short questionnaire (roster + anthropometrics) was administered to 10704 households in all clusters (24 households per cluster). Among them 12 randomly selected households within each cluster (for a total of 5352 households) were administered a longer, in-depth questionnaire.

Sampled households within clusters: In 2004, a random sample of 12 households was drawn from the household listing of the target eligible population (*households with women 15-49 who were either pregnant or had children 0-5*).

Within each community, the objective is to follow longitudinally all children (and their respective households) who were 0-36 months old in 2004 (and therefore going to be 3-6 years of age in 2007), for a total of 1505 children.

The number of households that would include at least one such child to be re-interviewed in the panel would be of 1,262 households.

In order to increase the representativeness of the sample, we will also follow-up the 239 households with a first-time pregnant woman for a total of 1,501 households (1,262+239).

There is no need to do a household listing exercise.

Table 1: number of households in the sample of the 150 selected villages

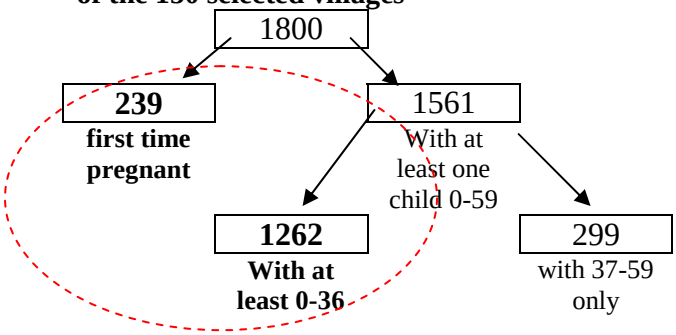

Table 2. Number of households with children 0-36 in 2004 (sample of the 150 selected villages)

	Total no. households	Total no. children 0-36
0 (only first time pregnant)	***239***	-
0 (only children 37-59) to be dropped	299	-
Subtotal 0	*538*	
1 child	1,039	1,039
2 children	206	412
3+ children	17	54
Subtotal (at least 1 child)	***1262***	***1,505***
Total	1,800	

How many children 0-36 will we be able to capture in 2007?

We can approximately estimate the likely number of 0-36 months old in the 2007 sample, by taking into account the fertility rate and the mortality rate.

Consider that on average 35% of the eligible women (15-49) in the 2004 sample are pregnant[6]. Taking into account that these pregnancies might terminate and that children born alive might not survive until 2007[7], we can assume that about 20% of these pregnancies will

[6] The 2004 sample will be three years older in 2007. The fertility rate of the 15-17 is more or less equivalent to the one of the 18+

[7] The DHS 2003-04 estimates that the mortality rate of 0-5 is 98/1000 and the 0-1 is about 58/1000.

not be observed in 2007. This leaves us with about 28% of the eligible mothers will have a newborn per year that survives to 2007:

- The longitudinal sample of 1261 households will produce on average (1262*.28=) 350 children per year: this corresponds to a cumulative number of 1,050 children 0-3 during the three years between the interview dates of 2004 and 2007.
- As indicated above, a simple way to increase the representativeness of the sample is be to include all those households who had pregnant women as of 2004 but no other children 0-5, which amounts to adding 240 households to be re-interviewed (see table 1). The final sample will be representative of all eligible females and their respective children in 2004, 3 years apart, i.e. all women 18-52 as of 2007.[8]

THE PANEL DIMENSION OF THE SURVEY

This is the first time that a panel survey is administered in Madagascar. We are interested in following up individuals (children 0-36 months or first time pregnant women) and their respective households.

The first concern in collecting panel data is to make sure to provide protocols to find individuals over time and minimize attrition. For each person we want to reinterview we need to make sure that we:

- interview them in the same community;
- or fill in a tracking form if they moved to a village (or commune) nearby;
- or fill in a mortality questionnaire if they died.

This implies (Glewwe and Jacoby, 2000):

- Increasing the supervision of interviewers, making sure they locate the households and individuals they are supposed to interview
- Increasing the quality control in field-work.
- Establishing clear rules to decide whether and how to track individuals have moved out of their original household or the original dwelling.

What is the likelihood of children moving out of the original household?

Scenario 1: temporary or permanent migration

In other developing country settings it is estimated that about 10-20 percent of the original households members are likely to move in the space of one to two years (Glewwe and Jacoby 2000). In the context of Madagascar, the low rates of internal migration coupled with the fact that we are following up individuals and not households make it less likely to be a severe problem within the three years difference between the two surveys. Children are in fact likely to be less mobile that adults (even in the presence of one adult migrant in the household). Nonetheless one could get a rough estimate of the likelihood of children moving out of the original household using the 2004 data.

On average 7.8% of the sampled households have migrated at any point in time in the previous 12 months, and among those who do a very small proportion takes the children with them. The estimate fraction of children 0 to 10 migrating would amount to 0.014 (for the 0-3) and 0.012 (for the 4-10) of the sample.

[8] That is all women 15-49 in 2004 after 3 years. The only group that will not be represented in the current sample will be women are going to be 15-18 in 2007 (about 11% of the eligible population of females).

For this small sample of likely movers, it might be worth following them up within the same or neighboring communes.

Table 3. Sample of 1800 households in the 150 selected villages

	Mean	sd	N if var=1
Any member of the household has migrated in the past 12m?	0.078	0.269	141
If migrated:			
* have brought with them children 0-3	0.184	0.389	26
* have brought with them children 4-10	0.149	0.357	21
If migrated with children (either 0-3 or 4-10), where?			
-other communes	0.161	0.374	5
-other districts	0.226	0.425	7
- forest	0.613	0.495	19
Total no. of households			1800

Scenario 2: households splitting

Another potential concern to be taken into consideration is the case that the target population of children might be living in households and dwellings different from the ones where they resided in 2004. Two possible cases of potential splits come to mind:

1. two children under 3 years of age in 2004 living in the same household but with two different mothers. We can see from table 4 that this situation applies to about 7% of the children in the sample;
2. children under 3 years of age in 2004 for whom where the mother is not living in the household. This case does not apply, since all children in the sample live with their mothers.

Table 4. Sample of children 0-36 in the 150 selected villages

	Mean	sd	N if var=1
Living in the same household with two different mothers	0.069	0.253	102
If so: relationship to the head: - son/daughter	0.288		30
-grandchild	0.625		65
-others	0.086		9
Not living with their mother	-		
Total no. children 0-36			1505

MEASURING EARLY CHILDHOOD DEVELOPMENT OUTCOMES

All children to be reinterviewed in the panel sample (1505) will be administered a battery of tests that range from cognitive development (visual spatial processing, fluid reasoning, sustained attention, short term memory, executive function)to language, fine and gross motor skills and socio-emotional development.

A team lead by Lisy Ratsifandrihamanana, a Malagasy clinical psychologist and Lia Fernald (assistant professor public health and nutrition at U. Berkeley) has worked on the adaptation of international survey instruments to the Malagasy context. The choice of tests restricts to domains that have been shown in the nutrition literature to nutritional interventions or poverty. Mothers will also be administered the Language test.

An in-depth pre-test was administered between Dec 26 2006 and Jan 6 2007 in two different settings (Miandrivazo in the province of Toliara, and Ifanadiana in the province of Fianarantsoa). Following the pre-test, the tests themselves and the manuals were revised extensively to incorporate problems encountered in the field.

Final list of tests to be administered to each child:

Domain	Source:
Attention and speed of processing.	Local adaptation Leiter R
Working memory	Local adaptation Woodcock-Johnson
Short term memory	ESB5
Fluid reasoning	ESB5
Spatial visual processing	ESB5
Fine motor skills	Local adaptation Pegboard
gross motor skills	Local adaptation McCarthy
Language	Peabody
Socio-emotional development	Strengths and difficulties
Executive function	Day-night stroop test

The interviewers for this child development component (henceforth ECD interviewers) were selected by Mme Ratsifandrihamanana among the most performing graduate students of the *Ecole de Service Social*. Their participation to the survey will be counted as a practical internship (*stage*) towards completion of their studies. Two of each will join each interviewing team in the fieldwork. Their primary task will be the administration of these instruments.

The general training for this subcomponent took place on February 21-24 2007. The training team has 2 or 3 days of practical exercises in selected Seecaline communities, with subsequent group discussions among all the interviewers. A training of two days was administered in April 10-11th 2007. A final pre-test during the week of April 16th took place in Ambatolampy in conjunction with the final pretest. In order to ensure homogenous scoring for the child tests, a inter-rater reliability test was performed.

SURVEY INSTRUMENT AND MANUAL

The same survey instruments from the 2004 Anthropometrics survey will be slightly revised and adapted for the the 2007 follow-up:

Questionnaire:	**Level:**	**Content**	**To be administered to:**
Short	Individual/Household	Basic roster, anthropometrics	All clusters
Ménage	Individual/Household	Education, employment, migration, water/sanitation, assets and shocks	All clusters
Femme	Females 15-49	Pregnancy, prenatal care, breastfeeding, vaccination and health female/children	All clusters
Femme Seecaline	Females 15-49	Participation, knowledge and perceptions about the nutrition program	Only Seecaline clusters
CAN	Community nutrition worker	Socio-economic characteristics ACN, training and implementation of the program	Only Seecaline clusters
Community	Key community informants	Demographic and socio-economic characteristics of the community,	All clusters

		infrastructure, and community shocks	

A few innovations were introduced in 2007:

- *Questionnaire ménage* (household): The food security section lists all crops cultivated by the household. However, instead of asking *quantities* of crops harvested, consumed, sold or stored as in 2004, a decision was made to elicit *shares* of the total by using 10 beans and asking the respondent to form groups that reflect the crop allocation. The technique (called proportional piling) has been successfully used in Madagascar during a nationwide food security survey financed by WFP in 2005.
- *Questionnaire individuel femme* (eligible female): expanded the questions on hygiene, added two new sections on self-efficacy (the self-reported degree of confidence in activating actions in the domain of child care) and on knowledge (adding scenarios for which the mother has to identify the cause).
- *Questionnaire femme Seecaline and ACN* (in participating communities): both were revised extensively to reflect program changes. Sections about farine distribution were taken out and new questions on the growth promotion by age group were added.

Additional adaptation for the panel dimension include detailed tracking protocols and the following two forms:

- A household update form (questionnaire mise a jour ménage 2004), with a preprinting roster from 2004, a set of mortality questions for those household members who died and an identification of the key members to be tracked.
- An individual tracking form for each key informant of the household members who have moved (with a key child or first time pregnant woman to be tracked).

The tracking forms and protocols have been developed by Parfait Enlundou-Enyengue (Associate Professor of Demography, Cornell University) and revised by the INSTAT team. A pre-test of these protocols has been done on March 17-18th and in the week of the final pre-test for the survey (week of April 16th).

SUPERVISION

Cross-country experience has shown that the quality of a household survey is critically dependent on the extent of supervision during the data collection stage. The survey plan envisions support of a consultant (Valerie Ranaivo), who was in charge of the coordination of the 2004 survey as part of the INSTAT team. She will work closely with DDSS to manage the process of field supervision .

The field work is organized in 8 teams, each of which will have a key reference person (1 controleur) who is responsible for the quality of the survey only. Each team will be composed of 4 interviewers, two for the household survey and anthropometrics measurement, and two interviewers for the ECD outcomes.
Satisfactory arrangements on the organization of the field work have been agreed with INSTAT/DDSS and Valerie Ranaivo.

The field work is scheduled from May 1st to july 14th 2007.