MADAGASCAR

Service Delivery in the Education and Health Sector: Results of the 2006/2007 Public Expenditure Tracking Survey

Draft Version

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Acknowledgements

Abbreviations

CHD	Centre Hospitalier de District/District Hospital
Cisco	Circonscription Scolaire/District Education Facility
CoGe	Comité de Gestion/Community Management Committee
CoSan	Comité de Santé/Community Health Committee
CSB	Centre de Santé de Base/Basic Health Center
DREN	Direction Régionale de l'Education Nationale
FAF	Fiarahana ombon'antoka ho Fampandrosoana ny Sekolo/ Parents-school partnership association
FANOME	Fandraisan'Anjara No Mba Entiko/Cost recovery policy
Fivondronana	District
Fokontany	Village
FRAM	Fikambanan'ny Ray aman-drenin'ny Mpianatra/ Parents-teachers association
MEFB	Ministère des Finances et du Budget/Ministry of Economy, Finance and Budget
MINESEB	Ministère de l'Education Secondaire et de l'Education de Base/Ministry of Primary and Secondary Education
MINESAN	Ministère de la Santé et du Planning Familial/Ministry of Health and Family Planning
PhaGDis	Pharmacie à Gestion District/District Pharmacy
PhaGeCom	Pharmacie à Gestion Communautaire/Commune Pharmacy
SALAMA	Central drug purchasing unit
SSD	Service de Santé de District/District Health Authority
ZAP	Zone d'Administration Pédagogique

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The results in this study are based on primary data collected in Madagascar in a nation-wide budget tracking survey. The survey was conducted in two rounds. The first round was conducted in October/November 2006 and the second one in April/May 2007. The stratified sample was set up in such a way to reflect national diversity. Madagascar counts 22 regions and 111 districts and at least one district was visited in each region. Two districts were selected in the six largest regions. Hence, 28 districts were visited in total. The selected districts were obtained through random selection, giving greater (less) weight to districts with more (less) public primary schools and health centers within the district. The education and health sector were given equal weight in the latter selection (World Bank, 2006). In each district, three communes were randomly selected, giving greater weight to the communes with more schools.

Within each commune, three public primary schools were randomly selected. By ranking schools from large to small and ensuring that a school was picked out of each tercile, a representative sample of school sizes was chosen (World Bank, 2006). Two types of health centers provide basic health care in Madagascar i.e. CSB Type I and CSB Type II. In the selected communes, all public health centers of Type II were visited. If public health centers of type I were present in the commune, one was visited based on random selection.

In order to track different resource flows from the decentralized district facility levels to the schools or health centers, surveys were organized at district and school/health center level. At the local level, the directors of the education/health facility as well as the teachers/health workers were interviewed independently. To ensure compatibility, the surveys at district and school/health center level were held at the same time. Table 1.1 gives an overview of the sample. In total, 252 schools and 113 health centers were visited. Approximately one-third of the health centers (35%) are Type I facilities. Due to closure of some schools and health centers during either the first or the second round (or both rounds), we ended up with reliable panel data on 229 schools and 100 health centers. Finally, it is noteworthy that the second round of data collection faced greater challenges to collect the data and therefore results are less robust for the second round.[1]

Table 1.1: Structure of the sample

Province	Number of public primary schools	Number of public primary health centers
Antananarivo	54	23
Fianarantsoa	63	27
Toamasina	36	19
Mahajanga	45	24
Toliara	36	12
Antsiranana	18	8
Type I		39
Type II		74
Madagascar	**252**	**113**

Source: World Bank/UNICEF, PETS Nov. 2006 & May 2007, Madagascar.

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[1] For example, we faced mismatching codes for some schools and health centers as well as personnel codes between both rounds; there were a lot of blank entries on school equipment and other line items in the second round, and there were more cases where collected information on certain budgets did not add up to the total of those budgets as reported by the enumerators in the second round.

Chapter 2: The Determinants of Absenteeism in Social Service Delivery

2.1.   Introduction

A large portion of public education and health expenditures goes to the payment of salaries: in 2004 roughly 50% of all government primary education sector spending was on salaries in Madagascar (73% of recurrent expenditures)[2]; in 2005 about 45% of all MINESAN spending was on salaries (68% of recurrent expenditures)[3]. But what is the quality of the service delivery that those salaries are purchasing? A recent study analyzed one indicator of service delivery—provider absenteeism—using a consistent methodology across six countries and showed that teacher and health worker absenteeism were very high—extremely so—in some countries (Chaudhury *et al.* 2006, see Box 2.1). Regardless of its causes, absenteeism potentially reflects inefficiencies in public expenditures, and importantly, reductions in effective service delivery. Duflo and Hanna (2005) provide an estimate of the effect of teacher absence on student outcomes and show that a reduction on teacher absence in India led to a sizeable improvement in student test scores.

The results in this chapter explore the situation in Madagascar using data collected following the protocol used in the international study. Enumerators made two unannounced visits—separated by six months—to public primary schools and health clinics in Madagascar and recorded the list of teachers and health workers who worked in the facilities, and whether they were working at the time of the visit. In each of the visits, on the order of about **13% of teachers and 19% of health workers were absent**. Overall, these numbers are lower than the average absence rates found in the multi-country study: 19% of teachers and 35% of health workers. However, the numbers are high compared to the absence rates found in developed countries e.g. Ehrenberg *et al.* (1991) revealed a mean absence rate of 5% in the American education sector in the mid-1980s.

Like the international pattern, absence in Madagascar is typically fairly **widespread** rather than concentrated in a small number of workers. Around one-quarter of teachers and one-third of health workers were absent during at least one out of two visits. Overall, the likelihood of absenteeism **decreases with the years of residence** a teacher or health worker has lived in the commune in which the facility is located, but **increases with the individual's age and education level**. Contract workers are not found to be significantly more absent. However, investigating the absence rates in greater detail also reveals **substantial differences in the patterns across the education and health sectors.**

Absenteeism is mainly determined by individual characteristics, but in the education sector school and regional determinants also appear to play an important role. Furthermore, in the education sector **absence rates are generally higher in remote areas**. This result is partly driven by the fact that teachers in those areas often need to travel (and thus are absent) for an extended period of time in order **to pick up their salary**. **Inspections and frequent teaching staff meetings lower the likelihood of absenteeism**. By contrast**, teachers with a lower teaching load or with a secondary activity appear to be absent more often in particular during the second semester**. In the health sector, **health staff with a higher status are absent more often**, but personnel that **live in a house provided by the health facility are absent less often**. Also, **type II health centers show higher absence rates**.

One way to address the problem of absenteeism is to promote the **use of proper index cards** for service delivery personnel stating their presence (or authorized absence). Currently, the use of such index cards is still rather low in Madagascar. **Accurate record-keeping** on the presence or authorized absence of employees could also be kept at the respective decentralized levels and as such simplifying top-down monitoring. Finally, the establishment of a **proper**

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[2] PER 2005.
[3] PER 2007 Volume 2.

incentives and accountability system in the health and education sectors could be encouraged. Nowadays, employees who perform well are barely rewarded and punishments of incompetent workers are rare.

Box 2.1
Results from a Multi-Country Study of Absenteeism:
Missing in Action: Teacher and Medical Provider Absence in Developing Countries

A recent World Bank research project set out to measure the extent of absenteeism in multiple countries using a common approach. The project used a minimum of two unannounced visits of a random sample of no less than 100 schools in each country. The main finding was that on average 19 percent of teachers and 35 percent of health workers were absent from their facilities in Bangladesh, Ecuador, India, Indonesia, Peru, and Uganda. Of those present, not all were actually "working". In India, for example, only half the teachers were actually teaching when the survey teams arrived.

Provider absence was found to be worse in poorer countries (See box figure), in poorer regions within countries, and higher-ranking and more powerful providers such as headmasters and doctors were absent more often than lower-ranking ones.

Box Figure: The association between absenteeism and GDP per capita across countries, and States of India
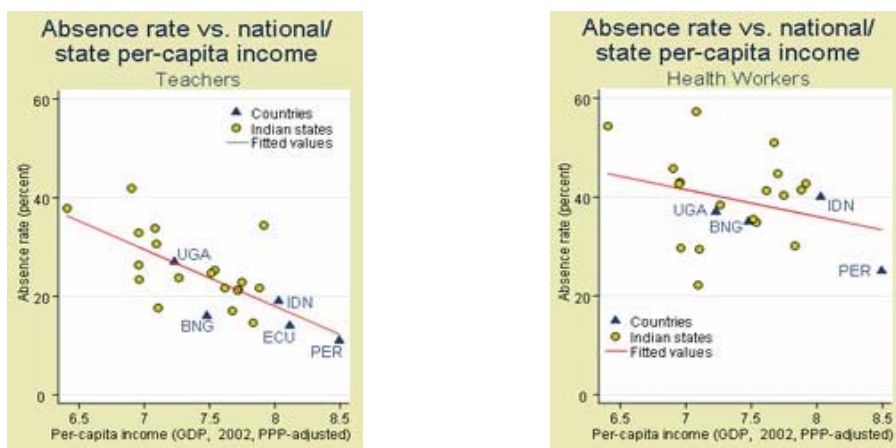
A seemingly obvious intervention to improve provider attendance in poorer regions is raising pay. However, the multicountry sample shows little evidence that relatively high salaries strongly affect absence. In fact, evidence suggests that facilities that have better oversight, as measured through recent school inspections, and facilities with better infrastructure, as well as proximity to a paved road, have lower absence rates.

This is consistent with the finding that teachers and health workers are extremely unlikely to be fired for absence, so that their attendance decisions are influenced more by their working conditions than by fear of losing pay. Contract teachers, who are not subject to civil service protection and earn a fraction of what civil service teachers earn, also do not typically have higher absence.

A companion research paper focusing on absence among Indian teachers supports in greater detail the finding that higher pay is not associated with lower absence. For instance, older teachers, more educated teachers, and head teachers are all paid more but are also more frequently absent.

The study found some differing results across countries—for example on the role of the local community in reducing absenteeism. In India, stronger local community ties are not associated with lower absence: Teachers from the local area have similar absence rates as teachers from outside; locally controlled non-formal schools have higher absence rates than government-run schools; and the existence of a parent-teacher association is not correlated with lower absence. In Peru, on the other hand, being a local teacher does correlate with lower absence.

Source: Adapted from Halsey Rogers (2006): http://go.worldbank.org/NYBCYN34C0

2.2.   Survey instruments

Consistent with the international protocol on absenteeism a two-round survey in both the health and education sectors was conducted with a first visit in November 2006 and a second visit in May 2007 (World Bank, 2006). Each survey could take one or two days and consisted of four instruments: (1) the school/health center director survey - part 1 on staff presence; (2) the school/health center director survey - part 2 on budgets; (3) the teacher/health personnel survey; and (4) the education/health district facility survey (Cisco/PhaGDis). In addition, during June/July 2007 payroll data were gathered at the Ministry of Education level. This allowed us to compare the employees' roster in the survey with the list of teachers on the Ministry of Education's payroll. A total of 967 teachers and 411 health workers were surveyed.

2.3.   Definitions of absenteeism

We use two definitions of absenteeism: one basic and one extended. The basic definition considers teachers/health workers as absent if they were not in the school/health facility at the time of the random visit during facility hours. Enumerators created a list of employees at the facility itself and checked the attendance with the school/health center director or another principal respondent when they first arrived at the facility. We excluded those employees who were reported by the respondent as working a different shift. In the education sector, a large number of teachers were working on another shift.

The extended definition considers employees as absent according to the basic definition, but adds some additional cases to the sample. First, employees who were not initially mentioned by the director, but who showed up during the second part/day of the visit were considered as absent in the extended definition. Second, we included staff of facilities that were closed due to staff absenteeism.[4] Third, we included employees who were mentioned in the first round, but not in the second round as absent in the second round and vice versa (excluding those employees who were recently hired). Finally, we included employees who were reported by the director to be present, but whose physical presence could not be verified by the enumerators.[5]

2.4.   Absenteeism in the education sector

2.4.1.   Descriptive results

a. On average 13% of teachers are absent. This number is lower than the 19% teacher absence rate found in the multi-country study. However, descriptive results suggest that there are large regional differences and that absence rates increase with remoteness.

Table 2.1a shows that – depending on the definition used – about 10% to 16% of teachers are absent during a random visit. Absence rates are found to be slightly higher during the second visit. Overall, teacher absence in Madagascar is lower compared to the multi-country average of 19% calculated by Chaudhury *et al.* (2006). However, considering both rounds we find that on the order of one-quarter of the teaching staff were absent during one of two visits. It is possible that our figures present too favorable a picture as schools that were closed during both rounds due to teacher absence were not included in our calculations as data on these schools were very limited. According to data on these schools from the Ministry of Education, these were mainly single-teacher schools. Taking these schools into account would increase our estimates of teacher absence by about 1 percentage point.

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[4] With the exception of those facilities that were closed during both visits as we do not possess sufficient data on these schools. However, we account for this in the general tables.

[5] Unfortunately, the verification question on the physical presence of employees was only added during the second round of the survey but only a limited amount of employees was reported to be present, but not working at the time of our second visit.

Table 2.1a: Teacher absenteeism – 2006/2007 school year (in %)

	Visit 1 (Nov. 06)		Visit 2 (May 07)		Either visit 1 or 2	
	Basic	Extended	Basic	Extended	Basic	Extended
All teachers	**10**	**13**	**12**	**16**	**19**	**26**

Source: World Bank/UNICEF, PETS Nov. 2006 & May 2007, Madagascar.

Descriptive data suggest that there are large regional differences. Overall, the provinces of Mahajanga and Toliara seem to suffer most from teacher absence. In contrast, the provinces of Fianarantsoa and Antsiranana appear to suffer least. The results in Table 2.1b also suggest that remote to extremely remote areas suffer most from teacher absence, in particular according to the extended definition.

b. Compared to other developing countries, the number of teachers that is present but just sitting around and not teaching at the time of the visit is very low; it only amounts to 2% of the teaching staff.

In the second round, the enumerators were asked to indicate which teachers were present but not teaching at the time of the visit. Only 2% of the teachers were not teaching when the enumerators arrived at the schools. This number is very low compared to, for example, India where only about one-half of the government primary school teachers were found to be actually teaching when enumerators visited the schools (Chaudhury *et al.*, 2006).

Table 2.1b: Teacher absenteeism – 2006/2007 school year (in %)

	Absent in either visit 1 or visit 2	
	Basic	Extended
All teachers	**19**	**26**
Including schools closed twice	*20*	*27*
Teaching load		
More than 27.5 hours	14	20
27.5 hours or less	25	33
Contract		
Civil service teacher	22	28
Contract/FRAM teacher	16	24
Poverty		
Well off	19	27
Not poor	21	28
Poor	17	27
Very poor	19	22
Remoteness		
Easy access	20	26
Accessible	12	19
Remote	23	30
Extremely remote	21	32
Province		
Antananarivo	21	26
Fianarantsoa	10	14
Toamasina	24	33
Mahajanga	28	38
Toliara	25	34
Antsiranana	7	17

Source: World Bank/UNICEF, PETS Nov. 2006 & May 2007, Madagascar.

c. Absenteeism of contract teachers as well as teachers with a lower teaching load increases towards the end of the school year. This result could be due to irregular salary payment or secondary income activities.

FRAM teachers are contract workers that are not subject to civil service protection and whose salary is a fraction of what civil service teachers earn. Irregular salary payment is an important problem, in particular 24% and 38% of FRAM teachers declared to have suffered from irregular payment during last and this school year respectively. We will further investigate whether the increase in the absence rates of FRAM teachers is due to delayed payment of their allowances. On the other hand, absence rates among certain teacher types as e.g. teachers with a lower teaching load could increase over time as these types are more likely to have an activity

on the side. We will discuss potential determinants of absenteeism in greater detail further in this chapter.

2.4.2. Why are teachers absent?

a. About 13% of teachers are absent because they have left to collect their salary, 16% of teachers are absent due to an official mission. Another quarter is on unauthorized leave. The remainder of the absent teaching staff is ill, on authorized absence, or suspended.

It is difficult to assess the extent to which absence is authorized. Instances of absenteeism may be described to enumerators as authorized even if they were not truly so: respondents may be trying to obscure the fact that facility employees are not performing. Importantly, however, the effects on student learning are the same regardless of the cause (World Bank, 2004).

Keeping some skepticism in mind, Table 2.2 nevertheless reports the reasons of teacher absence as declared by the respondent. These declared reasons for absence are only available for the basic definition. One-quarter of the absent teachers were on unauthorized absence. Approximately 13% were collecting their salary, while 16% were on an "official mission". One-fifth of the teachers were ill and another one-fifth was on authorized leave. A small 2% of teachers were recently suspended.

Table 2.2: Reasons of teacher absenteeism – 2006/2007 school year (as declared by school director – in %)

	Visit 1 (Nov. 06)	*Visit 2 (May 07)*	*Both visits 1 & 2*
Teacher left to pick up his/her salary	17	9	13
Teacher is on another official mission	16	17	16
Illness	22	23	23
Authorized absence	19	22	21
Unauthorized absence	24	27	25
Teacher is suspended	2	2	2
Total	100	100	100

Source: World Bank/UNICEF, PETS Nov. 2006 & May 2007, Madagascar

b. One of the main reasons of absenteeism is the time needed for teachers to collect their salary. On average, teachers are absent for one up to three days per month for this reason.

Table 2.3: Teacher absenteeism due to salary pick up (in number of days per month)

	Dry season		Rainy season		Maximum	
	Mean	Median	Mean	Median	Mean	Median
2005/2006						
Madagascar	**1.2**	**1.0**	**1.6**	**1.0**	**2.7**	**1.0**
Antananarivo	0.8	1.0	0.9	1.0	1.3	1.0
Fianarantsoa	1.5	1.5	2.0	1.5	3.4	3.0
Toamasina	0.5	0.0	0.5	0.0	0.9	0.0
Mahajanga	2.4	1.5	3.2	2.0	5.0	4.0
Toliara	2.3	1.8	3.3	2.0	7.0	5.0
Antsiranana	1.2	1.0	1.7	1.0	1.6	1.0
2006/2007						
Madagascar	**1.4**	**1.0**	**1.8**	**1.0**	**2.7**	**1.0**
Antananarivo	1.0	1.0	1.1	1.0	1.1	1.0
Fianarantsoa	1.8	1.5	2.4	2.0	4.2	2.0
Toamasina	0.5	0.0	0.6	0.0	0.9	0.0
Mahajanga	2.8	1.5	4.2	2.5	5.8	5.0
Toliara	2.4	2.0	3.0	2.0	5.8	4.0
Antsiranana	1.1	1.0	1.7	1.0	1.5	1.0

Source: World Bank / UNICEF, PETS Nov. 2006 & May 2007, Madagascar

Teacher absenteeism due to salary pick up is a major problem in Madagascar (Minten *et al.*, 2005). Table 2.3 shows the number of days per month a teacher is absent to collect his/her salary in the dry and rainy season respectively. The third column depicts the maximum time teachers needed to collect their salary during the two previous school years. On average, teachers are absent for 1 up to 3 days per month to obtain their salary. It is especially a major

problem in the provinces of Toliara and Mahajanga. The most extreme case we found in the province of Toliara was where teachers were absent for 18 days in one month only to pick up their salary.[6]

c. Teacher absenteeism is mainly solved through replacement.

Table 2.4 illustrates how schools manage teachers' absence. In about 65% of the cases the absence of a teacher is solved through replacement of that teacher. In the remainder of the cases the students are sent back home or they have to wait idle until the teacher shows up.

Table 2.4: Solutions to teacher absenteeism

	Visit 1 (Nov. 06)		Visit 2 (May 07)	
	Nr.	%	Nr.	%
Students are sent back home	20	27	16	17
Replacement of teacher	46	62	63	68
Students wait for teacher	8	11	14	15
Total	74	100	93	100

Source: World Bank/UNICEF, PETS Nov. 2006 & May 2007, Madagascar

2.4.3. The allocation of government teachers

a. There are small inconsistencies between the payroll data at MINESEB versus school level.

The phenomenon of "missing" teachers—teachers who are on the payroll but who never appear for work in the facility—has been noted to be an important impediment to service delivery in several countries (World Bank, 2004).[7] Payroll data from the Ministry of Education can be compared to the survey data in order to verify the consistency with the number of civil service teachers at the local school level.

Table 2.5: Discrepancy of civil service teachers on payroll at Ministry level and present at school level – 2006/2007

	Nr. of schools	Average nr. of teachers per school on payroll (1)	Average nr. of teachers per school reported (2)	Discrepancy in average nr. of teachers per school (1)-(2)*	Discrepancy rate (%)*
Poverty					
Well off	55	4.8	4.6	0.2	4.9
Not poor	45	1.6	1.5	0.1	2.8
Poor	42	1.5	1.6	-0.1	-6.2
Very poor	47	1.9	2.1	-0.2	-9.9
Remoteness					
Easy access	60	4.4	4.2	0.2	3.8
Accessible	43	2.2	2.3	-0.1	-4.2
Remote	41	1.6	1.6	0.0	0.0
Extremely remote	45	1.5	1.6	-0.1	-5.8
Province					
Antananarivo	45	2.4	2.5	-0.1	-2.7
Fianarantsoa	46	1.8	2.0	-0.2	-8.4
Toamasina	29	6.3	6.0	0.3	4.9
Mahajanga	32	1.6	1.5	0.1	5.8
Toliara	29	1.4	1.5	-0.1	-4.8
Antsiranana	8	2.5	2.3	0.2	10.0
Total	189	2.6	2.6	0.0	0.4

Source: World Bank/UNICEF, PETS Nov. 2006 & May 2007, Madagascar; * This rate takes into account that people might be assigned to one school but be working in another school.

This analysis is limited to those schools that employ at least one civil service teacher (about three-quarters of the sample; one-quarter only employ FRAM teachers). Of this sub-sample, there is a discrepancy between the number of teachers on the MINESEB payroll and the actual number of teachers at the school in 19% of the schools. There is a surplus of between 1 and 3 government teachers in 10% of the schools and a shortage of between 1 and 4 government

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[6] This reflects the bad state of infrastructure in the remote commune of *Bereketa* (*Sakaraha, Toliara)*.
[7] These missing teachers are sometimes referred to as "ghost" teachers.

teachers in 9% of the schools. Overall, the difference between payroll data at MINESEB and at school level is only 0.4% (Table 2.5).

On the whole, therefore, these results suggest that "missing" teachers are a small problem in Madagascar: a similar exercise in Papua New Guinea yielded an estimate of about 15% of "missing" teachers. But there are surprisingly large deficits and correspondingly large surpluses in some provinces. It would appear that civil service teachers might be assigned to one school but actually be working in another school, without informing the Ministry of their decision. In particular, the results in Table 2.5 show that government teachers might have reallocated themselves to richer and more easily accessible areas—to the detriment of schools in poorer and more remote areas.

2.4.4. Monitoring and inspection

a. There is a general lack of monitoring at public primary school level. Moreover, monitoring decreased between 2005/2006 and 2006/2007.

Better monitoring seems necessary to increase the efficiency of public spending in the education sector in Madagascar (Francken, 2007). However, only 7% of the schools in our sample received a formal inspection from the education authorities at regional, provincial or central level in 2005-2006. Thirty-four percent of the schools received a visit from the district director which is perceived by the schools as an inspection by the Cisco. Overall, 39% of the schools received a visit from the district director or other education authorities and this number declined radically to one-fifth of the schools (21%) at the end of 2006/2007. There is a good deal of regional variation and the latter number should be interpreted with caution as at the time of our survey the school year still had one month to go, but overall our results indicate that monitoring of public primary schools decreased over time. During the 2002-2003 budget tracking survey, 32% of the public primary schools stated that they received a formal inspection or visit from the Cisco director during that same year (Francken, 2003). Table 2.6 illustrates that this number increased in 2003-2004 as a high 76% of the schools received such a visit (see Glick *et al.*, 2004; Francken and Minten, 2005). It is unclear why the monitoring level fell dramatically over time.

Table 2.6: % of public schools that received an inspection – from the district director or other authorities

	School year		
	2003/2004*	2005/2006	2006/2007[x]
Antananarivo	89	43	20
Fianarantsoa	68	35	11
Toamasina	82	49	33
Mahajanga	70	27	10
Toliara	82	44	39
Antsiranana	55	33	19
Madagascar	**76**	**39**	**21**

Source: *Commune survey, 2004; PETS, Nov. 2006 & May 2007, World Bank/UNICEF, Madagascar; [x] These numbers should be interpreted with caution as the school year still had one month to go.

2.4.5. Correlates of teacher absence

To complement the descriptive analysis, we explored several factors that might determine teacher absence. A multivariate analysis was conducted where the dependent variable is teacher absence, coded as 1 if the provider was absent during the respective visit and 0 if s/he was present. Selected results from probit regressions are reported in Table 2.7.[8] We related whether or not a teacher was absent to teacher characteristics, school characteristics, commune characteristics and provincial dummies.

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[8] To address the problem of any kind of intra-commune correlation and arbitrary heteroskedasticity, we use robust standard errors that are adjusted for clustering on the communes.

A glance at our sample of teachers shows that a little more than half of them are civil service teachers (52%). Most of the teachers have a working load equal or less than 27.5 hours per week (57%). The average teacher's age is 40 years and a little more than half of the teachers are female (56%). A quarter of the teachers have a second job and 38% live in a house provided to them due to their teaching work. Approximately one-tenth was not paid on a regular basis during 2005/2006. On average, there are 46 pupils per teacher with a maximum pupil-teacher ratio of 149. One-quarter of the schools have access to potable water. The average literacy rate in the commune is 58%.

2.4.5.1. Teacher characteristics

a. Teachers with a lower teaching load or with a secondary job are more likely to be absent while teachers that have resided in the commune for several years are less likely to be absent. We also find some evidence that higher educated and older teachers are absent more often.

While higher salary levels are often thought to be a way of reducing absenteeism, the results suggest that staff with more education, or who are older, are absent more often. These are the staff with the higher salaries since education and age are the main determinants of salaries, especially for civil service teachers. In analyses not reported in this chapter we also found that lower rank teachers are not significantly more absent compared to head teachers. Moreover, while FRAM teachers typically have substantially lower salaries than civil service teachers, our results provide no evidence that they have higher absence rates. This finding is consistent with past studies of teacher absenteeism. The importance of education and age in determining absenteeism is not consistent across the rounds of the survey—these variables are not statistically significantly different from zero in the results for visit 2.

The descriptive results in Table 2.1b suggested that teachers with a lower teaching load are absent more often, especially towards the end of the school year. The multivariate results confirm this result. A teacher that works equal to or less than 27.5 hours per week is about 11 percentage points more likely to be absent compared to a 'full-time' teacher that works more than 27.5 hours per week (Column 4). One hypothesis is that this result is due to the fact that those with a lower teaching load are more prone to taking on a second job. However, 22% of those teachers in our sample have a secondary activity compared to 30% of the 'full-time' teachers. Including a dummy variable in the multivariate analyses that equals one if the teacher has a side activity implies that teachers with a second job are about 5 percentage points more likely to be absent (Columns 3 and 4 of Table 2.7). These findings suggest that teachers with a lower teaching load as well as teachers with a secondary income are absent more often. On the other hand, irregular payment does not seem to increase the likelihood of absenteeism.

Teachers that have resided in the commune for several years might be expected to be absent less often because they receive more peer pressure, have higher reputation costs, or care more about their students because they interact with them more outside of school. In addition, they need to travel less in order to get to work. On the other hand, they could be absent more often because they have a larger social network that protects them from being sanctioned, or they have more outside options. Empirically, we find that the likelihood of absenteeism decreases with the years of residence of teachers in the respective commune thus confirming the first hypothesis. This is consistent with the results of Chaudhury *et al.* (2006) who find that teachers who are born in the district of the school are typically more likely to show up for work.

2.4.5.2. School characteristics

a. Inspections and frequent teaching staff meetings lower the likelihood of absenteeism.

Several studies have suggested that local control of schools may be associated with better performance by teachers (e.g. King and Ozler, 2001; Eskeland and Filmer, 2007). To account

for this and consistent with Chaudhury *et al.* (2006), we included the activity level of the Parents Teacher Association (PTA) measured by the average PTA meetings during the previous and current school year respectively in our analyses. As Table 2.7 shows, we do not find a significant correlation between absence and the frequency of PTA meetings.

Serneels, Lindelow and Lievens (2007) conducted qualitative group interviews on the causes of absenteeism among health workers in Ethiopia and Rwanda and found that an explanation consistently emerging from the interviews is the importance of intrinsic motivation. Teachers could be highly motivated if they are working in a vibrant school environment with an active director and hence we included the average number of teacher meetings per month during the previous and current school year respectively in our regressions. Table 2.7 shows that there is a significant correlation between absence and the frequency of teacher meetings. The more frequent the teaching staff meets the lower the likelihood of absenteeism among the teachers.

As discussed above, the frequency of school inspections decreased over the last few years. The lower inspection rates in 2006/2007 could have resulted in the higher teacher absence rates found in the second round. To account for this, we included a dummy variable that equals one if the school received a visit from the district director during the last 12 months; and zero otherwise in our analyses. The results in Columns 1 and 2 confirm our hypothesis as the coefficients are statistically significant with a negative sign.

Including the inspection variable in these multivariate regressions could be problematic as "good" teachers would be able to choose the school in which they work and may well prefer to work in schools with excellent inspection records and as such these schools are more closely monitored. While this argument could stand for many other countries, the situation in Madagascar is different. The population consists of more than 18 different ethnic groups, each living in certain parts of the country. Madagascar has a particular geographical composition with a general lack of infrastructure and means of transport and for these reasons rather low internal migration. In rural areas, approximately one-third of the teachers are locally hired by the parent-teacher associations with limited possibility to move to other schools. Besides, civil service teachers receive hardship allowances if they are willing to teach in remote areas. During our field interviews we encountered many highly motivated teachers (hired by the PTA or the government) who are living in remote areas as they want to remain close to their family, and area of origin. Also, dropping the variable from our analyses did not alter our results. For these reasons, we do not believe the issue to be of major concern in interpreting the results.

There is some slight evidence that teacher absence rates are higher in schools with a higher pupil-teacher ratio, but this result is not robust. Also, we included two variables that measure the quality of the school's infrastructure in our multivariate analyses namely the presence of a toilet and whether or not the school has access to potable water. Overall, our findings do not follow the international pattern that absence rates are significantly lower in schools with better infrastructure.

2.4.5.3. Commune characteristics

a. Remote schools seem to suffer more from teacher absenteeism.

The results from the multivariate analyses support the earlier descriptive findings that remoteness of the schools increases the likelihood of teacher absenteeism. As discussed above this result might be driven by the fact that teachers in remote areas need to absent themselves for a longer time in order to pick up their salaries.

Chaudhury *et al.* (2006) find that teachers are less frequently absent in richer schools and in schools where the parental literacy rate is higher. Table 2.7 shows that our findings do not support this view for Madagascar. Moreover, schools in unsafe regions do not suffer from

higher absence rates. By contrast, schools that are situated in more ethnically homogenous areas do have significantly less teacher absenteeism (see Column 3 of Table 2.7) which could be due to the fact that teachers in such areas are subject to more social control.

2.4.5.4. Provincial dummies

a. There are large provincial discrepancies in teacher absence rates.

The location of the school matters as there are large provincial discrepancies in teacher absence rates. Overall, accounting for individual, school, and commune characteristics we find that the provinces of Antananarivo, Toamasina, Mahajanga, and Antsiranana have significantly higher teacher absenteeism than the reference province of Fianarantsoa. The results in Column 2 suggest that a teacher in the central province of Antananarivo is 20 percentage points more likely to be absent than a teacher in the province of Fianarantsoa.

We conducted joint tests to investigate which of the abovementioned groups of characteristics are the most important determinants of teacher absenteeism. Our results taken together suggest that it are mainly individual teacher and school characteristics that determine absence rates in the education sector in Madagascar.

Table 2.7: Determinants of absenteeism in the public primary education sector in Madagascar

	Visit 1 (Nov. 06)		Visit 2 (May 07)	
	(1) Basic	(2) Extended	(3) Basic	(4) Extended
Teacher characteristics				
Civil service teacher (0/1)	0.0153	-0.0023	0.0450	0.0476
	(0.74)	(-0.10)	(1.44)	(1.40)
More than 27.5 hours teaching/week (0/1)	-0.0171	-0.0305	**-0.0582****	**-0.1106*****
	(-0.71)	(-1.10)	**(-2.40)**	**(-4.13)**
Age	**0.0022****	0.0017	-0.0027	-0.0026
	(2.14)	(1.54)	(-1.57)	(-1.39)
Residence in commune (Nr. of years)	**-0.0018*****	**-0.0020****	0.0012	0.0012
	(-2.84)	**(-2.55)**	(1.44)	(1.25)
Lives in provided house (0/1)	-0.0119	0.0028	0.0168	0.0408
	(-0.79)	(0.15)	(0.66)	(1.48)
Education (Nr. of years)	**0.0098***	**0.0111***	-0.0092	-0.0152
	(1.66)	**(1.76)**	(-0.96)	(-1.49)
Male (0/1)	-0.0250	-0.0281	0.0008	-0.0051
	(-1.33)	(-1.43)	(0.04)	(-0.22)
Side activity (0/1)	0.0117	0.0169	**0.0422****	**0.0534****
	(0.66)	(0.70)	**(2.14)**	**(2.36)**
Irregular payment 05/06 (0/1)	0.0139	0.0109	-0.0198	**-0.0524***
	(0.47)	(0.34)	(-0.67)	**(-1.66)**
School characteristics				
Pupil_teacher ratio	**0.0008***	-0.0004	0.0002	-0.0009
	(1.89)	(-0.70)	(0.28)	(-0.99)
Av. teacher meetings/month last 12m.	**-0.0083***	**-0.0131****	-0.0010	-0.0008
	(-1.90)	**(-2.32)**	(-0.52)	(-0.50)
Av. PTA meetings last 12m.	-0.0002	-0.0005	0.0044	0.0049
	(-0.27)	(-0.47)	(1.38)	(1.32)
Inspection CISCO last 12m. (0/1)	**-0.0462*****	**-0.0470****	-0.0219	-0.0364
	(-2.86)	**(-2.42)**	(-1.10)	(-1.55)
Toilet (0/1)	0.0284	**0.0517***	-0.0050	-0.0312
	(1.26)	**(1.80)**	(-0.18)	(-0.98)
Potable water (0/1)	-0.0013	-0.0179	0.0030	-0.0196
	(-0.06)	(-0.69)	(0.12)	(-0.63)
Commune characteristics				
Log of mean_expenditures	-0.0145	0.0226	-0.0255	-0.0116
	(-0.61)	(0.80)	(-0.78)	(-0.35)
Literacy rate	3.31e-06	-0.0005	-3.43e-05	-0.0001
	(0.00)	(-0.60)	(-0.04)	(-0.03)
Insecure or 'red' commune (0/1)	-0.0247	-0.0175	-0.0065	-0.0147
	(-1.44)	(-0.71)	(-0.25)	(-0.49)
Ethnic homogeneity (0/1)	-0.0031	-0.0203	**-0.0502****	-0.0108
	(-0.14)	(-0.92)	**(-2.04)**	(-0.37)
Remoteness index	**0.0320***	**0.0563****	-0.0089	-0.0073
	(1.84)	**(2.30)**	(-0.31)	(-0.22)
Provincial dummies				
Antananarivo	**0.1221*****	**0.2018*****	0.0463	0.0341
	(2.62)	**(3.77)**	(1.15)	(0.83)
Toamasina	**0.0955****	**0.1192****	0.0337	0.0719
	(2.13)	**(2.15)**	(0.76)	(1.47)
Mahajanga	**0.0805****	**0.1148****	**0.0729***	**0.1261****
	(2.01)	**(2.47)**	**(1.82)**	**(2.46)**
Toliara	0.0162	0.0572	0.0536	0.0615
	(0.35)	(1.04)	(1.14)	(1.05)
Antsiranana	0.0615	**0.1327****	0.0026	**0.1351***
	(1.09)	**(2.00)**	(0.04)	**(1.84)**
No. observations	752	771	690	706
Joint tests (P-values)				
Teacher characteristics	0.02**	0.13	0.04**	0.00***
School characteristics	0.00***	0.09*	0.68	0.09*
Commune characteristics	0.16	0.24	0.48	0.99
Provincial dummies	0.09*	0.00***	0.49	0.23

Note: dprobit regression results; dF/dx reports marginal effects; robust standard errors adjusted for clustering on communes; z-statistics are reported in parentheses; significance levels of 10, 5 and 1 percent are represented by *, ** and ***.

2.5.   Absenteeism in the health sector

2.5.1.   Descriptive results

a. On average 19% of health workers were absent. This number is lower than the 35% health worker absence rate found in the multi-country study. However, we find that one-quarter to one-third of health personnel was absent during at least one of the two visits.

Table 2.8a illustrates that – depending on the definition used – 14% to 22% of health workers were absent during a random visit. Absence (according to the basic definition) was lower in the second round which could be due to a "warning effect" instigated during the first round of the survey as also encountered in other studies on absenteeism (e.g. Chaudhury *et al.*, 2006). Considering both survey rounds, we find that 27% to 36% of health workers were absent during at least one of the two visits.

Table 2.8a: Health worker absenteeism – 2006/2007 (in %)

	Visit1 (Nov. 06)		*Visit 2 (May 07)*		*Either visit 1 or 2*	
	Basic	Extended	Basic	Extended	Basic	Extended
All health workers	**19**	**21**	**14**	**22**	**27**	**36**

Source: World Bank/UNICEF, PETS Nov. 2006 & May 2007, Madagascar.

Absenteeism is higher in health centers of Type II (Table 2.8b). There is some provincial variation, but the variation is not statistically significant. Our basic results do not suggest that health worker absence rates are higher in poorer or remote regions. Civil service health workers appear to be absent more often than contract health workers as the former have absence rates of about 31% compared to 20% for the latter if we consider both visits. We will investigate this matter in greater detail further in this chapter.

Table 2.8b: Health worker absenteeism – 2006/2007 (in %)

	Absent in either visit 1 or visit 2	
	Basic	Extended
All health workers	**27**	**36**
Including CSB closed twice	*28*	*37*
Type of health center/CSB		
Type I	15	31
Type II	30	38
Contract[x]		
Civil service health worker	27	35
Contract health worker	15	25
Poverty		
Well off	32	36
Not poor	19	30
Poor	25	48
Very poor	21	29
Remoteness		
Easy access	32	37
Accessible	23	38
Remote	22	28
Extremely remote	23	42
Province		
Antananarivo	22	26
Fianarantsoa	19	38
Toamasina	39	46
Mahajanga	22	31
Toliara	31	37
Antsiranana	27	38

Source: World Bank/UNICEF, PETS Nov. 2006 & May 2007, Madagascar.; [x]We only have information on the contract of a reduced sample of health workers.

As in the analysis of the education sector, it is possible that our figures present too favorable a picture as health centers that were closed during both rounds due to health worker absence were not included in our calculations as data on these centers were very limited. However, only a minority of 3% of health centers was closed in both rounds due to absenteeism and it mainly

concerned health centers employing only one health worker.[9] We did include those health centers that were closed due to absenteeism either during the first or the second round. They amounted to 12% of our sample.

2.5.2.   Why are health workers absent?

a. A majority of health workers is absent due to missions, authorized leave, illness or salary pick-up. Approximately one-fifth of health workers are on unauthorized leave.

Table 2.9 depicts the reported reasons of health worker absenteeism. As mentioned earlier, due to the survey set-up we were only able to know the reasons for those health workers that were absent according to the basic definition. Moreover, declared reasons for absence should be viewed with some skepticism as respondent may be trying to shed favorable light on fellow employees.

The results show that 21% of the health workers were on unauthorized absence. About 28% of the health workers were on an official mission which covers activities such as meetings and training. Overall, 8% were absent due to salary pick-up at district level. About 16% were ill and 22% were on authorized leave. A very small number of health workers were reported absent due to a secondary job. Another small percentage of health workers recently resigned or was suspended. Worryingly for service delivery, there is not much of a system in place to replace workers when they are not in the health center: 54% of health workers are not replaced when they are absent.

Table 2.9: Reasons of health worker absenteeism – 2006/2007 (as stated by health center director – in %)

	Visit 1 (Nov. 06)	*Visit 2 (May 07)*	*Either visit 1 or 2*
Health worker left to pick up his/her salary	13	2	8
Health worker is on another official mission	29	28	28
Official job besides work at centre[c]	1	2	2
Illness	21	11	16
Authorized absence	27	16	22
Unauthorized absence	8	35	21
Health worker is suspended	1	1	1
Health worker resigned	0	5	2
Total	100	100	100

Source: World Bank/UNICEF, PETS Nov. 2006 & May 2007, Madagascar; [c]This category includes people who have political obligations as organizing local elections etc.

b. On average, health personnel is absent for one up to two days per month to pick up their salary.

Table 2.10 shows absenteeism in the health sector due to salary pick-up in the dry and rainy season in number of days per month. The third column depicts the maximum time needed to collect the salary during the two previous years. The results are very similar to the results in the education sector discussed above. On average, health personnel were absent for 1 up to 2 days per month to obtain their salary, with the problem especially acute in Toliara and Mahajanga.

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[9] The enumerators were able to collect some information on the amount of staff working at those health centers that were closed during both visits from other respondents living in the respective commune.

Table 2.10: Health staff absenteeism due to collection of salary (in number of days per month)

	Dry season		Rainy season		Maximum	
	Mean	Med.	Mean	Med.	Mean	Med.
2005-2006						
Madagascar	**1.1**	**1.0**	**1.5**	**1.0**	**2.1**	**1.0**
Antananarivo	0.8	1.0	0.8	1.0	1.0	1.0
Fianarantsoa	1.1	1.0	1.7	1.0	2.5	1.0
Toamasina	0.5	0.0	0.5	0.0	0.8	0.0
Mahajanga	2.0	2.0	2.2	1.0	3.5	3.0
Toliara	2.4	1.0	3.8	1.0	4.9	3.0
Antsiranana	1.7	1.0	1.4	1.0	2.6	2.0
2006-2007						
Madagascar	**1.2**	**1.0**	**1.6**	**1.0**	**2.0**	**1.0**
Antananarivo	1.0	1.0	1.0	1.0	1.1	1.0
Fianarantsoa	1.1	1.0	1.5	1.0	2.1	1.0
Toamasina	0.6	0.0	0.6	0.0	0.8	0.0
Mahajanga	2.0	1.0	3.3	2.0	4.3	3.0
Toliara	1.9	2.0	3.0	2.0	4.1	4.0
Antsiranana	1.3	1.0	1.5	1.0	1.9	1.0

Source: World Bank / UNICEF, PETS 2006/2007, Madagascar

2.5.3. Monitoring and inspection

a. Approximately three-quarters of health centers received an inspection during the previous year, but monitoring decreased over time. There is a good deal of variation across the different types of health centers. In particular the inspection level of type I health centers could be improved.

In general, monitoring is higher in the health sector compared to the education sector: over 70% of health centers had received a visit from the Doctor Inspector in the six months prior to the survey visits (Table 2.11). However, monitoring decreased over time: the percentage who had received such a visit fell from 84% to 71% between the two rounds (November 2006 to May 2007). The central province of Antananarivo had the highest inspection rates as over 90% of the health centers had been inspected. This compares to as low as 76% in other provinces in the first survey round, and as low as 50% in the second survey round. Overall, health centers of type I receive less inspections compared to health centers of type II.

Table 2.11: % of public health centers that received a visit from the Doctor Inspector

	June 2006 - Nov. 2006	Dec. 2006 - May 2007
Type of health center/CSB		
Type I	72	59
Type II	90	78
Province		
Antananarivo	96	91
Fianarantsoa	79	71
Toamasina	76	83
Mahajanga	82	50
Toliara	90	58
Antsiranana	88	63
Madagascar	**84**	**71**

Source: Commune survey, 2004; PETS, Nov. 2006 & May 2007, World Bank/UNICEF, Madagascar

2.5.4. Correlates of health worker absence

As in the education sector, we further explore patterns in the data through multivariate analysis. The results for the health sector were quite sensitive to the variables included in the analysis and the round of the survey. In order to estimate robust "averages" we limit the analysis to that of the determinants of being absent in either of the two visits. The dependent variable equals 1 if the health provider was absent during at least one out of two visits and 0 if s/he was present during both visits. Moreover, we report results for two specifications: one including only

individual characteristics, and one that adds health center and commune characteristics. The multivariate probit results are reported in Table 2.12.[10]

A quick inspection of the sample reveals that 70% of the health care workers in our sample are civil servants. Seventeen percent are doctors. Half of all workers live in a house provided for them – by the commune, health center or others – associated with their work at the center. The average number of beds in a health center is 13 and the median is 12. In 44% of the health centers, a share of the personnel was paid on an irregular basis in 2006. Overall, 61% and 77% of the health centers has access to water and a toilet respectively.

2.5.4.1. Health worker characteristics

a. Higher educated and older health workers are absent more often. On the contrary, health workers that reside in the commune for several years or that live in a house provided by the health center are absent less often.

International studies on absenteeism in the health sector (e.g. Chaudhury *et al.*, 2006; Serneels *et al.*, 2007) typically find that doctors are more likely to be absent than other health care workers as doctors often have profitable outside earning options at private clinics or they have their own practice on the side. Our results confirm that higher-educated health workers are more likely to be absent than lower-educated ones and this result is robust to changes in the definition on absenteeism as illustrated in Table 2.12. In particular, our findings reflect that health workers with a higher social status i.e. mid-level managers and doctors are in the order of 15 percentage points more likely to be absent compared to lower-educated health staff. Older health workers are also found to be absent more often than younger staff.

As in the interpretation of the results for the education sector, doctors and other workers with higher status have higher salaries—especially those who have civil service contracts. The results therefore suggest that these higher salaries are not associated with lower absenteeism: to the contrary.

It has been hypothesized that contract workers – who are not subject to civil service protection – may have more incentive to perform well because they lack the job security and therefore need to demonstrate more productivity in order to stay employed. On the other hand, the lack of a good salary or job security could increase incentives for contract workers to spend less time in their current job and look for alternative employment. Our descriptive results seem to support the first hypothesis, but when we control for the level of education and age of the health workers (and therefore, to a large extent, salary) our multivariate analyses shows that civil service health workers are not significantly more absent than contract workers.

Similar to findings in Bangladesh and Uganda, we can conclude that health workers who live in a house provided for them – by the commune, health center or others – due to their work at the health center have statistically lower absence rates. These health workers have about a 12 percentage points lower likelihood of being absent. Consistent with our findings in the education sector and with the multi-country study of Chaudhury *et al.* (2006), the results also show that the likelihood of absenteeism decreases with the years that a health worker has lived in the facility's commune.

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[10] Standard errors are adjusted for clustering at the district level.

Table 2.12: Determinants of absenteeism in the public health sector in Madagascar

	TOTAL (VISIT 1 & 2)			
	Basic		Extended	
Health worker characteristics				
Civil service health worker (0/1)	0.0207	-0.0289	-0.0141	-0.0198
	(0.30)	(-0.40)	(-0.19)	(-0.24)
Age	**0.0052***	**0.0054***	**0.0051***	**0.0053***
	(1.79)	**(1.78)**	**(1.82)**	**(1.75)**
Residence in commune (Nr. of years)	**-0.0054***	-0.0032	**-0.0068****	**-0.0056***
	(-1.84)	(-1.13)	**(-2.05)**	**(-1.79)**
Lives in provided house (0/1)	**-0.1384****	-0.0570	**-0.1138****	-0.0917
	(-2.28)	(-0.89)	**(-1.98)**	(-1.29)
Mid-level management (12-17 years of education) (0/1)	**0.1377***	0.1130	**0.1711***	**0.1573***
	(1.68)	(1.59)	**(1.74)**	**(1.79)**
Doctor (18 years of education) (0/1)	**0.1553****	**0.1252***	**0.1034***	0.1061
	(2.48)	**(1.95)**	**(1.68)**	(1.60)
Male (0/1)	-0.0333	0.0105	-0.0362	-0.0272
	(-0.51)	(0.17)	(-0.69)	(-0.48)
Health center characteristics				
Health center of Type II (0/1)		**0.1451*****		0.0785
		(2.78)		1.01
Nr. of beds		-0.0026		**-0.0074***
		(-0.75)		**(-1.91)**
Share of personnel with side activity		-0.0735		0.0342
		(-0.80)		(0.32)
Share of personnel with irregular payment in 2006		0.0871		-0.2082
		(0.66)		(-1.06)
Meeting health center & COGE - May/Nov 2006 (0/1)		0.0503		-0.0189
		(0.66)		(-0.18)
Inspection - May/Nov 2006 (0/1)		0.0893		0.0943
		(1.06)		(1.18)
Toilet (0/1)		0.0044		0.0147
		(0.08)		(0.25)
Potable water (0/1)		-0.0442		-0.0327
		(-0.73)		(-0.49)
Commune characteristics				
Log of mean_expenditures		0.1102		-0.0012
		(1.16)		(-0.01)
Literacy rate		-0.0001		0.0004
		(-0.03)		(0.24)
Insecure or 'red' commune (0/1)		0.0160		0.0081
		(0.27)		(0.14)
Ethnic homogeneity (0/1)		-0.0663		-0.0017
		(-1.22)		(-0.03)
Remoteness index		0.0340		**0.1329****
		(0.61)		**(2.43)**
No. observations	292	292	324	324
Joint tests (P-values)				
Health worker characteristics	0.00***	0.20	0.02**	0.09*
Health center characteristics		0.00***		0.13
Commune characteristics		0.46		0.12

Note: dprobit regression results; dF/dx reports marginal effects; robust standard errors adjusted for clustering on districts; z-statistics are reported in parentheses; significance levels of 10, 5 and 1 percent are represented by *, ** and ***.

2.5.4.2. Health center and commune characteristics

a. Health centers of Type II seem to suffer more from absenteeism.

As mentioned above, type II health centers typically received more inspections, and therefore one might have expected absenteeism to be lower in those centers. However, we find that type II health centers have significantly higher absence rates compared to type I health clinics as illustrated in Column 2 of Table 2.12. A plausible explanation could be that type II health centers are typically based in more populated areas which offer more outside earning options for health staff. Similar to findings in India, attendance at larger health care facilities (i.e. centers with a higher number of available beds) is found to be significantly higher than in smaller centers.[11] This could be due to the fact that larger clinics offer better working

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[11] Note that this result controls for the type of facility (CSB I or II).

conditions and Chaudhury *et al.* (2006) provide evidence that working conditions at the health facility level affect labor incentives. We also find some evidence that absenteeism in the health sector is higher in remote areas. However, all these results are sensitive to changes in the definition on absenteeism.

Overall, adding health center and commune characteristics to our multivariate analyses weakens our associations discussed above. Comparing Columns 1 and 2, and columns 3 and 4 of Table 2.12 indicates that most of the health center and commune characteristics do not seem to determine absenteeism. The joint test results in Table 2.12 confirm that it is mainly the individual health worker characteristics and to some extent the type of health center that are determining absenteeism in the health sector.

2.6. Accountability and incentives for performance

a. The use of proper index cards for teachers and health staff stating their presence could be promoted. Moreover, accurate records on this matter could be kept at the respective decentralized levels.

Only a little more than half of the teachers were in the possession of an index card that stated their presence at the time of our visits. In the health sector the number was even much lower as only about 35% of the staff was the owner of such a card. Overall, in 33% of the schools and 42% of the health centers such index system did not exist.

Moreover, in case of authorized absence, our enumerators could only verify the documents in around one-third of the cases. In almost half of the cases there were no such documents and in another 20% the documents existed but could not be verified. It is recommendable that record keeping on presence – as well as authorized absence – of staff are introduced or promoted. These records could be kept at school or health center level. The documents could also be made publicly accessible at all times.

Table 2.13: Incentives system for teachers (as stated by the director of the school) - % of answers

	Visit 1 (Nov. 06)		Visit 2 (May 07)	
	Civil service teacher	FRAM teacher	Civil service teacher	FRAM teacher
Rewards for competent teachers				
No reward	92	86	92	87
Promotion	1	1	2	1
School/community give reward	3	4	2	2
Gifts	4	8	4	8
Salary increase	0	1	0	1
Choice of class to teach	0	0	0	1
Total	100	100	100	100
Punishments for incompetent teachers				
No penalty	78	75	72	81
Suspension	0	5	0	3
Advice to increase discipline	4	3	7	3
Transfer to a lower position	2	0	3	0
Report to Cisco or ZAP leader	14	12	7	6
Decrease in salary	0	1	1	0
Higher assessment frequency	1	3	2	4
Lower teaching load	1	1	7	1
Other	0	0	1	2
Total	100	100	100	100

Source: World Bank/UNICEF, PETS Nov. 2006 & May 2007, Madagascar

b. The establishment of a system of accountability and incentives could be encouraged. Employees who perform well are barely rewarded and incompetent workers are hardly punished.

Low teacher motivation and its detrimental effect on student achievement are central problems in many education systems in Africa (Michaelowa, 2002). The survey findings suggest that Madagascar also suffers from this problem. Table 2.13 illustrates that there are hardly any

incentives for teachers to perform well. School directors report that only about 10% of teachers received any type of reward in the previous two school years. Similarly, incompetent teachers were barely punished. Clearly, more thinking about ways to set-up proper incentives and accountability schemes for school staff could be encouraged. Unfortunately, the surveys in the health sector did not allow us to investigate the system of accountability, but anecdotal evidence suggests similar lack of accountability as in the education sector.

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Chapter 3: Results from the Public Expenditure Tracking Surveys

3.1.   Introduction

Multiple studies have shown the importance of access to education and health as a means to alleviate poverty (e.g., World Bank, 2007; Glick and Sahn, 2006; Minten *et al.*, 2005; Ilo Program, 2003). The Government of Madagascar has therefore made education and health reform one of its policy priorities as for example stated in the Madagascar Action Plan (MAP).

Despite large efforts by the Government and donors to reach the frontline service providers, little updated information is available on the effectiveness of spending in the public education and health sectors (World Bank, 2006). This chapter investigates the different resource flows in the financing of the public primary education and public health sector.

Discrepancies in the amounts noted or declared as sent by the decentralized levels and as received by the intended beneficiaries are referred to as leakages. However, leakages could reflect very different factors; for example a lack of proper accounting rules and procedures; or alternatively, a lack of incentives at the decentralized or local level.[12]

Overall, the results on the resource flows in the primary education and health sector of Madagascar indicate that there is low financial capacity and accountability at the decentralized levels: (1) a large number of schools and health centers do not receive the money or equipment they are entitled to; (2) there are reports of surpluses and leakages for all items investigated in the 2007 tracking survey; (3) bookkeeping at the decentralized levels is limited and capacity is low.

Some preliminary suggestions are as follow.

1/ *Simplify accountancy rules and procedures on all resource flows*. The existing bookkeeping in the education as well as the health sector should be simplified and the rules made clear to everybody.

2/ *Provide financial training for staff at all decentralized levels*. Problems often occur due to a lack of competence and training of personnel at the decentralized levels.

3/ *Increase transparency and accountability at all levels*. Information dissemination is an important way of increasing transparency and accountability and hence an accurate information flow on the allocation and disbursement of funds and equipment to the intended beneficiaries should be stimulated. The use of local radio stations to broadcast information on budget execution and performance at the intermediate and local levels of the education and health supply chains could be stimulated.[13]

4/ *Encourage regular monitoring at all levels*. Regular inspections and monitoring is essential to ensure a good functioning of the education and health sectors.

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[12] Examples of the latter case are that the diverted funds could be used for purposes unrelated to education or health or for private gain of local government officials.

[13] Currently, certain local radio stations are cooperating in the broadcasting of the amount of caisse ecole that the public primary schools in their region receive. A possibility in the health sector could for example be that market prices of certain drugs are announced via the radio.

3.2.   Service delivery in the public primary education sector

Madagascar has low school enrollment rates, even compared to other African countries: only 60% of the urban children and 12% of the rural children complete primary school (Banque Mondiale, 2002). To improve the enrollment and completion rates as well as the quality of education, the Government of Madagascar – supported by the international donor community – has substantially increased investments in the education sector in recent years. It committed itself to the Education For All (EFA) initiative and started to fully subsidize the tuition fees through the so-called "caisse école,"[14] and school kits for all students in public primary schools. The Government also raised the districts' budgets for school material and started distributing free textbooks to schools.

Consistent with the new educational policies, the data confirm that there has been a positive shift in financing of the public primary education sector from the parents of the students (before 2002) to the Government of Madagascar. Nowadays, the Government is the main provider of cash and in-kind funds to the public primary schools.

However the data reveal important challenges. For example:
- Significant delays in the arrival of the caisse école at school level. In 2005/2006, the majority of schools only received the caisse école by the end of the first semester or at the start of the second semester. In 2006/2007, only 9% of the schools received their caisse école by May 2007;
- Some leakage of the caisse école. Overall, the ratio of non-received funds to expected funds for the school year 2005-2006 from MINESEB to Cisco and from Cisco to school level equaled 3% and 4% respectively.
- Leakage of the caisse école is high for some schools: in particular smaller schools and schools in ethnically heterogenous areas suffered more from leakage in 2005/2006;
- Huge delays in the arrival of school kits: 36% of the schools only received the school kits by the end of the school year 2005-2006. The findings also suggest school kit reallocation within certain districts without formal communication. The situation last school year was even worse as only 15% of the schools received their school kits by May 2007;
- Substantial leakage of equipment. A high 40% of the schools did not receive all the equipment that they were entitled to during the last two school years;
- Considerable bottlenecks in the supply chain of textbooks. In half of the schools that received new manuals in 2005/2006, not all textbooks arrived at school level as stated in the districts' accounts;
- Limited distribution of textbooks. Only 13% of the public primary schools received textbooks by May 2007 for the previous school year;
- Big delays in allowance payments for the FRAM teachers and the situation worsened during the last two years : in 2005/2006 25% of the FRAM teachers did not receive their allowance from the government in time and in 2006/2007 44% did not;
- Low financial capacity at the decentralized levels. There were reports of surpluses and leakages on all line items investigated suggesting low financial capacity and cumbersome accountancy procedures at the different levels in the education supply chain;
- Schools in poorer and less educated areas seem to suffer more from leakages;
- The importance of good school management as well as regular monitoring of all decentralized levels. Frequent teaching staff meetings and inspections lower are associated with leakages of the caisse école in the education supply chain;

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[14] The total amount of caisse ecole per public primary school is also referred to as the 'caisse école'.

3.2.1. Overview of the resource flows in the education sector

Figure 3.1 depicts a schematic overview of the flow of money and supplies from the central level to the public primary schools. The budget of the Government is allocated in two ways for public primary schools. Salaries are directly paid to the civil servant teachers by the MEFB (Ministère de l'Economie, Finances et Budget). This Ministry also allocates money to MENRES (Ministère de l'Education Nationale et de la Recherche Scientifique). The latter gives money and material to the Cisco (*Circonscription Scolaire* or district education office) which is largely in charge of distributing most of the financial and material resources[15] to the schools in their district. By studying the payment of the salaries and the caisse école and the distribution of school kits, books and some other indicators of equipment, this analysis covers the most important financial and material flows going to the frontline service providers.

3.2.2. Descriptive results

3.2.2.1. Caisse école

a. The Government – through the payment of the caisse école – and the parents-teachers association are the main donors of cash contributions to public primary schools.

Figure 3.2 illustrates that in 2005/2006 58% of the total sum of cash contributions to public primary schools was provided by the Government through the payment of the caisse école. The parents-teachers association (FRAM) was the second main donor and contributed 37% of the total (cash) school funding. In May 2007, the sample schools received 25% less revenues compared to the school year before. However, the 2006-2007 school year was a particular year due to policy changes. The central education authorities demanded that public primary schools first open an account, and only afterwards would the caisse école be wired directly to that account.[16] This measure was taken in order to avoid delays or leakages in the budget execution at the decentralized district levels.[17] Anecdotal evidence suggested that there were delays in the budget execution at the central level. Moreover, schools were only informed very late about the new policy and due to bureaucratic and logistical hurdles, a large number of schools had not managed to open an account by May 2007. Consequently, during this school year only 21% of the caisse école had been disbursed to the schools by the Government by May 2007 and most of the schools relied entirely on the FRAM contributions.
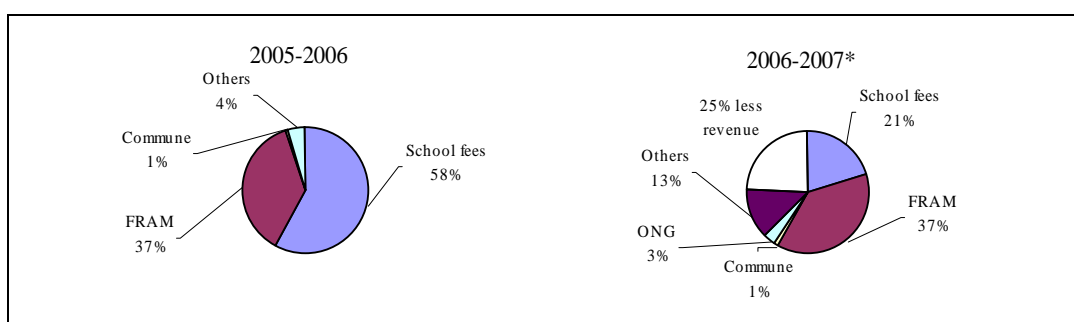
Figure 3.2: Donors of cash contributions to the public primary schools for the school years 05/06 & 06/07
Note: *May 2007, these numbers should be interpreted with caution as the school year was still on-going.

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[15] The Government distributes school kits, books etc. to the Ciscos but the latter are also able to buy school equipment on their credit line from the Government.

[16] The schools were supposed to open an account in the nearest post office.

[17] Before 2006/2007, money was sent from the MINESEB to the districts and the districts were supposed to send the money to the public primary schools under their authority.

Figure 3.1: Circuit of money and supplies for public primary schools in 2005-2006 (c=cash; k=in-kind; *: month 1-4 through CISCO; afterwards MENRES)

Payroll - percepteur

Civil servant teachers

c

Parent-teacher association (FRAM)

Fram teachers without subsidy

c

Fram teachers with subsidy

c

Ministry of Economy, Finance and Budget (MEFB)

c

c

Ministry of Education (MENRES)

c*

k

c*

CISCO

c

Caisse école: 2000 Ar/student

c

DREN

c

c

k

Kits scolaires

k

Donors

c

c

Contractor

c

k

k

Other equipment books, tables,…

k
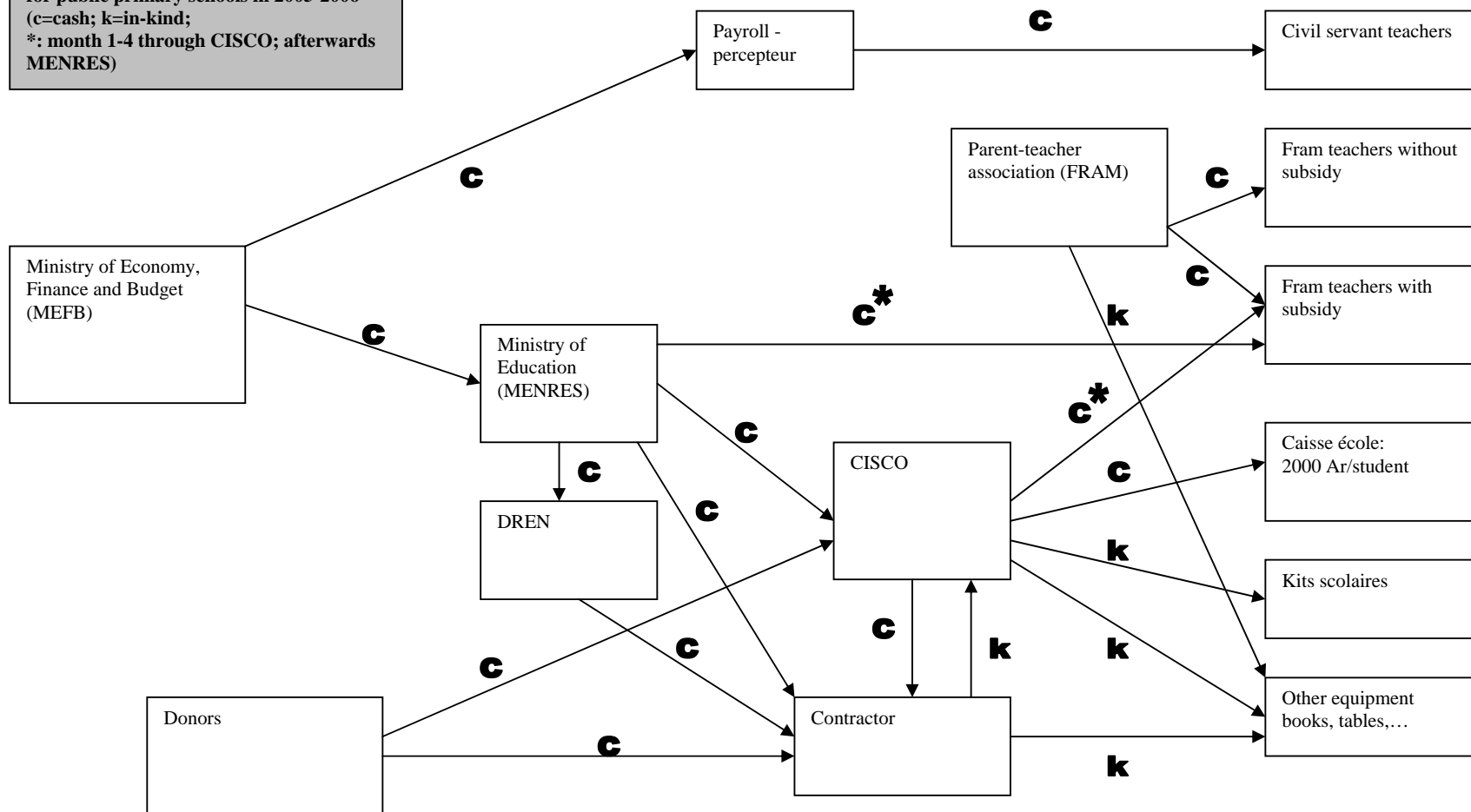
b. The majority of schools only received the caisse école by the end of the first semester or the beginning of the second semester in 2005/2006. The situation in 2006/2007 was even worse.

As the Government – through the payment of the caisse école – is the main funding source for public primary schools, it is important that the funds arrive at the start of the new school year. Figure 3.3 shows the timing of arrival of the caisse école in greater detail. The majority of schools only received their caisse école by the end of the first semester or at the start of the second semester in 2005/2006 (i.e. in December 2005, or in January or February 2006). Only 7% of the schools received the caisse école before December 2005. 14% received them after February 2006.

The situation in 2006/2007 was even worse as 91% of the schools had yet to receive their caisse école in May 2007. As mentioned above, this situation occurred due to recent policy changes aimed at increasing accountability. Overall, 21% of the total caisse école amount was already disbursed to the sample schools (see Figure 3.2), so it was mainly small schools that were still waiting to receive their fees. The sample schools that received their fees by May 2007 were situated in the province of Antananarivo and in the city of Toamasina. It were mainly richer and non-remote schools that had already received their caisse école.
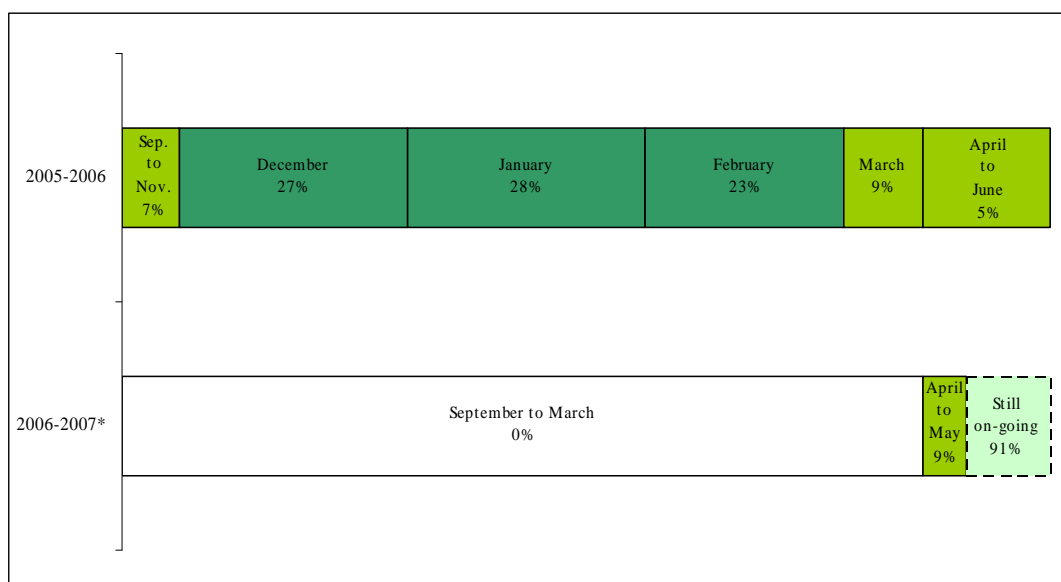
Figure 3.3: Timing of reception of the caisse école at public primary school level in Madagascar - 05/06 & 06/07
Note: *May 2007, these numbers should be interpreted with caution as the school year was still on-going at the time of the survey[18]

c. Budget execution was very slow in 2005/2006. It took three months on average for the Ciscos to distribute the caisse école to all schools in their district.

Table 3.1 illustrates the total lead times of the 'caisse écoles' to the schools calculated as the sum of the time from the arrival of the caisse école at district (Cisco) level to the end of the distribution to all schools. On average in 2005-2006 the Ciscos needed 95 days to get the caisse école to all public primary schools in their district.

There were significant differences in the lead times of the caisse école between provinces. The provinces of Mahajanga, Antananarivo, and Antsiranana showed especially long delivery times.

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[18] In our earlier report we mentioned that 3% of the schools received their caisse ecole at the start of the school year 2006-2007, but we corrected this number in this version of the report as these schools reported to use the rest of last school year's caisse ecole budget.

Overall, the districts in Mahajanga needed 1.5 month to organize and start the distribution of the caisse école and another 3.5 months to distribute the latter to all schools in their districts. It is hoped that the recent policy changes whereby money is no longer distributed via the district education facilities, but is wired directly to the schools will speed-up budget execution considerably.

Table 3.1: Lead time of the 'caisse école' for the 2005/2006 school year (as stated at Cisco level)[19]

A. Time from arrival of the caisse école at district level to start of distribution (in days)		
	Mean	Median
Antananarivo	45	50
Fianarantsoa	11	10
Toamasina	11	10
Mahajanga	44	18
Toliara	28	12
Antsiranana	55	55
Madagascar	**31**	**16**
B. Distribution time of the caisse école from district to school level (in days)		
	Mean	Median
Antananarivo	54	30
Fianarantsoa	56	50
Toamasina	62	64
Mahajanga	109	114
Toliara	44	9
Antsiranana	41	41
Madagascar	**64**	**55**
C. Total lead time from arrival of the caisse école at district level to arrival at school level (in days)		
	Mean	Median
Antananarivo	99	87
Fianarantsoa	67	64
Toamasina	72	80
Mahajanga	153	150
Toliara	72	71
Antsiranana	96	96
Madagascar	**95**	**91**

Source: World Bank/UNICEF, PETS Nov. 2006 & May 2007, Madagascar.

d. A high 97% of the sum of the intended caisse ecole reported as sent by MINESEB arrived at district level in 2005/2006 and 96% of the total sum of fees reported as sent by the Ciscos arrived at school level. However, in approximately one-third of the schools the amount received did not correspond with the amount declared as sent by the district facility.

In this sub-section, we discuss the discrepancies in the amounts declared as sent by the district facility levels and as received by the schools. We refer to leakages in cases where the amount sent by the Cisco is larger than the amount declared as received by the school. In 2005/2006, Figure 3.4 shows that 97% of the entire caisse école budget disbursed to the districts in our sample according to the MINESEB was reported as received at district level. Overall, 96% of the total sum of the caisse école reported as sent by the Ciscos was reported as received at school level. Overall, therefore, total leakage amounted to about 7%.

Table 3.2 shows that in 69% of the schools there was a perfect flow of the caisse école from district to school level. However, in 22% of the schools the amount declared as sent by the Cisco exceeded the amount claimed as received by the school. Small discrepancies are likely caused by reporting errors, so we focus on those schools where the discrepancy was larger than 5% of the total amount sent by the Cisco. Table 3.3 illustrates that in 19% of the schools the shortfall was larger than 5%. There were significant provincial differences in performances. The ratio of non-received funds to expected funds was the highest for the province of Mahajanga (-21%) and 56% of the schools suffered from leakages in the caisse école.

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[19] The statements at Cisco level correspond to those at school level.
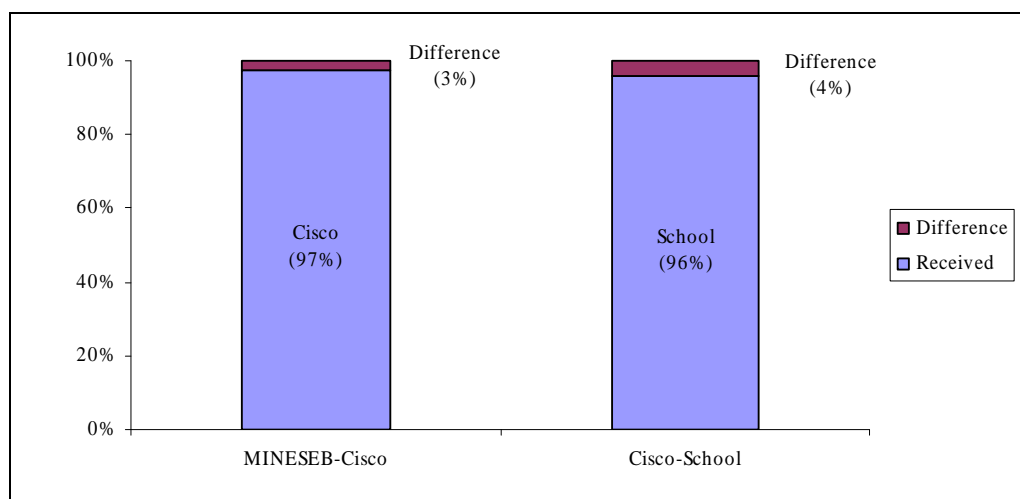
Figure 3.4: Percentage of the caisse école reported as sent and received at the different levels in the education sector for the 2005/2006 school year

On the other hand, Table 3.2 shows that in about 9% of the schools the amount declared as sent by the Cisco was lower than the amount declared as received at the local school level. One plausible explanation could be that Ciscos decided to reallocate school funds to schools within their district without updating their accounting. Overall, schools reported to have received 4% less than the total amount of the caisse école they were entitled to receive. Leakages could occur due to a variety of factors; for example, a lack of proper accounting rules and procedures; or diversion of funds for purposes unrelated to education or for private gain of local government officials. Section 3.2.3. below explores the factors associated with leakage.

Table 3.2: Flow of the caisse école from Cisco to school level (results at school level) – 2005/2006 school year

	Total nr. of schools	Nr. of schools where amount sent < received	Total diff. (in `000 Ariary)	Diff. as % of amount sent	Nr. of schools where amount sent = received	Nr. of schools where amount sent > received	Total diff. (in `000 Ariary)	Diff. as % of amount sent	Overall discrepancy as % of amount sent
Madagascar	**239[x]**	**23**	**+2253**	**+41**	**164**	**52**	**-5612**	**-33**	**-4**
Antananarivo	54	2	+501	+120	46	6	-1328	-68	-4
Fianarantsoa	61	2	+366	+195	50	9	-269	-11	+1
Toamasina	35	2	+110	+20	30	3	-418	-48	-1
Mahajanga	41	6	+554	+30	11	24	-3119	-41	-21
Toliara	33	11	+723	+29	19	3	-263	-12	+5
Antsiranana	15	0	-	-	8	7	-214	-11	-5

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar; [x] Data are missing for the remaining schools in our sample.

To evaluate the effect of the location of schools, districts were divided by remoteness according to an index developed by Stifel and Minten (2004). Table 3.3 illustrates that the percentage of schools suffering from leakages was higher in remote relative to non-remote areas consistent with the findings of the 2002-2003 budget tracking survey conducted by the World Bank in Madagascar. The latter revealed that 90% of the cash transfers arrived at school level, but a discrepancy in school funding was found in 21% of the schools (Francken, 2003).[20] Anecdotal evidence suggested that the diverted funds were used for purposes unrelated to education or for private gain of local bureaucrats. A more detailed analysis showed that it were mainly remote facility levels that suffered from discrepancies as they suffer from higher top-down and bottom-up monitoring costs (Francken, Swinnen and Minten, 2006).

Table 3.3: Percentage of schools with shortfalls of more than 5% in the caisse école received from the Cisco – 2005/2006

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[20] The budget tracking survey in the public primary education sector was organized by the World Bank in April/May 2003. In total, 185 public primary schools were visited nationwide.

Madagascar	**19**
Province	
Antananarivo	9
Fianarantsoa	15
Toamasina	3
Mahajanga	56
Toliara	14
Antsiranana	27
Remoteness[*]	
Accessible to easy access	13
Remote to extremely remote	27

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar; [*] Remoteness index based on Stifel and Minten (2004).

At district level, 68% of the districts showed leakage of the caisse école for at least one school per district in 2005/2006. Table 3.4 shows that there were discrepancies in the caisse école amounts reported as sent and received for at least one school in all visited districts in Mahajanga and Antsiranana. On average in the districts with leakage, there was a discrepancy in one-third of the schools.

Table 3.4: Percentage of districts with leakage in the caisse école for at least one school in the district – 2005/2006

Province	Nr. of visited districts	% of districts with leakage	% of schools with leakage in those districts
Antananarivo	6	50	22
Fianarantsoa	7	57	26
Toamasina	4	50	18
Mahajanga	5	100	59
Toliara	4	75	13
Antsiranana	2	100	47
Madagascar	**28**	**68**	**33**

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar.

It proved impossible to estimate the amount of leakage in 2006/2007 only a small 9% of the schools in our sample received their caisse école s by the time of survey (May 2007). A little more than half of the schools that received their caisse école by May 2007 (11 of the 21 schools) were satisfied that the amount wired to their account was the fixed caisse école [21] times the total number of students in the school. The remaining 10 schools that received the caisse école in 2006/2007 claimed to have received too little. The main reason reported was that the number of students increased during the course of the school year and caisse école allocations could no longer be adjusted.

e. In 2005/2006, a majority of the schools kept records on the expenses of their 'caisse école' and in almost two-thirds of the schools the latter were inspected by their Cisco.

There was a significant negative correlation between proper accounting records of the caisse école grant and leakage of this grant. In 2005/2006, 91% of the schools kept records on the expenses of the 'caisse école' and in 63% of the schools the records were inspected by their Cisco. There were strong regional differences. In the province of Mahajanga, the caisse école records were only inspected by the Cisco in one-third of the schools.

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[21] The school fee for 2006-2007 equaled 3,000 Ariary per student for schools in urban areas and 2,100 Ariary per student for schools in rural areas. The median tuition fee for the schools in our sample equaled 2,000 Ariary per student as many schools received additional students in the course of the school year.

f. There is a difference in spending of the caisse école versus the money received from the PTA/FRAM. The caisse école is mainly used to buy basic materials and textbooks, to pay for equipment and transport or construction and maintenance. The money received from the FRAM is mainly used to pay for the salaries of contract teachers which are locally hired by the parents-teachers association.

Table 3.5 shows the allocation of spending of the caisse école in 2005/2006. Most of the money was spent on basic materials and textbooks (29%), on equipment and transport (22%) and on construction and maintenance (14%). Approximately one-quarter of the caisse école was not spent in the respective school year. The rest of the caisse école was spent on food, salary payment of FRAM teachers or other items. It does not appear as there are large differences in spending patterns between remote and non-remote, or poor and non-poor areas.

Table 3.5: Expenditure statement of the caisse école received in 2005/2006

| | Unit | Share of spending (%) | | | | | | | Total |
		Basic materials & Textbooks	Food	Construction & Maintenance	Equipment & Transport	Salary of FRAM teachers	Others	Not spent in current school year	
Madagascar	**Mean**	**28.5**	**1.8**	**14.1**	**22.3**	**1.4**	**8.0**	**23.9**	**100.0**
	Median	23.9	0.0	7.3	18.8	0.0	3.1	13.7	
	SE	1.4	0.4	1.1	1.2	0.5	0.8	1.8	
Remoteness									
Non-remote	**Mean**	**28.0**	**1.6**	**10.6**	**24.6**	**1.9**	**7.4**	**25.8**	**100.0**
	Median	23.4	0.0	4.8	18.2	0.0	0.6	13.7	
	SE	2.1	0.6	1.4	1.9	0.9	1.1	2.7	
Remote	**Mean**	**29.1**	**2.0**	**17.5**	**20.0**	**0.9**	**8.5**	**22.0**	**100.0**
	Median	25.1	0.0	10.7	18.9	0.0	5.0	12.7	
	SE	1.8	0.6	1.8	1.6	0.3	1.1	2.4	
Poverty									
Non-poor	**Mean**	**29.6**	**2.2**	**13.4**	**23.5**	**1.5**	**6.9**	**22.8**	**100.0**
	Median	25.6	0.0	8.4	19.1	0.0	1.7	11.2	
	SE	1.9	0.7	1.4	1.8	0.8	0.9	2.4	
Poor	**Mean**	**27.3**	**1.4**	**14.8**	**20.9**	**1.3**	**9.2**	**25.2**	**100.0**
	Median	23.2	0.0	5.4	18.5	0.0	4.1	17.7	
	SE	2.0	0.4	1.9	1.7	0.5	1.4	2.7	

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar

Table 3.6: Expenditure statement of money received from the PTA (FRAM) in 2005/2006

| | Unit | Share of spending (%) | | | | | | | Total |
		Basic materials & Textbooks	Food	Construction & Maintenance	Equipment & Transport	Salary of FRAM teachers	Others	Not spent in current school year	
Madagascar	**Mean**	**8.9**	**1.2**	**25.2**	**10.4**	**38.4**	**9.2**	**6.6**	**100.0**
	Median	0.0	0.0	0.0	0.0	2.3	0.0	0.0	
	SE	2.0	0.6	3.2	2.0	3.9	2.0	1.5	
Remoteness									
Non-remote	**Mean**	**7.7**	**0.5**	**25.4**	**11.7**	**40.2**	**9.3**	**5.3**	**100.0**
	Median	0.0	0.0	5.2	0.0	28.0	0.0	0.0	
	SE	2.3	0.4	4.1	3.0	5.2	3.1	1.7	
Remote	**Mean**	**10.3**	**2.0**	**25.1**	**8.9**	**36.3**	**9.1**	**8.2**	**100.0**
	Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	SE	3.4	1.2	4.9	2.7	6.0	2.5	2.7	
Poverty									
Non-poor	**Mean**	**11.7**	**2.1**	**32.0**	**10.0**	**30.7**	**7.4**	**6.1**	**100.0**
	Median	0.0	0.0	16.4	0.0	0.0	0.0	0.0	
	SE	3.1	1.0	4.4	2.3	5.0	2.3	1.8	
Poor	**Mean**	**5.2**	**0.0**	**16.4**	**11.1**	**48.4**	**11.5**	**7.3**	**100.0**
	Median	0.0	0.0	0.0	0.0	53.2	0.0	0.0	
	SE	2.2	0.0	4.2	3.6	6.0	3.5	2.6	

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar

Table 3.6 reports the allocation of spending of the money received from the FRAM. Overall, 38% of funds were spent on salary payment of contract teachers which are locally hired by the

FRAM. One-quarter was spent on construction and maintenance. The remainder of the money was spent on equipment and transport, basic materials and textbooks and other activities. Less than one-tenth of the FRAM money was not spent during last school year.

Since the introduction of the Education for All initiative and the caisse école system whereby the fees are paid by the Government of Madagascar, the contributions tend to arrive later during the school year (as discussed above and illustrated in Fig. 3.3). Hence in order to avoid cash flow problems at school level the FRAM tends to collect the fees from the parents of the students at the beginning of the school year. However, as the Government is the main funding source for public primary schools in Madagascar school level planning, budgeting and execution could be improved if caisse école grants would arrive at school level at the start of the school year.

3.2.2.2. School kits

a. All allocated school kits arrived as recorded in the districts' accounts in 61% of the schools. In the remaining cases it seems as the Ciscos decided to alter the allocation of school kits within their district without formal adjustment to their accounts.

Table 3.7 shows the flow of school kits from Cisco to school level in 2005/2006.[22] Overall, there was a match in amount sent and received in 61% of the schools.[23] Twenty-three percent of the schools reported to have received a surplus of school kits while 16% of the schools reported leakages. The provinces of Mahajanga and Toamasina were especially prone to leakages (Table 3.8). Overall, the schools reported to have received a surplus of school kits equal to 12% of the amount declared as sent at district level.

In results not reported in the tables, we excluded those cases where the stated discrepancy was smaller than 5% of the amount sent as it is plausible to consider these discrepancies as reporting errors. The results showed that the province of Antsiranana performed very well after excluding those cases as there was a perfect match between the number of school kits reported as sent at district and as received at school level. Overall, excluding these cases yields that the allocated school kits arrived as reported in the district's accounts in 80% of the schools.

Table 3.7: Flow of school kits from Cisco to school level (results at school level) – 2005/2006 school year

	Total nr. of schools	Nr. of schools where amount sent < received	Total diff.	Diff. as % of amount sent	Nr. of schools where amount sent = received	Nr. of schools where amount sent > received	Total diff.	Diff. as % of amount sent	Overall discrepancy as % of amount sent
Madagascar	**237[x]**	**54**	**1692**	**112**	**144[c]**	**39**	**-565**	**-26**	**12**
Antananarivo	54	21	531	235	24	9	-113	-36	31
Fianarantsoa	60	7	84	22	43	10	-117	-21	-1
Toamasina	35	8	357	87	20	7	-74	-22	14
Mahajanga	40	9	182	55	22	9	-171	-38	1
Toliara	33	5	126	79	24	4	-90	-51	2
Antsiranana	15	4	412	-*	11	0	-	-	112

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar; Note:*Amount sent equal to 0; [x] Data are missing for the remaining schools in our sample; [c] This number includes 5 schools that declared to have received zero school kits consistent with the Cisco that declared to have sent nothing.

There was a significant positive correlation of surpluses and leakages within districts suggesting that the Ciscos decided to alter the allocation of school kits to the schools within their districts but that these reallocations were not reflected in their accounts. It is unclear why

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[22] Unfortunately, the data did not allow us to track school kits, equipment and textbooks from MINESEB to Cisco level.

[23] In total 5 schools (or 2% of our sample) declared to have received zero school kits and consistently the Cisco declared to have sent nothing.

the Ciscos decided to alter the allocations and whether these changes were agreed upon with the schools.[24]

Table 3.8: Percentage of schools with leakage in school kits received from the Cisco - 2005/2006

Madagascar	**16**
Province	
Antananarivo	17
Fianarantsoa	17
Toamasina	20
Mahajanga	23
Toliara	12
Antsiranana	0
Remoteness	
Accessible to easy access	16
Remote to extremely remote	17

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar.

b. Thirty-six percent of the schools only received the school kits for 2005/2006 towards the end of the school year. The situation was even worse for 2006/2007 as only 15% of the schools received their school kits by May 2007.

Table 3.9 shows that for 2005/2006 about half of the schools received the school kits in December 2005 or January 2006. A little more than one third of the schools (36%) only received the school kits between April and August 2006. By May 2007, only about one-fifth of the districts and 15% of the schools received the school kits for the 2006/2007 school year. Most of those schools received their kits during the second semester. There are large provincial differences as almost half of the schools (47%) in Toamasina received their school kits compared to only 4% of the schools in Antananarivo (Table 3.10).

Table 3.9: Arrival time of school kits – 2005/2006

Year	Month	% of schools
2005	Sept. to November	19
	December	26
2006	January	22
	February	12
	March	4
	April	11
	May	17
	June to August	8
Total		100

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar.

Table 3.10: Percentage of schools that received their school kits from the Cisco by May 2007 – school year 06/07

	Mean	Obs.
Madagascar	**15**	244
Antananarivo	4	54
Fianarantsoa	15	62
Toamasina	47	36
Mahajanga	15	40
Toliara	6	36
Antsiranana	6	16

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar. Note: These numbers should be interpreted with caution as the school year was still on-going at the time of the survey.

The average time for the Ciscos to distribute the school kits to all schools in their districts during 2005/2006 was 100 days after they had been received at district level (Table 3.11). This period was mainly used to "effectively distribute" the school kits. The time from arrival of the school kits at district level to the start of the distribution was considerably smaller compared to those times for the caisse école in 2005/2006 as discussed earlier.

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[24] We did not find any significant correlation between districts or schools with leakages in the caisse école and district or schools with leakages or surpluses in school kits.

Table 3.11: Lead times for school kits distribution –2005/2006 (as stated at Cisco level; in days)

	Mean	Median
A. Time from arrival at district to start of distribution		
Madagascar	**9**	**6**
B. Distribution time from district to all schools in district		
Madagascar	**85**	**55**
C. Total lead time from district to school level		
Madagascar	**100**	**78**

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar.

c. It i mainly FAF, FRAM or school members who <u>collect</u> the school kits and deliver them to the schools.

Overall, 44% and 60% of the schools received their school kits through FAF, FRAM or school members who went to collect the kits at the district facility level during 2005/2006 and 2006/2007 respectively (Table 3.12). Averaging across survey rounds, about one-quarter of the schools were supplied from a secondary distribution point (i.e.: not the Cisco office) by FAF, FRAM or school members. For 2005/2006, half of the schools with leakages and surpluses received their school kits from a secondary distribution point.

Table 3.12: Mode of distribution of school kits to the schools (as stated at school level)

	2005/2006 (in %)	2006/2007 (in %)
Supply from the Cisco to the school by ZAP representative or Cisco personnel	20	24
Supply from the Cisco to the school by school/FAF/FRAM members	44	60
Supply from another distribution point by school/FAF/FRAM members	36	16
Total	100	100

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar.

3.2.2.3. School equipment

a. Leakage of school equipment is rampant. In about 40% of the schools that received equipment from the Cisco, there was leakage of the equipment items during the two previous school years. Remote schools suffer more from school equipment leakages.

The study investigated the flow of five selected equipment items from district to school level[25] for the two previous school years. An indicator of equipment leakage was constructed that equals one if the total amount of the five selected equipment items did not arrive at school level as stated in the district's accounts. The indicator equals zero if the flow of each item from district to school level is correct. The survey did not inquire about values or prices so it is impossible to study differences in the value or price of the school equipment reported as sent and received at both levels.

Table 3.13: Flow of school equipment° from Cisco to school level (results at school level) –2005/2006

	Total nr. of schools	Nr. of schools where amount sent < received	Diff. as % of amount sent	Nr. of schools where amount sent=received*	Nr. of schools where amount sent > received	Diff. as % of amount sent	Overall discrepancy as % of amount sent
Madagascar	**235ˣ**	**47**	**103**	**122**	**66**	**-95**	**-70**
Antananarivo	54	7	110	30	17	-98	-94
Fianarantsoa	58	9	327	37	12	-85	-19
Toamasina	35	10	69	9	16	-47	34
Mahajanga	40	16	334	16	8	-51	92
Toliara	33	2	18	18	13	-74	-34
Antsiranana	15	3	-**	12	0	-	-**

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar; *Note*: ˣ Data are missing for the remaining schools in our sample; *Number of schools where the total amount sent equals the total amount received & the amount sent per item equals the amount received per item – it also contains 70 schools where the amount declared as received by the school and sent by the Cisco equaled zero; **Amount sent equal to 0; °School equipment includes chalk, school desks, notebooks, steel plates, and bags of cement; Unit=1item.

For 2005/2006, amounts sent and received matched in 52% of the schools (i.e. 122 out of the 235 schools with information). It is noteworthy that 70 of those 122 schools did not receive any

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[25] The five items are chalk, notebooks, school desks, steel plates, and bags of cement.

school equipment, and consistently the Cisco also reported to have sent no school supplies to those schools. Surpluses of school equipment were reported in 20% of the schools and leakages in 28% of the schools. Among schools that received school equipment during 2005/2006, 40% suffered from school equipment leakages. Overall, the district education facilities declared to have sent 70% more of the total number of selected items than the schools claimed to have received. There are large regional differences and it appears as remote schools suffered more from leakages in the school equipment supply chain in 2005/2006 (Tables 3.13 and 3.14). We return to this variation below in the econometric analysis.

Table 3.14: Percentage of schools with leakage in school equipment for those schools that received equipment from the Cisco –2005/2006

Madagascar	**40**
Province	
Antananarivo	46
Fianarantsoa	31
Toamasina	57
Mahajanga	29
Toliara	41
Antsiranana	0
Remoteness	
Accessible to easy access	37
Remote to extremely remote	42

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar.

For 2006/2007, the data from the second survey round only allow a comparison of items sent by the Cisco and received by the schools for 104 schools (Table 3.15). Among schools that received school equipment during 2006/2007 (i.e. 101 schools out of those 104), 41% suffered from school equipment leakages. Overall, the district education facilities declared to have sent 20% more of the total number of selected items than the schools reported to have received by the Ciscos. Leakage was the most problematic in the province of Toliara (Table 3.16) while the discrepancy as a percent of the amount sent was the highest in the province of Mahajanga (Table 3.15). Consistent with our earlier findings remote schools seem to suffer most from school equipment leakages.

Table 3.15: Flow of school equipment° from Cisco to school level (results at school level) –2006/2007

	Total nr. of schools	Nr. of schools where amount sent < received	Diff. as % of amount sent	Nr. of schools where amount sent = received*	Nr. of schools where amount sent > received	Diff. as % of amount sent	Overall discrepancy as % of amount sent
Madagascar	**104[x]**	**33**	**102**	**30**	**41**	**-79**	**-20**
Antananarivo	32	6	71	12	14	-96	-21
Fianarantsoa	21	7	382	6	8	-83	3
Toamasina	15	6	365	7	2	-93	-19
Mahajanga	16	6	176	3	7	-97	-72
Toliara	20	8	64	2	10	-46	-16
Antsiranana	-	-	-	-	-	-	-

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar; *Note*: [x] Data are missing for the remaining schools in our sample; *Number of schools where amount sent = received & amount sent per item equals amount received per item – it also contains 3 schools where the amount declared as received by the school and sent by the Cisco equaled zero; **Amount sent equal to 0; ° School equipment includes chalk, school desks, notebooks, steel plates, and bags of cement; Unit=1item; All schools in the province of Antsiranana had blank entries on school equipment.

These findings are consistent with the results of the 2003 public expenditure tracking survey conducted by the World Bank in Madagascar where leakages of in-kind contributions were encountered in 40% of the schools. Anecdotal evidence suggested that leakages occurred due to weak planning models, incompetence and very poor accounting procedures at the decentralized levels as well as capture by local government officials. In the latter case, in-kind capture resulted from effective theft of materials or from over-invoicing of materials in the districts' accounts (the district officer noted a higher invoice price compared to the market price of the in-kind contributions s/he sent to the schools.)[26]

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[26] This study – i.e. the 2007 PETS –only allows us to study discrepancies in the amounts of in-kind contributions reported as sent and received at district and school level respectively, but it should be noted that there are other sources of discrepancies.

Table 3.16: Percentage of schools with leakage in school equipment for those schools that received equipment from the Cisco –2006/2007 school year [x]

Madagascar	**41**
Province	
Antananarivo	44
Fianarantsoa	40
Toamasina	15
Mahajanga	44
Toliara	50
Antsiranana	-
Remoteness	
Accessible to easy access	37
Remote to extremely remote	47

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar; *Note*: [x] Results should be interpreted with caution as data are missing for more than half of the schools in our sample.

3.2.2.4. Textbooks

a. There are considerable bottlenecks in the supply chain of textbooks from district to school level. In half of the schools that received textbooks in 2005/2006, not all textbooks arrived at school level as stated in the districts' accounts.

Textbooks are an important part of what governments provide to support the teaching and learning process (Frölich and Michaelowa, 2007; Michaelowa, 2001; UNESCO-UIS, 2003; Glewwe *et al*, 1995) Table 3.17 shows the flow of textbooks[27] from Cisco to school level – according to the accounts from both sides – for 2005/2006. Excluding 29 schools which were not sent any textbooks: amounts sent and received matched perfectly in 38% of the schools; 11 % of the schools claimed to have received a surplus of manuals while 51% reported to have suffered from leakages. Overall, there were considerable problems in the flow of textbooks from Cisco to school level: as 74% of the total amount of books claimed as sent by the Cisco did not arrive at the schools according to the latter's accounts. Table 3.18 illustrates that the province of Toliara performed relatively well as only 13% of the schools report textbook leakages compared to the province of Antsiranana, for example, where 77% of the schools did.

Table 3.17: Flow of textbooks° from Cisco to school level (results at school level) – 2005/2006 school year

	Total nr. of schools	Nr. of schools where amount sent < received	Total diff.	Diff. as % of amount sent	Nr. of schools where amount sent = received*	Nr. of schools where amount sent > received	Total diff.	Diff. as % of amount sent	Overall discrepancy as % of amount sent
Madagascar	**237[x]**	**23**	**1234**	**110**	**107**	**107**	**-31092**	**-93**	**-74**
Antananarivo	54	4	288	720	20	30	-16947	-98	-91
Fianarantsoa	60	4	101	40	29	27	-5742	-85	-69
Toamasina	35	4	347	102	18	13	-458	-68	-6
Mahajanga	40	2	90	375	15	23	-6546	-93	-80
Toliara	33	6	277	95	23	4	-86	-46	9
Antsiranana	15	3	131	77	2	10	-1313	-85	-69

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar; *Note*: [x] Data are missing for the remaining schools in our sample; °French, Malagasy, and math textbooks; * The number contains 29 schools where the amount declared as received by the school and as sent by the Cisco equaled zero.

Anecdotal evidence from the previous budget tracking survey suggested there was a general lack of capacity and accurate accountancy procedures at the decentralized levels in 2003. Several schools did not keep accounts on the textbooks that arrived at their school, and in cases where they did the accountancy was extremely unclear. The current results do not contradict these earlier results, but additionally indicate serious issues of accountability in thextbook distribution.

Table 3.18: % of schools with leakage in textbooks for those schools that received textbooks from the Cisco – 05/06

Madagascar	**51**
Province	
Antananarivo	61
Fianarantsoa	55
Toamasina	41

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[27] This includes textbooks on the French and Malagasy language respectively and on mathematics. We did not include the FFMOM manuals are excluded as they were only sent to 4% of the schools.

Mahajanga		68
Toliara		13
Antsiranana		77
Remoteness		
Accessible to easy access		53
Remote to extremely remote		49

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar.

b. There is a slow distribution of textbooks as only 13% of the schools received new manuals by May 2007 in 2006/2007.

Table 3.19 illustrates that by May 2007, only 13% of the schools claimed to have received new textbooks for the school year 2006/2007. There are regional differences but in each province less than one-quarter of the schools received new manuals by May 2007 for the previous school year.

Table 3.19: Percentage of schools that received textbooks from the Cisco by May 2007 – 2006/2007 school year

	%	Obs.
Madagascar	**13**	244
Antananarivo	9	54
Fianarantsoa	15	62
Toamasina	8	36
Mahajanga	8	40
Toliara	22	36
Antsiranana	19	16

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar.

3.2.2.5. Salaries

a. FRAM teachers who were supposed to obtain an allowance from the Government/Cisco received their subsidy correctly, but in 2006/2007 as many as 44% were not paid on time.

Seventy percent of the schools in our sample had one or more subsidized FRAM teachers who received an allowance from the Government/Cisco of 55,000 Ariary per month during the last two school years. However, delays in payment of FRAM teachers increased over time as about one-quarter of these teachers were not paid on time in 2005/2006 compared to 44% in 2006/-2007 (Table 3.20). The payment was on average delayed by 3 months. Delayed payment of the subsidized FRAM teachers is a mainly problem in the provinces of Toamasina and Toliara. The longest average delays in payment in 2006/2007 were found in the province of Toamasina where FRAM teachers had to wait for 7 months before being paid. Clearly , shortening these delay will be an important part of attracting and motivating high quality FRAM teachers.

Table 3.20: Delays in payment of the allowances for the FRAM teachers

	2005/2006		2006/2007	
	% of FRAM teachers with delay in payment	Average delay (in months)	% of FRAM teachers with delay in payment	Average delay (in months)
Antananarivo	16	4	35	2
Fianarantsoa	29	2	25	2
Toamasina	7	3	89	3
Mahajanga	12	5	40	4
Toliara	74	2	61	2
Antsiranana	11	2	10	2
Madagascar	**25**	**3**	**44**	**3**

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar.

3.2.2.6 Correlation between types of leakage

Table 3.21: Correlation matrix of leakages of different flows in the public primary education sector - 2005/2006

Correlation	Caisse école	School kits	Equipment	Textbooks
Caisse école	1.00			
School kits	**0.13*** **(0.05)**	1.00		
Equipment	-0.07 (0.32)	**0.18**** **(0.02)**	1.00	
Textbooks	**0.22***** **(0.00)**	**0.13*** **(0.06)**	-0.03 (0.70)	1.00

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar.

Table 3.21 explores whether it is the same schools who are suffering from leakages of the different types. Schools suffering from leakage of school kits are also suffering from other forms of leakages. In particular, there is a significant correlation between schools suffering from leakage of school kits and of school equipment. Moreover, the correlation matrix shows that there is a significant and positive correlation between schools suffering from leakage of the caisse école and those of textbooks. While these correlations are statistically significant, they are not large: it is therefore hard to conclude that leakage is concentrated in just a few schools or areas.

3.2.2.7. Financial accountability

a. There is a general lack of financial accountability at all decentralized levels. Only one-third of those schools that received the caisse école by May 2007 in 2006/2007 school year posted the amount received.

Posting in a public place of the grant received by the Government to pay for the caisse école is a necessary condition to receive the money. However, it seems that the decrease in monitoring at school level (which we discussed in greater detail in chapter 2) was associated with a reduction in posting. The number of schools posting the amount decreased from 62% in 2003-2004 (Minten *et al.*, 2005) to 42% in 2005/2006 and to 33% in 2006/2007. Moreover, in a majority of schools that did post the amounts, the poster did not appear on the external walls of the school as required, but only inside the school walls which did not make it generally and easily accessible.

There was a significant negative correlation between posting and leakage of the caisse école for 2005/2006: posting was associated with less leakage. There are two main reasons why this might be: on the one hand, posting of the 'caisse école' could increase the monitoring capacity of the service beneficiaries and hence decrease leakage. On the other hand, government officials who are performing well might be eager to show their good performance to the local population.

3.2.3.   Correlates of leakages in the education sector

To complement the descriptive analysis, this section explores the combination of factors that might determine leakages in the education sector. Four multivariate analyses were conducted where each dependant variable is leakage, coded as 1 if the Cisco reported to have sent more (1) caisse école; (2) school kits; (3) school equipment or (4) textbooks than stated as received at school level. The dependant variables equal zero if the Cisco declared to have sent less or an equal amount of the respective contributions than claimed as received in the school's accounts. Selected results from probit regressions are depicted in Tables 3.22 and 3.23.

The majority of school directors (77%) of the schools in our sample are not born in the village or commune where they operate. On average, the directors already work in the education sector for 9 years and in the specific school for 5 years. They enjoyed 6 to 15 years of education with a mean and median of 9 years of schooling. Thirty-nine percent of the schools received an inspection from the Cisco during the last 12 months. Teachers' meetings are on average organized once a month. The parents-teachers' association meets on average every 2 to 3 months. The mean and median school size is respectively equal to 174 and 124 students. One-quarter of the schools has access to potable water.

3.2.3.1. Director characteristics

a. Director characteristics do not significantly determine leakages in the education supply chain.

Das *et al.* (2004a,b) found that in the education sector in Zambia the interest and ability of the school director was crucial in receiving the educational funds at the school level. The results in Table 3.22 do not support this view for Madagascar and even show the opposite as the results in Columns 2 and 3 imply that schools with a more experienced school director suffered more leakage of the caisse école.[28] However, this result is not robust to changes in the choice of factors that might determine leakage (see Column 3). There is some evidence that the likelihood of leakage of school equipment is lower for schools with a director born in the commune (Column 2 of Table 3.23), but in general the joint test results (in Tables 3.22 and 3.23) suggest that director characteristics do not significantly determine leakages in the education supply chain.

Table 3.22: Determinants of leakages of the caisse école in the public primary education sector - 2005/2006

	Caisse école		
	(1) dF/dx	(2) dF/dx	(3) dF/dx
Director characteristics			
Born in commune (0/1)	0.0149	0.0493	0.0669
	(0.28)	(0.80)	(1.12)
Experience as director in school (Nr. of years)	-0.0098	-0.0082	-0.0052
	(-1.60)	(-1.22)	(-0.87)
Experience as director in sector (Nr. of years)	**0.0062****	**0.0058***	0.0027
	(2.02)	**(1.78)**	(0.81)
Education (Nr. of years)	0.0077	0.0058	-0.0008
	(0.43)	(0.34)	(-0.05)
School characteristics			
School size 05/06	-0.0003	-0.0004	**-0.0007****
	(-1.37)	(-1.62)	**(-2.42)**
Av. teacher meetings/month last 12m.	**-0.0384***	**-0.0315***	-0.0223
	(-1.74)	**(-1.75)**	(-1.37)
Av. PTA meetings last 12m.	0.0004	0.0006	0.0034
	(0.07)	(0.11)	(0.72)
Inspection CISCO last 12m. (0/1)	**-0.0932****	**-0.1089****	**-0.0926****
	(-2.01)	**(-2.19)**	**(-2.06)**
Potable water (0/1)	**-0.1028***	-0.0863	-0.0298
	(-1.75)	(-1.28)	(-0.45)
Commune characteristics			
Log of mean_expenditures		**0.1742****	0.1182
		(2.07)	(1.62)
Literacy rate		**-0.0027****	-0.0016
		(-2.06)	(-1.34)
Ethnic homogeneity (0/1)			**-0.1622*****
			(-2.73)
Remoteness index		-0.0054	0.0119
		(-0.09)	(0.23)
No. observations	234	212	209
Joint tests (P-values)			
Director characteristics	0.31	0.34	0.65

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[28] There might be some concern that the model includes both the experience of the school director as director in the sector and the experience as director in the respective school as independent variables in the analysis, but excluding the latter from the analysis does not alter the results.

School characteristics	0.00***	0.00***	0.02**
Commune characteristics		0.06*	0.00***

Note: dprobit regression results; dF/dx reports marginal effects; robust standard errors; z-statistics are reported in parentheses; significance levels of 10, 5 and 1 percent are represented by *, ** and ***.

Table 3.23: Determinants of leakages in the public primary education sector in Madagascar - 2005/2006

	School kits	Equipment	Textbooks
Director characteristics			
Born in commune (0/1)	0.0746	**-0.1357***	-0.0167
	(1.15)	**(-1.83)**	(-0.17)
Experience as director in school (Nr. of years)	-0.0022	-0.0064	-0.0006
	(-0.34)	(-0.82)	(-0.06)
Experience as director in sector (Nr. of years)	0.0006	3.91e-05	0.0058
	(0.18)	(0.01)	(1.04)
Education (Nr. of years)	-0.0043	-0.0112	0.0133
	(-0.21)	(-0.48)	(0.42)
School characteristics			
School size 05/06	-0.0001	-0.0001	**-0.0006***
	(-0.60)	(-0.60)	**(-1.93)**
Av. teacher meetings/month last 12m.	-0.0145	-0.0108	-0.0023
	(-1.14)	(-1.29)	(-0.18)
Av. PTA meetings last 12m.	0.0009	0.0007	0.0101
	(0.15)	(0.10)	(0.81)
Inspection CISCO last 12m. (0/1)	0.0840	0.0708	0.0478
	(1.47)	(1.03)	(0.57)
Potable water (0/1)	-0.0437	-0.0324	0.0284
	(-0.68)	(-0.39)	(0.25)
Commune characteristics			
Log of mean_expenditures	-0.0264	**-0.3196***	**-0.3063**
	(-0.33)	**(-2.93)**	**(-2.20)**
Literacy rate	0.0022	**0.0046**	**0.0059**
	(1.52)	**(2.41)**	**(2.50)**
Ethnic homogeneity (0/1)	-0.0656	-0.0820	**-0.2413**
	(-1.03)	(-1.06)	**(-2. 48)**
Remoteness index	**0.1383***	0.0451	0.0944
	(1.92)	(0.52)	(0.88)
No. observations	202	207	179
Joint tests (P-values)			
Director characteristics	0.81	0.30	0.83
School characteristics	0.53	0.64	0.44
Commune characteristics	0.27	0.01**	0.02**

Note: dprobit regression results; dF/dx reports marginal effects; robust standard errors; z-statistics are reported in parentheses; significance levels of 10, 5 and 1 percent are represented by *, ** and ***.

3.2.3.2. School characteristics

a. Inspections and frequent teachers staff meetings are associated with lower leakages.

The results in the previous chapter of this report indicated the importance of intrinsic motivation to teacher performance. Teachers and directors could be highly motivated (i.e. to work as well as to obtain the funds their school is entitled to) if they are working in a vibrant school environment with an active management and thus the model includes the average number of teaching staff meetings per month during the last year. Table 3.22 shows that there is a significant correlation between the likelihood of leakage of the caisse école and the frequency of teacher meetings. Consistent with earlier findings on absenteeism, the more frequent the teaching staff meets the lower the likelihood of leakage of the caisse école.

Also as discussed earlier, local control of schools may be associated with better performance of the teachers and hence of the school in general (e.g. King and Ozler, 2001; Eskeland and Filmer, 2007). To account for this, the model includes the activity level of the Parents Teacher Association (PTA) measured by the average PTA meetings during the last school year in our analyses. As Tables 3.22 and 3.23 show, there is not a significant correlation between leakages and the frequency of PTA meetings.

The results of the 2003 budget tracking survey in Madagascar found that better monitoring and evaluation seemed necessary to increase the efficiency of public spending in the education sector in Madagascar. The results from this study reinforce these findings as a visit/inspection by the district director during the last 12 months is significantly associated with a lower likelihood of leakage of the caisse école (Table 3.22).

b. Smaller schools tend to suffer more from leakages.

Reinikka and Svensson (2004a) found that, in Uganda, the bargaining power of a school vis-à-vis the district officer and thus the school's probability of receiving funds from the government depended on its size. The findings for Madagascar are consistent (see Columns 3 of Tables 3.22 and 3.23). The likelihood of leakage of the caisse école and leakage of textbooks is significantly higher for smaller schools.

3.2.3.3. Commune characteristics

a. Schools in ethnically homogenous areas suffer less from leakages. Schools in poorer and less educated communes suffer more.

Previous studies suggest that ethnically homogenous or richer regions seem to suffer less from local capture and corruption (e.g. Reinikka and Svensson, 2004a,b; Olken, 2005, 2006). As Tables 3.22 and 3.23 show, schools in ethnically homogenous communes in Madagascar experience significantly less leakage of the caisse école and textbooks. The results also suggest that schools in poorer communes suffer more from (equipment and textbook) leakages. On the contrary, there is some evidence that poorer communes suffer less from leakage of the caisse école, but this result is not robust to changes in the specifications (see Column 3 of Table 3.22).

It is plausible that schools that serve less educated populations experience more bottlenecks in the education supply chain as the school management's and parents-teachers association's ability to access information might be lower (and thus their monitoring cost will be higher compared to schools in better educated areas). The findings support this view as Table 3.23 shows that schools in less literate areas suffer more from (equipment and textbook) leakages. Again, schools in less literate areas seem to suffer less from the caisse école's leakage, but this result is sensitive to adding additional commune characteristics (see Column 3 of Table 3.22).

The joint test results conducted in Tables 3.22 and 3.23 suggest that it is mainly school and commune characteristics that determine leakages of educational contributions. In particular, the efficiency of the new educational policy on cash transfers (i.e. caisse école) is determined by the school's as well as the commune's characteristics while the efficiency of in-kind transfers seems to be mainly determined by commune characteristics.

3.3.   Service delivery in the public health sector

A tracking survey in the health sector was conducted in the second round of the survey. The data did not allow a clear picture of the situation to merge. For example, the survey collected totals on budgets at SSD level, but there was often ambiguity as to whether this total corresponded to the actual total budget or the total of the line items investigated in the questionnaires. In several cases, the total reported in the questionnaire amounted to less than the total of the line items listed. This suggests considerable problems in the financial capacity at the decentralized levels (and in survey design). In addition, it proved impossible to track resources from MINESAN to SSD level with the available data. The remainder of this section investigates the spending patterns of the CRESAN and government funds allocated to the District Health Authorities, and tracks equipment sent from SSD to CSB level.

a. Eighty percent of the CRESAN funds, and 73% of government funds allocated to SSD level were disbursed by May 2007. Thirty-one percent of the CRESAN funds and 40% of government funds, allocated to SSD level, were used for SSD operation.
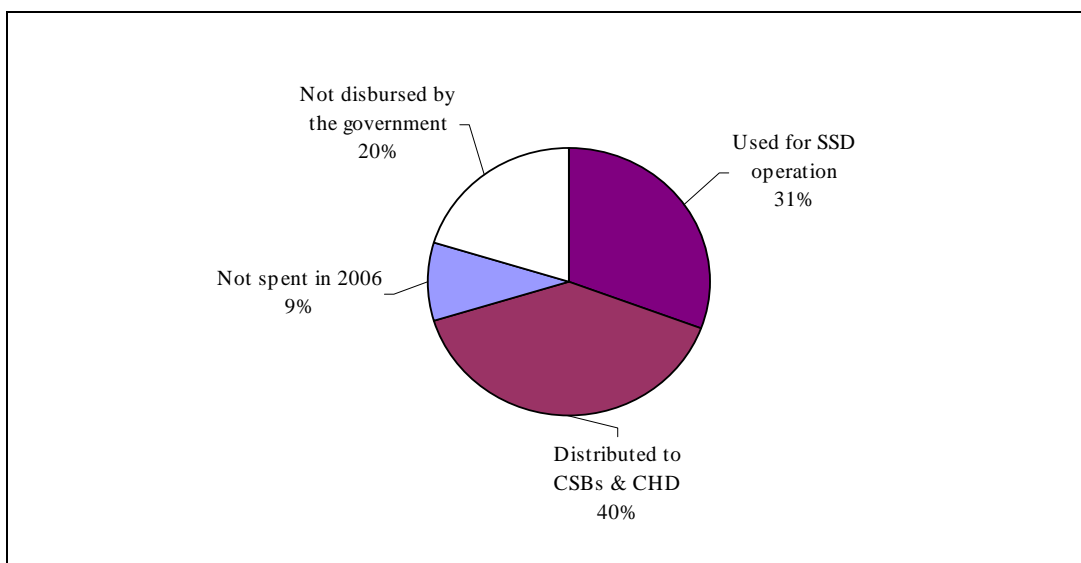
Figure 3.5: Disbursement of allocated CRESAN funds (2006)
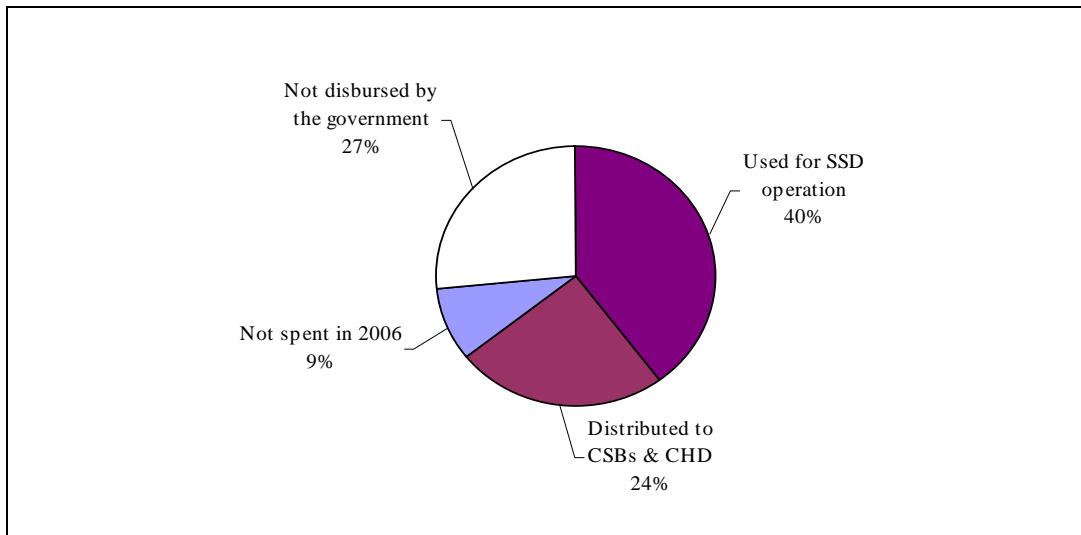
Figure 3.6: Disbursement of allocated government funds (2006)

Figures 3.5 and 3.6 show the disbursement of allocated CRESAN and government funds in the health sector respectively for 2006. Thirty-one percent of the CRESAN and 40% of the government funds were used for SSD operation. A larger portion of the CRESAN funds were distributed to the CSBs and CHD compared to the portion of the government funds disbursed to the basic health centers and district hospitals.

b. CRESAN funds are mainly used to sponsor missions and trainings while government funds are mainly used to pay for fuel and lubricants as well as maintenance and goods for general use.

The use of CRESAN and government funds in the health sector in Madagascar for the year 2006 is reported in figures 3.7 and 3.8: There was a difference in spending patterns. A large portion of the CRESAN funds were used to pay for missions and training as well as furniture and maintenance/rehabilitation.. The government funds were mainly used to buy fuel and lubricants as well as maintenance and rehabilitation.
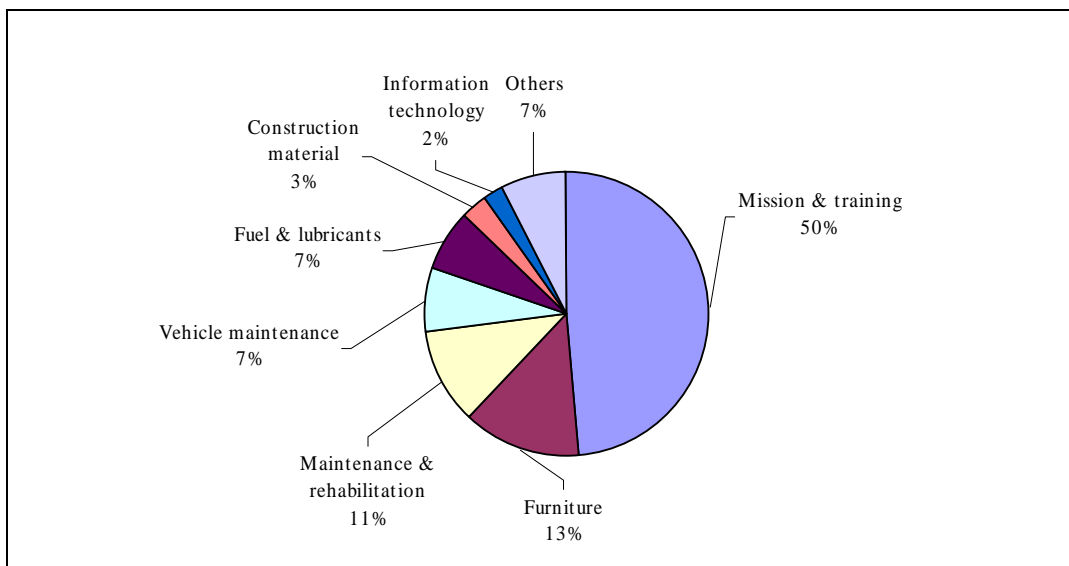
Figure 3.7: Use of CRESAN funds
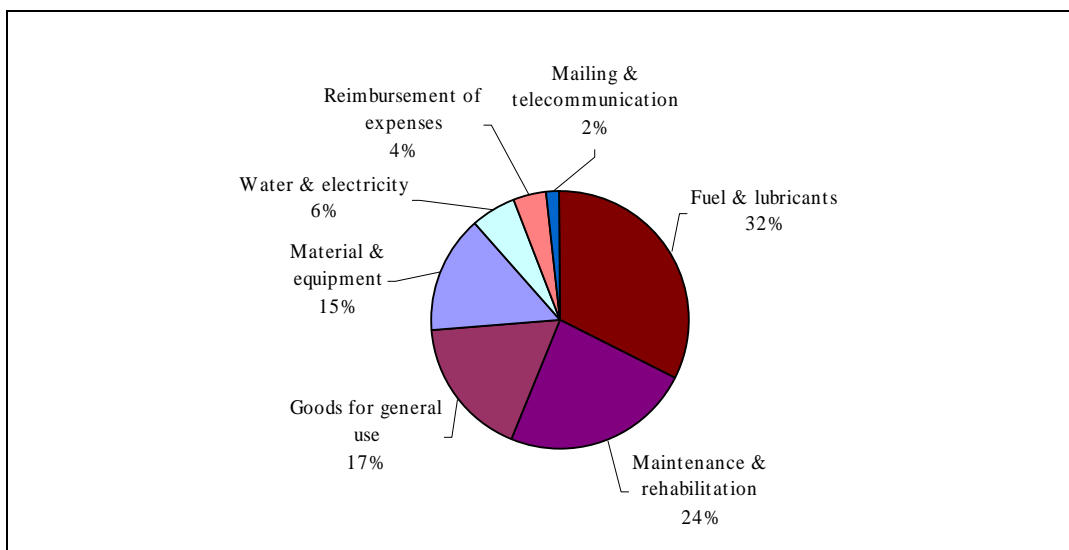
Figure 3.8: Use of government funds

c. There is substantial leakage between SSD to CSB levesl. There is a positive correlation between the likelihood of leakage and the market price of the specific items.

This analysis focusese on specific items which are important (several basic health centers ordered these items in 2006) and for which accurate tracking from SSD to CSB level could be carried out. As mentioned above, enumerators encountered low financial capacity at the decentralized levels. In total 28 District Health Authorities were visited. Table 3.24 illustrates the resource flows of the specific line items from SSD to CSB level for 2006. Price information was gathered at SSD level. Outliers, where the price of certain items was declared to be much higher than the market price which could reflect incompetence, were deleted. There was no price information available on mosquito nets as the latter were distributed for free by the Government or other donors. The final column reflects leakages as well as surpluses for all line items comparing the accounts at SSD and CSB levels. Overall, there is 15% leakage of total amount of petroleum and registers sent. In particular, leakage of petroleum is problematic as it is estimated that 3,511,200 Ariary[29] disappeared from SSD to CSB level in 2006.

Table 3.24: Matching of specific line items sent from SSD to CSB level (aggregated at SSD level) - 2006

Item[x]	Nr. of SSD where amount sent < received at CSB level	Total diff.	Diff. as % of amount sent	Nr. of SSD where amount sent = received at CSB level	Nr. of SSD where amount sent > received at CSB level	Total diff.	Diff. as % of amount sent	Overall discrepancy as % of amount sent	Value of discr. (in '000 Ariary)
Soap	9	+123	+66	11	8	-113	-33	+1	+6.7
Petroleum	5	+730	+100	14	9	-2578	-38	-15	-3511.2
Mosquito nets	4	+4687	cc	18	6	-5305	-35	-4	xx
Register	7	+18	cc	14	7	-32	-53	-15	-50.4

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar; [x]The unit is piece except for petroleum where it is liter; cc The SSD declared to have sent no such items, but the CSB's declared to have received such items from the SSD – as we divide by zero this value is missing; xx There is no price information available as these mosquito nets are distributed for free by the Government or other donors; Price information was gathered at SSD level.

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[29] This corresponds to approximately 2,000.

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4.1.   Introduction

In recent years, Madagascar's health sector has gone through some significant policy changes with an overall increase in the health budget in nominal terms (Minten *et al.*, 2005; World Bank, 2006a).[30] At the same time, the country continues to face serious health issues

Despite large efforts by the Government and international donors to reach frontline service providers, little updated information is available on the effectiveness of spending in the public health sector (World Bank, 2006b). Pharmaceutical drugs are fundamental—and often costly—inputs in public health systems (for example see Cohen and Montoya, 2001). Moreover, the distribution of subsidized drugs can be easily diverted since their retail value is high (Filmer, Hammer and Pritchett 2000). This chapter investigates the supply chain of drugs to basic health centers based two rounds of health center-level data collection in Madagascar (November 2006 and May 2007).

The results show:
- Extensive delays in the distribution of drugs from the central purchasing unit (SALAMA) to the facility-level pharmacies (PhaGeCom). The distribution takes on average one and a half months. The longest part is the distribution of drugs from SALAMA to the District-level Pharmacies, which takes on average five weeks;
- Inventory shortages at district and at commune level are mainly problematic for some specific drugs;
- Substantial leakages—discrepancies in the amounts or prices of goods reported as sent by the District and as received by the Commune Pharmacies—in the drug supply chain with large differences across drug types;
- The likelihood of leakages in the drug supply chain increases with drug price;
- Leakages of antibiotics are especially problematic: half of the basic health centers that ordered this drugs did not receive what they were supposed to receive;
- Health centers with a more educated director, with a locally-born director, which are of Type I, or are located in remote areas are more likely to suffer from leakages;
- There are big delays in payment of dispensers' salaries by communes: 60% of the health centers report irregular payments. Health centers where payments are irregular suffer more from the leakage of antibiotics;
- Accountability of public funds for drugs (FANOME funds) is limited as the public posting of amounts is limited.

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[30] According to the latest national health account of 2003, health spending is estimated at 11.9 USD per inhabitant and represents 3.5% of GDP (World Bank, 2007a).

4.2.   Functioning of the drug supply chain

The functioning of the drug supply chain in Madagascar is illustrated in Figure 4.1. SALAMA is the semi-autonomous central drug purchasing unit for the Government of Madagascar. It supplies District Pharmacies (PhaGDis), based on their purchase orders, who in turn supply the public basic health centers (CSB) with drugs. The supply of the CSBs is based on purchase orders submitted through the Community Managed Pharmacies (PhaGeCom), which are supervised by the Community Management Committee (CoGe). The CoGe is supposed to be elected by members of various villages (*fokontanys*) that fall within a CSB area through the commune level Community Health Committee (CoSan). Drugs, which have been prescribed by staff at the CSB, are then sold to patients through the retail side of the Commune Pharmacy, which is administered by the Dispenser. The Dispenser of the PhaGeCom and the Guard are paid for by the commune out of a subvention from the Government. Money from the sale of drugs is received by the Dispenser, who transfers it on a regular basis to the CoGe Treasurer. From here, the money should be deposited into an account, of a bank or a post office, on a regular basis. The account should require the signatures of both the CoGe Treasurer and President for any transactions. In cases where it is difficult to open a bank account, a provision is made for the CSB to use the account of the District Hospital (or District Health Authority i.e. SSD). The funds from sale of drugs are used by the Management Committee (CoGe) and Commune Pharmacy (PhaGeCom) to purchase drugs, pay for transport, management, banking fees, upkeep of the basic health center infrastructure and stipends for the President and Treasurer of the CoGe (World Bank 2006a).
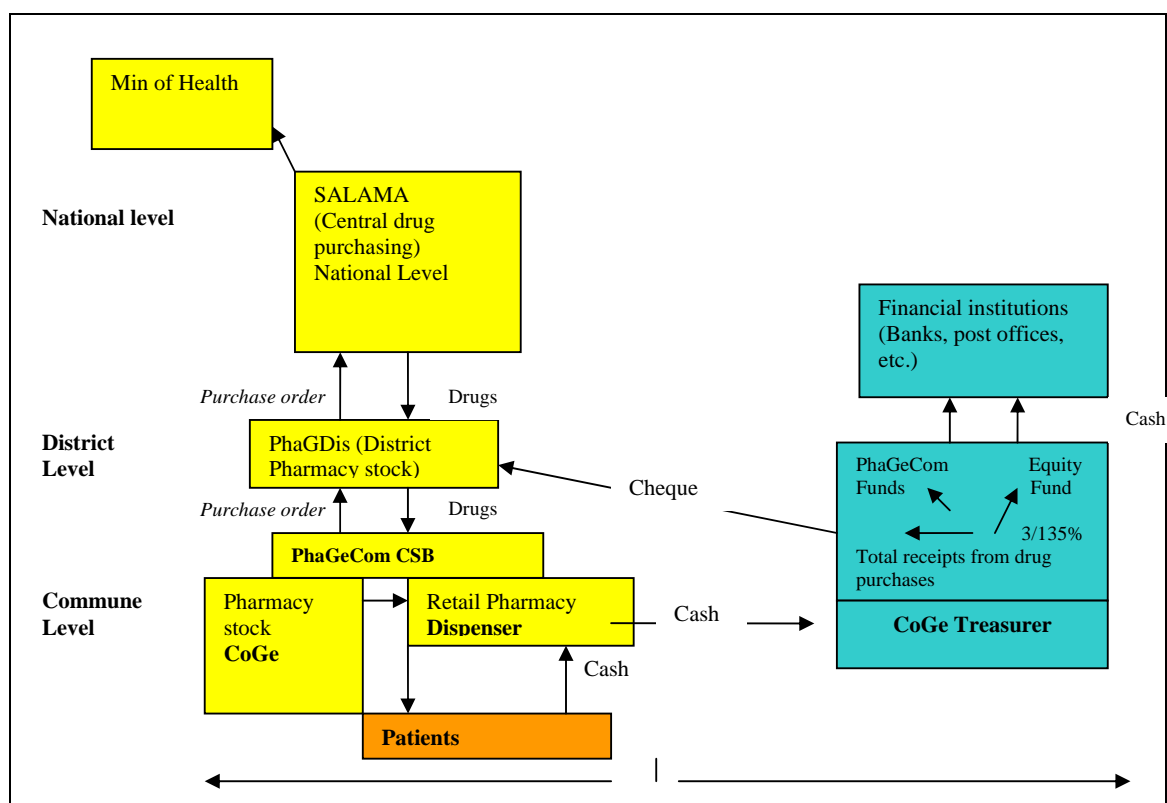
Figure 4.1: Functioning of the drug supply chain (Source: World Bank, 2006a)

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4.3.   Flow from SALAMA to PhaGeCom

a. *The delivery of drugs from the central purchasing unit to the Commune Pharmacies takes on average about five weeks.*

The total time it takes for pharmaceutical drugs to get from SALAMA to the PhaGeCom/CSB level was 43 in November 2006 and 33 days in May 2007. While the shorter time could reflect an improvement in the drugs delivery process, it is also plausible that it reflects seasonal changes as November corresponds to the rainy season and May to the dry season.[31] Averaging over all responses, the delivery of drugs from the central purchasing unit to the commune pharmacies takes on average 38 days. In order to investigate this finding in greater detail, the following separates the supply chain into discussions of the flows from SALAMA to the PhaGDis level, and then from the PhaGDis to the PhaGeCom levels.

4.3.1.   Flow from SALAMA to PhaGDis

a. *It takes on average one month between the placement of an order and delivery to district pharmacies.*

The different steps in the ordering and distribution process are shown in Table 4.1. The entire procedure consists of four steps: the PhaGDis obtains permission for the order from the chef SSD; then the purchase order is mailed to SALAMA which issues an invoice; the invoice is then paid by check; and then the drugs are sent to the PhaGDis.

Table 4.1: Time needed for the different steps of the drug supply chain from SALAMA to PhaGDis as reported in November 2006 (rainy season) and in May 2007 (dry season)

	November 2006				May 2007			
	Time from…[a]							
	Common		Maximum		Common		Maximum	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
…mailing of purchase order to chef SSD to obtaining his permission								
	3.6	1.5	5.2	2.0	3.5	1.0	5.6	2.0
…mailing of approved purchase order to SALAMA to arrival of invoice								
	12.1	11.5	16.6	15.0	12.1	10.5	16.4	15.0
…arrival of invoice from SALAMA to sending of check to SALAMA								
	3.7	2.5	6.6	7.0	4.0	3.5	7.2	7.0
…sending of check to SALAMA to delivery of drugs at PhaGDis								
	12.7	11.5	18.9	15.0	11.5	10.0	15.4	15.0
…mailing of purchase order to chef SSD to delivery of drugs*								
32.8	**30.0**	**45.5**	**45.0**	**28.2**	**30.0**	**39.4**	**37.0**	

Source: World Bank/UNICEF, PETS Nov. 2006 & May 2007, Madagascar; [a] The enumerators asked for the average time during the last 12 months (November 2006) and 6 months (May 2007) respectively (in number of days), but it is highly likely that the respondents only related the question to the time/month of the interview; *entire process.

There is an average time of about one month between the placement of the order to the delivery of the drugs at district level (Tables 4.1 and 4.2). Delivery took longer in November 2006 with an average lead time of 33 days compared to 28 days in May 2007. There are significant differences across provinces: while in Toliara the process took an average of 18 days, it took 47 days in Toamasina. The most time consuming parts of the process are the second and last steps: the creation of the invoice, and the delivery of drugs once they had been paid for. Both steps involve both the mail system and processing by SALAMA.

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[31] Even though our enumerators enquired about the average lead time of drugs in a 12 and 6 months period prior to the survey time of November 2006 and May 2007 respectively, it is plausible that the respondents only related the question to the time/month of the interview.

Table 4.2: Lead times of drugs from SALAMA to PhaGDis as reported in November 2006 (rainy season) and in May 2007 (dry season)

	November 2006				May 2007			
	Time needed from order placement to delivery* (in number of days)							
	Common		Maximum		Common		Maximum	
Province	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Antananarivo	29.2	30.0	47.0	52.5	18.8	21.0	48.2	50.0
Fianarantsoa	32.7	32.0	39.0	39.0	31.0	32.0	34.9	34.0
Toamasina	48.5	45.0	60.0	60.0	46.0	44.5	57.5	60.0
Mahajanga	39.0	39.0	56.4	50.0	33.2	30.0	35.2	41.0
Toliara	20.0	19.0	30.3	24.0	16.0	13.0	24.8	18.5
Antsiranana	22.5	22.5	37.5	37.5	22.5	22.5	32.5	32.5
Madagascar	**32.8**	**30.0**	**45.5**	**45.0**	**28.2**	**30.0**	**39.4**	**37.0**

Source: World Bank/UNICEF, PETS Nov. 2006 & May 2007, Madagascar; *Time from mailing of purchase order to chef SSD to delivery of drugs at PhaGDis.

b. District pharmacies report that SALAMA is often incapable of delivering their orders. However, inventory shortages (stockouts) at district level are only prevalent for certain specific drugs.

Table 4.3 illustrates that in November 2006 as many as 50% the district pharmacies reported that SALAMA was often incapable of delivering the drugs that had been ordered; 36% reported that SALAMA was often incapable of delivering drugs that had been paid for. Moreover, one out of five district pharmacies reported that the delivery often does not correspond with the invoice. In May 2007 the situation had improves somewhat, with 36% of district pharmacies reporting that SALAMA was often incapable of delivering the drugs ordered, 11% say SALAMA was often incapable of delivering drugs paid for. Fourteen percent of the district pharmacies stated that the delivery does often not correspond with the invoice in May 2007.

Table 4.3: Drug supply chain from SALAMA to PhaGDis

	November 2006				May 2007			
	Often	Rarely	Never	Total	Often	Rarely	Never	Total
SALAMA is not capable of delivering the drugs…								
…*ordered* by PhaGDis	50	36	14	100	36	28	36	100
… *paid* by PhaGDis	36	25	39	100	11	25	64	100
Delivery does not correspond with invoice	21	21	57	100	14	18	68	100

Source: World Bank/UNICEF, PETS Nov. 2006 & May 2007, Madagascar.

There is substantial variation in drug availability across the different drugs (Table 4.4). The overall availability of drugs at the district pharmacies is good but some drugs stand out as problematic.[32] For example Oral Rehydration Solutions (SRO), Retinol, and the antibiotics Tetracycline systematically appear to have the lowest availability on the day the pharmacies were visited. Some of this is due to not ordering the drug, or using an alternative drug. True stockouts are lower than unavailability, but affect the same drugs mentioned above. Stockouts were of long duration: SRO and Tetracycline had median inventory shortages of 90 and 68 days respectively. This is substantially longer than the average restocking time (described in Table 4.1) suggesting that these drugs were unavailable from SALAMA. Availability of drugs was slightly better in May 2007—again this could be due to improvements in distribution or due to the fact that this was the dry season.

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[32] Drugs are considered available if at least one specification of the drug (e.g. Cotrimoxazole either in tablets or as liquid) was available.

Table 4.4: Availability of drugs (in % of PhaGDis) as reported in November 2006 (rainy season) and in May 2007 (dry season)

	November 2006			May 2007		
	Available at time of visit	Stockout*	Median nr. of days of stockout	Available at time of visit	Stockout*	Median nr. of days of stockout
Aspirine (Acetylsalicilique acide)	82	4	22	82	4	90
Paracétamol	100	0	-	100	0	-
Chloroquine	89	7	30	96	0	-
Quinine	96	0	-	89	0	-
Antibiotique cotrimoxazole	100	0	-	96	0	-
Antibiotique amoxyciline	96	0	-	96	0	-
Antibiotique tetracycline	71	18	68	82	7	75
Fer acide folique	89	11	90	89	0	-
Ibuprofene	96	7	68	86	7	82
Mébendazole	100	0	-	93	7	21
Retinol (Vitamine A)	71	4	90	68	11	90
SRO (Sels de réhydratation orale)	57	32	90	89	11	60

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar; Note:*rupture de stock

4.3.2. Flow from PhaGDis to PhaGeCom/CSB

a. The time is takes from the placement of an order by a communelevel pharmacy to the delivery of the drugs is about 10 days.

The turnaround time between when a drug is ordered by a commune level pharmacy (PhaGeCom) and delivered by the district level pharmacy varies by the remoteness of the health center. It took 11 days between the placement of an order and delivery of the drugs at commune level in November 2006 and 8 days in May 2007. The average maximum time reported was 19 days in November 2006 and 15 days in May 2007. About half the commune pharmacies pay exclusively in cash, a third pay by check, and the remainder combine both methods of payment.

Table 4.5: Lead times from PhaGDis to PhaGeCom/CSB as reported in November 2006 (rainy season) and in May 2007 (dry season)

	November 2006				May 2007			
	Lead time* (in number of days)[a]							
	Common		Maximum		Common		Maximum	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
CSB at close distance	8.2	2.0	10.6	3.0	6.3	1.5	9.4	3.0
CSB at normal distance	10.3	3.5	14.6	6.0	7.3	2.0	11.6	3.5
CSB at remote distance	13.6	6.5	18.6	12.0	10.3	2.5	15.4	6.0
Average	11				8			

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar; *Time from mailing of purchase order to delivery of drugs at PhaGeCom/CSB; [a] The enumerators asked for the average lead time of drugs during the last 12 months (November 2006) and last 6 months (May 2007) respectively (in number of days), but it is plausible that the respondents only related the question to the time/month of the interview.

b. Less than one-third of the PhaGeCom report perfect flows in the drug supply chain.

Table 4.6 illustrates that only 11% of the Commune Pharmacies reported that they never experienced problems in the delivery of ordered drugs in November 2006, 29% in May 2007. Between a quarter and a third of commune pharmacies report that district pharmacies are often unable to delivery the drugs ordered.

Table 4.6: Drug supply chain from PhaGDis to PhaGeCom

	November 2006				May 2007			
	Often	Rarely	Never	Total	Often	Rarely	Never	Total
PhaGDis is not capable of delivering the drugs…								
… ordered by PhaGeCom	36	53	11	100	25	46	29	100

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar.

c. Inventory shortages at commune level are mainly problematic for some specific drugs. The results are consistent with the findings at district level.

Table 4.7 shows the availability of drugs at the commune level pharmacies. Consistent with the district level findings, the availability of drugs was slightly better in May 2007 compared to November 2006. However, availability and delivery at PhaGeCom/CSB level could still be considerably improved: Tetracycline, Iron/Folic Acid, Retinol (Vitamin A), the anti-inflammatory drug Ibuprofine, and the malaria medications Chloroquine and Quinine all had elevated stockout levels.[33]

Table 4.7: Availability of drugs (in % of PhaGeCom/CSB) as reported in November 2006 (rainy season) and in May 2007 (dry season)

	November 2006			May 2007		
	Available at time of visit	Stockout*	Median nr. of days of stockout	Available at time of visit	Stockout*	Median nr. of days of stockout
Aspirine (Acetylsalicilique acide)	66	4	75	59	4	90
Paracétamol	93	2	53	91	4	90
Chloroquine	90	5	90	72	7	30
Quinine	68	6	90	77	7	90
Antibiotique cotrimoxazole	95	3	30	96	1	14
Antibiotique amoxyciline	88	5	55	90	5	60
Antibiotique tetracycline	62	12	90	68	10	90
Fer acide folique	83	12	60	79	8	90
Ibuprofene	72	16	90	80	16	60
Mébendazole	80	6	81	90	9	75
Retinol (Vitamine A)	69	5	90	69	3	90
SRO (Sels de rehydratation orale)	68	17	90	89	7	60

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar; Note:*rupture de stock

4.4. Leakages in the drug supply chain

As mentioned in the introduction to this chapter, leakage in the delivery of pharmaceutical drugs is an important concern. Leakage is defined here as discrepancies in the quantity or in the value/price of drugs reported as sent by the District Pharmacies and as received by the Commune Pharmacies. Leakage occurs when the PhaGDis reported to have sent more goods or goods of a higher value than claimed as received at PhaGeCom/CSB level or when the latter claimed to have paid a higher price than reported to have been received at district level.

Leakages could come about for a variety of reasons. Lack of proper accounting procedures or training at the various levels could account for part of the discrepancy. On the other hand, diversion of drugs for private gain is also a possibility. Unethical procurements practices in the health sector are common in many developing countries. For example, a recent study in Brazil found that a municipal government was purchasing medicines from a local private pharmacy, at excessive prices due to collusion between the mayor and the owner of the pharmacy. Also, a study in Columbia found that when bidding processes are not used, drug prices are consistently higher. (Additional examples are in Cohen and Montoya, 2001). This section first provides a descriptive overview, and subsequently explores the correlates of leakage using multivariate analysis.

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[33] Availability of aspirin is also low, but this is not due to delivery failures, but due to the fact that a lot of health centers did not order aspirin as they prefer to use other painkillers instead.

4.4.1. Descriptive results

a. Averaging across survey rounds, 73% of the commune pharmacies report leakage in the drug supply chain from district to commune levels.

For the country as a whole, leakage of at least one drug were reported in 66% of the commune pharmacies in November 2006 and 80% in May 2007. (Table 4.8). There is provincial variation: leakage was lowest in Fianarantsoa (where still more than half of the commune pharmacies suffered from leakages); and it was highest in Mahajanga (where 81% of the commune pharmacies reported discrepancies). Commune pharmacies associated with Type II health centers suffer less from drugs leakages, especially in November 2006. This descriptive analysis does not suggest that leakage is higher in poorer or remote areas—although we return to this issue in the multivariate analysis.

Table 4.8: Basic health centers with leakages in the drug supply chain (in % of PhaGeCom/CSB that ordered drugs)

	Nov. 2006 (Visit 1)		May 2007 (Visit 2)		Visit 1&2
		Nr. of obs.		Nr. of obs.	
Madagascar	**66**	99	**80**	92	**73**
Type of health center/CSB					
Type I	74	35	81	31	77
Type II	61	64	80	61	71
Poverty					
Not poor to well off	71	55	75	48	73
Poor to very poor	59	44	86	44	73
Remoteness*					
Accessible to easy access	69	52	79	52	74
Remote to extremely remote	62	47	83	40	71
Province					
Antananarivo	80	20	76	21	78
Fianarantsoa	35	26	81	26	58
Toamasina	69	16	87	15	77
Mahajanga	89	19	69	13	81
Toliara	64	11	91	11	77
Antsiranana	71	7	83	6	77

Source: World Bank/UNICEF, PETS Nov. 2006 & May 2007, Madagascar.; *Remoteness index based on Stifel and Minten (2004).

b. Leakage varies substantially across drug types. In particular, half of the community pharmacies that ordered antibiotics did not receive what they were supposed to receive.

There were dramatic differences in leakages across types of drugs as illustrated in Table 4.9.[34] The highest prevalence of leakage is for antibiotics: 45% and 54% of the basic health centers who ordered antibiotics in November 2006 and May 2007 respectively reported leakage. Although not quite as problematic, there were also substantial leakages for Retinol (Vitamin A) and malaria medications. The lowest levels of leakages were for ORS and anti-parasitic medications where leakage prevalence was 18% and 21% respectively.

Table 4.9: Leakages in the drug supply chain (by drug type and in % of PhaGeCom/CSB who ordered product either in November 2006 or in May 2007)

	November 2006 (Visit 1)		May 2007 (Visit 2)		Visit 1&2
	Leakage (Sum of last two deliveries)				
	Leakage	Nr. of obs.	Leakage	Nr. of obs.	Leakage
Pain killers	31	93	30	79	31
Malaria medications	28	88	38	68	33
Antibiotics	45	99	54	92	50
Anti-inflammatory drugs	30	82	24	75	27
Retinol (Vitamin A)	29	14	50	8	36
SRO/ORS	23	35	14	42	18
Fer acide folique/Folic Acid	20	84	30	70	25
Anti-parasitic medications	20	56	22	36	21

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar.

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[34] This analysis aggregates each type of drug, and considers discrepancies in the amounts or values/prices reported as sent and received in at least one specification of one sub-type of the drug or more as leakage.

c. Leakages of antibiotics in November 2006 and May 2007 are strongly related, suggesting structural differences across facilities.

Almost all of the health centers ordered antibiotics during both survey rounds which enables an analysis of whether leakage is concentrated in specific health centers, or whether it occurs randomly across facilities (Table 4.10). The incidence of leakage of antibiotics is statistically significantly positively correlated across rounds, suggesting that leakages of antibiotics reflect structural differences in the health centers, the local communities, or the districts. The remainder of this chapter explores these factors. Note that there is also a positive correlation in leakages of SRO, but few commune pharmacies ordered the drug twice, and recall that the level of leakage is lower. Leakage for the other drug types does not appear to be correlated across rounds.

Table 4.10: Leakages in the drug supply chain (by drug type and in % of PhaGeCom/CSB who ordered product twice i.e. in November 2006 & in May 2007)

	November 2006	May 2007	Correlation	Nr. of obs.
	Leakage (Sum of last two deliveries)			
Pain killers	31	28	0.01	68
Malaria medication	31	35	0.00	54
Antibiotics	44	56	0.19*	82
Anti-inflammatory drugs	37	22	-0.16	59
Retinol (Vitamin A)	0	0	-	3
SRO/ORS	12	12	0.43*	17
Fer acide folique/Folic Acid	22	28	-0.15	58
Anti-parasitic medication	25	25	0.11	24

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar; *Note:* *Significant at the 10%-level.

d. Value/price leakage of antibiotics is more prevalent than quantity leakage, but both types of leakage often occur at the same time.

Value/price leakage is defined as when the PhaGDis stated to have sent goods of a higher value than reported as received at PhaGeCom/CSB level, or when the latter claimed to have paid a higher price for the drugs than was reported to have been received at the district level. Quantity leakage occurs when the PhaGDis reported to have sent more drugs than stated as received at PhaGeCom/CSB level. Table 4.11 illustrates that on average 49% of the basic health centers that ordered antibiotics during either survey rounds suffered from value/price leakage and 34% suffered from quantity leakage. There is a strong positive correlation between both types of leakage suggesting that a lot of PhaGeCom that experience quantity leakage also experience value/price leakage—again pointing to structural problems rather than idiosyncratic ones.

Table 4.11: Basic health centers with leakage in the antibiotics supply chain – 2006/2007 (in %)

	Nov. 2006 (Visit 1)	May 2007 (Visit 2)	Visit 1 or 2
Madagascar	**45**	**54**	**50**
Value/price leakage	44	53	49
Quantity leakage	29	39	34
Correlation (value/price & quantity leakage)	0.68***	0.71***	0.69***
Type of health center/CSB			
Type I	46	55	50
Type II	45	54	50
Poverty			
Not poor to well off	49	48	48
Poor to very poor	41	61	51
Remoteness			
Accessible to easy access	46	54	50
Remote to extremely remote	45	55	49
Province			
Antananarivo	60	52	56
Fianarantsoa	15	50	33
Toamasina	31	67	48
Mahajanga	68	54	63
Toliara	54	55	54
Antsiranana	71	50	62

Source: World Bank/UNICEF, PETS Nov. 2006 & May 2007, Madagascar.

e. There is strong provincial variation: Mahajanga and Antsiranana experience the highest levels of antibiotic leakages.

Antibiotic leakage was lowest in Fianarantsoa, although even there leakage was identified in a third of the PhaGeCom that ordered antibiotics. In Mahajanga and Antsiranana leakage is identified in almost two-thirds of the community pharmacies. These descriptive results do not suggest that antibiotic leakage increases with poverty or remoteness, but we return to this issue in the multivariate analysis.

4.4.2.   Correlates of leakages of antibiotics

This section describes the results from a multivariate analysis of the correlates of the leakage of antibiotics.   The analysis is carried out for all types of leakage, and subsequently using value/price and quantity leakage as separate outcomes variables. The correlates investigates include the characteristics of the health center director, general characteristics of the health center, commune characteristics.   Provincial dummy variables are included to account for systematic differences across provinces. Selected results from probit regressions are reported in Tables 4.13 and 4.14.[35]

The results were quite sensitive to the round of the survey. Based on the responses to a variety of survey responses, the first round data appear to be more reliable. The results from the first round are therefore given more emphasis in the discussion that follows.

A little over half of the health center directors in the sample are male and one-third of them is born and raised in the respective district. The directors have a range of 6 to 18 years of education with an average of 14 years. Sixty-one percent of the health centers has access to water, and there are on average 13 beds. About two-thirds of the community pharmacies are attached to health centers that are of Type II. On average, 39% of the dispensers are paid on a regular basis. The Community Management Committee (CoGe) had met within the prior six months in 85% of the health centers.

4.4.2.1. Director characteristics

a. Health centers with a more educated director, or with a director born in the region, experience more antibiotics leakage.

Previous studies in the education sector have shown that the interest and ability of the district or school director was an important factor in reducing leakage (e.g. Das *et al.,* 2004a,b; Francken, 2007). The findings here for the health sector are not consistent with those findings. On the contrary, community pharmacies attached to a health center with a more educated director experienced more leakages in the antibiotics supply chain (Table 4.13). Coefficients are positive in both rounds of the survey, although the result is not statistical significant in the second round (Table 4.14) but the coefficient remains positive.

The results also indicate that where the director was born matters. The model includes a dummy variable equal to one if the director is born in the district where he operates, and zero otherwise. A director who is born in the district where he operates, has more informal connections than a newcomer. While his social capital could be an incentive to him to perform well (see Putnam, 1993; Esping-Andersen, 1994), the results suggest the opposite. Having a director born in the district is associated with more antibiotics leakage. This is consistent with local elites exploiting services to their own benefit (see Rubio, 1997; Bardhan and Mookherjee,

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[35] To address the problem of any kind of intra-district correlation and arbitrary heteroskedasticity, we use robust standard errors that are adjusted for clustering on the districts.

2000, 2006; Warren, 2004). In the second survey round the indicator is a statistically significant correlate of leakage (Table 4.14).[36]

4.4.2.2. Health center characteristics

a. Health centers with more active management had more antibiotics leakage.

Health centers that had a meeting with the community pharmacy management committee (CoGe) during the prior six months experienced more antibiotics leakages in November 2006 (although this result does not carry through to May 2007). It is plausible, however, that rumors or evidence of leakage draws attention to the problem and results in a meeting with the Community Management Committee, resulting in a reverse causation problem. (Note that the remaining results do not alter when excluding this variable from the analysis.)

b. Health centers that suffer from irregular payment of their dispensers experience more antibiotics leakages.

The PhaGeCom/CSB dispensers play a key role in the supply and administration of drugs at the community pharmacy level (e.g. World Bank, 2007a). As mentioned above, they are paid by the commune out of a subsidy from the Government. The findings for November 2006 suggest that irregular payments of the dispensers is associated with more leakage. The experience of the dispensers, on the other hand, is not associated with leakage. Note that these results do not carry through to the May 2007 survey round (Table 4.14).

4.4.2.3. Commune characteristics

a. Remote health centers experience more antibiotics leakages.

The results from the multivariate analysis suggest that more remote health centers experience more antibiotics leakage, although the result is only statistically significant in the May 2007 survey round.

Communes with a higher average literacy rate experience more antibiotics leakages, statistically significantly so in the November 2006 survey round (Table 4.13). This is not consistent with the expectation that more educated beneficiaries might be able to better monitor leakage, and thereby reduce it). On the other hand, however, health centers serving wealthier communes experienced less leakage in that same round.[37]

Joint tests suggest that the most important groups of characteristics determining antibiotics leakage are health center and commune characteristics (Tables 4.13 and 4.14).

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[36] One might be concerned that health centers in which inspections had revealed leakages might have been replaced, therefore leading to a spurious correlation between having a newly appointed director and evidence of leakage. This is unlikely to be a concern since inspections have little consequence: they are therefore unlikely to result in the removal of a director.

[37] Excluding literacy does not change the significance of the mean expenditures result, although the magnitude of the effect is reduced. Excluding mean expenditures reduces the magnitude and significance of the literacy result.

Table 4.13: Determinants of leakage of antibiotics in the public health sector in Madagascar – November 2006

	Leakage	Value/Price leakage	Quantity leakage
	dF/dx	dF/dx	dF/dx
Director characteristics			
Male (0/1)	0.141	0.153	0.019
	(1.17)	(1.30)	(0.22)
Born in respective district (0/1)	0.134	0.158	0.081
	(0.81)	(0.93)	(0.68)
Experience as director in health center	0.005	0.011	-0.014
(Nr. of years)	(0.30)	(0.60)	(-0.72)
Experience as director in health sector	-0.016	-0.014	0.000
(Nr. of years)	(-1.18)	(-1.05)	(0.01)
Education (Nr. of years)	0.025	0.027	**0.024***
	(1.42)	(1.57)	**(1.65)**
Health center characteristics			
Size (Nr. of beds)	-0.005	-0.002	-0.011
	(-0.56)	(-0.26)	(-1.30)
Meeting health center with COGE during	**0.294****	**0.262****	-0.022
last 6m. (0/1)	**(2.54)**	**(2.27)**	(-0.18)
Experience of CSB dispenser (Nr. of	-0.006	-0.004	-0.005
years)	(-0.46)	(-0.31)	(-0.45)
Regular monthly payment of CSB	**-0.243***	-0.210	**-0.188***
dispenser (0/1)	**(-1.70)**	(-1.56)	**(-1.84)**
Toilet (0/1)	-0.267	-0.186	0.115
	(-1.29)	(-0.89)	(0.77)
Access to water (0/1)	-0.036	-0.016	-0.061
	(-0.23)	(-0.10)	(-0.56)
Commune characteristics			
Log of mean_expenditures	**-0.705*****	**-0.677*****	**-0.443***
	(-2.73)	**(-2.70)**	**(-1.73)**
Literacy rate	**0.013****	**0.012****	**0.008***
	(2.31)	**(2.22)**	**(1.85)**
Insecure or 'red' commune (0/1)	-0.101	-0.061	**-0.179***
	(-0.70)	(-0.43)	**(-1.77)**
Ethnic homogeneity (0/1)	-0.078	-0.074	-0.173
	(-0.60)	(-0.59)	(-1.49)
Remoteness index	0.042	0.052	0.117
	(0.27)	(0.35)	(0.84)
Provincial dummies	Yes	Yes	Yes
No. observations	94	94	94
Joint tests (P-values)			
Director characteristics	0.30	0.28	0.28
Health center characteristics	0.04**	0.11	0.32
Commune characteristics	0.01**	0.02**	0.17

Note: Sum of last 2 orders and results for basic health centers which ordered antibiotics around November 2006; dprobit regression results; dF/dx reports marginal effects; robust standard errors adjusted for clustering on districts; z-statistics are reported in parentheses; significance levels of 10, 5 and 1 percent are represented by *, ** and ***.

Table 4.14: Determinants of leakage of antibiotics in the public health sector in Madagascar – May 2007

	Leakage	Value/Price leakage	Quantity leakage
	dF/dx	dF/dx	dF/dx
Director characteristics			
Male (0/1)	-0.183	-0.138	-0.132
	(-1.27)	(-0.88)	(-0.98)
Born in respective district (0/1)	**0.285****	**0.214***	0.090
	(2.20)	**(1.71)**	(0.70)
Experience as director in health center (Nr. of years)	0.003	0.009	0.003
	(0.22)	(0.73)	(0.20)
Experience as director in health sector (Nr. of years)	-0.001	-0.003	0.007
	(-0.11)	(-0.24)	(0.64)
Education (Nr. of years)	0.021	0.022	0.027
	(1.17)	(1.22)	(1.56)
Health center characteristics			
Size (Nr. of beds)	0.007	0.006	**-0.014****
	(0.72)	(0.61)	**(-2.42)**
Meeting health center with COGE during last 6m. (0/1)	-0.207	-0.195	-0.297
	(-0.88)	(-0.84)	(-1.34)
Experience of CSB dispenser (Nr. of years)	0.002	-0.002	-0.001
	(0.09)	(-0.12)	(-0.05)
Regular monthly payment of CSB dispenser (0/1)	0.165	0.165	0.044
	(1.06)	(1.07)	(0.31)
Toilet (0/1)	-0.075	-0.074	0.089
	(-0.50)	(-0.50)	(0.68)
Access to water (0/1)	0.011	0.004	0.036
	(0.09)	(0.03)	(0.32)
Commune characteristics			
Log of mean_expenditures	0.203	0.122	0.149
	(1.02)	(0.63)	(0.96)
Literacy rate	0.005	0.005	0.003
	(1.14)	(1.15)	(0.84)
Insecure or 'red' commune (0/1)	0.147	0.180	0.004
	(1.02)	(1.25)	(0.03)
Ethnic homogeneity (0/1)	-0.199	-0.199	-0.154
	(-1.28)	(-1.32)	(-1.21)
Remoteness index	**0.634*****	**0.614****	0.287
	(2.59)	**(2.53)**	(1.33)
Provincial dummies	Yes	Yes	Yes
No. observations	89	89	89
Joint tests (P-values)			
Director characteristics	0.05*	0.15	0.42
Health center characteristics	0.81	0.81	0.25
Commune characteristics	0.07*	0.05*	0.43

Note: Sum of last 2 orders and results for basic health centers which ordered antibiotics around May 2007; dprobit regression results; dF/dx reports marginal effects; robust standard errors adjusted for clustering on districts; z-statistics are reported in parentheses; significance levels of 10, 5 and 1 percent are represented by *, ** and ***.

4.5.   The implementation of FANOME

One of the recent important recent changes in Madagascar's health sector is the cost recovery policy FANOME. It was implemented by the Government at the beginning of 2004, and requires payment for drugs and services with creates special provisions for the poor through a health card system.

a. Almost all basic health centers had implemented the FANOME policy by the time of the survey.

Over 95% of basic health centers had implemented the cost recovery policy FANOME by November 2006. All had established a Management Committee (CoGe) by May 2007 and a vast majority (85%) had organized a management meeting during the last six months (Table 4.15). On average, communes had identified 32 "needy" people covered by the health card which gives them access to subsidized services and drugs. Consistent with population size, there are large regional differences: the median number of people with a health card is 12 in a commune. On average, a quarter of them visit the CSB monthly.

Table 4.15: Information on CoGe, CoSan, and FANOME

	Mean
Management committee (CoGe)	
Proportion of CSBs	
…with CoGe	0.96
……number of committee members	3.82
…that had a CoGe meeting during the last six months	0.85
Proportion of CoGe presidents	
…elected by CoSan assembly	0.65
…nominated by the mayor or commune authorities	0.21
…nominated by the health center director	0.02
Community health committee (CoSan)	
Proportion of CSBs	
…situated in a commune that has a CoSan	0.96
……number of committee members	15.56
Proportion of CoSan's	
…where all fokontanys are represented	0.87
……proportion of CoSan members who are fokontany directors	0.29
Number of CoSan meetings organized per month	0.50
FANOME*	
Proportion of CSBs	
…with FANOME accountancy	0.91
…with FANOME budget poster	0.27
……posted inside health center	0.73[i]
……posted outside health center	0.13[i]
…that had a meeting with the mayor or commune authorities	0.63
…where the list of the poor is set up	
……by the mayor with other people of the commune	0.53
……by CoGe	0.01
……by CoSan	0.03
……by the health center director	0.03
……by a combination of the above	0.19
……by others**	0.22
Number of needy people with a health card in the commune°	31.73 °°
Other	
Proportion of CSBs	
…conducting bookkeeping of revenues and expenses	0.93
…with sufficient equity funds	0.84
…where the dispenser is paid on a regular basis every month	0.38

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar; Data of May 2007 which are very similar to the data of November 2006; *Note*:*FANOME is the cost recovery policy; [i] Information on the location of the budget poster is missing in 14% of the CSB with a poster; ** No detailed information on this category is available, ° People who are inscribed on the FANOME list for cost recovery, °° Median is 11.5.

In about half of the communes (53%), the FANOME list of the needy is drawn up the mayor together with other people of the commune. However, 22% of the communes reported that the list is set-up in another, unspecified, way.

There is a Community Health Committee (CoSan) with an average of 16 members in 96% of

the communes. Overall, the data indicate a good representation of all different villages in the commune in this Committee. On average, there is one CoSan meeting every two months.

b. The commune does often not manage to pay the dispensers on a regular basis.

The commune is the most important employer of pharmaceutical dispensers. During the prior year, 44% of the dispensers had not been paid for 7 months or more by the commune. Averaging across both survey rounds indicates that about 60% of the health centers reported irregular payments of their dispensers (Table 4.15). Dispenser salary payments are particularly problematic in the provinces of Mahajanga and Toliara.

c. Only 27% of the CSB posted the use of the FANOME funds.

Accounting documents for the use of FANOME funds is available in 91% of the CSB. However, only a little more than one-quarter of the health centers had publicly posted the use of the funds, and the poster is typically located inside the facilities (Table 4.15). This goes against the spirit of the requirement for posting which aims to promote transparency and accountability.

d. The FANOME budget is mainly used to purchase drugs.

Tables 4.16a and 4.16b report the FANOME accounting for the month prior to the survey visits. Sales of drugs are equal to about 8 percent of the overall FANOME budget carried over from month to month. In remote and poor areas, sales of drugs account for a larger share revenues. The majority of expenditures made from the FANOME budget are for the purchase of drugs (about 60% prior to the first visit, around 95% prior to the second). Equity funds and other expenses such as transportation costs, stipends for the President and Treasurer of the CoGe, etc. only made up relatively small parts of the FANOME expenditures.

Table 4.16a: Accountancy of the FANOME budget—Revenues (past month)

		2006*			2007°		
		Carry over	Medicine sales	(As percent of carry over)	Carry over	Medicine sales	(As percent of carry over)
		in '000,000 Ariary	in '000,000 Ariary	in %	in '000,000 Ariary	in '000,000 Ariary	in %
Madagascar	**Mean**	**2.55**	**0.20**	**7.8**	**4.50**	**0.16**	**3.6**
	Median	1.35	0.11	8.3	1.44	0.10	7.0
	SE	0.39	0.04	9.5	1.31	0.02	1.3
Remoteness							
Non-remote	**Mean**	3.72	0.26	7.0	6.76	0.22	3.3
	Median	2.45	0.14	5.7	2.43	0.17	7.1
	SE	0.66	0.06	9.7	2.36	0.03	1.1
Remote	**Mean**	1.23	0.12	9.7	1.80	0.09	5.1
	Median	0.65	0.07	11.1	0.83	0.07	8.6
	SE	0.25	0.02	7.8	0.43	0.01	3.2
Poverty status							
Non-poor	**Mean**	2.88	0.15	5.1	4.93	0.15	3.0
	Median	1.39	0.11	7.6	1.41	0.09	6.4
	SE	0.62	0.02	3.5	2.15	0.02	0.9
Poor	**Mean**	2.10	0.27	12.9	3.98	0.18	4.6
	Median	1.29	0.14	10.7	1.44	0.13	8.9
	SE	0.37	0.08	22.6	1.33	0.03	2.1

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar; Note: *Sep.-Nov. 2006, °Mar. - May 2007

Table 4.16b: Accountancy of the FANOME budget—Percent allocation of expenditures (past month)

		2006* Medicine purchase (%)	2006* Equity funds (%)	2006* Other expenses (%)	2007° Medicine purchase (%)	2007° Equity funds (%)	2007° Other expenses (%)
Madagascar	**Mean**	61.6	12.3	26.1	95.2	1.2	3.6
	Median	0.0	24.3	75.7	0.0	29.6	70.4
	SE	55.4	20.7	23.9	98.3	0.7	1.0
Remoteness							
Non-remote	**Mean**	50.8	18.6	30.6	95.8	1.1	3.1
	Median	0.0	18.3	81.7	0.0	24.5	75.5
	SE	49.8	23.8	26.4	98.4	0.7	0.9
Remote	**Mean**	79.4	2.0	18.7	89.8	2.1	8.1
	Median	0.0	51.8	48.2	0.0	100.0	0.0
	SE	82.4	1.0	16.6	91.6	1.0	7.4
Poverty status							
Non-poor	**Mean**	72.6	5.2	22.2	95.9	1.1	3.0
	Median	0.0	23.9	76.1	0.0	19.7	80.3
	SE	73.4	10.3	16.3	98.5	0.7	0.8
Poor	**Mean**	48.0	21.2	30.8	93.3	1.4	5.3
	Median	0.0	28.4	71.6	0.0	36.6	63.4
	SE	47.5	24.7	27.7	97.2	0.4	2.4

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar; Note: *Sep.-Nov. 2006, °Mar. - May 2007

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A.   Education sector

A.1.   Public primary school infrastructure

a. Most schools only have the most basic school infrastructure (cement floors, an iron roof, and a blackboard) but do not have access to electricity or a potable water source. In one-third of the schools, students have to sit on the floor during classes. There are considerable differences by poverty status and remoteness.

Table A.1: Physical infrastructure at public primary schools

	All		Poverty Status				Remoteness			
			Poor		Non-poor		Remote		Non-remote	
	Mean	(SE)	Mean	(SE)	Mean	(SE)	Mean	(SE)	Mean	(SE)
School Buildings										
Proportion of school buildings										
…with cement floors	**0.75**	0.03	**0.72**	0.04	**0.78**	0.04	**0.68**	0.05	**0.82**	0.03
…with dirt / sand floors	**0.21**	0.03	**0.23**	0.04	**0.19**	0.04	**0.29**	0.04	**0.14**	0.03
…with stone / clay walls	**0.64**	0.03	**0.56**	0.05	**0.71**	0.04	**0.44**	0.05	**0.81**	0.04
…with bamboo walls	**0.16**	0.02	**0.21**	0.04	**0.10**	0.03	**0.26**	0.04	**0.06**	0.02
…with corrugated iron roof	**0.78**	0.03	**0.75**	0.04	**0.81**	0.04	**0.75**	0.04	**0.81**	0.04
…with thatched roof	**0.19**	0.03	**0.22**	0.04	**0.16**	0.03	**0.22**	0.04	**0.17**	0.03
…with glass windows	**0.05**	0.01	**0.03**	0.02	**0.07**	0.02	**0.02**	0.01	**0.07**	0.02
Classrooms										
Number of classrooms per 100 students	**2.29**	0.16	**2.41**	0.30	**2.17**	0.12	**1.78**	0.09	**2.73**	0.28
Proportion of classrooms										
…that are in use	**0.98**	0.01	**0.97**	0.01	**0.99**	0.01	**0.97**	0.01	**0.99**	0.00
…that cannot be used when it rains	**0.37**	0.03	**0.40**	0.04	**0.34**	0.04	**0.37**	0.04	**0.36**	0.04
…with blackboard	**0.95**	0.01	**0.95**	0.02	**0.95**	0.02	**0.94**	0.02	**0.96**	0.02
…with electric lights	**0.02**	0.01	**0.00**	0.00	**0.04**	0.02	**0.00**	0.00	**0.04**	0.02
Other Infrastructure										
Proportion of schools										
…with director's office	**0.14**	0.02	**0.06**	0.02	**0.21**	0.04	**0.09**	0.03	**0.18**	0.03
…with library	**0.05**	0.01	**0.03**	0.02	**0.07**	0.02	**0.05**	0.02	**0.06**	0.02
…with teachers' office	**0.03**	0.01	**0.01**	0.01	**0.04**	0.02	**0.02**	0.01	**0.03**	0.02
…with infirmary	**0.10**	0.02	**0.07**	0.02	**0.12**	0.03	**0.00**	0.00	**0.18**	0.03
…with toilets	**0.61**	0.03	**0.58**	0.05	**0.64**	0.04	**0.41**	0.05	**0.78**	0.04
…with separate toilets for boys and girls	**0.61**	0.04	**0.55**	0.06	**0.66**	0.05	**0.48**	0.07	**0.67**	0.05
…with cafeteria	**0.10**	0.02	**0.11**	0.03	**0.08**	0.03	**0.07**	0.02	**0.12**	0.03
…with sports area	**0.58**	0.03	**0.54**	0.05	**0.62**	0.04	**0.53**	0.05	**0.63**	0.04
…with potable water source	**0.27**	0.03	**0.21**	0.04	**0.32**	0.04	**0.15**	0.03	**0.37**	0.04
…with one textbook per student	**0.36**	0.03	**0.34**	0.04	**0.38**	0.04	**0.22**	0.04	**0.48**	0.04
…with students sitting on the floor	**0.27**	0.03	**0.28**	0.04	**0.25**	0.04	**0.40**	0.05	**0.15**	0.03
…with classes held in open air	**0.04**	0.01	**0.04**	0.02	**0.04**	0.02	**0.05**	0.02	**0.03**	0.02

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar

b. The median travel time in the dry season from the sample schools to the administrative center of the commune 2 hours to the commune administrative center, and 4 hours to the district facility.

Table A.2: Distances from schools to selected institutions (November 2006)

	Traveling time in dry season (hours)		
	Mean	Median	Obs.
Educational institutions			
ZAP/administrative center of the commune	**3**	2	233
Cisco	**5**	4	233
DREN	**9**	6	233
Public financial institutions			
Treasury accountant/tax collector[x]	**5**	4	233
Others			
Bank or savings bank	**6**	4	233
Post office	**5**	4	233
Minibus taxi stop	**5**	3	232
Police station	**4**	3	233
Agricultural product market	**3**	2	233
CSB2	**2**	2	232

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar; *Note*: [x]Comptable du Trésor Public

A.2. Public primary school enrollment rates

a. The number of students in primary school increased by 4% in 2006-2007 compared to the previous school year. Enrollments increased most in remote to extremely remote areas.

Following the upward trend in education enrollments since the introduction of the Education for All initiative in 2001, the number of students in the school year 2006-2007 was higher than one year earlier (+4%) and was significantly higher than population growth. There is some provincial variation. In particular the province of Mahajanga (+18%) showed an important increase in enrollments between 2005-2006 and 2006-2007. However, the overall growth in enrollments has slowed.[38] It is unclear if this is because government policies have less effect or because most children of primary school age are now already in school.

Table A.3: Enrollment rates in public primary schools in Madagascar

	Unit	2005-2006	2006-2007	Change* (%)
Madagascar	Mean	179	187	+4
	Median	125	133	+6
Remoteness				
Easy access	Mean	246	247	0
	Median	153	149	-3
Accessible	Mean	157	159	+1
	Median	113	125	+11
Remote	Mean	148	165	+11
	Median	110	131	+19
Extremely remote	Mean	148	162	+9
	Median	125	127	+2
Province				
Antananarivo	Mean	171	174	+2
	Median	147	155	+5
Fianarantsoa	Mean	138	142	+3
	Median	112	112	0
Toamasina	Mean	344	353	+3
	Median	207	205	-1
Mahajanga	Mean	136	160	+18
	Median	105	118	+12
Toliara	Mean	149	151	+1
	Median	124	121	-2
Antsiranana	Mean	173	174	+1
	Median	103	117	+14

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar; *Note*: *Percent change between mean enrollment rates of 2005-2006 and 2006-2007.

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[38] Between 2001-2002 and 2002-2003 enrollment rates increased with 14% (Francken, 2003).

The number of students increased especially in schools in remote to extremely remote areas (Table A.3). Little change was noticed in schools in easy accessible regions. Overall, since 2001 especially the remote and poorer areas seem to have benefited from the education reforms (Minten *et al.*, 2005). This seems to be explained by two factors i.e. remote areas are poorer (Razafindravonona *et al.*, 2001) and poorer people are more responsive to price changes in schooling costs (Glick *et al.*, 2001, 2004). These results might indicate that education reforms have been an effective pro-poor policy, although household data analysis would need to be carried out to confirm this.

b. There is a fair gender balance as approximately half of students enrolled in public primary school are girls.

Table A.4 shows the percentage of girls enrolled in public primary school for the previous two school years. Overall, there is a fair gender balance in enrollment as about half of the students are girls. There is not a major difference over time or between provinces.

Table A.4: Percentage of girls per school

	Unit	2005-2006	2006-2007
Madagascar	Mean	49	49
	Median	49	49
Antananarivo	Mean	47	49
	Median	48	49
Fianarantsoa	Mean	49	48
	Median	49	48
Toamasina	Mean	49	49
	Median	50	50
Mahajanga	Mean	49	49
	Median	50	50
Toliara	Mean	50	52
	Median	50	52
Antsiranana	Mean	50	47
	Median	48	46

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar

c. There is a large number of schools with multi-grade classes. In remote areas the multi-grade class system is very common.

Around three-quarters of the schools in the sample (73% - see Table A.5) reported having multi-grade classes in 2006-2007. More remote schools use the multi-grade class system more frequently, probably due to a lack of teachers and facilities.

Table A.5: Percentage of schools with multi-grade classes

	Unit	2006-2007
Madagascar	Mean	73
Remoteness		
Easy access	Mean	61
Accessible	Mean	65
Remote	Mean	81
Extremely remote	Mean	88
Poverty		
Well off	Mean	60
Not poor	Mean	85
Poor	Mean	75
Very poor	Mean	73

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar

d. About 20% of the public primary schools in poor areas report having refused entry to students due to a lack of classrooms.

Table A.6 shows that 14% of the public primary schools in the sample had refused students due to a lack of classrooms. In poor areas one-fifth of the schools reported to have refused students

during 2006-2007 because of space constraints. There are some regional differences: Mahajanga and Fianarantsoa had the highest refusal rates.

Table A.6: Percentage of public schools that refused students due to lack of class rooms – 2006/2007

Madagascar	14
Remoteness	
Non-remote	17
Remote	13
Poverty	
Non-poor	10
Poor	21
Province	
Antananarivo	11
Fianarantsoa	18
Toamasina	14
Mahajanga	24
Toliara	11
Antsiranana	6

Source: World Bank / UNICEF, PETS 2006/2007, Madagascar

e. CEPE passing rates increased slightly over time.

Passing rates for CEPE increased slightly over time as shown in Table A.7. The rate was somewhat lower in 2001-2002 due to the crisis in Madagascar, but bounced back to its previous level of 62% in 2002-2003. It increased by 2% during the following two years to 64% in 2005-2006.

Table A.7: Passing rate for CEPE – comparison over time

	2000-2001°	2001-2002°	2002-2003°	2003-2004°	2005-2006*
Madagascar	62	50	62	63	64

Source: °Panel data; Post-crisis survey, Cornell University, 2002; Commune survey, 2004; *World Bank / UNICEF, PETS 2006/2007, Madagascar

A.3.   Public primary school budgets

a. About 15% of the money received per school as caisse ecole went back to the district facility during the 2005-2006 school year.

The median caisse ecole per student per school was 2,000 Malagasy Ariary in 2005-2006 which corresponds to approximately 1 USD. Table A.8 shows the amount of the caisse ecole that were flowing back from the school to the district facility for payment of sports activities, insurance, school union fees or others. About 15% of the caisse ecole was reimbursed to the CISCO for these activities.

Table A.8: Amount of the caisse ecole that were paid back to the district facility level (Cisco) in 2005/2006

	Mean	Median	SE
Caisse ecole			
Caisse ecole received per student	**1,997.9**	2,000.0	0.7
Percentage of caisse ecole returned to CISCO			
Total	**15.3**	13.5	0.7
…for insurance	**2.4**	2.5	0.1
…for school union	**1.0**	0.5	0.2
…for sports	**9.7**	9.0	0.5
…for other obligations	**2.2**	0.0	0.5

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar

b. There is a difference in spending of the caisse ecole versus the money received from the FRAM. The caisse ecole is mainly used to buy basic materials and textbooks, as well as to pay for equipment and transport or construction and maintenance. The money received from the FRAM is mainly used to pay for the salaries of the contract teachers which are locally hired by the FRAM.

Table A.9 shows the share of spending of the caisse ecole for 2005-2006. Most of the money was spent on basic materials and textbooks (29%), on equipment and transport (22%) and on construction and maintenance (14%). Approximately one-quarter of the caisse ecole was not spent in the respective school year. The rest of the caisse ecole was spent on food, salary payment of FRAM teachers or other items. There are not large differences in spending patterns between remote and non-remote, or poor and non-poor areas.

Table A.9: Expenditure statement of the caisse ecole received in 2005/2006

		Share of spending (%)							
	Unit	Basic materials & Textbooks	Food	Construction & Maintenance	Equipment & Transport	Salary of FRAM teachers	Others	Not spent in current school year	Total
Madagascar	**Mean**	**28.5**	**1.8**	**14.1**	**22.3**	**1.4**	**8.0**	**23.9**	**100.0**
	Median	23.9	0.0	7.3	18.8	0.0	3.1	13.7	
	SE	1.4	0.4	1.1	1.2	0.5	0.8	1.8	
Remoteness									
Non-remote	**Mean**	**28.0**	**1.6**	**10.6**	**24.6**	**1.9**	**7.4**	**25.8**	**100.0**
	Median	23.4	0.0	4.8	18.2	0.0	0.6	13.7	
	SE	2.1	0.6	1.4	1.9	0.9	1.1	2.7	
Remote	**Mean**	**29.1**	**2.0**	**17.5**	**20.0**	**0.9**	**8.5**	**22.0**	**100.0**
	Median	25.1	0.0	10.7	18.9	0.0	5.0	12.7	
	SE	1.8	0.6	1.8	1.6	0.3	1.1	2.4	
Poverty									
Non-poor	**Mean**	**29.6**	**2.2**	**13.4**	**23.5**	**1.5**	**6.9**	**22.8**	**100.0**
	Median	25.6	0.0	8.4	19.1	0.0	1.7	11.2	
	SE	1.9	0.7	1.4	1.8	0.8	0.9	2.4	
Poor	**Mean**	**27.3**	**1.4**	**14.8**	**20.9**	**1.3**	**9.2**	**25.2**	**100.0**
	Median	23.2	0.0	5.4	18.5	0.0	4.1	17.7	
	SE	2.0	0.4	1.9	1.7	0.5	1.4	2.7	

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar

Table A.10: Expenditure statement of money received from the PTA (FRAM) in 2005/2006

		Share of spending (%)							
	Unit	Basic materials & Textbooks	Food	Construction & Maintenance	Equipment & Transport	Salary of FRAM teachers	Others	Not spent in current school year	Total
Madagascar	**Mean**	**8.9**	**1.2**	**25.2**	**10.4**	**38.4**	**9.2**	**6.6**	**100.0**
	Median	0.0	0.0	0.0	0.0	2.3	0.0	0.0	
	SE	2.0	0.6	3.2	2.0	3.9	2.0	1.5	
Remoteness									
Non-remote	**Mean**	**7.7**	**0.5**	**25.4**	**11.7**	**40.2**	**9.3**	**5.3**	**100.0**
	Median	0.0	0.0	5.2	0.0	28.0	0.0	0.0	
	SE	2.3	0.4	4.1	3.0	5.2	3.1	1.7	
Remote	**Mean**	**10.3**	**2.0**	**25.1**	**8.9**	**36.3**	**9.1**	**8.2**	**100.0**
	Median	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	SE	3.4	1.2	4.9	2.7	6.0	2.5	2.7	
Poverty									
Non-poor	**Mean**	**11.7**	**2.1**	**32.0**	**10.0**	**30.7**	**7.4**	**6.1**	**100.0**
	Median	0.0	0.0	16.4	0.0	0.0	0.0	0.0	
	SE	3.1	1.0	4.4	2.3	5.0	2.3	1.8	
Poor	**Mean**	**5.2**	**0.0**	**16.4**	**11.1**	**48.4**	**11.5**	**7.3**	**100.0**
	Median	0.0	0.0	0.0	0.0	53.2	0.0	0.0	
	SE	2.2	0.0	4.2	3.6	6.0	3.5	2.6	

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar

Table A.10 shows the allocation of funds received from the FRAM. Overall, 38% of funds were spent on salary payment of contract teachers which are locally hired by the FRAM. One-

quarter was spent on construction and maintenance. The remainder of the money was more or less equally spent on equipment and transport, basic materials and textbooks and other activities. Less than one-tenth of the FRAM money was not spent in 2005-2006.

Since the introduction of the Education for All initiative and the caisse ecole system, the money paid by the Government of Madagascar tends to arrive later during the school year. Hence in order to avoid cash flow problems at school level the FRAM tends to collect the fees from the parents of the students at the beginning of the school year. However, as the Government is the main funding source for the public primary schools budget allocation and execution would be optimal if the caisse ecole would arrive at the start of the school year.

A.4.   Public primary school management and staff

a. Only 71% of the directors of the public primary schools are civil servants. The remainder is paid by the FRAM. On average, the directors had had less than 3 times complementary courses in administration during the last 5 years.

As shown in Table A.11, almost all directors of the public primary schools (92%) are also teachers. About one-third of the directors have a second job (besides their job as director and teacher at the school).

Table A.11: School director (2006)

	Mean	(SE)
Years working as a director at the school	4.45	0.37
Years working as a director in the sector	8.15	0.62
Years working in the education sector without being a director	9.34	0.66
Number of times benefiting from a complementary course in administration during the last 5 years	2.62	0.29
Number of times changed schools during the last 5 years	1.23	0.12
Proportion of directors		
…who are civil servants	0.71	0.03
…who teach courses	0.92	0.02
…who have had a second job during the last 12 months	0.30	0.03
…who have had a second job in agriculture / farm / fishing during last 12 months	0.22	0.03

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar.

b. Half of the teachers are member of a teachers' association.

Table A.12 illustrated that most of them are member of an association at the local level. Only 11% are member of a teachers' association at national level.

Table A.12: Members of an association (2006)

Proportion of teachers	
…being a member of a teachers' association	0.50
……at national level	0.11
……at fivondronana/district or regional level	0.11
……at local level	0.28

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar

c. Teachers' wages differ substantially and are determined according to teachers' contracts.

Table A.13 shows the salary of teachers during 2005-2006 for teachers with the same education level (based on data availability). Civil servant teachers are restricted to the most common category of teachers. Overall, 57% of all teachers in the sample are civil servants and a vast majority of them belong to the category 2 and cadre C payment scale. Table A.13 clearly shows that civil servant teachers earn the most. About 40% of the teachers in the sample are paid by the FRAM and approximately two-thirds of them receive an allowance from the government or the district facility. The wage of FRAM teachers who are solely paid by the parents of the students and who are not entitled to receive an allowance from the government earn

substantially less than their (FRAM) colleagues with an allowance from the government or Cisco. The remaining 3% of the teachers is paid by the Cisco, the commune, or others.

Table A.13: Salary of teachers (November 2006)

	Wage (per month in Ariary)		Education (years)
	Mean	Median	Mean
Teachers paid			
…by government			
……belonging to category 2 cadre C°	186,061	182,649	9
…by FRAM government/Cisco allowance	55,074	55,000	9
…by FRAM parents	22,377	20,000	9
…by Cisco	70,273	55,000	9
…by commune	45,000	45,000	9
…by others	60,833	50,000	9
Total			

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar; Note: °We choose to restrict ourselves to the most common category of bureaucrats, *44% of the teachers in our sample are paid by the government and belonging to category 2 cadre C.

d. Government teachers have, on average, more experience than FRAM teachers. This is probably due to a high turnover of FRAM teachers who have lower salaries, a relatively low status, and fewer career opportunities.

As Table A.14 shows, government teachers have on average 23 years of experience in the education sector and 10 years of experience in the respective school. FRAM teachers have considerably less experience. In particular, FRAM teachers without an allowance from the government have on average only two years of experience in the respective school.

Table A.14: Average teacher experience (May 2007)

	Years working as a teacher at the school			Years working as a teacher in the sector		
	Government teachers	Fram teachers with allowance	Fram teachers without allowance	Government Teachers	Fram teachers with allowance	Fram teachers without allowance
Madagascar	**10**	**4**	**2**	**23**	**5**	**5**
Antananarivo	12	3	2	24	6	5
Fianarantsoa	11	4	2	23	5	2
Toamasina	9	4	3	26	6	6
Mahajanga	5	3	3	17	5	5
Toliara	6	3	2	14	4	2
Antsiranana	8	4	4	22	7	6

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar

e. The parents-teachers association gathers on average 4 to 5 times per school year.

Table A.15: FRAM

	2005-2006		2006-2007	
	Mean	Median	Mean	Median
Number of meetings held during the school year	5	3	4	3
Number of parents and other commune members assisting each meeting (excluding teachers)	46	30	47	39
Number of community members in CoGe of FRAM (excluding directors and teachers)	8	7	8	7
…Proportion of females	0.30	0.25	0.31	0.25

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar

f. The FAF gathers on average 2 to 3 times per school year.

Table A.16: FAF

	2005-2006		2006-2007	
	Mean	Median	**Mean**	Median
Number of meetings held during the school year	**3.64**	3.00	**2.45**	2.00
Number of FAF members	**13.63**	10.00	**20.10**	10.00
…Proportion which are also FRAM members	**0.14**	0.00	**0.12**	0.00
Number of community members in CoGe of FAF (excluding directors and teachers)	**6.80**	7.00	**7.54**	8.00
…Proportion of females	**0.20**	0.13	**0.21**	0.20

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar

g. According to the school director and school staff perceptions, management of civil service teachers is most influenced by the Ministry of Education while the management of FRAM teachers is most controlled by the parents of the students together with the director and teachers of the school. The ZAP director seems to play an important role in the performance evaluations of all teachers while the parents only have marginal decision power.

Table A.17: School management according to school director/employees perceptions (proportion of answers in %)

	2005-2006	2006-2007
Management of civil service teachers is most influenced		
…by ministry/national level	50	58
…by Cisco	27	22
…by ZAP director[x]	3	4
…by director, teachers and parents	8	8
…by others	12	8
TOTAL	100	100
Management of FRAM teachers is most influenced		
…by ministry/national level	2	2
…by Cisco	19	29
…by ZAP director[x]	10	7
…by parents	38	22
…by director, teachers and parents	26	31
…by others	5	9
TOTAL	100	100
Civil servant teachers' performance evaluation most influenced		
…by ministry/national level	19	14
…by Cisco	25	26
…by ZAP director	40	45
…by parents	5	5
…by director	3	4
…by director, teachers and parents	3	2
…by others	5	4
TOTAL	100	100
FRAM teachers' performance evaluation most influenced		
…by ministry/national level	2	1
…by Cisco	14	20
…by ZAP director	45	46
…by parents	11	8
…by director	15	12
…by director, teachers and parents	11	9
…by others	2	4
TOTAL	100	100
Teaching methods most influenced		
…by ministry/national level	21	29
…by DREN	1	4
…by Cisco	22	16
…by ZAP director	22	27
…by director, teachers and parents	33	24
…by others	1	0
TOTAL	100	100
Selection of school books most influenced		
…by ministry/national authority	36	42
…by Cisco	24	19
…by ZAP director	3	12
…by director, teachers and parents	37	26
…by others	0	1
TOTAL	100	100

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar; *Note:* [x]Chef ZAP.

B. Health sector

B.1. Infrastructure of basic health centers

a. Only 65% of basic health centers have access to water. Thirty-one percent have access to electricity. A little more than half of the centers possess a means of transportation ranging from a cart to an ambulance. There are considerable differences by poverty status and remoteness.

Table B.1: Physical infrastructure at CSBs (in % of basic health centers)

	All		Poverty Status				Remoteness			
			Poor		Non-poor		Remote		Non-remote	
	Mean	(SE)	Mean	(SE)	Mean	(SE)	Mean	(SE)	Mean	(SE)
Water Access										
Proportion of CSBs										
…with access to water	**0.65**	0.05	**0.67**	0.07	**0.63**	0.06	**0.51**	0.07	**0.78**	0.06
…with source at center	**0.51**	0.05	**0.47**	0.07	**0.55**	0.06	**0.38**	0.07	**0.64**	0.06
Electricity										
Proportion of CSBs										
…with access to electricity	**0.31**	0.04	**0.24**	0.06	**0.37**	0.06	**0.16**	0.05	**0.45**	0.07
Hours of center operation per day										
…with generator at center	**3.94**	1.05	**9.00**	2.30	**1.30**	0.54	**6.78**	2.52	**2.96**	1.08
…with public electricity	**4.09**	0.89	**2.83**	2.01	**4.74**	0.86	**0.00**	0.00	**5.50**	1.06
Waste disposal										
Proportion of CSBs										
…that bury waste into a pit	**0.58**	0.05	**0.63**	0.07	**0.55**	0.06	**0.55**	0.07	**0.62**	0.06
…that burn waste	**0.40**	0.05	**0.35**	0.07	**0.44**	0.06	**0.44**	0.07	**0.36**	0.06
Transportation										
Proportion of CSBs										
…with means of transportation	**0.56**	0.05	**0.67**	0.07	**0.47**	0.06	**0.49**	0.07	**0.62**	0.06
…with cars	**0.02**	0.01	**0.04**	0.03	**0.00**	0.00	**0.00**	0.00	**0.03**	0.02
…with ambulances	**0.01**	0.01	**0.00**	0.00	**0.02**	0.02	**0.00**	0.00	**0.02**	0.02
…with motorcycles	**0.25**	0.04	**0.25**	0.06	**0.24**	0.05	**0.25**	0.06	**0.24**	0.06
…with bicycles	**0.41**	0.05	**0.49**	0.07	**0.34**	0.06	**0.35**	0.06	**0.47**	0.07
…with carts	**0.01**	0.01	**0.02**	0.02	**0.00**	0.00	**0.00**	0.00	**0.02**	0.02
Beds & mattresses										
Number of										
…beds at center	**6.34**	0.42	**6.96**	0.69	**5.82**	0.51	**5.64**	0.53	**7.00**	0.64
…mattresses at the center	**7.50**	0.40	**8.55**	0.64	**6.63**	0.48	**7.05**	0.60	**7.91**	0.54
……mattresses in good condition	**5.61**	0.34	**6.33**	0.55	**5.02**	0.43	**5.67**	0.50	**5.55**	0.48
Toilet										
Proportion of CSBs										
…with access to toilets	**0.82**	0.04	**0.80**	0.06	**0.84**	0.05	**0.75**	0.06	**0.90**	0.04
…with flushing toilets	**0.10**	0.03	**0.06**	0.03	**0.13**	0.04	**0.02**	0.02	**0.17**	0.05
…with pit latrine	**0.68**	0.04	**0.71**	0.06	**0.66**	0.06	**0.69**	0.06	**0.67**	0.06
Other infrastructure										
Proportion of CSBs										
…with functioning telephone line	**0.07**	0.02	**0.10**	0.04	**0.05**	0.03	**0.09**	0.04	**0.05**	0.03
…with radio receptor	**0.16**	0.03	**0.18**	0.05	**0.15**	0.05	**0.18**	0.05	**0.14**	0.05

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar

b. The median travel time from the health centers in our sample to the first (reference) hospital is 2 hours in the dry season.

Table B.2: Distances from health centers to selected institutions (2006)

	Traveling time in dry season (hours)		
	Mean	Median	Obs.
Health institutions			
SSD (District Health Authorities)	**4**	3	104
DRSPF (Regional Health Authorities)	**6**	4	104
Reference hospital 1	**3**	2	104
Reference hospital 2	**5**	3	76
Public financial institutions			
Treasury accountant/tax collector[x]	**4**	3	104
Others			
Bank or savings bank	**5**	3	86
Post office	**4**	3	88
Minibus taxi stop	**6**	3	54
Police station	**3**	3	80
Agricultural product market	**3**	2	42

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar; *Note*: [x]Comptable du Trésor Public

B.2.   Public health center budgets

<mark>%%%% update using new numbers %%%</mark>

a. As explained in greater detail in the third chapter of this report, the spending pattern of government funds compared to CRESAN funds is different.

Table B.3: Use of government funds by the SSD for certain selected items (2006)

Acct. code		Unit	Modified as % of initially allocated budget	Used for SSD operation as % of modified budget	Distributed to CSBs and CHD as % of modified budget	Modified as % of initially allocated budget	Used for SSD operation as % of modified budget	Distributed to CSBs and CHD as % of modified budget
216	Material & equipment	**Mean**	**63.35**	**51.76**	**37.23**	**14.98**	**9.52**	**14.64**
		SE	4.46	8.35	7.86	2.98	1.48	5.12
611	Goods for general use	**Mean**	**63.20**	**53.16**	**40.44**	**17.36**	**17.01**	**20.58**
		SE	4.02	6.63	6.26	1.49	1.94	4.54
612	Goods for specific use	**Mean**	**53.06**	**0.89**	**54.88**	**0.16**	**0.00**	**0.25**
		SE	29.03	0.26	44.43	0.11	0.00	0.23
613	Fuel & lubricants	**Mean**	**86.31**	**60.49**	**31.32**	**32.52**	**37.41**	**26.74**
		SE	2.68	6.97	6.66	2.65	3.52	4.56
621	Maintenance	**Mean**	**69.22**	**46.21**	**42.91**	**23.48**	**19.41**	**23.60**
		SE	4.77	7.07	7.34	2.27	2.63	3.77
622	Dissemination & documentation expenses	**Mean**	**53.92**	**68.55**	**11.09**	**0.13**	**0.17**	**0.03**
		SE	17.04	17.26	11.09	0.07	0.08	0.03
624	Reimbursement of expenses	**Mean**	**78.93**	**55.38**	**35.18**	**4.16**	**4.36**	**8.94**
		SE	4.51	6.71	5.68	0.44	0.54	4.84
625*	Water & electricity	**Mean**	**88.71**	**61.01**	**32.87**	**5.60**	**10.69**	**4.90**
		SE	5.81	8.63	8.44	0.93	4.67	1.16
626*	Mailing & telecommunication	**Mean**	**73.90**	**53.35**	**15.89**	**1.61**	**1.43**	**0.32**
		SE	7.89	9.52	7.73	0.29	0.29	0.16
	Total	**Mean**	**73.22**	**54.27**	**33.34**	**100**	**100**	**100**
		SE	2.16	2.85	2.68			

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar; *Note*: * In the questionnaire, accounting codes 631 and 632 were used respectively.

Tables B.3 and B.4 depicts the use of government and CRESAN funds respectively by the SSD in 2006. Overall, 73% of the initially allocated government funds and 80% of the initially allocated CRESAN budget was disbursed to the district hospitals in 2006. About half of the modified government budget was used for SSD operation mainly to buy for fuel and lubricants and to pay for maintenance (Table B.3). Forty-two percent of the modified CRESAN budget was distributed to the CSBs and CHD to pay for missions and training and miscellanea (e.g. communication costs etc.).

Table B.4: Use of CRESAN funds by the SSD for certain selected items (2006)

	Unit	Modified as % of initially allocated budget	Used for SSD operation as % of modified budget	Distributed to CSBs and CHD as % of modified budget	Modified as % of initially allocated budget	Used for SSD operation as % of modified budget	Distributed to CSBs and CHD as % of modified budget
Rehabilitation	**Mean**	**72.41**	**40.44**	**52.46**	**7.27**	**6.53**	**8.22**
	SE	11.71	11.33	11.88	1.60	2.14	2.36
Construction material	**Mean**	**69.46**	**38.75**	**44.57**	**3.20**	**4.37**	**1.86**
	SE	18.04	16.70	17.26	2.06	3.09	1.26
Mission & training	**Mean**	**73.91**	**41.19**	**50.80**	**40.88**	**40.42**	**42.37**
	SE	9.95	8.22	7.90	4.99	5.70	6.22
Furniture	**Mean**	**96.85**	**32.48**	**47.83**	**13.50**	**9.51**	**11.46**
	SE	33.27	9.28	10.15	5.09	5.03	4.32
Others	**Mean**	**78.14**	**40.12**	**49.05**	**35.15**	**39.17**	**36.09**
	SE	8.27	7.41	7.01	5.31	5.31	6.37
Total	**Mean**	**79.53**	**38.68**	**49.45**	**100**	**100**	**100**
	SE	8.58	4.17	4.22			

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar

B.3.   Management and staff at basic health centers

a. On average, health center directors had had a complementary course in administration every year to every two years during the last 5 years.

As shown in Table B.5, only 10% of the directors of the public health centers in the sample had a second job besides their work at the clinic in 2006. Most of them had an extra job in agriculture, farming or fishing. The average number of years of experience of the directors is 15 years.

Table B.5: Health center director (2006)

	Mean	(SE)
Years working as a director at the center	**3.27**	0.42
Years working as a director in the sector	**6.05**	0.71
Years working in the health sector without being a director	**8.53**	0.96
Number of times benefiting from complementary courses in administration during the last 5 years	**4.67**	1.00
Proportion of directors		
…who have had second job during the last 12 months	**0.10**	0.03
……in agriculture / farming / fishing	**0.90**	0.10

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar

b. Forty-two percent of the health center directors are member of a medical or paramedical association. Most of them are member of such an association at the national level.

Table B.6: Members of an association (2006)

Proportion of health center directors	
…being a member of a medical/paramedical association	**0.42**
……at national level	**0.23**
……at fivondronana/district or regional level	**0.12**
……at local level	**0.07**

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar

c. Compared to other countries in the region, Madagascar has average salary levels in the health sector.

Approximately 70% of the health workers in the sample are civil servants of which the largest group belongs to the category 8 and cadre A payment scale. This group consists of doctors or high-level managers with 18 years of education on average. Their median monthly wage equaled 288,879 Ariary or approximately 160 USD in 2006. Health workers paid by the commune earn substantially less, but these employees also have a considerably lower education. Compared to other countries in the region, Madagascar has average salary levels in the health sector as shown in Table B.8 (World Bank, 2007).

Table B.7: Salary of health workers (2006)

	Wage (per month in Ariary)		Education (years)
	Mean	Median	Mean
Health workers paid			
…by government			
……belonging to category 8 cadre A°	288,879	279,594	18
…by commune	42,421	40,000	8

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar; *Note*: °We choose to restrict ourselves to the most common category of civil servants: 12.9% of health workers are paid by the government and belong to category 8 cadre A.

Table B.8: Salary of health workers as a percentage of GDP per inhabitant (2006)

Country	Doctor/General practitioner	Nurse with diploma
Tchad	10.3 - 18.8	5 – 10.6
Burkina Faso	7.3 – 23.5	4.2 – 13.5
Burundi	6.6	
Madagascar	7.3	4
Mauritania	5.67 – 9.45	3.2-5.7
Cameroun	4.7	1.7
Niger	10.6 – 20.8	5.3 – 12
Ethiopia	18.3 – 30	11.7 - 27
DRC	1.8 – 2.4	

Source: World Bank (2007).

B.4.   Activities conducted by basic health centers

a. Overall, the SSD conducted social mobilization activities (also called 'tam tam') on STDs and HIV/AIDS, family planning, and PEV immunization in about one-third of the public health centers in the sample. The SSD organized activities against tuberculoses and malaria (Palustop) in around one-quarter of the CSBs. There are large regional differences.

As shown in Table B.9, in particular in the capital province of Antananarivo the SSD organized social mobilization activities in a majority of public health centers in 2006. Such activities were organized to a significantly lower extent in the provinces of Toamasina and Mahajanga. The emphasis on certain topics appears to differ by province: 63% of the health centers in Antsiranana had had a 'tam tam' on PEV immunization while 50% of the health centers in Toliara had had an activity on STDs and HIV/AIDS.

Table B.9: SSD conducting social mobilization activities on specific topics in CSBs (as percent of CSBs) – 2006

	Unit	Madagascar	Antananarivo	Fianarantsoa	Toamasina	Mahajanga	Toliara	Antsiranana
Family	**Mean**	**35**	**61**	**57**	**6**	**13**	**33**	**25**
planning	Median	0	100	100	0	0	0	0
	SE	5	10	10	6	7	14	16
STDs &	**Mean**	**37**	**65**	**54**	**6**	**13**	**50**	**25**
HIV/AIDS	Median	0	100	100	0	0	50	0
	SE	5	10	10	6	7	15	16
PEV°	**Mean**	**32**	**65**	**25**	**17**	**8**	**33**	**63**
immunization	Median	0	100	0	0	0	0	100
	SE	4	10	8	9	6	14	18
Child nutrition	**Mean**	**17**	**48**	**7**	**0**	**8**	**0**	**50**
	Median	0	0	0	0	0	0	50
	SE	4	11	5	0	6	0	19
Maternity	**Mean**	**17**	**52**	**4**	**0**	**4**	**25**	**25**
without risk	Median	0	100	0	0	0	0	0
	SE	4	11	4	0	4	13	16
Palustop*	**Mean**	**27**	**43**	**36**	**6**	**13**	**33**	**38**
	Median	0	0	0	0	0	0	0
	SE	4	11	9	6	7	14	18
Tuberculoses	**Mean**	**25**	**61**	**29**	**0**	**4**	**25**	**25**
	Median	0	100	0	0	0	0	0
	SE	4	10	9	0	4	13	16
Plague	**Mean**	**18**	**65**	**0**	**0**	**8**	**8**	**25**
	Median	0	100	0	0	0	0	0
	SE	4	10	0	0	6	8	16
Cholera	**Mean**	**11**	**30**	**4**	**0**	**8**	**0**	**25**
	Median	0	0	0	0	0	0	0
	SE	3	10	4	0	6	0	16
Decontami-	**Mean**	**13**	**43**	**4**	**0**	**4**	**8**	**25**
nation	Median	0	0	0	0	0	0	0
	SE	3	11	4	0	4	8	16
Num. of obs.		113	23	28	18	24	12	8

Source: World Bank/UNICEF, PETS 2006/2007, Madagascar; *Note*: °Vaccination program against 6 specific diseases; *Treatment kit for uncomplicated childhood malaria

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