

## **Education in Madagascar: A Guide on the State of the Educational System, Needed Reforms and Strategies for Improvement**

**L C Venart**

*The Ladybug Project Inc*

*E-mail: [lvenart@msn.com](mailto:lvenart@msn.com)*

**K E Reuter\***

*Department of Biology,*

*Temple University,*

*Philadelphia*

*E-mail: [kim.reuter@temple.edu](mailto:kim.reuter@temple.edu)*

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### **Abstract**

Madagascar is considered to be among the least developed countries, has experienced decreased aid funding, and there is a lack of summarized information regarding the country's education system. This is a matter of great concern, as over 50% of Madagascar's work force have received no formal education, and are likely to remain in underpaying jobs with little access to career advancement. The lack of access to quality education is also positively correlated with a variety of societal and developmental concerns. We summarize the findings of a systematic literature review to: (1) describe the size and scope of the education system at different levels, (2) identify hurdles that students, teachers, and the education system face, (3) provide recommendations for development interventions/foci at different spatial and funding scales, and (4) identify gaps in knowledge. With aid returning due to Madagascar's recent presidential election, this paper serves as a guide on the state of the educational system, needed reforms, and successful strategies for improvement.

**Keywords:** Madagascar; Education; Students; Teachers; Africa

*\*For correspondences and reprints*

## **1. INTRODUCTION**

Improved access to education provides many social and economic benefits (Manacorda et al., 2005; Kremer & Holla, 2009); education has been linked to increased market growth (Hanushek & Woessmann, 2008) and foreign investment (Manacorda et al., 2005). Specifically, increases in higher education enrollments have been linked to lowered population growth; increased tax revenue and entrepreneurship; improved health and technology; a strengthened government; and decreased corruption (Bloom et al., 2006). Consequently, many countries including those in sub-Saharan Africa have increased investments in their education systems, but the benefits have not always been realized (Oyelere, 2007), possibly due to the ineffectiveness of local education systems (Pritchett, 2001; Oyelere, 2007; Stijns et al., 2012).

One country facing this challenge is Madagascar, where over 50% of the work force has no formal education, and little access to career advancement (Stifel, Rakotomanana & Celada, 2007). Since 2009, Madagascar's education system has suffered from a political coup, which caused a decrease in international aid and the economy to decline (Ross, 2013). However, international aid is poised to return in 2014, following the election of a new president and subsequent recognition of the government by other countries and multinational agencies (Rabary, 2014). Renewed support provides the opportunity to better target education funding.

In this review, we summarize the findings of 78 sources regarding the history, structure, and needs of the primary, secondary, and tertiary education systems in Madagascar. We aim to: (1) synthesize data regarding the size and scope of the education system, (2) identify gaps in knowledge, (3) identify hurdles that students, teachers, and the system face, and (4) summarize recommendations from published literature to propose interventions/foci at different spatial and funding scales. We focus on Madagascar due to: (1) its identification as a lowest developed country, (2) the decrease in funding in recent years, and (3) the prior lack of a clear, summarized report regarding education in this country.

## **2. METHODOLOGY**

A systematic search of English-language peer-reviewed and gray literature was conducted in May 2012. Four search methods were used: (1) Google Scholar search using keywords “Madagascar “ and “education” with relevant papers selected from the first 600 results, (2) Google Scholar search using keywords “Madagascar” and “teacher” or “Madagascar” and “student”, with relevant papers selected from the first 400 results for both search terms, and a (3) Web of Knowledge search using key words Top=(Madagascar) AND Topic=(educat\* OR teach\* OR student\* OR school\*).

A total of 93 papers were identified as potential information sources, though sixteen were excluded from further research, as they were duplicates (n=5), not relevant (n=2), or mentioned education for context only (n=8).

To standardize our review process, we recorded the: (1) geographic scope (area of the globe), (2) level of education (i.e. primary, secondary, and tertiary), (3) rural or urban focus, and (4) the general topic (i.e. student success, teachers, organizational infrastructure, funding, language of instruction, and gender). The results illustrate the proportion of papers included in these categories, along with additional information and anecdotes to highlight trends across the literature.

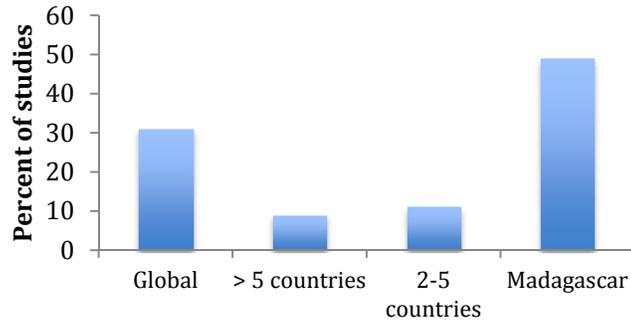
## **3. RESULTS**

### **Distribution of Research**

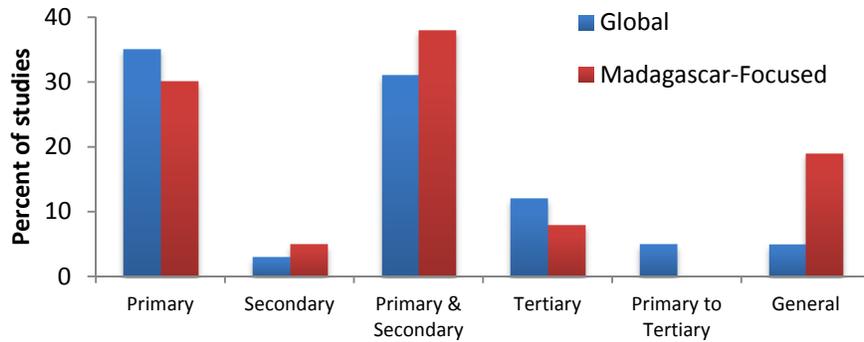
Most studies either focused on developing countries worldwide or on Madagascar exclusively (Figure IA). There was a knowledge bias towards primary education with few studies examining secondary schools exclusively and even fewer focusing on the education system simultaneously at all levels (Figure IB). There was a small bias towards rural studies, though many studies examined both rural and urban areas (Figure IC). Finally, while global studies tended to discuss student and teacher issues, studies focused solely on Madagascar were more likely to address student and funding issues, and less likely to address hurdles facing teachers (Figure ID).

**Figure I:** The distribution of available information sources which reference education in Madagascar (IA), and attributes of those papers, including their level of focus within the education system (IB), urban or rural emphasis (IC), and the issue being addressed (ID).

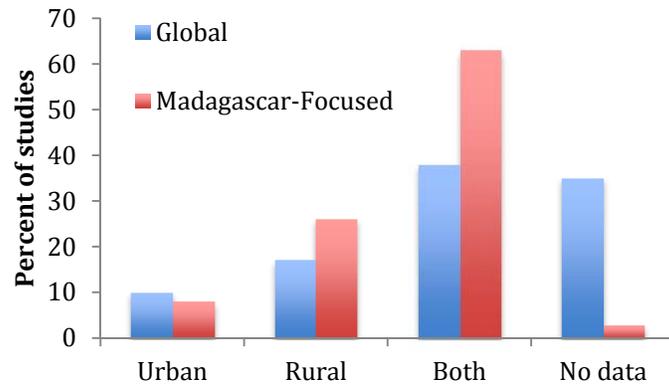
A)



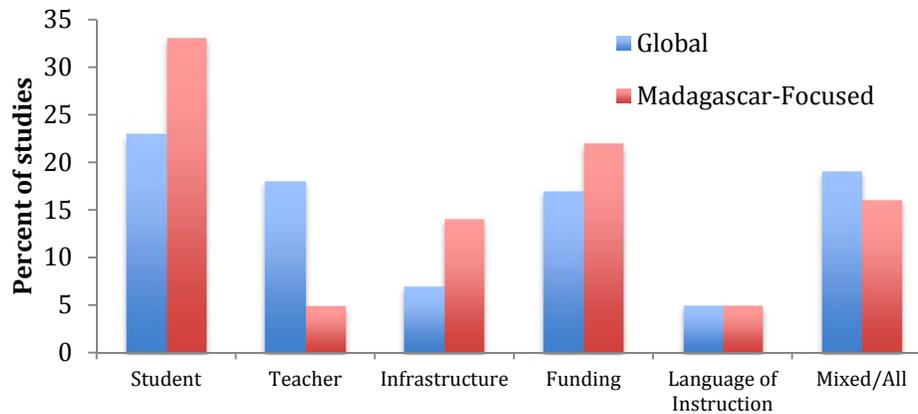
B)



C)



D)



### Gaps in knowledge.

Existing research is lacking in the following areas: secondary education, technical schools, teachers as they relate specifically to Madagascar, language of instruction, and the organizational infrastructure of the Madagascar education system. With 75% focusing solely or partly on primary education, further research needs to be conducted on secondary and tertiary schooling.

Only one paper focused on post-secondary technical schooling (Atchoarena & Esquieu, 2002). Given this paper's focus of the effectiveness and regulation of private technical schools across Sub-Saharan Africa, its findings regarding technical schools in Madagascar are limited. More research is needed to form a robust view of technical schooling, especially as it compares with university-level schooling in Madagascar.

While nine articles studied university-level education, more research is needed. Kapur and Crowley (2008) ask, "Can it provide a ladder for social mobility, or does it only create national elites? How should resources be allocated, by whom, and how much?" Additionally, Bloom et al. (2006) suggest using case studies to "compare a country in which significant advances have been made (e.g., Mauritius) with a country or countries that exhibit more common problems (e.g. Madagascar)."

Research on teachers was prevalent among papers with a large geographic range, but only two studied Madagascar exclusively, and both examined teacher training. Five more papers studied teachers in combination with other aspects of

education, including the high need for teachers in rural areas (Moulton, 2001), issues surrounding female teachers at the university level (Skjortnes & Zachariassen, 2010), and the use of contract teachers (Kingdon, Aslam, Rawal & Das, 2012). While the larger geographic scope of research provides useful data, more research focused on Malagasy teachers, specifically, would be useful.

Additionally, while we did find research on the language of instruction, it merits further study, especially with regard to the nationwide comprehension of Official Malagasy (Bouwer, 2007), and increasing learning comprehension despite language challenges.

Finally, research focused primarily on the organizational infrastructure of the educational system made up only 7% of research overall and 13% of Madagascar-only research. Infrastructural problems can increase corruption and poor allocation of funding (Francken, 2009), so additional data are needed, especially in regards to rural schools (Brinkerhoff & Keener, 2003).

## **Overview of the Education System**

### **Funding.**

Government funding for education was 2.5% of the GDP in 2002, which is substantially lower than the average (5.1%) for Sub-Saharan Africa (Wirak, Randriatavy, Helgø, Høystad & Rahanivoson, 2003), and also lower than in Madagascar's past (6.5% of GDP in 1971, Wirak et al., 2003). This is due, in part, to a 40% decrease in education spending in the early 1990s, when Madagascar suffered from large increases in interest due on its debt. After 1995, the education budget began increasing, but remains low (Tomasevski, 2006).

### **School fees.**

Malagasy families are unclear whether they should pay public school fees and if so, how much should be paid. Though school fees were eliminated in 2002 for children who had completed civil registration, some charges remain, and 2.5 million children do not meet the civil registration requirement (Tomasevski, 2006). Consequently, ~25% of households with children in public school report paying enrollment fees, though most school directors claim fees are not collected (Glick, Rajemison, Ravelo, Raveloarison, Razakamanantsoa & Sahn, 2005). The

reasons for this discrepancy are unclear, but miscommunication about what constitutes a fee (such as asking for monetary support for contract teachers) could be the cause (Glick et al., 2005). Students may also be asked to pay for schooling when there are delays in the provision of funding (Fafchamps & Minten, 2007), school supplies, and teacher salaries, which often do not arrive until much of the school year has passed (Minten et al., 2005).

### **Administration.**

Both the government and outside researchers have recognized that education administration protocols in Madagascar are cumbersome, especially for remote rural districts (Brinkerhoff & Keener, 2003). Additionally, teachers in rural areas receive little support and supervision, with limited interaction with Ministry offices (Moulton, 2001) and supervisors, due to the long distances to reach their supervisors (averaging ~9km at schools >60km from the district capital, often on foot) (Brinkerhoff & Keener, 2003). Due to this distance, supervisors often use the community to monitor the state of the school and the teacher's effectiveness (Brinkerhoff & Keener, 2003), but the teachers and community may not speak the same dialect of Malagasy, and therefore often cannot communicate well (Moulton, 2001).

Also, while regional and local administrators are responsible for implementing programs in their regions (Wolhuter & Steyn, 2003), they often lack the funds, skills and manpower to properly do so (Febgler, 2004). At the local primary level, school leaders often "lack the authority, skills, and motivation to provide strong pedagogic leadership," and receive little support from the Ministry of Education (Heneveld, 1994). However, at the university level, the Ministry of Education is so involved that it "appoints all faculty members, sets salaries, and determines working conditions," forcing faculty to engage closely with politics in order to get and keep jobs (Bloom et al., 2006).

### **Public primary education.**

#### ***Enrollment.***

Throughout the 1990s and 2000s, public primary student enrollment increased, doubling from 1996 to 2006 (from 1,468,211 to 3,102,833 students;

Razafimbelo, C., 2011). Enrollment increases may have resulted from 2003 government policies guaranteeing free education for all, or 2004 policies expanding the primary school age from 6-10 years to <14 years of age (Tomasevski, 2006). In 1992, private schools enrolled 25% of all primary school students (Heneveld, 1994).

The Madagascar Ministry of Education reported that the primary net enrollment ratio (NER) increased from 67% in 2001/02 to 98% in 2004/05 (Ramanantoanina, 2008). But, this state-reported 98% NER contradicts research by Minten et al. (2005), Glick and Sahn (2006) and Glick, Razafindravonona and Randretsa (2000), who all reported lower primary enrollment rates, which were lowest in more rural and poorer areas. For example, 40% of children in the poorest quintile attended primary school, compared to 73% in the richest quintile (Glick and Sahn, 2006).

### ***Retention and dropout.***

Many students do not complete primary school; Madagascar has a higher dropout rate than other African countries (16% in 2003; Wirak et al., 2003) though fifth grade completion rates increased from 37% in 2001 to 60% in 2006 (Ramanantoanina, 2008). Notably, enrollment and dropout rates are lower for students with more educated mothers; one year of a mother's education increases a six-year old child's chance of enrollment by 1.5% and her completion of primary school decreases the chance of her teenage child's dropout by 6.7% (Glick, Sahn & Walker, 2011).

### ***Grade repetition.***

Madagascar has one of the highest primary school grade repetition rates in Africa (32%; Wirak et al., 2003). The average student takes 16.2 years to graduate from fifth grade (Michaelowa, 2001), and over one-third of primary students repeat grade levels (Heneveld, 1994). This is especially troubling, because in all but the first year, grade repetition is largely ineffective in improving student learning (Fehrler, Michaelowa & Wechtler, 2009). Additionally, high repetition rates negatively impact teachers and increase the burden on the school system, by causing a higher need for instructional materials and other resources (Michaelowa, 2003).

***Student-teacher ratio.***

At the primary school level, the student-teacher ratio rose slightly from 47:1 in 1999 to 54:1 in 2005 (Sifuna, 2011). Though large class sizes (up to 100 students) do not negatively affect student learning (Michaelowa, 2001; Michaelowa, 2003, Michaelowa & Wittmann, 2007), double shift classes—when one teacher teaches two groups of students daily, one early class and one later class—do (Michaelowa & Wittmann, 2007); however they are recommended once class sizes reach more than 100 (Michaelowa, 2001).

**Public secondary education.*****Enrollment.***

Madagascar's secondary education system suffers from low enrollment rates. In 2003/2004, the enrollment ratio for junior secondary schools was 24%, while the senior secondary enrollment ratio was 8%, with enrollment highest for boys, high-income students, and those in urban areas (Ramanantoanina, 2008). To increase accessibility for rural families, a large number of small public secondary schools (under 100 students) were created in rural areas; these now make up 32% of all public junior secondary schools (Ramanantoanina, 2008).

***Dropout and repetition.***

Ramanantoanina (2008) reported that repetition and dropout rates were both high, with less than half of graduating junior secondary and senior secondary students passing their exit exams.

***Student-teacher and teacher-administrator ratios.***

Student-teacher ratios are relatively low in public secondary school (27:1 in junior secondary; 18:1 in senior secondary), and the teacher-administrator ratio is even lower (3.4:1 in junior secondary; 2.3:1 in senior secondary, Ramanantoanina, 2008). The teacher-administrator ratio is higher in private schools (7.8:1 in junior secondary; 5.6:1 in senior secondary), suggesting low cost effectiveness in the public system (Ramanantoanina, 2008).

### **Private primary and secondary education.**

By 1992, private schools enrolled 40% of junior secondary schools students and 48% of senior secondary students (Heneveld, 1994). More recently, it was found that >50% of secondary school students attend private schools (Ramanantoanina, 2008). In primary school, private schools had higher completion rates, with 53% of students completing fifth grade compared to 33% in public school (Dahl, 2011). Unlike public primary schools, most private primary schools do not rely on multi-grade teaching (Wietzke, 2011; World Bank, 2002). Despite their advantages, private schools are often financially out of reach (Wietzke, 2011); are not disbursed equally across Madagascar (often located in urban and suburban areas; Ramanantoanina, 2008); and are mostly Christian, making the children of rural, lower-income Malagasy families—who are more likely to be traditional believers—less likely to attend (Wietzke, 2011).

### **Tertiary education.**

Research on tertiary education in Madagascar is limited, and the system has been challenged by extreme political circumstances (Viens & Lynch, 2000). Though there have since been improvements, in the 1990s, the university system was largely ineffective, with many “eternal students” repeating courses for up to five years via publicly funded grants; “squatters and vandals taking over the university;” and “little if any teaching ... taking place because senior members of universities could not enter buildings” (Viens & Lynch, 2000).

### ***Enrollment.***

Enrollment at Madagascar’s six public universities was ~9,000 in 2003, with ~2,000 additional students at sixteen private universities (Stiles, 2003). University students are “unevenly divided across the country” and most often higher income (Bloom, Canning & Chan, 2006). A 2002 study on technical school found 255 private and 60 public schools focusing on “low-level training,” (Atchoarena & Esquieu, 2002) which is not high enough to meet student and industry demand (Bloom et al., 2006).

### ***Student-teacher and student-administrator ratios.***

At universities, the student-teacher ratio was 47:1 in 1993 and 22:1 in 1996, while the student-administrator ratio was 6:1 in 2003 (Teferra & Altbach, 2004). This “disproportionately large” number of administrative staff often leads to the inefficient use of resources (Teferra & Altbach, 2004).

### ***Faculty retention.***

Research suggests it is difficult to retain knowledgeable faculty in Madagascar, due to the “brain drain” phenomenon, whereby educated Africans emigrate to work elsewhere (Kapur & Crowley, 2008).

### **Hurdles Facing Students**

#### **School infrastructure and resources.**

Schools in many Sub-Sahara African countries, including Madagascar, lack an adequate supply of learning materials (Adem, 2009), especially in their native language (Michaelowa, 2003). Additionally, many school buildings, especially in rural areas, are in very poor condition (Glick et al., 2005).

#### **Unmet demand for secondary school.**

More new students are looking to join the secondary school system each year than can be accommodated (Ramanantoanina, 2008). By 2015, it is estimated that 600,000 students will graduate from primary school each year, but the current secondary school system can only support one-third of those students annually (Ramanantoanina, 2008).

#### **Language of instruction.**

Many developing countries in Africa, including Madagascar<sup>1</sup>, use a western language as the primary language of instruction in schools, in lieu of the

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<sup>1</sup> Historically, Madagascar’s education policy has been inconsistent regarding the use of French or Malagasy as the primary language of instruction, leaving “a very high level of the population unable to read and write in any language, including Malagasy” (Dahl, 2011). From 1960 to 2008, the language of instruction switched between French and Malagasy three times, including the period of Malgachisation (1972-1991), when Malagasy was the primary language of instruction. During Malgachisation, the overall quality of education was very poor, with students not adequately learning Malagasy or French, a lack of textbooks and funding, untrained teachers, and a poorly run administration (Dahl, 2011).

country's native language (Wolhuter & Steyn, 2003). This may be because of a shortage of teaching resources printed in the local language, the lack of faith in the local language (Brock-Utne, 2001), or the desire to compete in the global workforce (Wolhuter & Steyn, 2003). Many researchers who have done research on the language issue in Africa (e.g. Qorro, 2009 and Brock-Utne, 2012) find that the use of non-local languages may be due to the fact that many parents and politicians think the best way to learn English is to have it as the language of instruction. However, research has shown that it may be better to have a familiar language as the language of instruction and to teach English first as a foreign language using teachers who are experts at doing so.

Since 2008, Malagasy is the language of instruction in primary schools while higher levels are taught in French. This coincides with Gouleta's (2006) research, which states that first-year students may be traumatized if "they are told that what they know and who they are is of no worth and value, that (Malagasy) is inappropriate for school, (and) that school uses a language and ways that are more worthy and superior than their home language and practices." However, this may lead to dropout after the fifth grade, when instruction switches to French, because ~84% of the population speaks only Malagasy, and French is often not spoken in a student's family or community (Dahl, 2011).

### ***Comprehension of French.***

The requirement for teachers to educate their students in French is confounded by the fact that only about 18% of Madagascar's primary school teachers know French well enough to do so (Dahl, 2011). Furthermore, the Malagasy curriculum is focused on French grammar as opposed to French communication (Freeman, 2001). Teaching often emphasizes memorizing over understanding, with students copying information into exercise books and memorizing these notes for exams (Freeman, 2001), but not learning enough French to converse or understand what they are being taught (Dahl, 2011). This leads to lower student learning especially in science and mathematics, which may result in an increase in grade repetition and dropout (Dahl, 2011).

### ***Comprehension of Official Malagasy.***

Though many dialects of Malagasy are spoken in Madagascar, Official Malagasy (Merina dialect) is spoken in the capital, by policymakers, and in official communications about health, education and other important matters (Bouwer, 2008). In contrast, the average level of “intelligibility” of Official Malagasy varies in some rural and non-centralized urban areas from 0.0% to 73.8%, and Official Malagasy may even be considered a different language than dialects spoken in the south (Bouwer, 2008). Therefore, the exclusive use of Official Malagasy in education and government communications may be ineffective for much of the country (Bouwer, 2008). Areas that are fluent in Official Malagasy have the highest literacy rates, levels of education, and economic opportunities, and “if all regions of Madagascar are to have equal opportunity for educational development, regional speech forms need to be taken into consideration at the local level” (Bouwer, 2008).

### **Economic and health shocks.**

Communities in Madagascar face a number of shocks that negatively impact student learning. Shocks are unexpected and potentially disruptive life events and can include the death or illness of a parent (Glick, Sahn & Walker, 2011), an unexpected significant loss of family income (Gubert et al., 2007), bad road conditions due to weather (Razafimbelo, J., Rajonhson, Ratompomalala & de la Croix Malazamanana, 2009), and region-wide economic trouble such as famine (Razafimbelo, J. et al., 2009). Shocks that affect a large portion of the community, such as road conditions and famine, result in a large percentage of students missing school simultaneously (Razafimbelo, J. et al., 2009). In addition, the death or illness of a student’s parent increases the likelihood of dropout, but does not appear to impact initial enrollment, except in cases of the illness of a child’s father, which correlates with earlier school enrollment (Glick, Sahn & Walker, 2011).

Research is contradictory on the effect of income shocks on dropout. While Glick, Sahn and Walker (2011) concluded that income shocks do not affect dropout rates; Gubert and Robilliard (2007) found that families with transitory income often rely on their older children to work, which increases dropout rates—especially for girls—during economic shocks. Economic shocks are particularly frequent in rice-farming communities, with one-third experiencing

economic shocks across several consecutive years, compared to only 7.4% of maize-farming households (Guber & Robilliard, 2007). Interestingly, families with more assets were not any less impacted by shocks (Glick, Sahn & Walker, 2011).

### **Teacher performance.**

#### ***Teacher behavior.***

Teacher performance may be low across Madagascar. In one rural study, 100% of school children reported one or more negative teacher behaviors including being mean, lazy, intoxicated, or frequently absent; striking students; locking them out of school buildings; and selling donated supplies (McNeil, 2010).

#### ***Non-completion of course material.***

In one study, many teachers (35.77%) did not complete their syllabus by the time final evaluations were given, even though most (74.23%) had previously stated the syllabus was “neither too difficult nor very long” (Razafimbelo, J. et al., 2009). While teachers cited time-constraints as the main reason for not completing a syllabus (Razafimbelo, J. et al., 2009), another reason for this disparity may be because only 20% of Malagasy teachers prepare daily lessons, and even less consistently prepare biweekly plans (Lasibelle, Tan, Jesse & Van Nguyen, 2010). Additionally, weekly teaching time is frequently much lower than the international standard of 20 hours, with 33% of teachers providing less than 10 hours of instruction, 64% providing 11 to 20 hours, and only 3% providing more than 20 hours (Ramanantoanina, 2008).

#### ***Teacher absence.***

Low teacher attendance decreases student performance (Guerrero, Leon, Zapata, Sugimaru & Cueto, 2012). Madagascar’s teachers are absent 10% of all school days (Lasibelle et al., 2010) or 2.5 days per month (Michaelowa, 2003). The main cause of absences are teachers travel, often long distances and by foot, to collect salaries at school district headquarters, or CISCO, resulting in an estimated 1-10 days of absence per month, depending on the remoteness of the school (Razafimbelo, J. et al., 2009). Absences can increase during periods of political turmoil, where travel to a central location may be difficult, and the

arrival of a salary to that location may be delayed (Fafchamps & Minten, 2007). Despite these potentially long absences, teachers only plan to catch up their students 57.27% of the time (Razafimbelo, J. et al., 2009).

### ***Accountability.***

Accountability is low for teacher attendance, student performance, and teaching quality (Lasibelle et al., 2010; Michaelowa, 2003). Only 8% of school directors regularly monitor teacher attendance, and over 80% do not report the frequency of absences to their district administrators (Lasibelle et al., 2010). Many teachers also lack accountability for student performance, with test scores seldom recorded (Lasibelle et al., 2010). A quarter of teachers do not prepare student grade reports, and teachers often do not discuss student performance with anyone, leaving parents and students without feedback, and school directors without knowledge of teacher performance (Lasibelle et al., 2010). Like many francophone countries, Madagascar hires school inspectors to visit schools periodically and check quality (Michaelowa, 2003). While inspections increase accountability, successfully reduce teacher absences, and positively effect student achievement, they also decrease teacher job satisfaction (Michaelowa, 2003).

### ***Teacher qualifications.***

Many primary and secondary school teachers in Madagascar are undertrained (Adem, 2009). Many primary school teachers only hold two years of secondary education (Bennell, 2004), and only 80% of junior secondary education (JSE) teachers and 67% of senior secondary education (SSE) teachers hold teaching certificates (Ramanantoanina, 2008).

There is conflicting evidence on the effects of increased teacher education. Teacher training may be counterproductive beyond a baccalaureate (Michaelowa, 2003), as teachers may not feel it results in significant professional advancement (Michaelowa & Wittmann, 2007). However, increasing teacher education rates could positively impact students. When a school increases the amount of teachers with a teaching degree by 10%, students are 5.9% more likely to complete primary school, and 7.4% more likely to complete junior secondary school (Glick, Handy & Sahn, 2011). Similarly, a 10% increase in teachers with over

five years of teaching experience leads to higher graduation rates: 3.7% for primary, and 4.6% for junior secondary (Glick, Handy & Sahn, 2011).

### **Hurdles Facing Teachers and Administrators, and the Impact on Students**

Teachers and administrators in Madagascar face a variety of hurdles in their professional careers, which may decrease their effectiveness in teaching.

#### **Corruption.**

Schools may not always receive the full amount of money and resources allocated to them by the government and charity organizations (Francken, 2009). Although 90% of cash transfers are successfully delivered to schools, 20% of schools report that the money received is not equal to the amount sent from district headquarters, and the more remote a school, the more likely that some or all of funds do not arrive (Francken, 2009). In cases where funding was diverted, it was usually used for non-educational initiatives or privately by local officials (Francken, 2009).

#### **Teacher shortage.**

Across Sub-Saharan Africa, many teachers are reaching retirement age, resulting in a widespread and “significant teacher gap” (Pitsoe & Machaisa, 2012). While Madagascar is facing this shortage (Glewwe & Maiga, 2011), recruitment strategies are on track to meet the country’s needs by 2015 (Pitsoe & Machaisa, 2012). But the current lack of teachers, and an increase in requests for teachers by teacher-less communities, has caused the reshuffling of teachers from one school to another, where a teacher is provided to a school-in-need by depriving another of its educator (Brinkerhoff & Keener, 2003).

#### ***Use of contract teachers.***

One of the strategies used in Madagascar to combat the teacher shortage has been hiring contract teachers (Glewwe & Maiga, 2011), which are described as “fixed-term contracts with shorter training, lower salaries and a sharply reduced duration of professional training,” who are “engaged by and/or under contract with parents or local communities” (Bourdon, Frölich & Michaelowa, 2007). Over half (53%) of Madagascar’s primary school teachers are contract teachers and this will

increase from 33,510 in 2008 to 50,035 individuals in 2015 (Razafimbelo, J., Rajonhson, Ratompomalala & de la Croix Malazamanana, 2009).

Despite little pre-service training, contract teachers are not all unqualified. In fact, “about 21% have a high school diploma, versus 8% for regular teachers” (Glewwe & Maiga, 2011; Ramanantoanina, 2008). However, the effectiveness of contract teachers is debated, (Vegas & De Laat, 2005; Michaelowa, 2003) because they have lower job satisfaction, job security, and pay than their non-contract peers (Michaelowa, 2003). Close monitoring by inspections and the “incentive structure” of their contracts results in lower teacher absenteeism and increased student learning, but also lower job satisfaction, often leading them to search for alternate employment (Michaelowa, 2003).

### **Pay.**

Contract and non-contract teachers are paid low salaries that fluctuate frequently and dramatically due to political situations, with little consideration for the livability or sustainability of the wage<sup>2</sup> (Mehrotra & Buckland, 1998). Research shows that to hire enough teachers to make up for increased demand due to population growth, a developing country should not pay salaries greater than 3.5 times GDP per capita (Bourdon et al., 2007). In Madagascar, teachers who are “civil servants make 4.4x GDP... (while contract teachers) make 1x GDP” (Bourdon et al., 2007). Some communities even pay their contract teachers in-kind with rice or “by working on teachers’ farms” (Bennell, 2004). Therefore, while non-contract teachers are making more than recommended, contract teachers are making substantially less.

### **Job satisfaction.**

High teacher satisfaction helps improve the overall quality of education (Michaelowa & Wittmann, 2007). While contract teachers report low job satisfaction, Madagascar’s civil service teachers generally experience higher satisfaction than those in other French-speaking African countries (Michaelowa, 2003). When asked, the majority of Malagasy teachers indicated they would

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<sup>2</sup> For example, in 1980, teacher wages were higher than in any more recent year. But in 1982, salaries dropped to 64% of 1980 levels; in 1985, they were 71%; in 1988, they were only 45%; and in 1992, they rose back to 71% of the 1982 pay level (Mehrotra & Buckland, 1998).

choose the same profession again and <25% indicated a desire to change schools (Michaelowa, 2003). Michaelowa and Wittmann (2007) note that “the frequently stated hypothesis that low salaries and large classes are the major source of low teacher satisfaction” is inaccurate, and Michaelowa (2003) points to “inspections and non civil service teaching contracts”—which address accountability and teacher shortage—as key sources of dissatisfaction.

### **Unique Hurdles for Rural Areas**

It is significantly more difficult for children in rural areas to receive quality education (Moulton, 2001; Skjortnes & Zachariassen, 2010). While 60% of urban children graduate from primary school, only 12% of rural children do so (Francken, 2009).

#### **Fewer classroom resources.**

Rural classrooms often have fewer resources than their urban counterparts. Most (81%) parents with children in small rural schools described their schools as “dilapidated” or “very dilapidated” (Glick et al., 2005). Because of their difficult-to-reach locations, remote districts often receive fewer educational resources (Brinkerhoff & Keener, 2003), such as visually stimulating classroom decorations, basic scientific supplies, radios, and other media equipment (Moulton, 2001). Rural classrooms also have less regulatory oversight and rely more on community support (Brinkerhoff & Keener, 2003). For example, when supplies and equipment are provided to rural schools, they are often transported to the nearest accessible road and then carried by community residents to the village/town (Brinkerhoff & Keener, 2003). Because each item must be carried, residents may bring back the items they deem most valuable, such as desks, and forfeit materials, like chalk and paper, which may be considered limited-use items (Brinkerhoff & Keener, 2003).

#### **Lack of household amenities.**

Rural students may also perform worse in school due to the indirect effects of not having electricity and other amenities at home. Only 10% of Malagasy households have electricity (Bradt, 1999; Wolhuter & Steyn, 2003). Because 87% of homework is completed in the evening after students finish housework,

children in homes with electricity have more time to study (Daka & Ballet, 2011).

**Lower parental satisfaction.**

Parental satisfaction of the education system is lower in rural areas than in urban regions, with only 41% of rural parents of public school children stating they were “satisfied” with their child’s education compared to 61% of public school parents countrywide and 87% of private school parents (Glick et al., 2005).

**Irrelevant curriculum.**

In many rural communities, the school curriculum is not directly relevant to students’ everyday lives, and students are not likely to apply knowledge gained in school (Freeman, 2001; McNeil, 2010; Dahl, 2011). Students and parents struggle to find value in continuing their education (Freeman, 2001), and may not see the benefits of investing time and money in schooling (Hanushek, 1995). Some schools may lack practical classes (like gardening) while simultaneously emphasizing computer literacy, despite students having limited or no access to computers (Wolhuter & Steyn, 2003). For example, when students in the fishing village of Ankilibe were asked if “anything about fishing, money management, selling goods, or daily activities of the Vezo were taught in school,” they “looked confused or laughed” and claimed to learn these skills from family members (McNeil, 2010). Although the children claimed they liked school and wanted to continue, the prohibitive cost of school and the “lure of the sea” meant that most of these children may never realize alternative career choices (McNeil, 2010). Even in semi-urban towns where most people are literate, few people read regularly (Freeman, 2001).

**Higher cost to attend secondary school.**

Because there are fewer secondary schools than primary schools, and they are not evenly distributed across Madagascar, secondary education is largely unavailable to rural communities due to distance and cost limitations (Heneveld, 1994; Ramanantoanina, 2008). The total education expense of travel/transportation, lodging, food, and school fees of geographically distant schools may preclude

poorer rural families from sending more than one child to secondary school (Ramanantoanina, 2008).

### **Difficult to attract and retain teachers.**

It is difficult to attract and retain teachers into rural schools (Moulton, 2001). Many qualified educators receive credentials in urban or semi-urban areas, and are hesitant to work in rural areas; this is especially true for female teachers and in non-familiar communities (Moulton, 2001).

### **Findings Unique to Women and Girls**

#### **Benefits from increased female education.**

The societal gains from increased female education are significant, including an overall increase “in household incomes and a reduction in poverty” (Subbarao & Raney, 1995). Additionally, children of more educated women stay in school longer, thereby increasing the positive impacts of female education with each generation (Glick, Sahn & Walker, 2011).

Enrolling girls in school delays childbirth and marriage, and increases the likelihood that they will use contraception (Subbarao & Raney, 1995). When girls enroll in one additional year of school, marriage is delayed by 1.5 years, and first childbirth is delayed by six months (Glick, Handy & Sahn, 2011). However, these benefits decrease with more years of education; the delay in marriage after four years of school is not significantly different from after one year of school (Glick, Handy & Sahn, 2011).

Increased female education also leads to improved health for a woman and her children (Subbarao & Raney, 1995). Secondary education is particularly beneficial to decreasing the infant mortality rate (Subbarao & Raney, 1995). While Subbarao & Raney’s (1995) data is from 1975 and not limited to Madagascar, it demonstrates that doubling the enrollment of girls in secondary education would lower the infant mortality rate from 81 to 38, resulting in a much more significant decrease than doubling the GDP or “halving the ratio of population per physician”.

#### **Hurdles for girls in primary and secondary school.**

Enrollment is slightly higher for boys than girls at all levels of schooling (Filmer, 2000; Skjortnes & Zachariassen, 2010), though the disparity is not as great as between different income levels (Filmer, 2000). Location may also affect a girl's chances of completing school, since 41% of teen girls in rural Africa become pregnant compared to only 22% of their urban counterparts (Bennell et al., 2002). Additionally, lacking electricity in the home disproportionately hurts girls, especially in single parent households, as female children are tasked with more housework, and without household electricity, their lighted time for homework is significantly reduced and learning suffers (Daka & Ballet, 2011).

### **Hurdles for women in tertiary education.**

Almost half (46%) of Malagasy university students are women, ranking third of fourteen Sub-Saharan countries (Mama, 2003). However, women with higher education are often expected to be caregivers for their extended family (Skjortnes & Zachariassen, 2010), and may carry familial, social, or community responsibilities leading some women to feel they have to choose between their careers and personal lives (Mama, 2003). In Southern Madagascar, many women indicated they would choose their education over marriage, or use education to decrease their dependence on their husband (Skjortnes & Zachariassen, 2010). Some reported that their families had doubted the value of spending money educating a girl, though their increased education gave them more power and stature in the community (Skjortnes & Zachariassen, 2010).

Finally, there is evidence of discrimination and sexual harassment at the university level (Skjortnes & Zachariassen, 2010). Female students reported being asked by male professors for sexual favors or threatened with bad grades, and female professors reported facing obstacles to obtain their positions, with one needing "a national appointment to overcome the resistance and get her position approved" (Skjortnes & Zachariassen, 2010).

### **Recommendations from the Published Literature**

#### **Providing school resources.**

##### *Learning materials.*

Teacher guides and textbooks are key methods for improving education (Heneveld, 1994; Fehrler et al., 2009), and textbooks are most effective when they are in the primary language of instruction (Michaelowa, 2003). Providing textbooks is especially important, as other materials (furniture and building materials) can be supplied locally, whereas textbooks cannot (Moulton, 2001). One book for every two students is acceptable, especially at higher levels where students do not always take them home (Fehrler et al. 2009). Additionally, the existence of a library and the use of technical equipment in the classroom significantly increased student achievement (Fehrler et al., 2009). It has also been suggested that customizing the curriculum for the student's communities would be useful (Dahl, 2011).

***Building repair.***

The condition of school buildings and windows affect student performance (Fehrler et al., 2009; Glick & Sahn, 2006), and when structural conditions increased from “extremely bad” to “extremely good,” student achievement increased ~10% of a standard deviation from the average (Fehrler et al., 2009).

***School uniforms.***

The provision of free school uniforms has been shown to reduce teen pregnancy and dropout rates by 10 to 15 percent (Kremer & Holla, 2009).

***Health support.***

Deworming has been shown to increase enrollment by one year per student (Nguyen, 2008; Miguel & Kremer, 2004; Kremer & Holla, 2009).

***Resources for rural areas.***

Organizations providing supplies to remote rural areas should be aware that not all supplies are reaching villages if they are dropped at the nearest accessible road (Moulton, 2001). Sources suggest working with the community to determine the most needed supplies or arranging for end-to-end transport (Moulton, 2001). Additionally, initiatives that focus on building schools in hard-to-reach areas should address the long-term management of these buildings (Moulton, 2001).

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***Cash grants during shocks.***

Several globally focused studies reveal that government funded cash transfers in times of need are successful in protecting children from the educational impact of shocks (Gubert & Robilliard, 2007).

***Improving teacher quality.******Accountability.***

In the Lasibelle (et al. 2010) case study, poor teacher performance was addressed by implementing interventions—including using student report cards— aimed to make staff responsibilities clear, clarify operations, and increase information flow between teachers, students and parents. When implemented at the school, sub-district and district levels, attendance increased significantly, test scores increased slightly, and grade repetition decreased (Lasibelle et al., 2010).

***Incentives.***

Research from other developing countries suggests that giving teachers incentives for attendance is successful (Kremer & Holla, 2009). In one study, rewarding teacher attendance halved absence rates; students achieved higher test scores; and graduation rates increased by 10% (Kremer & Holla, 2009). It is noted, however, that monetary incentives can be difficult to implement. One study revealed that supervisors often “provided bonuses to all teachers regardless of attendance, suggesting it is difficult to change an entrenched culture ... through local monitors who have discretion” (Kremer & Holla, 2009). In order for incentives to work, “teachers (must) fully understand the way ... incentives are calculated and the specific behaviors that are being rewarded” (Guerrero et al., 2012).

***Distance education programs.***

Distance education programs can help meet the need for well-trained teachers, because they are effective (Thompson, 2010; Sifuna, 2011; Moon, Leach & Stevens, 2005) and less expensive (Moon et al., 2005). Sifuna (2011) noted that these programs do face key challenges throughout Africa, namely “lack of online materials relevant to the African context, low levels of computer literacy, (and)

insufficient staff development.” However, once teaching materials are created, expenses are minimal, and these lower costs are passed on to teachers, costing them “between one-third and two-thirds of conventional programs” (Moon et al., 2005). An additional benefit is that teachers do not need to travel and miss school in order to participate (Moon et al., 2005).

### **Increasing parental and community involvement.**

When government programs do not involve the community, the community feels less responsibility for their children’s education and schooling is negatively impacted (Heneveld, 1994). Likewise, parental and community empowerment can have positive effects on student learning (Guerrero et al., 2012; Solaux & Suchaut, 2006), especially in rural schools (Moulton, 2001). Community involvement increases teacher accountability, because the community is comfortable enough to provide vocal criticism (Brinkerhoff & Keener, 2003), and puts pressure on teachers to do well (Guerrero et al., 2012).

Additionally, informing parents and the community about the benefits of education could increase overall satisfaction with the education system, and increase student enrollment and retention (Kremer & Holla, 2009; Nguyen, 2008; Moulton, 2001; Hanushek, 1995). In one study, attendance was increased by 3.5% and test scores were increased by 0.20 standard deviations when parents were informed of the correlation between increased education and higher earnings (Nguyen, 2008).

### **Changing lengths of primary and secondary school.**

Ramanantoanina (2008) suggests increasing the length of primary school from five to seven years, so that students are more prepared for junior secondary school, and less likely to drop out or repeat grades. This research also suggests reducing the years of junior secondary and senior secondary school, so that more students complete the program (Ramanantoanina, 2008).

### **Adjusting school costs at local levels.**

The poor in Madagascar may be disproportionately affected by the cost of education, and are less likely to continue their children’s schooling if the price is too high (Tomasevski, 2006; Fafchamps & Minten, 2007; Glick & Sahn, 2006).

Glick and Sahn (2006) suggest adjusting school costs at a regional or local level, so that underprivileged families are not disproportionately impacted by the cost of education.

**Reducing corruption.**

The loss of allocated funds through corruption is lower in areas where residents are literate, more educated, and have “local access to media” (Francken, 2009). Additionally, requiring schools to publicly post funding amounts and using a mass media campaign to publicize those amounts decreases corruption (Francken, 2009). Finally, cash grants, when implemented with measures to prevent corruption, are more likely to arrive at schools than in-kind donations (Francken, 2009).

**Improving higher education.**

Curriculum reform is needed to “embrace the ‘knowledge economy,’ and build the human capital that helps development” (Kapur & Crowley, 2008). Reform should address “rapidly expanding scientific knowledge and changing economic opportunities” (Bloom et al., 2006).

## **4. DISCUSSION**

### **Recommendations for Government and Funding Organizations**

Based on the literature, we recommend the following research and development initiatives.

**Small budget programs.**

We suggest a focus on a discrete area (a few villages or districts), with money allocated to provide end-to-end delivery of all needed project supplies. Examples of programs that are needed and have proven successful include finite school supply delivery (such as chalk, paper and textbooks), sex and health education programs, school uniforms, electricity provision, and deworming programs. In addition, the provision of scholarships for secondary school students (paying for travel, food and other expenses) would be helpful, especially in rural areas.

### **Large budget programs.**

Many of the problems associated with the Malagasy education system require a larger commitment of time and funding. We recommend funding and managing cash grants to school districts in times of need to decrease the impact of shocks on school attendance and dropout. Grants should be announced nationwide in the appropriate Malagasy dialects, to help communities to self-monitor corruption, and could be used to transport students, fix roads, or provide food assistance in times of drought and famine. An additional area of need is the production and delivery of Malagasy textbooks to primary schools, and reading and math textbooks for primary and secondary schools. Finally, more contract teachers should be hired, especially for rural districts, and programs should be implemented to increase community and parental involvement in education.

### **Recommended Changes to the Education System**

The literature suggests that a number of changes to the Madagascar education system would be helpful. These include a pay increase for rural teachers as an incentive to bring teachers to hard-to-reach areas, the implementation of a system for delivering pay to teachers to decrease teacher absences, the standardization of the monthly teaching time nationwide, and the implementation of a system to more closely monitor teacher performance (specifically for teacher attendance and student grade reporting). Additionally, a customized curriculum is recommended, to increase the relevance of education to students, based on their region and local source of income. These changes in curriculum should also include or encourage the use of local Malagasy dialects—in combination with Official Malagasy—in primary school and in community announcements, so that language barriers do not disadvantage non-Merina students. Finally, at the university level, reducing administrative staff could help reallocate funding to teaching and research; and providing more hiring autonomy at the institutional level could attract new talent, and allow faculty appointments to not be tied to political standing and affiliation.

## **5. CONCLUSION**

Focused development initiatives can strive to ensure access to quality education for all, provide a bright future for Madagascar's youngest generation, and

strengthen continuing education opportunities. In this study, we summarized the findings of 78 information sources and then (1) synthesized the data regarding the size and scope of the education system at different levels, (2) identified gaps in knowledge, (3) identified hurdles that students, teachers, and the system face, and (4) summarized recommendations to propose development interventions/foci at different spatial and funding scales.

We found the existing research on education in Madagascar is lacking regarding secondary education; technical schools; teachers as they relate specifically to Madagascar; language of instruction; and the organizational infrastructure of the education system. Additionally, we found evidence that the current system is deepening the opportunity gap between the poor and the wealthy, especially in rural areas and for students whose communities do not speak Official Malagasy. Additional key problems include high teacher absence and low teacher accountability; low parental satisfaction; cost barriers for secondary school; cumbersome administration protocols and excessive administrative staff; and high grade repetition rates.

However, we also found a number of strategies that have proven successful, especially the use of cash grants and announcements in the local Malagasy dialect to prevent corruption; increased parental and community involvement; deworming; and the provision of school uniforms, textbooks in the language of instruction, electricity and end-to-end supply delivery.

With international aid poised to return to Madagascar (Rabary, 2014), opportunities exist to address the deficiencies of the Malagasy education system. Therefore, our study—which identifies both gaps in aid and previous successful interventions — may help organizations implement useful and cost-effective programs to improve Madagascar’s education system.

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