

The Impact of the “Kere” on the Quality and Equity of Education Among Children in the Androy region of Madagascar

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Abstract—Several studies highlight the impact of food crises on human development indicators. However, the consequences of the “kere,” or famine, on education—particularly in southern Madagascar—remain poorly documented. This article presents a study conducted in the Androy region on the effects of the “kere” on the quality and equity of education, in relation to the achievement of one of the Sustainable Development Goals, specifically SDG 4. The guiding research question is: how does the “kere,” or famine in southern Madagascar, affect the achievement of the goals of quality education and equity? We argue that the “kere” undermines both the quality and the equity of education in southern Madagascar. Our study adopts a hypothetico-deductive approach, combining analysis of quantitative and qualitative data collected from students, teachers, and parents through surveys conducted in schools located in Ambovombe and Amboasary in the Androy region, over the period 2021 to 2025. The findings indicate that the “kere” is a major obstacle to achieving several SDG 4 targets, as it affects the quality of teaching and equity in access to education. The school dropout rate is very high, reaching 69% out of 300 respondents. Additionally, the data indicate that teacher absenteeism rises with malnutrition: 84% of the 50 respondents said they had a poor level of enthusiasm for teaching. Among the 37% suffering from severe malnutrition, motivation drops to just 40%. As a consequence, their performance declines by 40%, and students’ academic results fall by 41.14%. This situation contributes to growing inequality in access to education and compromises the achievement of equitable, inclusive, and quality education.

Keywords— Equitable; inclusive; “kere”; famine; quality education; SDG 4.

I. INTRODUCTION

In southern Madagascar, the “kere,” or famine, appears to be recurrent. The situation dates back to the 1930s, has claimed thousands of victims, and keeps many people trapped in a cycle of impoverishment, despite the existence of various aid-based responses (Ralaingita et al., 2022). This phenomenon is all the more worrying in a context where Madagascar aims to achieve Sustainable Development Goal 4 (SDG 4) by 2030: to “ensure inclusive and equitable quality education and promote lifelong learning opportunities for all” (UNESCO, 2023). Indeed, despite various measures recommended to reform basic education and improve students’ knowledge and skills,

education sector evaluation reports indicate that these goals remain largely unmet (INSTAT, 2021).

The Grand Sud region, and more specifically the Androy region, illustrates this challenge, with the lowest literacy rate in the country and a high level of school attrition (UN, 2022). The alarming situation—marked by rising insecurity, drought, and the persistence of the “kere”—is cited by education sector officials as one of the factors contributing to the problem of education quality in this region (Randriatsoa, 2022). Yet, despite the central importance of SDG 4 for quality education, very few studies have examined the direct impact of this scourge on the achievement of this goal, and existing work provides limited explanation of the relationship between food crises and the education system. Previous research shows that food crises negatively affect human development indicators, particularly health, economic security, and social stability (FAO, 2018; UN, 2022). However, the specific phenomenon in southern Madagascar remains under-studied, especially regarding its impact on education. While some studies highlight a correlation between food insecurity and declining academic performance, they mainly focus on nutritional or broader socio-economic consequences, without examining in depth how these crises compromise the quality and equity of education in connection with SDG 4 (Ralaingita et al., 2022; UNESCO, 2023).

Thus, the key research question guiding this study is: *how does the “kere,” or famine in southern Madagascar, affect the achievement of the objectives of quality education and equity?*

This research is important for two reasons. First, it highlights the disparities and obstacles that undermine access to inclusive and equitable education, particularly in a context marked by food insecurity. Second, it provides an opportunity to identify levers for improvement to promote quality teaching even when resources are limited.

Accordingly, the overall objective of this article is to conduct an in-depth analysis of the conditions of access to quality and equitable education for children in the Androy region. More specifically, it aims to:

- Analyze the impacts of famine on the quality of education;
- Understand the effects of famine on equality of access and equal treatment within the education system.

Based on these objectives, the central hypothesis of this study is formulated as follows: the “kere” undermines the quality and equity of education in southern Madagascar.

II. MATERIALS AND METHODS

Study Area

The study was conducted in the Androy region in southern Madagascar, specifically in the districts of Ambovombe and Amboasary. These areas were selected because of their high exposure to famine and the vulnerability of their school infrastructure. An initial field visit was carried out between August and September 2021 to conduct an exploratory phase and better understand the local context. The main data collection then took place between March and May 2025, during which questionnaire surveys and interviews were conducted with students, teachers, and education officials.

Study Population and Sampling

The study targeted primary schools located in the areas most affected by famine. A stratified random sampling method (Mucchielli, 2005) was used to select 20 representative schools, including both public primary schools (Écoles Primaires Publiques—EPP) and community schools. These included EPP Ambovombe, EPP Antaola, EPP Ampatalefo, EPP Tsimolofo, and EPP Bemena. The sample also included several community schools such as École Communautaire Ankilitsimamo, École Communautaire Antainakanga, and École Communautaire Mahahevy. In each school, students (n=300), parents (n=120), teachers (n=50), and school administrators (n=20) were surveyed. Groups were stratified according to professional status (civil servant, contractual, volunteer) as well as geographic location and socio-economic level.

Methodological Approach

This study adopts a hypothetico-deductive approach, combining qualitative and quantitative data to test hypotheses formulated from fieldwork findings. This approach makes it possible to rigorously assess the impact of famine on the quality and equity of education, while highlighting obstacles to achieving Sustainable Development Goal 4 (SDG 4).

The value of this approach lies in its ability to provide a structured and rigorous scientific process. It establishes a clear analytical framework by formulating testable hypotheses and using diverse methodological tools to examine their validity. In this context, the combined use of qualitative data derived from interviews, testimonies, and field observations and quantitative data obtained from questionnaires, enrolment and dropout rates, and malnutrition indicators supports triangulation, thereby strengthening the reliability of the conclusions.

Data Collection Tools

Several instruments were used. On the quantitative side, questionnaires were administered to students, parents, and teachers to collect information on schooling, academic achievement, living conditions, and teachers' employment status. Assessment tests based on the PASEC framework

(CONFEMEN, 2014) were used to measure basic skills in reading and mathematics, in relation to the teacher's profile. Anthropometric measurements were conducted, including height, weight, and body mass index (BMI) for students aged ten and above, as well as for teachers. For children under ten, weight-for-age and height-for-age indicators were used in accordance with WHO standards. Finally, administrative data were extracted from school registers and local education services, notably enrolment, dropout, achievement, and attendance rates.

On the qualitative side, semi-structured interviews were conducted with key actors in the education system teachers, parents, and administrators to elicit their perceptions of the effects of famine on education. Five focus group discussions were also held with students from diverse social backgrounds to explore their school experiences in a context of food crisis. In addition, field observations were carried out in schools and villages to contextualize the findings and identify material and organizational barriers to schooling.

The variables analyzed fall within the SDG 4 monitoring indicators. Regarding access, variables included enrolment, attendance, and dropout rates. Education quality was assessed through teachers' employment status and qualifications, as well as students' test performance. Equity was evaluated based on disparities between girls and boys, the inclusion of children displaced due to famine, and nutritional indicators. The learning environment was examined through the quality of infrastructure, access to school canteens, and the availability of teaching materials. Finally, adult literacy was measured using basic reading and writing exercises.

Data Analysis Tools

Data from closed-ended questionnaires were processed using descriptive statistics (means, standard deviations) to assess enrolment, attendance, dropout rates, and academic performance according to nutritional status and teacher profile. Scores from standardized reading and mathematics tests were compared across different student groups (malnourished versus well-nourished), in relation to the anthropometric data collected. These anthropometric measures were compared to WHO thresholds to identify cases of undernutrition (stunting, underweight). Variables related to the learning environment (infrastructure, access to canteens, and materials) were also quantified to assess inequalities between schools affected and not affected by famine.

Semi-structured interviews and focus groups were analyzed using thematic coding to identify education stakeholders' perceptions of the consequences of famine on school attendance, students' concentration, teachers' morale, and rising social inequalities. Children's narratives provided deeper insight into their subjective experience in a context of food crisis. Finally, field observations were categorized by themes (infrastructure, school organization, barriers to schooling) and cross-checked with other data to ensure triangulation.

Overall, this analysis makes it possible to produce a comprehensive diagnosis of the impact of famine on progress toward SDG 4, highlighting imbalances in access, quality,

equity, and the learning environment. The collected data were processed using Excel and presented in tables and graphs.

III. RESULTS

The various data obtained from the investigations are presented in the different tables and are shown below.

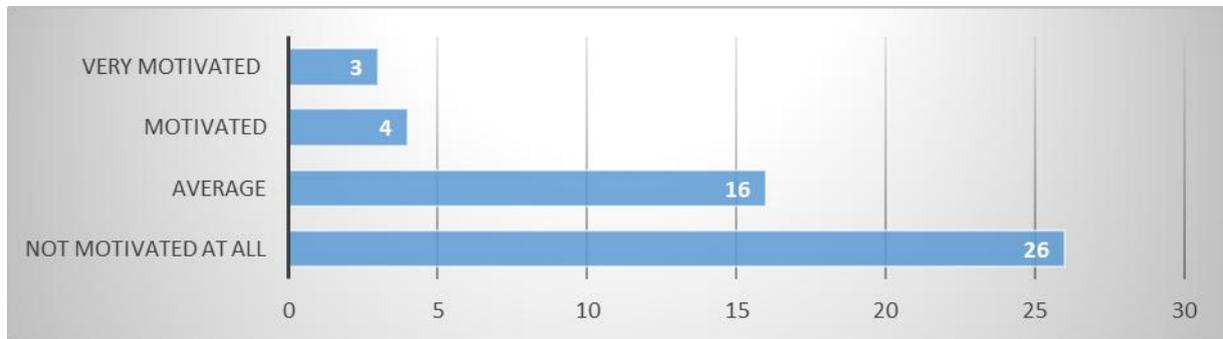


Figure 1: Survey result on the motivation of our sample of 50 teachers who continue teaching despite the famine.

Moreover, 16 teachers (32%) indicate that they are moderately motivated. This proportion corresponds to nearly one third of the teachers surveyed.

Conversely, teachers with a high level of motivation are few in number. Only 4 teachers (8%) report being motivated and 3 teachers (6%) very motivated. Thus, 14% of the sample report high motivation. Overall, the distribution of responses shows that teachers' motivation is low, with a strong concentration in the "not motivated at all" and "moderately motivated" categories.

2) Teachers' nutritional status according to the Weight-for-Height index

The data show a clear trend: as teachers' nutritional status deteriorates, their absenteeism rate increases, teaching performance declines, and students' academic results drop. Teachers in good nutritional condition show low absenteeism (5%) and high performance (55%), and about 52.65% of students reach a satisfactory level in reading and mathematics (i.e., 158 students out of 300). With mild teacher malnutrition, absenteeism rises to 15%, performance falls to 51%, and 48.94% of students succeed (147 students out of 300). Under

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1) Teachers' motivation

The results show that the majority of the teachers surveyed are not motivated. Indeed, 26 teachers out of 50, or 52%, state that they are not motivated at all. This category is the most represented in the sample.

severe malnutrition, these values worsen further: absenteeism reaches 37%, teaching performance drops to 40%, and 41.14% of students perform well (123 students out of 300).

Table 1: Results on the impact of teachers' nutritional status on the quality of education through three indicators: teachers' absenteeism rate, teachers' performance, and students' results (in reading and mathematics).

Teachers' nutritional status (based on n=50)	Absenteeism rate (%)	Teaching performance score (%)	Students' results in reading and mathematics (based on n=300%)
Good nutritional status	5	55	52,65
Mild malnutrition	15	51	48,94
Severe malnutrition	37	40	41,14

These results highlight a clear relationship between teachers' nutritional status and the quality of education, with a progressive deterioration across all indicators as malnutrition becomes more severe.

3) Teachers' qualifications

Within the schools visited, 65% of the teachers hold only the BEPC. Only 5% have the baccalaureate, and no teacher has completed university studies. Moreover, 23% of the

teachers dropped out in grade 10 (seconde), while 8% reached grade 12 (terminale) without obtaining the baccalaureate.

4) Teachers' employment status



Figure 2: Levels of teachers' academic qualifications in schools affected by famine.

Table 2: Results showing teachers' employment status in schools affected by famine.

Status	EPP Ambovombe (%)	EPP Antaola (%)	EPP Ampatalefo (%)	EPP Tsimolofo (%)	EPP Bemena (%)
Civil servant (tenured)	5	19	14	11	27
FRAM teacher	78	81	86	89	73
Volunteer	17	0	0	0	0
TOTAL	100	100	100	100	100

The results presented below were collected in five representative primary schools located in the areas most affected by famine, namely: Ambovombe Public Primary School (EPP Ambovombe), EPP Antaola, EPP Ampatalefo, EPP Tsimolofo, and EPP Bemena. These institutions include both public schools and community schools, making it

possible to capture the diversity of teacher profiles in a context of heightened socio-economic vulnerability.

The results show a predominance of FRAM teachers in schools affected by famine. The proportion of FRAM teachers ranges from 78% to 89% depending on the school. Civil servants represent a small share, between 5% and 27%, and only a few teachers are volunteers, notably 17% in School No. 1.

5) *Reasons for teachers' dropout*

The analysis of this figure shows that most reasons for teacher dropout are directly linked to *Kere* (famine) or malnutrition. Food insecurity is the leading cause of teacher dropout, accounting for more than 33%, followed by difficult working conditions (22%), family migration (16%), health problems (13%), decreased motivation (9%), and difficult socio-economic conditions (7%).

Figure 3 : Results from the questionnaire on the reasons for teacher dropout

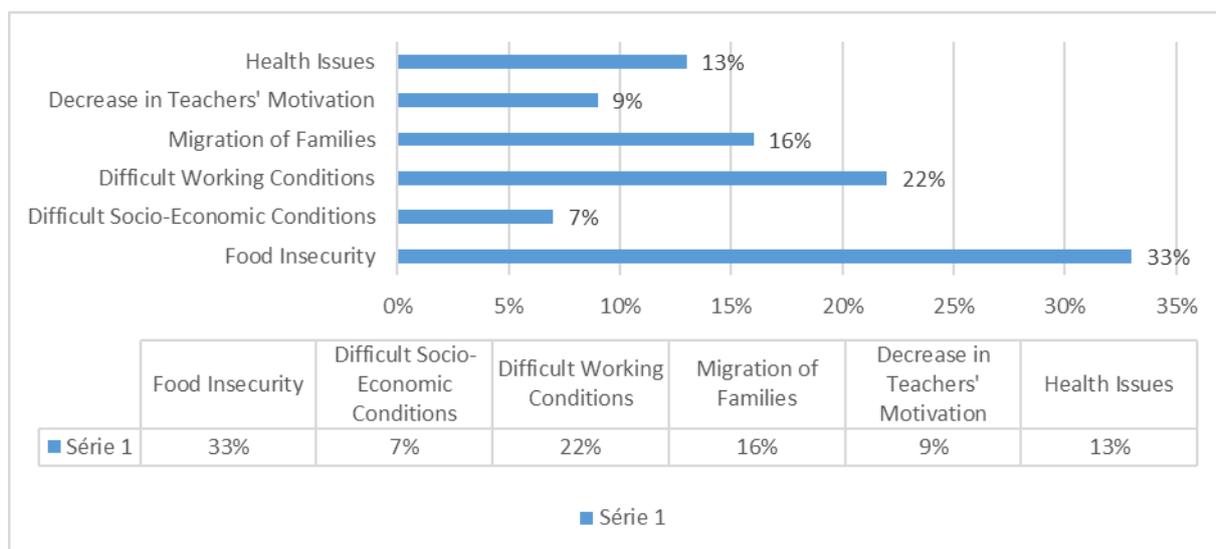


Figure 3 : Results from the questionnaire on the reasons for teacher dropout



Figure 4 : School enrolment rate of children by gender in the sample of 120 households affected by famine.

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6) *Food security among students*

Table 3: Results of the distribution of students according to BMI

BMI	Number (n)	Percentage (%)
BMI < average	227	75,6
BMI > average	73	24,3
Total	300	100

The proportion of students with a BMI below the average is very high, at over 75.6%. For students with a BMI above the average, it is 24.3%.

7) *Access to education*

Out of 120 households affected by famine, 69% of children are not enrolled in school. Among them, 43% are girls compared with 21% boys.

8) *Reasons for school dropout*

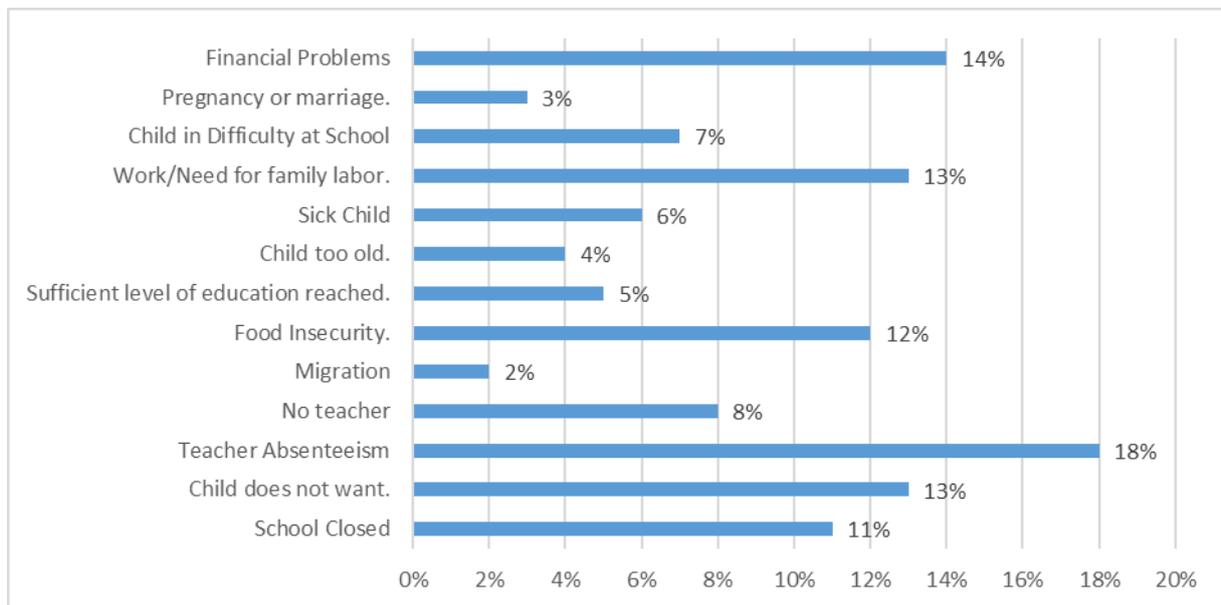


Figure 5: Results of the questionnaire on the reasons cited by households to explain school dropout.

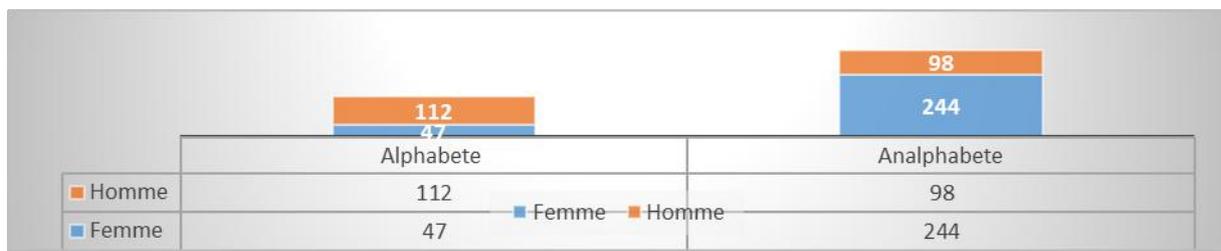


Figure 6: Results on the literacy rate in our sample of 500 adults, including the 120 parents of students.

Various factors can potentially affect children’s schooling. These results show that food insecurity, migration, teachers’ absenteeism, child labour/need for family labour, financial constraints, students’ lack of motivation, and school closure are the reasons most frequently cited by households to explain school dropout. Teachers’ absenteeism ranks first among the reasons (18%), while migration is the least cited reason (only 4%).

9) Adult literacy rate resulting from school dropout

Based on the analysis of 501 individuals, including the 120 parents of students, 31.6% are literate and 68.4% are illiterate. Among the 159 literate individuals, men number 112, while women are 47. In contrast, illiteracy is higher among the female population: out of 342 illiterate individuals, 244 are women compared with 98 men.

IV. DISCUSSION

The results from field visits, studies, and analyses highlight the consequences and impact of *Kere* (“famine”) on the quality and equity of education in Southern Madagascar, thereby undermining the achievement of the targets of Sustainable Development Goal 4 (SDG 4).

Quality of education

1) Quality of education in relation to teachers’ nutritional status

The findings of this study show that teachers’ nutritional status is a major determinant of education quality in areas affected by *Kere*. It is clear that malnutrition affects not only

teachers’ physical health, but also their professional motivation, attendance, and pedagogical effectiveness. This relationship demonstrates that the food crisis does not affect education alone; it also weakens the central actors of the education system, thereby compromising the entire teaching–learning process.

The analysis reveals that as teachers’ malnutrition worsens, their absenteeism increases significantly. This decline directly impacts students’ academic outcomes, whose reading and mathematics scores drop to 41.14%. Conversely, well-nourished teachers show limited absenteeism (5%), better teaching performance (55%), and contribute to higher student achievement (52.65%). These findings lead to the conclusion that teachers’ nutritional status acts as an indirect but decisive lever of students’ academic success.

These results are consistent with data from the research by (JP Jeudy & F Charles, 2010), showing that the motivation of teachers in the 2nd and 3rd cycles in Fundamental Application Schools in southern Haiti contributed significantly to improving teaching quality. Although their study did not focus specifically on nutrition, it highlights—like the present research—the central role of teacher motivation in educational performance. The similarity of findings, despite different geographic contexts (Haiti and Madagascar), suggests that teacher motivation is a universal factor of education quality, especially in settings of high socio-economic vulnerability.

The results also fit within the theoretical framework of Maslow’s hierarchy of needs, as interpreted by (Healy, 2016). According to this theory, meeting physiological needs is the

essential foundation for the emergence of higher needs, including self-esteem and professional fulfillment. The observations from this study empirically confirm the same model: teachers experiencing food insecurity struggle to maintain high professional commitment, resulting in lower motivation and performance. The key conclusion is that unmet basic needs prevent teachers from fully mobilizing their pedagogical skills.

Furthermore, these findings corroborate those of (Michaelowa, 2002a), who analyzed—across several Sub-Saharan African countries, including Madagascar—the relationship between teachers' job satisfaction, their motivation, and students' academic performance. The author highlighted the negative effects of very low salaries, poor working conditions, and lack of institutional support on teacher motivation. The present study extends this work by adding an original contribution: it specifically highlights the role of malnutrition as a factor that worsens demotivation and performance decline in a context of chronic famine.

However, a notable difference lies in the methodological approach. Whereas (Michaelowa, 2002b) relied mainly on macroeconomic and institutional analyses, this research adopts a micro-analytical approach focused on teachers' individual nutritional status. This specificity helps clarify the concrete mechanisms through which famine affects education quality, strengthening the originality and relevance of the results.

Ultimately, this study concludes that teacher motivation—closely linked to nutritional status—is a key component of education quality in areas affected by *Kere*. It underscores the need to integrate nutritional support policies for teachers into educational and humanitarian strategies, in order to ensure not only their well-being but also progress toward SDG 4, which aims for quality, equitable, and inclusive education.

2) *Attrition of qualified teachers*

The findings of this study show that the attrition of qualified teachers in the Androy region is mainly linked to food insecurity, which is the leading cause of departure (33%), followed by difficult working conditions, family migration, and health problems. These results indicate that famine functions as a structural factor disrupting the education system by weakening teachers' professional stability. The main conclusion is that *Kere* not only compromises students' schooling, but also affects the retention of qualified human resources essential to education quality.

The analysis shows that famine pushes many teachers to leave their posts to seek livelihoods, while malnutrition reduces their capacity to carry out their teaching duties effectively. Added to this are low salaries and the high cost of living, which encourage qualified teachers to shift toward more profitable activities. Their departure worsens the existing shortage and frequently results in classrooms without teachers or staffed by less qualified substitutes. These findings align with (Bennell & Akyeampong, 2007), who showed that teacher attrition in developing countries is linked to low salaries, precarious working conditions, rural isolation, and limited career prospects. Similarly, (Desmarais, Kenny & Carlson Berg, 2022) highlighted that professional instability negatively affects teacher performance and educational

outcomes. The convergence of these results—despite different spatial and temporal contexts—confirms the structural nature of the phenomenon.

However, the specificity of this study lies in identifying food insecurity as the central factor in teacher attrition—an aspect less developed in earlier work, which emphasized salary and institutional dimensions. This difference is explained by the context of chronic famine in southern Madagascar, which intensifies teacher vulnerability and amplifies the effects of economic and professional constraints.

In conclusion, combating the attrition of qualified teachers in areas affected by *Kere* requires integrated policies combining improved working conditions, salary enhancement, and food-support mechanisms. Without such measures, achieving SDG 4 and strengthening educational resilience in the face of food crises will remain seriously compromised.

3) *Student performance according to teachers' status*

This study shows that in famine-affected schools, students supervised by civil-servant (tenured) teachers achieve better results than those taught by FRAM teachers, although their scores remain below the average benchmark of **50/100**. By contrast, in areas not affected by famine—such as Antananarivo—performance exceeds this benchmark regardless of teacher status. The conclusion is that *Kere* negatively affects learning quality, notably through the loss of qualified teachers and the increased reliance on FRAM teachers.

These findings are consistent with (Diop, 2011), who—using PASEC 2006/2007 data and quasi-experimental methods—showed that students taught by tenured teachers achieved better results than those taught by non-civil-servant teachers. This convergence confirms that teacher status and qualification are important determinants of academic performance.

Similarly, (Safin, D., 2024) confirms that poor and undernourished areas are the most affected by low academic performance, without directly linking famine to the increasing number of FRAM teachers. For (Miangaly Ralitera, 2021), the poor student level is largely due to FRAM teachers.

The originality of this study lies in explicitly linking famine, shifts in teacher status, and declining student performance. It leads to the conclusion that improving student outcomes in areas affected by *Kere* necessarily requires stabilizing and upgrading the teaching workforce—a key condition for progress toward SDG 4.

Inequality caused by famine in education

4) *Students' food security*

Field surveys, studies, and analyses highlight the impacts of *Kere* (famine) on education equity in Southern Madagascar. Analysis of data collected from **300 students** shows that 75.6% have a body mass index (BMI) below the average, a clear sign of malnutrition.

These results corroborate findings by (MEN & UNICEF, 2022), which established a strong correlation between food insecurity and low enrollment rates in Androy and Anosy, with a net enrollment rate (NER) of only 64.7% in rural areas compared with 82.2% in urban areas. This comparison highlights the spatial dimension of malnutrition's impact: rural

and arid areas exposed to *Kere* face much more pronounced educational inequalities than urban or less affected areas.

Overall, food security is closely linked to equity in education. Students who are not adequately nourished are disadvantaged on multiple levels, which deepens educational inequalities—particularly in regions such as Androy. To reduce these inequalities, it is crucial to strengthen food-security programs integrated into education systems.

The specificity of this study lies in directly analyzing students' nutritional status through BMI, making it possible to empirically link malnutrition to observed educational inequalities. It leads to the conclusion that reinforcing food-security programs integrated into the education system is an essential condition for reducing schooling inequalities and advancing toward SDG 4, especially in highly vulnerable regions such as Androy.

5) School dropout and access to education (SDG target 4.1)

The study conducted among 120 households in the Androy region highlights a strong link between food insecurity and low school enrollment: more than 60% of children from famine-affected families are not enrolled in school, and those who are enrolled attend irregularly. The main conclusion is that *Kere* is a major driver of school dropout, by limiting regular attendance and widening educational inequalities.

Analysis of reasons reported by parents and teachers shows that dropout is driven by famine, family migration, teacher absenteeism, the need for family labor, financial difficulties, student demotivation, and health problems. These observations confirm the findings of Randrianandrasana (2023), who stated that drought episodes in the Grand Sud significantly reduce the likelihood that children attend school, particularly in the poorest households. They also corroborate the work of Marchetta, Sahn & Tiberti (2019), who demonstrated the negative effect of climatic shocks—such as droughts and cyclones—on Malagasy children's schooling.

Moreover, other data from the district of Amboasary indicate that about three out of four children were absent from school to help their families meet food needs, illustrating empirically the direct impact of the food crisis on school dropout (PAM & Krystyna Kovalenko, 2021). The specificity of this study lies in its combined analysis of food-related, socio-economic, and institutional factors, showing how famine interacts with the functioning of the education system to increase dropout.

6) Literacy rate (SDG target 4.6)

The results show that the famine affecting the Androy region is a major obstacle to achieving SDG 4 target 4.6, namely ensuring that all youth and a substantial proportion of adults can read, write, and count by 2030. This conclusion is based on precise data from our sample, in which 68.4% of the **500** individuals surveyed are illiterate. This very high rate underscores the critical impact of the food crisis on education. In addition, high illiteracy is a clear marker of deep educational inequalities, revealing the exclusion of marginalized groups from formal education systems. According to (UNESCO, 2017), low literacy rates are closely linked to socio-economic disparities and structural barriers, including poverty, food insecurity, and geographic remoteness

from schools. These inequalities undermine the principles of equity and inclusion pursued by SDG 4.

These results align with Tamiru & Belachew (2017), who highlighted the impact of food crises on massive school dropout, and with UNESCO (2020), which argues that populations facing food insecurity have significantly lower enrollment and literacy rates. As UNICEF notes, “three in ten young people are illiterate in countries affected by conflicts or disasters,” illustrating the impact of crises on access to education (UNICEF, 2018).

The specificity of our study lies in examining the impact of chronic famine on literacy in a particularly vulnerable region of Madagascar, combining quantitative data from a sample of 500 individuals with a contextual analysis of socio-economic determinants.

7) Confirmation of the hypothesis

The findings confirm that *Kere* in southern Madagascar undermines both the quality and equity of education (SDG 4). Malnutrition among teachers impairs their ability to teach, reduces their motivation, and increases absenteeism, all of which lead to poorer student results. Food insecurity also contributes to the departure of qualified teachers and increased reliance on less trained FRAM teachers, further weakening teaching quality.

Famine deepens educational inequalities: malnourished students, girls, and migrant children are particularly disadvantaged. More than 60% of children from famine-affected families are not enrolled or attend school irregularly, and the illiteracy rate reaches 68.4% among surveyed individuals. Degraded school infrastructure and lack of resources further worsen these disparities.

Overall, the combined weakening of teachers, student malnutrition, and unequal access confirms that *Kere* is a major barrier to quality, equity, and inclusion in education. The hypothesis that famine compromises SDG 4 is therefore fully confirmed.

Although this study provides solid evidence of the impact of *Kere* on education quality and equity in southern Madagascar, several limitations must be noted. First, the sample—although representative of the Androy region—remains limited in size and geographic diversity; results may therefore differ in other famine-affected areas or in less vulnerable urban or semi-urban contexts. Second, measures of teaching performance and student learning are mainly based on quantitative indicators and punctual observations, which may not capture all qualitative dimensions of teaching and learning. Third, the analysis of teachers' and students' nutritional status relies on indicators such as BMI and self-reports, which may involve measurement or reporting biases. Finally, the study does not thoroughly account for the potential influence of other socio-economic, cultural, or institutional factors that may affect teacher motivation, access to education, and academic success.

To address these limitations and strengthen the robustness of the findings, several recommendations can be made. Expanding the sample to other districts affected by *Kere* and including urban areas would improve contextual comparisons. Using mixed methods—combining longitudinal observations,

standardized tests, and in-depth interviews with teachers, students, and families—would provide a more complete and nuanced view of teaching quality and educational equity. Nutritional monitoring could be strengthened through more precise biometric measurements repeated over time to better assess the direct effect of malnutrition on teacher and student performance. Finally, incorporating socio-economic, institutional, and cultural factors into the analysis would help isolate the specific impact of famine more accurately and support more targeted educational and humanitarian strategies.

By integrating these improvements, future research could provide even stronger evidence and guide the implementation of education policies and food-security programs aimed at strengthening education quality and equity in areas affected by *Kere*.

V. CONCLUSION

Overall, the results of this study highlight the multidimensional impact of famine (*Kere*) on the quality and equity of education in Southern Madagascar, seriously compromising progress toward the targets of Sustainable Development Goal 4 (SDG 4). Regarding education quality, famine intensifies teachers' demotivation and malnutrition, increases absenteeism, and reduces performance, which in turn negatively affects student achievement. The large-scale attrition of qualified teachers and the growing reliance on poorly trained—or untrained—FRAM teachers lead to a significant decline in the level of instruction delivered. Academic performance observed in famine-affected areas confirms this trend, with notable gaps depending on teacher status.

Concerning equity of access to education, famine exacerbates existing inequalities. It reduces school attendance, particularly among children from poor households, girls, and children from migrant families. These groups are the most vulnerable to the combined effects of food insecurity, structural poverty, and inadequate educational infrastructure. Moreover, the high illiteracy rate—especially among adults and youth in southern Madagascar—underscores the deep and lasting impact of *Kere* on learning and on the transmission of basic knowledge.

In sum, famine in Southern Madagascar is not only a food crisis but also an educational emergency. Achieving SDG 4 in this region requires addressing all dimensions of the situation, through sustained investments in teacher training, school nutrition, enrollment of vulnerable groups, and the reduction of structural inequalities.

By shedding light on knowledge gaps and field realities, this research meets the objective stated in the introduction: analyzing the impact of *Kere* on education to inform actionable levers for more inclusive and equitable education. The results fully confirm this ambition by revealing the concrete mechanisms through which famine affects access, quality, and the sustainability of education in the most affected areas.

These findings confirm that the initial hypothesis—that *Kere* undermines education quality and equity in Southern Madagascar—is fully validated. The empirical evidence

clearly demonstrates how famine affects access to education, teacher motivation and performance, as well as students' learning outcomes and enrollment.

In addition, it would be relevant to experimentally evaluate the impact of multisectoral interventions—such as school nutrition programs, ongoing teacher training, and infrastructure improvements—on educational outcomes in famine-affected areas. Ultimately, future investigations should aim to answer the following question: How could an education response adapted to local conditions reduce the effects of famine on schooling for children in Southern Madagascar?

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