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REPUBLIC OF MADAGASCAR

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March 2023

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SELECTED ISSUES

February 15, 2023

Approved By
The African Department

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CONTENTS

SOCIAL SPENDING AND OUTCOMES IN MADAGASCAR[1]

Education, health, and social assistance spending in Madagascar is among the lowest worldwide and social outcomes such as education quality, malnutrition, basic immunization coverage, and poverty have deteriorated over the last decade. In a context of social fragility and vulnerability to exogenous shocks, Madagascar faces significant constraints to execute and deliver social spending and services. Looking ahead, sustained efforts are needed to implement the authorities' development agenda in the "Plan Emergence Madagascar" and support the needed investments in human capital. This includes creating fiscal space for higher social spending combined with institutional reforms to ensure a more efficient use of resources.

A. Introduction

1. Madagascar experienced some improvement in development outcomes over 2000–2010, but the overall situation remains challenging following two decades of income stagnation and recent pandemic and climate shocks. The authorities' Plan Emergence (PEM) aims to increase GDP per capita to US$4,000 in 2040 (compared to US$522 in 2019) and the human capital index to 0.60 (0.39 in 2020), while at the same time bringing the poverty rate down from 81 percent to 35 percent by 2040. While ambitious strategies have been developed in social sectors, a disconnect between announced ambitions and limited financial and human resources have led to slow reform implementation. Two years of pandemic, a series of climate shocks, and a more challenging external environment have compounded Madagascar's existing deep-rooted fragilities.

2. This paper takes stock of developments in education, health, and social assistance and offers policy options. It examines social spending[2] and outcomes in Madagascar. In particular, it addresses the following questions: (i) How large has social spending been over time and compared to peers? (ii) How does Madagascar perform on various socioeconomic outcomes? (iii) What are policy options and how can outcomes be improved?

B. Education

3. Government spending on education is relatively low compared with other Sub-Saharan African (SSA) countries and low-income peers. Education spending increased albeit at a slow pace in recent years (from 2.3 percent of GDP in 2011–15 to 2.6 percent of GDP in 2016–20

[1] Prepared by Samah Mazraani. The analysis benefitted from helpful comments from the World Food Program (WFP) and the European Union (EU).

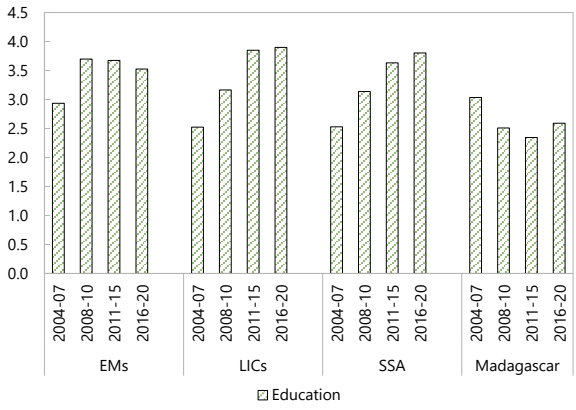
[2] Social spending throughout the paper is defined using the budget functional classification. The definition is consistent with the Classification of the Functions of Government (COFOG) and the IMF Statistics Department Government Finance Statistics Manual (GFSM 2014). It differs from the definition of the social spending target in the ECF program which includes domestically financed spending by four social ministries (education, health, water, and population/social protection) excluding wages.

on average) but remains low compared with other low-income and SSA countries. While education spending as a percent of total government spending is higher than in peers (Figure 2, left), this reflects lower levels of government spending in Madagascar due to still limited tax revenue. Moreover, education spending *per student* significantly lags peers both at the primary and secondary levels (Figure 2, right). The teacher-student ratio is somewhat similar to peer groups with Madagascar having about 40 primary and 20 secondary school students per teacher in 2018.

4. The quality of education in Madagascar is falling with low school completion rates, a high share of untrained teachers, and declining test scores. While Madagascar performs well in adult literacy rate (77 percent in 2021) and net enrollment rate for primary school (96 percent in 2018), the net enrollment rate in secondary school is still low at 29.8 percent in 2018 compared to 44 percent in low-income countries (Figure 3). Moreover, school completion rates have been on a declining trend over the last decade reaching levels below SSA and low-income countries (63 percent for primary school and 35 percent for lower secondary school). In addition, the strategy to use low-paid community-hired teachers supported by parents' associations, the "Maîtres FRAM" (now representing about 80 percent of teachers in primary schools) may have had a negative impact on education quality, as the majority lack formal credentials or teacher training (Figure 4). Harmonized test scores have also

Figure 1. Education Spending, Central Government

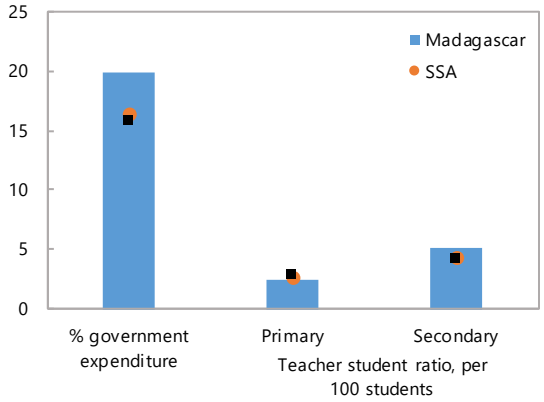
(Percent of GDP)



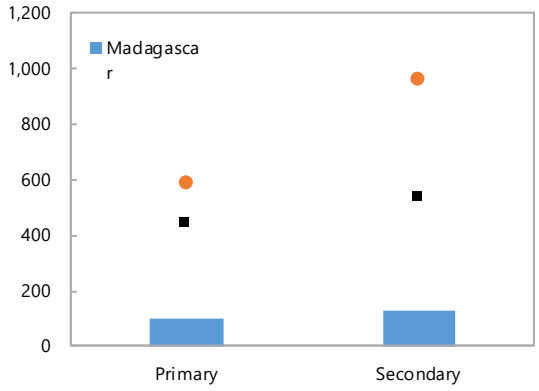
Sources: IMF, Statistics Department

Figure 2. Government Education Spending

Government Education Expenditure, Latest Value Available



Government Education Expenditure per Student, PPP$ adjusted, Latest

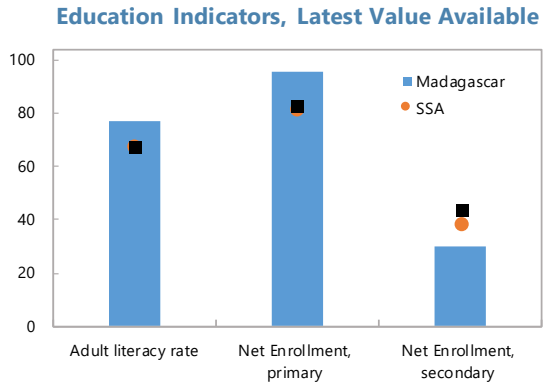


Source: IMF FAD Expenditure Assessment Tool (EAT), World Bank.
Note: Latest data available for Madagascar is 2018 (left panel) and 2012 (right panel).

fallen significantly since 2010[3] (Figure 4). As a result, 97 percent of 10-year-old children are not able to read and understand a simple text in French (World Bank, 2022b)[4].

5. Raising outcomes in education requires a concerted effort to allocate more resources to the sector, ensure transparent and merit-based teacher recruitment mechanisms, and strengthen teacher training and incentives. The government's policy initiated in October 2020 of canceling school enrollment fees is welcome and would facilitate universal access to school education. It is important to prioritize education spending by allocating more resources to the sector[5] and undertaking public financial management (PFM) reforms to improve budget execution. The preparation of annual expenditure commitment plans by social ministries in 2023, in line with sectoral strategies, together with the streamlined spending commitment process (both commitments under the ECF program) should help in this regard. Improving public investment prioritization of projects accompanied with appropriate costing of operational and maintenance costs (e.g., of school buildings) would contribute to greater resource efficiency in the sector. Additional recommendations include:

Figure 3. Education Outcomes



Source: IMF FAD Expenditure Assessment Tool (EAT), World Bank.

- Given limited fiscal space in Madagascar, integrating all FRAM teachers into the civil service is not feasible in the short term. An alternative approach is to gradually integrate them following a phased approach over several years (World Bank 2020, 2022a, 2022b).
- This should be done in a transparent and merit-based way following a competitive recruitment process to award contracts based on qualifications and competency tests—conducted for example by an independent agency for all civil service teachers (World Bank 2020, 2022a, 2022b).
- Undertake a biometric census of all civil servants including FRAM teachers and volunteer health personnel and utilize data results to verify the quality of the AUGURE database—an IT

[3] Student learning outcomes have multi-sectoral drivers which could include in addition to teacher quality, factors such as malnutrition, student illness, general learning environment, etc.

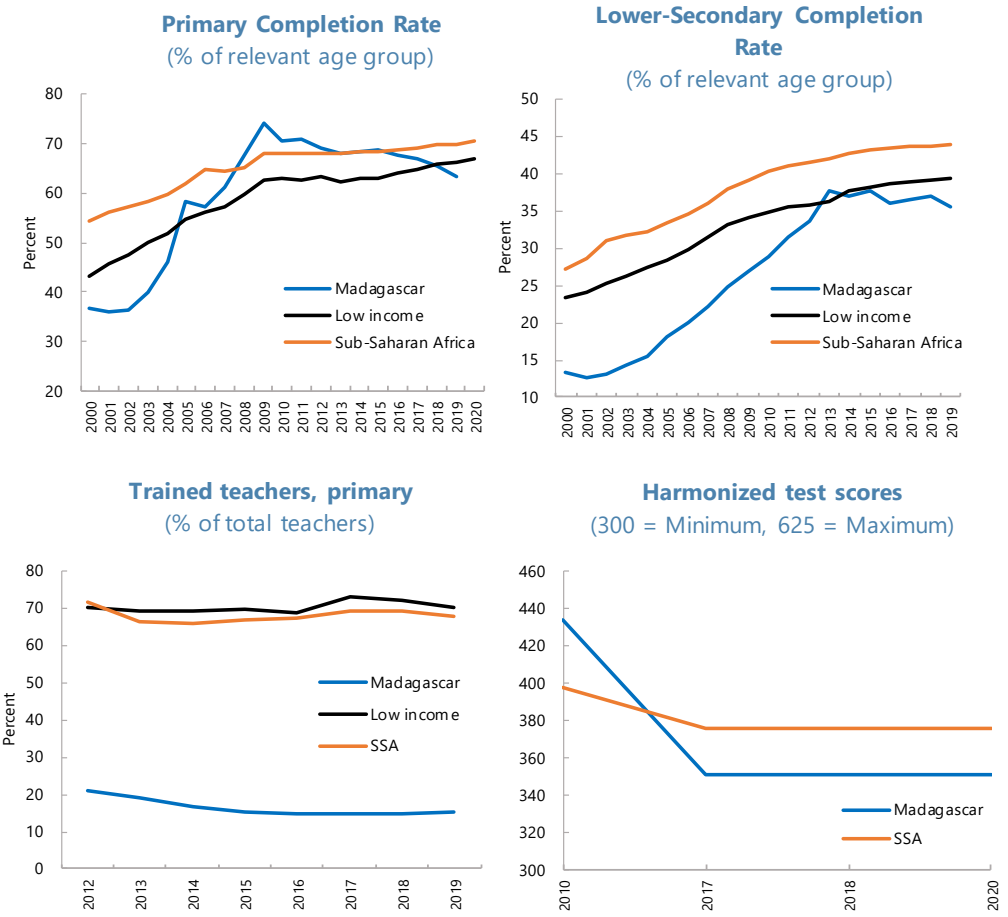
[4] A more recent study by the Ministry of Education and the World Bank suggests an improvement in learning outcomes between 2016 and 2021 despite the effects of the COVID-19 pandemic. The final results of the study should be released soon.

[5] While the government is committed to allocate at least 20 percent of the national budget to the education sector, actual budget allocations and realizations have been lower, ranging from 12–16 percent during 2021–23.

tool for civil service personnel management—including to eliminate any "ghost teachers". (Public Expenditure Tracking Survey, 2021).

- Ensure the timely release of funds to public school teachers[6] and to community teachers (World Bank 2020, 2022a, 2022b).
- Increase decentralized management in line with the decentralization policy[7] by allocating additional resources to schools (through school grants or transfers to "Caisse Ecole") while improving transfers' timeliness (World Bank 2020, 2022a, 2022b).

Figure 4. Education Outcomes



Source: World Bank.
Note: Harmonized test scores from major international student achievement test programs. They are measured in TIMMS-equivalent units, where 300 is minimal attainment and 625 is advanced attainment. Most recent estimates are used.

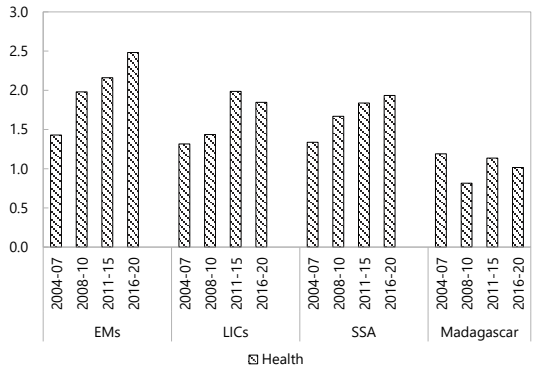
[6] According to World Bank (2022b), 40 percent of public teachers and 80 percent of FRAM teachers reported delays in receiving their salary more than once in the last two years, sometimes reaching several months.

[7] The government is shifting gradually towards management by school grants ("Caisse Ecole"). These school grants combined with school feeding transfers amounted to MGA 39 billion only in 2021 (0.07 percent of GDP).

C. Health

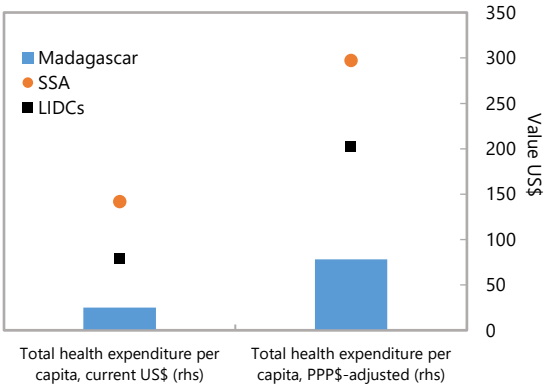
6. Government spending and total spending on health are low compared with low-income and SSA countries. Government health spending decreased in recent years (from 1.3 percent of GDP in 2016 to 1.0 percent of GDP in 2020) and remains low compared with LICs (1.8 percent of GDP over 2016-20), EMs (2.5 percent of GDP over 2016–20), and SSAs (1.9 percent of GDP over 2016–20) (Figure 5). Similarly to education spending, government health spending as a percent of total government spending is higher than in peers (18.6 in Madagascar compared to 10.2 in LICs), reflecting lower levels of government spending. However, total health spending *per capita* (both government and private) is about US$ 78 per person per year (on a PPP basis), less than half the average in low-income countries of $202 per person per year (Figure 6).

Figure 5. Health Spending, Central Government
(Percent of GDP)



Sources: IMF, Statistics Department

Figure 6. Health Spending, Total



Sources: IMF FAD Expenditure Assessment Tool (EAT), World Bank, World Health Organization.

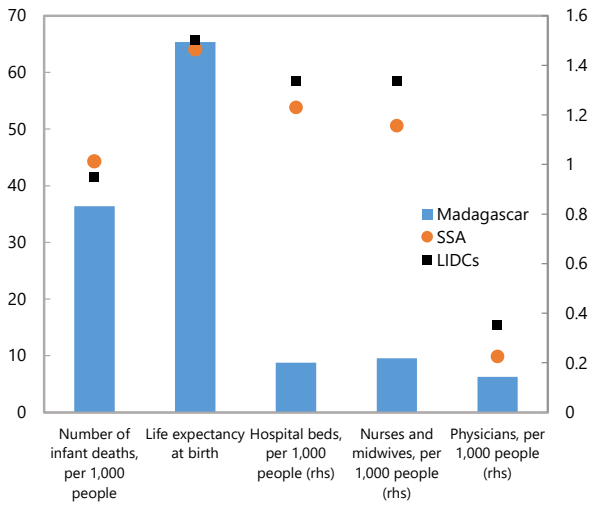
7. The public health system consists of four types of health facilities with limited autonomy (World Bank PER, 2014). These include basic health centers for primary care implemented within communes, referral hospitals within districts, referral and university hospitals within regions, and specialized centers at the regional and central levels. Private and community-based health insurance remains limited due to low incomes and a small formal employment base. Free services and vouchers are limited to specific programs and regions.

8. Madagascar has made progress on some key health indicators, but significant challenges remain in malnutrition, immunization, and service delivery. According to World Bank Development Indicators, Madagascar's performance improved over the last decade on life expectancy (67 years in 2020 compared to 62 in SSA), maternal mortality rates (335 deaths per 100,000 live births in 2017 compared to 534 in SSA), and infant mortality rates (36 deaths per 1,000 live births in 2020 compared to 50 in SSA). However, the prevalence of malnutrition has increased significantly (from 28 percent of the total population in 2010 to 49 percent in 2020). Likewise, the prevalence of stunting among children under five remains one of the highest in

the world (at 39.8 percent). Challenges remain on basic immunization coverage (Diphtheria, Tetanus, Pertussis) which remains low at 55 percent among 12–23 months aged children in 2021 according to World Bank indicators. Finally, the health system suffers from severe human resource shortages (physicians, nurses, and midwives) and other resource shortages (e.g., hospital beds) compared to other SSA and LIC countries (Figure 7).

9. Improving health outcomes will require the mobilization of additional domestic resources and large-scale reforms. With government health spending at only 1 percent of GDP, the health sector is clearly under-financed and under-staffed. Additional resources are needed—most notably in primary healthcare services—favoring the retention of qualified and motivated health workers while ensuring a better distribution in rural areas (most notably through strengthening decentralization and increasing allocations to basic health centers). PFM reforms are also needed to improve budget execution and ensure sound public investment management in the sector. The government's national social policy (adopted in 2015) and national social protection strategy (2019–23) outline the goal to attain universal health coverage (UHC) with a contributory system and free healthcare for the poorest households[8]. However, the implementation plan for the UHC strategy was never finalized. Therefore, a clear financing strategy is needed to achieve the objective of UHC accompanied with clear identification criteria of the poorest and most vulnerable households who will be eligible for free healthcare—based on the social registry currently in development (World Bank, 2022a).

Figure 7. Health Outcomes



Sources: IMF FAD Expenditure Assessment Tool (EAT), World Bank, World Health Organization.

D. Social Assistance

10. Social assistance[9] spending in Madagascar remains among the lowest in the world with limited coverage of the vulnerable population. Spending on social safety net programs (i.e., excluding social insurance such as pensions) averaged 0.2 percent of GDP over 2011–20 (according to ASPIRE database). This is significantly below spending levels in peers (0.9 percent of GDP median in SSA and 0.8 median in LIDCs, Figure 8). The government's strategy document (2019–23) aims to

[8] A decree was passed in 2017 establishing the "Caisse Nationale de Solidarité en Santé (CNSS)" or national health solidarity fund, a public entity with administrative and financial autonomy charged with collecting and managing UHC contributions and paying benefits to health institutions. The CNSS has recently been abrogated.

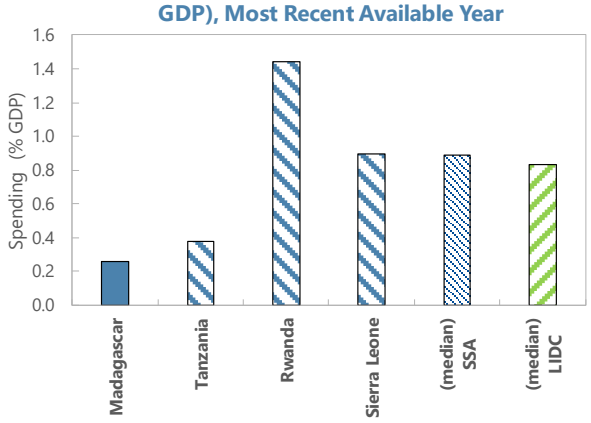
[9] Following the WB Aspire program classification, social assistance programs are defined as non-contributory transfers in cash or in-kind. Social assistance spending therefore includes cash transfers (conditional and unconditional), school feeding programs, targeted food assistance, and near cash benefits such as fee waivers and food vouchers.

increase social safety net coverage of extremely poor households to 15 percent by 2023 and 50 percent by 2030. However, coverage of social safety nets remains very limited (5 percent of the population compared to 20 percent in peers, Figure 9).

11. The social safety net system consists of two regular cash transfer programs mostly funded by donors:

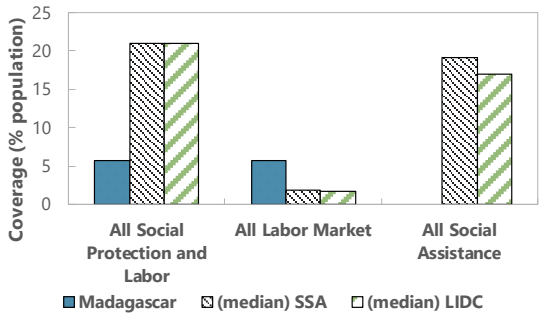
- A conditional cash transfer program (TMDH "Transfert Monétaire pour le Développement Humain"), providing regular cash transfers for families with children under the age of 12 and conditional on primary school attendance with a UNICEF-funded top up for children transitioning to secondary school (LUL "Let us Learn"). TMDH also includes beneficiaries from the program "Fiavota", an emergency cash transfer program designed to assist families severely affected by drought in the South of the country.
- A productive safety net program (ACTP - Asa Avotra Mirindra "Argent contre Travail Productif") providing cash for work opportunities over a minimum of three years for workers assessed as poor in select districts with an unconditional transfer component in favor of vulnerable persons who are unable to work due to disabilities.

Figure 8. Social Assistance Spending



Sources: IMF FAD Social Protection & Labor - Assessment Tool (SPL-AT), WB ASPIRE database.

Figure 9. Social Assistance Coverage



Sources: IMF FAD Social Protection & Labor - Assessment Tool (SPL-AT), WB ASPIRE database.

These programs are supported by the World Bank and implemented by the "*Fonds d'Intervention pour le Développment (FID)*". Combined, they currently cover about 309.000 households in extreme poverty mostly in rural areas (89 percent financed by donors). However, according to UNICEF, geographical coverage of these programs is limited (only operating in 7 out of 22 regions), and coverage is rationed in the beneficiary regions through proxy means testing and community verification (reaching only 30 percent of households in these regions despite pervasive poverty).

12. In addition, there are three types of shock-responsive social protection programs, two of which were developed in response to the COVID-19 pandemic:

- An unconditional cash transfer program (TVA "Toseke Vonje Aigne") launched in 2018 following the drought caused by El Nino in the South. This program includes specific triggers to cover victims of areas affected by poor harvests, cyclones, and droughts in the South. Coverage varies from year to year, but the total number of beneficiaries reached about 108,000 households receiving MGA 80.000 per month (around 20 U.S. dollars) for 5 months.

- An unconditional cash transfer program (Tosika Fameno) implemented following the COVID-19 pandemic in coordination with donors to support vulnerable households in three urban regions mostly affected by the negative effects of the national lockdown. Coverage reached around 215,000 households receiving MGA 100.000 per month (around 25 U.S. dollars) for two months (May and July 2020). Enrollment was done through self-registration using an online survey at the community level and payments were done in cash (through payment agencies) or through mobile money accounts.

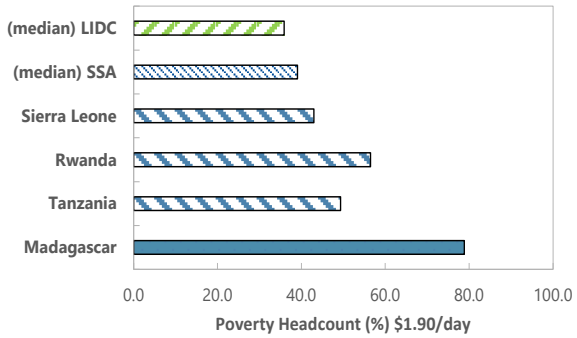
- A domestically financed presidential project providing in-kind donations (Vatsy Tsinjo) to the most vulnerable and to those whose activities were affected by COVID confinement in three regions. It is estimated that 305,000 food packs were distributed (out of an initial objective of 500.000 packs) with each household receiving two packs for two months (April and July 2020). While the strategy initially targeted the homeless, elderly, and those affected by confinement, it was extended to cover university students, artists, persons with disabilities, and public school teachers, among others.

13. Madagascar's poverty rate worsened following the COVID-19 pandemic and is projected to remain close to 80 percent over the next three years. The poverty rate based on the international definition (percent of the population living on less than US$1.90/ day in 2011 PPP) was estimated at around 78 percent in 2012, compared to 36 percent in LIDCs and 39 percent in SSAs (Figure 10). World Bank (2022a) estimates that Madagascar has not been able to reduce poverty over the last decade with the poverty rate now estimated at a record high of 81 percent in 2020. Furthermore, the poverty gap (a measure of the intensity of poverty given by the difference between the poverty line and the mean income of the poor in percent of the poverty line) is around 40 percent, compared to 13 percent only in SSAs. As for inequality, the latest measures date back to 2012[10] and show that inequality is close to the average of SSA countries, with a GINI coefficient of 42.6.

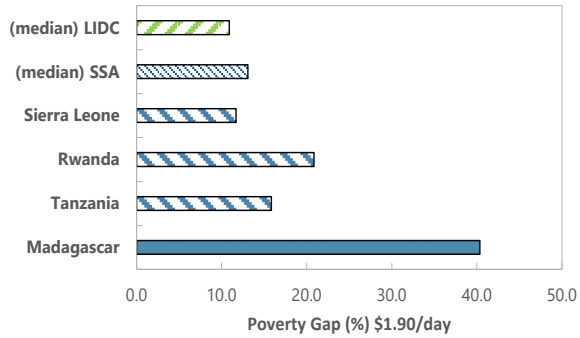
[10] According to World Bank (2020), there is a significant risk that the COVID-19 crisis heightened existing inequalities, given the projected increase in the extreme poverty rate in 2020.

Figure 10. Social Protection Outcomes

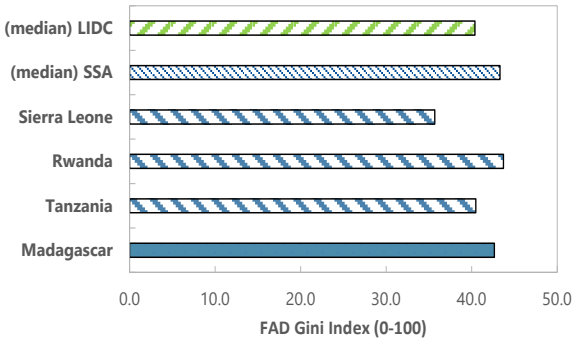
Poverty Context: Madagascar and Comparators, Most Recent Available Year



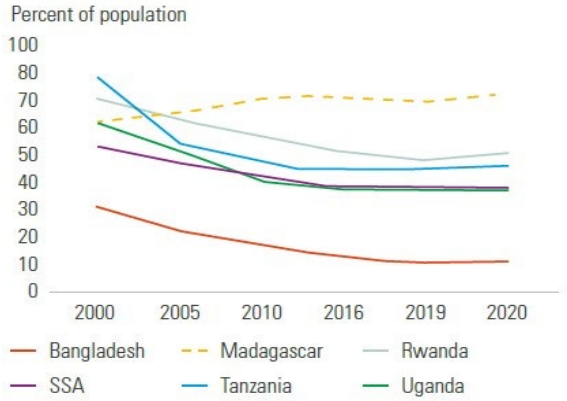
Poverty Context: Madagascar and Comparators, Most Recent Available Year



Inequality/Distributional Indicators Context: Madagascar and Comparators, Most Recent Available Year



Poverty Rate in Madagascar and Comparators



Sources: IMF FAD Social Protection & Labor - Assessment Tool (SPL-AT), WB ASPIRE, PovcalNet (World Bank), World Bank, ILO.

14. Strengthening the social protection system and expanding existing social safety nets should be a key policy priority in order to help reduce poverty and protect the most vulnerable. Key areas for policy action include[11]:

- **Update the social protection strategy.** The government adopted its National Social Protection Policy (PNPS) in 2015 with a vision to ensure coverage of half of the vulnerable population by 2030. The National Social Protection Strategy (SNPS) for 2019–23 in turn states the objective to cover 15 percent of the population in extreme poverty by 2023. In order to reach the PNPS objective, it will be important to update the medium-term strategy including to link stated objectives with a clear funding strategy.

[11] These areas are in line with the *Cour des Comptes* audit report on social measures taken in 2020 to combat the effects of the COVID-19 pandemic.

- **Develop a national social registry.** While the PNPS envisaged the creation of an inventory of all social programs and a unique register of beneficiaries with a view to improve planning and coordination of interventions, they are still under development and not yet operational. Scaling up the existing register of beneficiaries to a national social registry[12] (starting for example with a pilot phase with limited geographical coverage) will be key to facilitate expansion of transfers and to respond rapidly to future crises. The social registry should be managed and regularly updated over time by the Ministry of Population and serve as a basis to identify potential beneficiaries of social programs, ensure a coordinated and harmonized response to social needs, and avoid fragmentation of efforts by various donors.

- **Ensure predictable and sufficient budget allocations and scale up social protection programs sustainably.** Social assistance spending (i.e., cash and in-kind transfers) is extremely low and remains mostly financed by external donors. Given the poverty level and immense needs, it is important to find fiscal space (through spending reallocation and/or revenue mobilization) with a view to gradually expand coverage of existing social programs and increase households' resilience to future shocks. The successful experience gained from the program "Tosika Fameno", which was designed and implemented in just a few weeks, could be used to scale up existing social programs.

E. Simulations

15. Four illustrative scenarios are considered to estimate the total budgetary cost of raising the coverage of existing social assistance programs (Figure 11). In all four scenarios, it is assumed that the transfer increases every year with average inflation and that administrative costs are about five percent of the transfer size. Specifically:

- Scenario A assumes an average transfer of 50.000 MGA per household per month, with coverage of the poor population immediately reaching 15 percent in 2023 (in line with the authorities' social protection strategy targets).

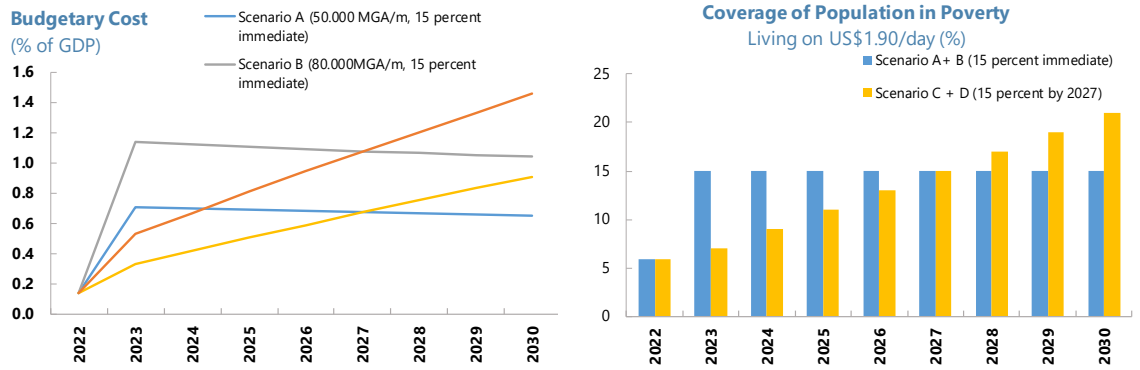
- Scenario B assumes an average transfer of 80.000 MGA per household per month, with coverage of the poor population immediately reaching 15 percent in 2023.

- Scenario C assumes an average transfer of 50.000 MGA per household per month, with coverage of the poor population only gradually reaching 15 percent by 2027 and continuing to increase to 20 percent by 2030.

[12] While a register of beneficiaries is a static database/list of *existing* beneficiaries of specific social programs, a social registry is not just a database, but a full information system including *potential* beneficiaries (eligible or not). In particular, it is a dynamic system that evolves over time and supports registration of applicants, determines potential eligibility, stores, verifies, updates, and validates data. Scaling up from a register of beneficiaries to a social registry would require pre-conditions such as establishing a unique identifier (e.g., biometric ID) and comprehensive surveys to collect socioeconomic indicators allowing the calculation of a vulnerability index.

- Scenario D assumes an average transfer of 80.000 MGA per household per month, with coverage of the poor population only gradually reaching 15 percent by 2027 and continuing to increase to 20 percent by 2030.

Figure 11. Increasing Social Assistance Coverage, Simulations 2022–30



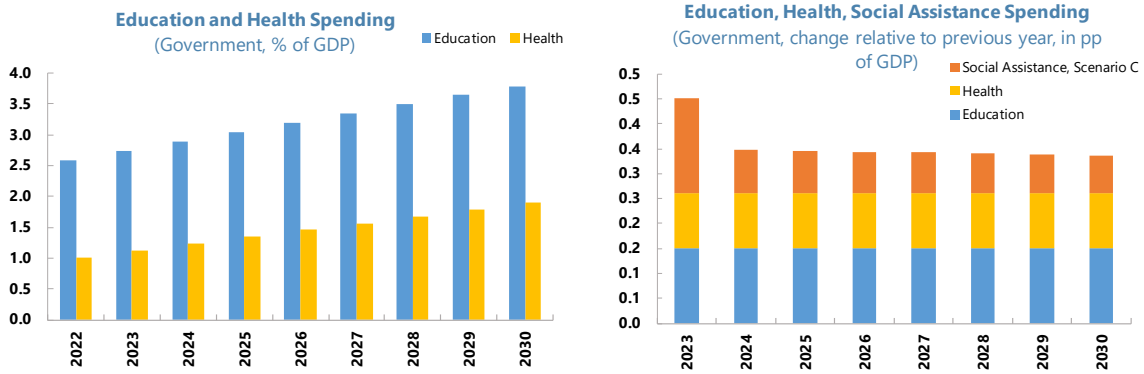
Sources: IMF Staff Estimates.

16. Significant budget allocations are needed to reach the authorities' objective under all four scenarios. The budgetary cost of social assistance spending would need to increase from the current 0.1–0.2 percent of GDP to 0.7–1.5 percent of GDP by 2030[13]. Under Scenario C, a gradual increase in coverage accompanied by a moderate transfer amount (50.000 MGA per household per month) would result in feasible budget increases of 0.1 percent of GDP per year, to reach the SSA spending average of 0.9 percent of GDP by 2030.

17. Increasing education, health, and social assistance spending gradually to SSA levels by 2030 would require annual budget increases of 0.3 percent of GDP every year (Figure 12). Specifically, government education spending is assumed to increase by 0.2 percent of GDP every year (from 2.6 to reach SSA average of 3.8 by 2030). Similarly, government health spending is assumed to increase by 0.1 percent of GDP every year (from 1.0 to reach SSA average of 1.9 by 2030). Social assistance spending is assumed to increase by 0.1 percent of GDP every year consistent with Scenario C above. In total, social spending needs to increase by 0.5 percent of GDP in 2023 then by 0.3 percent of GDP every year during 2024–30 to reach SSA spending levels and cover 15 percent of the vulnerable population by 2027.

[13] In all four scenarios, there is a steep increase in 2023 relative to 2022 due to the increase in the average transfer amount per household in 2023. The average transfer amount for all current social transfer programs is not known for 2022 but is assumed to be 22.500 MGA per household for the purpose of these simulations (which is implicitly derived by taking current household coverage and the estimated total budget cost).

Figure 12. Increasing Social Spending to Average SSA Levels, Simulations 2023–30



Sources: IMF Staff Estimates.

F. Conclusions

18. Finding fiscal space to allocate more public resources to the education, health, and social protection sectors should be a key government priority. The resources currently budgeted for these sectors remain much lower than in other SSA countries and insufficient to improve development outcomes. Madagascar made some progress in improving access to primary education and basic health services, but the quality of the education system has deteriorated, significant human resource gaps remain in the health sector, and the poverty rate has increased. Continued efforts are needed to scale up social services, identify additional sources of financing, and allocate resources efficiently given the immense development needs of the country.

19. Large scale institutional and structural reforms are needed to raise social outcomes and alleviate poverty:

- In all three sectors, undertake PFM reforms to address significant budget under-execution (including implementation of expenditure commitment plans by social ministries in line with sectoral strategies) and to strengthen public investment prioritization, budgeting, and management.
- In the education sector, ensure quality teachers by gradually integrating community teachers into the civil service through a transparent and merit-based recruitment system and increase decentralized management of education resources.
- In the health sector, mobilize additional resources to address equipment and medical staff shortages, improve merit-based recruitment processes to ensure the integration of qualified health workers, and clearly identify criteria for free basic healthcare coverage of the most vulnerable households. For households not eligible for free healthcare, encourage formalization or facilitate voluntary participation in contributory health insurance schemes.

- In the area of social protection, identify clear and predictable funding sources with a view to gradually scale up existing social programs, while developing a national social registry to harmonize the social response among different interventions and actors and set a strong basis to gradually increase social assistance coverage of the vulnerable population.

References

Cour des Comptes Audit Report, 2020, "Audit De Performance Des Mesures D'urgence Sociales Dans Le Cadre De La Lutte Contre La COVID-19"

Politique Nationale de Protection Sociale (PNPS), 2015, https://www.unicef.org/madagascar/media/8636/file/Politique%20Nationale%20de%20Protection%20Sociale%20(PNPS).pdf

Public Expenditure Tracking Survey (PETS) in the Education Sector at the Primary Level, 2021, https://www.unicef.org/madagascar/media/9581/file/Rapport%20PETS%20.pdf

Stratégie Nationale de la Protection Sociale (SNPS) 2019-2023, https://www.unicef.org/madagascar/media/8631/file/SNPS%202019-2023.pdf

UNICEF, 2021, "Towards a Universal and Inclusive Social Protection for the Children of Madagascar"

UNICEF, 2021, "Enquête sur le suivi des dépenses publiques dans le secteur de l'éducation au niveau primaire à Madagascar (enquête PETS)"

UNICEF, 2020, Budget Briefs, https://www.unicef.org/esa/documents/madagascar-budget-briefs-2020

World Bank, 2014, "Public Expenditure Review (PER) Health Sector Background Paper"

World Bank, 2020, "Madagascar Economic Update: Setting a Course for Recovery, December 2020"

World Bank, 2022 (a), "Systematic Country Diagnostic Update for Madagascar, April 2022"

World Bank, 2022 (b), "Madagascar Economic Update: Navigating through the Storm, May 2022"

INFORMALITY AND GROWTH IN MADAGASCAR[1]

This chapter investigates the link between informality and growth in Madagascar and aims for a better understanding of the informal sector. It provides an analysis of the characteristics of informal production units and informal employment. Findings suggest that informality is a key feature of economic activity in Madagascar, and that informal production units are the main driver of employment with a deep concentration around self-employment. Overall, informality is associated with a lack of awareness of administrative procedures and the complexity and cost of tax and regulatory measures. The informal sector's Total Factor of Productivity (TFP) growth is more stable and higher on average than formal sector TFP.

A. Introduction

1. The concept of informality has evolved over time. Since its introduction in the early seventies, the definition, causes, measurements and implications of the informal sector have generated lively debates. Given its multiple potential associations, the concept remains elusive, making its measurement subject to many criticisms and limitations. These limits constitute an important challenge to statisticians and policy makers, as informality is often associated with paths to circumvent "inadequate" policy decisions. Therefore, recognizing informality's possible contours and associations is key to design successful policy measures.

2. Informality is generally recognized as a reality entailing missing legal and administrative compliance. It represents all economic activities carried out by workers or economic units which are not covered or only partially covered – by law or in practice – by formal arrangements. This study is based on the results of the 2012 national survey on employment and informal sector (ENEMPSI in French) conducted by the National Statistics Office (INSTAT), which covers all informal non-agricultural production units in Madagascar. An updated survey has been carried out in 2021/2022, and the results' dissemination is ongoing with the support of the ILO. The preliminary results, to be published in the coming months, remain broadly unchanged compared to the 2012 survey. The informal sector used in this chapter represents production units that failed to provide statistical identification numbers and written financial records. The criterion of written financial records was introduced to avoid excluding production units which would have a statistical identification number without functioning like formal units (based on the mode of organization and production).

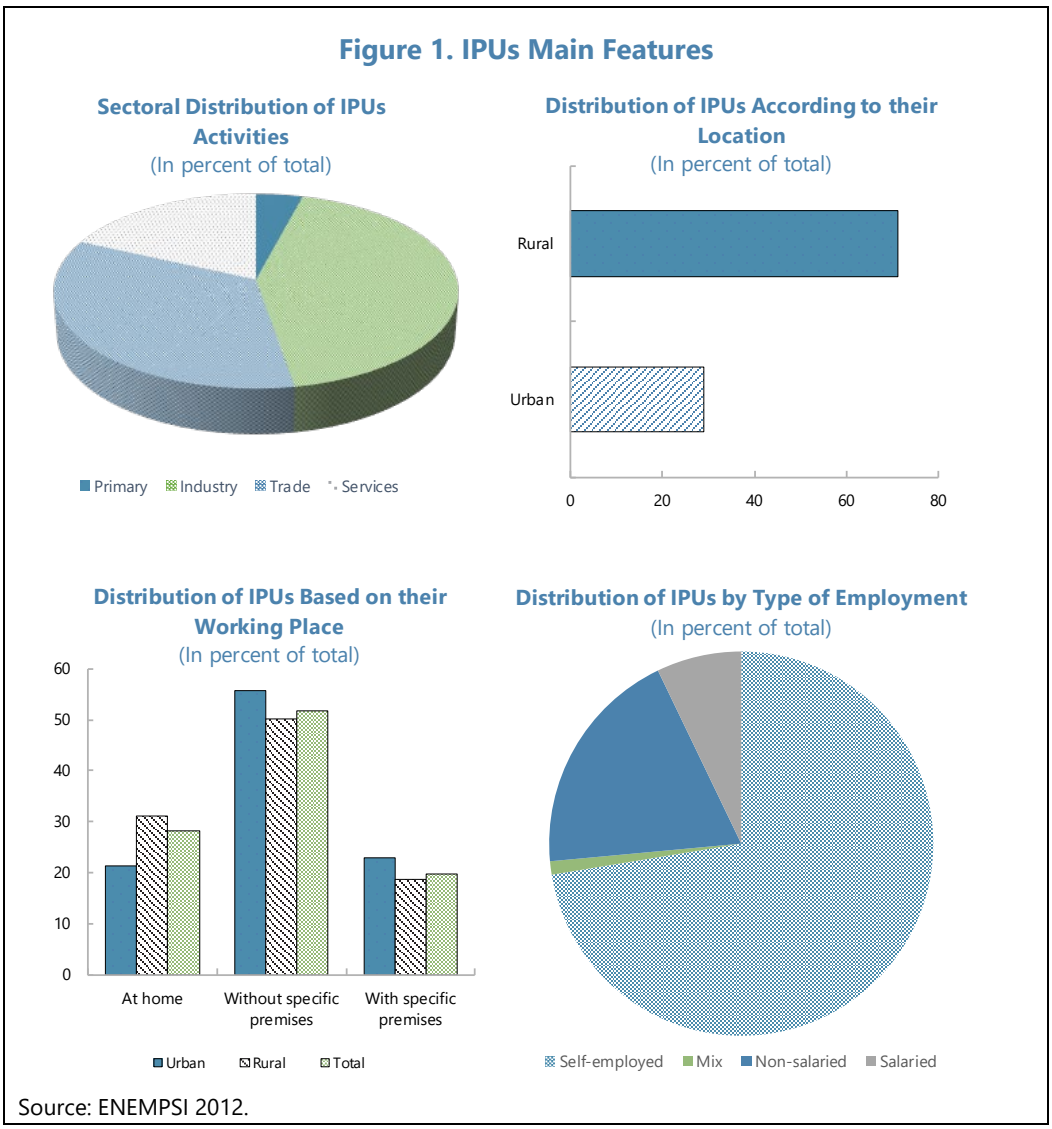
3. This chapter aims to provide a better understanding of the informal sector and investigates the relationship between informality and growth in Madagascar. The rest of the chapter is divided into four sections. Section B describes the key stylized facts of informality in Madagascar. Section C explores the link between informality and the state. Section D explores the link between informality and growth. Finally, section E concludes with some policy recommendations.

[1] Prepared by Mokhtar Benlamine, Véronique Salins, Ghislain Afavi, Ialy Rasoamanana (all AFR); Coffi Agossou and Nombàna Razafinisoa (all ILO).

B. Stylized Facts of Informality in Madagascar

4. Informal production units (IPUs) play a predominant role in Madagascar's economy. Almost all individual production units in the country are informal. As of end-December 2012, the country had 2,268,900 individual production units, 99.9 percent of which were classified as informal as they failed to provide statistical identification numbers and written financial records. Their activities are principally concentrated in garment manufacturing (43 percent) and trade (34 percent). IPUs are mostly located in rural areas (71 percent), and typically operate without specific premises (52 percent) or at home (28 percent). Most of these informal units only include one self-employed individual (72 percent) and only 8 percent employ salaried workers. The average size of an informal unit is about 1.4 person. IPUs operate for about 10.3 years on average, with longer lifespan for units located in rural areas and for units operating in both the manufacturing and agricultural sectors. In contrast, IPUs operating in trade and services have a shorter lifespan on average.

Figure 1. IPUs Main Features

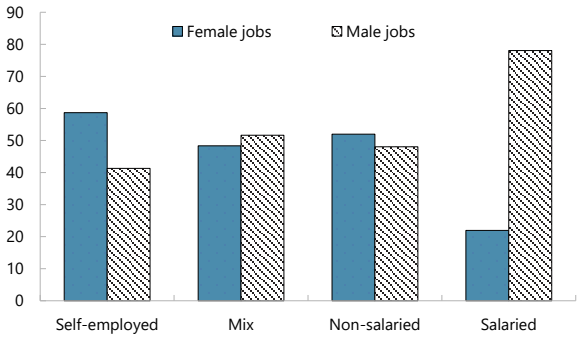


Source: ENEMPSI 2012.

5. The informal sector is the main source of employment in Madagascar. It provides 95 percent of the total employment and is the main supplier of jobs for women (97 percent of women employment is in IPUs vs. 94 percent for men), young people, and people with less to no education. Workers in the informal sector are relatively young with an average age of 35 years compared to 41 years in the administration. Almost one third of the informal workforce are made up of individuals under the age of 26 years. Younger employees often work as paid or unpaid apprentices, or as caregivers. Young people represent only 18 percent of IPUs managers. The level of education is low with an estimated average of 4.7 years of schooling. Seven out of ten employees learned on the job and only 2.4 percent have pursued official training. The share of employees with work experience in a large company is as low as 0.4 percent.

6. The Malagasy informal sector is characterized by a relatively high female participation. Half of the jobs (52 percent) in the informal sector are held by women. Most self-employed workers are women (58 percent). Most family helpers in the informal sector production units are women (53 percent). Nonetheless, women occupy the lowest paid or most vulnerable positions including domestic services to households and other categories of family aid. There is a strong female presence outside agriculture, as the female labor supply is significant and represents 21 percent of female jobs against 14 percent of male jobs. Informal agricultural enterprises mobilize much more male labor than informal non-agricultural enterprises.

Figure 2. Distribution of IPUs by Gender and Type of Employment
(In percent of total)



Source: ENEMPSI 2012.

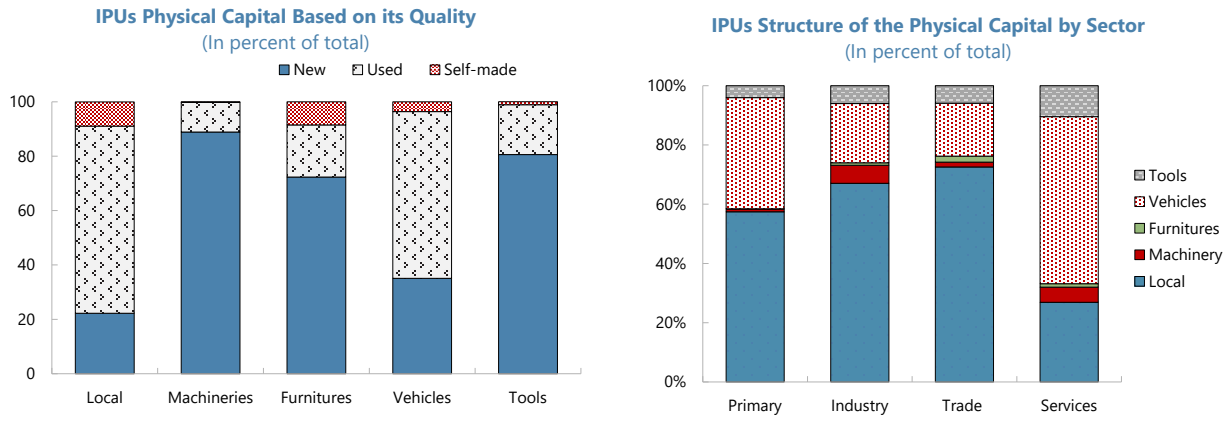
7. Decent work conditions are far from being met and labor regulations are poorly respected in the informal sector. Eight out of ten employed individuals are affected by inadequate employment situations. Only 3 percent of the workers benefit from a written contract; 27 percent have oral contract and nearly 70 percent have no contracts at all. Paid leave is almost non-existent among dependent workers (0.8 percent) and very low among employees (2.5 percent). Informal employees' access to social protection services is very low, with about 97 percent of workers being excluded from the existing contributory social security system. There is no employment protection. Four out of ten dependent (paid and non paid workers and family helpers) jobs and one third of salaried jobs are non-permanent.

8. The informal sector's assets remain low. Informal activities are mostly exercised by workforce with low level of education, skills, and competence. Working hours are less than in the formal sector with the majority of workers in the informal sector not working for more than 35 hours per week (53 percent). The average amount of physical capital remains low at MGA 956,600 (less than 250USD) per unit. Physical capital in informal activities consist essentially of premises (54 percent) and vehicles (33 percent). Machineries and tools count only for 12 percent of the total physical capital. Nearly 60 percent of this capital is purchased on the second-hand market, while

34 percent is newly acquired and 6 percent self-built. About 65 percent of it is personal properties, 23 percent is shared with other IPUs and 11 percent is rented. Investment remains very low at about MGA 380,200 (less than 100USD) and is basically used to acquire premises (48 percent) and rolling stock (33 percent). Only 44 percent of the IPUs report having invested during the year of the survey, with the investment being only estimated at 8 percent of their value added, highlighting the low accumulation capacity of the sector.

9. Financial borrowing is rare. Over the reporting period, only 3.4 percent of the IPUs affirm having recourse to borrowing. Loans come primarily from family and friends (48 percent); microfinance institutions (21 precent) and suppliers (15 percent) and they are used essentially to finance the acquisition of raw materials. Investment is largely financed by individual savings for almost 97 percent of its nominal value, with hardly any use of banking and microfinance services.

Figure 3. IPUs Access to Physical Capital



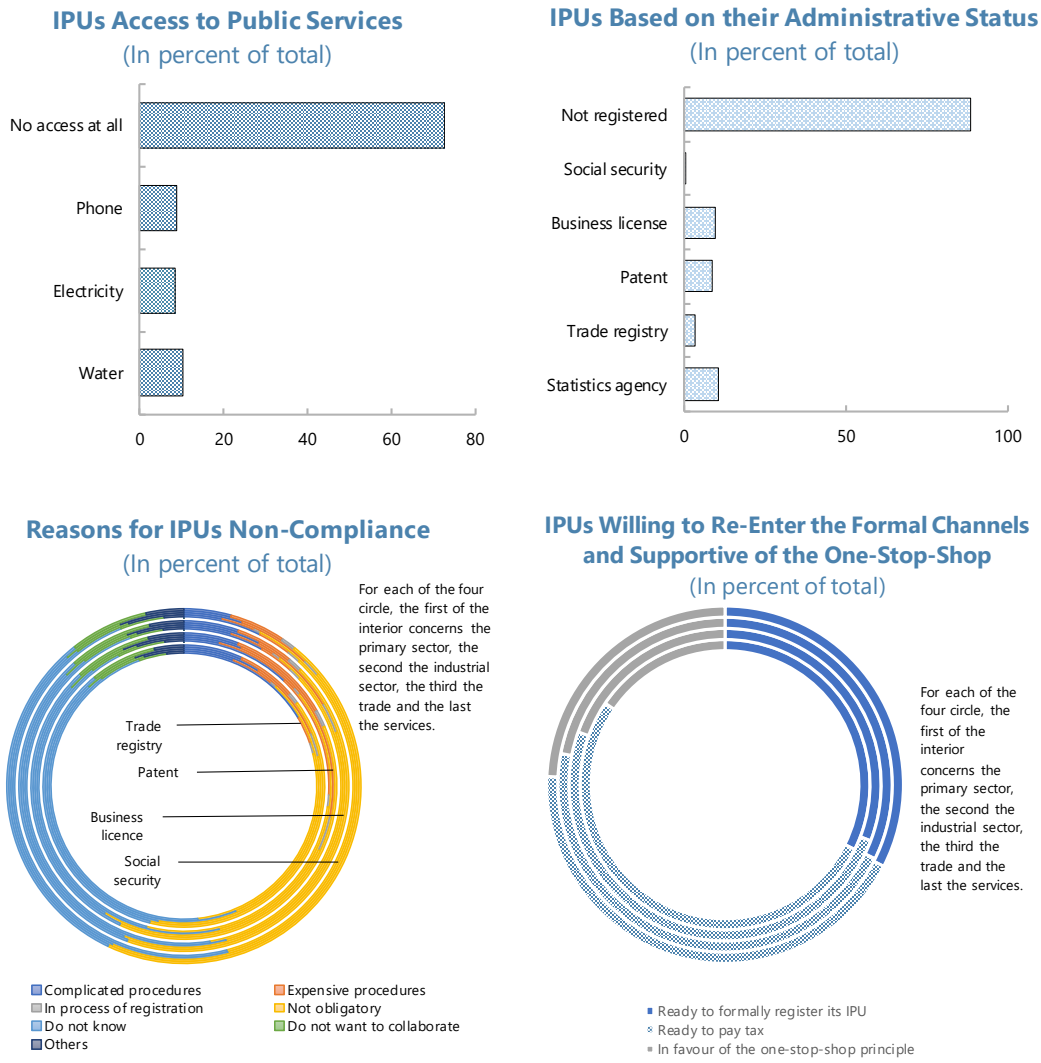
Source: ENEMPSI 2012.

C. The Informal Sector and the State

10. The informal sector has little if no access to public services, particularly in rural areas. Informal activities are often carried out in an unsafe environment, without access to basic public services. More than eight out of ten IPUs are housed in makeshift facilities with only 10.2 percent having access to water; 8.8 percent to phone communication; and 8.4 percent to electricity. The situation is worse in rural areas. Only 9.8 percent of IPUs located in rural areas have access to water, 4.6 percent to electricity and 6.4 percent to phone services against respectively 17.7 percent for water and electricity and 14.5 percent to phone services in urban areas.

11. The informal sector is almost completely unknown to the public sector. Nearly nine out of ten IPUs are completely unknown to the administrative services. Only 11 percent have a statistical identification number; 9 percent pay the patent (professional tax); 9 percent have professional license and 3 percent are registered at the "Trade registry". The affiliation to the social security system is almost inexistent (0.2 percent).

Figure 4. IPUs Links with State



Source: ENEMPSI 2012.

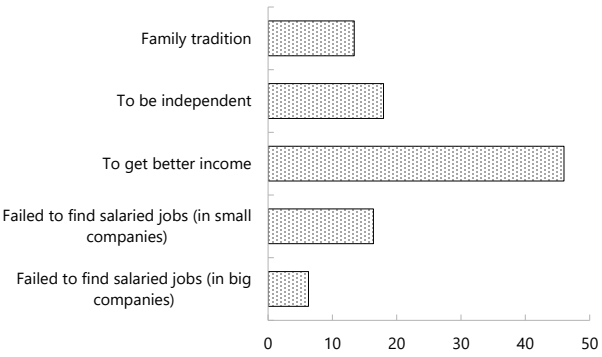
12. Unfamiliarity with procedures (40 percent) and lack of awareness on companies' obligations (33 percent) are the main reasons behind noncompliance in the informal sector. Only 8 percent of the units consider the procedures are complicated and 7 percent affirm that formally registering is expensive. Additionally, only 6 percent of the IPUs report being informal in order to circumvent the current legislation, to avoid paying a patent, to obtain professional license or to contribute to the social security system.

13. Yet, the informal sector claim they are not against formalizing their activities. More than 40 percent of respondents stand ready to administratively register their companies while 61 percent confirm their willingness to pay taxes. Their main motivations include a better access to market location (25 percent) and higher credit access (14 percent). Some 6 percent of the IPUs have already launched the registration process but could not finalize due to the complexity and high cost

of procedures. Nearly 67 percent of the units consider that taxes should be paid to the local administration (not the central administration) to (i) build infrastructure (44 percent); (ii) invest in health and education (30 percent); and (iii) establish a fund to support micro-enterprises (18 percent). This result underscores the importance that IPUs place on getting a better access to public services to justify taxation.

14. Setting-up informal activities appears to be motivated by the search for higher income and independence. Although, the situation differs from one sector to another, the choice to operate in the informal sector is overall motivated by the hope to get higher income (46 percent); to be independent (18 percent); and to perpetuate family tradition (13 percent). Less than a quarter of the respondents mentions the difficulties to find salaried job in small and large companies as a reason to create an individual company. In the urban areas, the creation of a non-agricultural informal units to compensate for the failure to find salaried employment is higher than in a rural areas, pointing to greater difficulties to enter the labor market in urban areas.

Figure 5. IPUs Main Motives to Create Informal Enterprises
(In percent of total)



Source: ENEMPSI 2012.

D. Informality and Growth

15. The relationship between informality and growth is a long-standing debate with mixed conclusions. The incapacity to define a unique and concensual measure of the informal production makes the discussion on the relationship between the formal and the informal sectors even more complex, as different studies with different methodologies provide different results. However, we can distinguish between four approaches to informality. In the dualist approach, the informal sector engages in survival activities and operates in isolation from the formal sector. The structuralist approach sees the informal units as subordinated economic units, and informality as an attempt by formal units to reduce their cost of operations to increase their competitiveness. The legalist approach considers the informal sector as a response to a hostile legal system characterized by cumbersome government rules and procedures creating barriers to formalization. Finally, the voluntarist approach sees the informal sector as a deliberate choice made by micro-entrepreneurs weighing the benefits and costs of formality.

16. The contribution of the informal sector to Madagascar's national wealth creation is significant. The informal sector accounted for 43 percent of GDP in 2012. Excluding agricultural activities, the informal sector contributed by 36 percent to non-agricultural GDP, the equivalent of 24 percent of total GDP. Informal trade businesses accounted for 69 percent of the informal sector total turnover, 45 percent of total production and for 46 percent of overall added value. The manufacturing sector accounted for 15 percent of the total turnover, 28 percent of the production of goods and services, and for 29 percent of the informal sector value added.

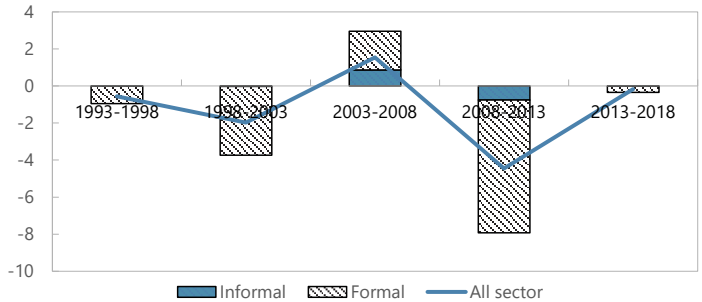
17. However, the informal sector may pose unfair competition to the formal sector. The 2013 World Bank Enterprise Survey highlights that 71.7 percent of formal firms are competing against unregistered or informal firms, and that 19 percent of firms identify practices of competitors in the informal sector as a major constraint.

18. There is a stable long-run relationship between the informal sector's GDP and the formal sector's GDP in Sub-Saharan Africa (SSA). The World Bank's Prospects Group provides a database for the informal economy using several approaches for 196 countries over the period 1990– 2018. Using the multiple indicators multiple causes model-based estimates (Schneider, Buehn, and Montenegro 2010) of informal output, we operate cointegration tests on a panel of 40 SSA countries from 1993-2018. We performed three different cointegration tests, which are Kao test, Pedroni test, and Westerlund test. The dependent variable is the formal sector's GDP, and the independent variable is the informal sector's GDP. The results suggest that both series are cointegrated so we can argue for the existence of a stable long-run relationship between the informal sector's nominal GDP and the formal sector's nominal GDP. The result holds for Kao and Westerlund tests. Assuming that there is no cross-sectional dependence in the panel, we found that, the informal nominal GDP does Granger cause the formal GDP (the inverse is also true), which means both variables can help predict each other. However, when controlling for the cross-sectional dependence in the Granger causality test, the Granger causality disappears in both directions. These results highlight the importance of formalizing the economy by providing enough incentives rather than constraining the development of the sector, which will have negative implications on the formal sector as well.

19. Single regressions confirm the existence of this cointegration for Madagascar. Using the multiple indicators multiple causes model-based estimates of informal output for Madagascar, we confirm the existence of a long-term positive relation between the informal and formal economy over the 1993-2018 period. This relation is stronger when controlling for the political crisis of 2002 and 2009. Both formal and informal GDP series are integrated with order one, and the Johansen cointegration tests is conclusive. The residual is stationnary at 10 percent.

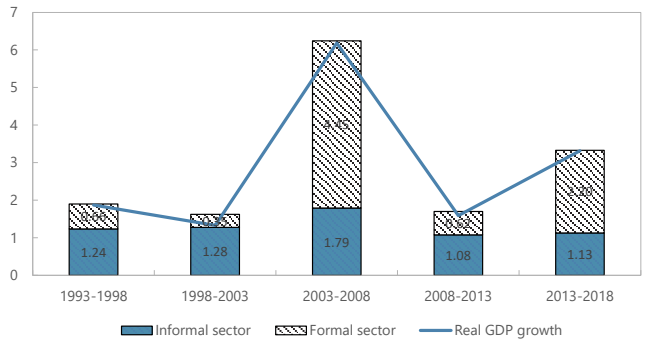
20. The informal sector's TFP growth is more stable and higher on average than the formal sector's TFP growth. We first estimate the TFP of the economy (Annex VI for the IMF staff report on Madagascar of the 2022 Article IV consultation). Second, we estimated the TFP of the informal sector under the assumption that the sector uses only labor to produce and employ 95 percent of the country's labor force. This assumes that the share of labor in the informal sector is constant, which is consistent with the preliminary results of the 2021/2022 national survey. The TFP is then computed using a linear Cobb-Douglas function. The formal sector's TFP is then computed assuming the TFP in the economy is the weighted average of both sectors'

Figure 7. TFP Growth Across Sectors



TFP. The weight is time variant and corresponds to the share of each sector in the GDP. The results suggest that TFP growth is heterogenous across sectors, TFP growth in the informal sector is more stable and is close to zero. These results are in line with previous studies. Grimm and Lay (2011) investigated the dynamics of the informal sector in Madagascar between 1995 and 2004. They find that growth in the informal sector was mostly extensive, with little job creation or capital accumulation and that most activities were expanded through the creation of new firms rather than expanding the existing ones, which is consistent with much higher returns at very low levels of capital. Additionally, using a panel of 135 formal firms collected in 2004 and 2007 in Madagascar, Byiers and Iacovone (2011) compare labor productivity in small informal firms with labor productivity in small formal firms. They find lower labor productivity in formal firms compared to informal firms. The authors explain these results by the high costs of formalization.

Figure 8. Contribution to Growth: Informal and Formal Sectors



E. Policy Recommendations

21. ILO recommendation R204 on the transition from the informal to the formal economy recommends three ways to complete the formalization process: (i) the creation of decent jobs and sustainable businesses in the formal economy; (ii) the transition of workers and enterprises from the informal to the formal economy; and (iii) the prevention of jobs informalization..

22. Formalizing the economy is in line with Madagascar's Emergence Plan, as stated in Velirano 8: Decent employment for all. This measure is of particular importance due to the effects on other sectoral and specific policies such as ones supporting inclusive growth (improving the productivity and efficiency of production units, equal opportunity for access to markets and means of production), tax policies (broadening of the tax base, transparency and tax justice), employment policies (promotion of decent work, etc.), trade policies (integration in the national or international value chain, competition law), education and health policies (abolition of child labor, improvement of scholarship rate, improvement of working conditions and women's health, etc.).

23. Considering the importance of the informal sector in Madagascar, adjusting policies in favor of the transition from the informal economy to the formal economy is key. With a growing number of people operating in the informal economy in Madagascar, it is felt that a less tax-oriented and a much more social protection-oriented strategic approach is required to stimulate the formalization process. Aknowledging and considering the dynamic of informality and its key drivers and features constitute a first step towards adopting better-tailored policies. To do so, the National Institute of Statistics is currently compiling the results of the 2021/2022 informal survey conducted with the support of the ILO. Ensuring timely and reliable access to this information could

help. Additionally, supporting the National Employment and Training Office, responsible for centralizing, analyzing, and disseminating statistical data on employment, as well as the General Directorate of Employment for the strengthening of the Public Employment Service will help overcome the weaknesses of the labor market information system and facilitate matching job supply and demand at the national level. They also could provide orientation, training, placement, and follow-up services.

24. Streamlining labor regulations and strenghtening institutional coordination are also key elements in the formalization process. The Labor Code currently in force in Madagascar is governed by Law No. 2003-044 of July 28, 2004. The issue of the informal economy is not considered in this law. ILO has supported the authorities in revising this law, especially in its articles 1, 2 and 3 to better consider the rights of informal workers. The new Labor Code is expected to be submitted to the National Assembly and Senate during the next parliamentary session. The authorities could also (i) promote the creation of formal employment in Madagascar by supporting youth entrepreneurship initiatives and strengthening existing projects (FIHARIANA, etc.); (ii) reform the legal and regulatory standards to conform to the ratified international instruments; (iii) put in place legislation likely to facilitate the transition from the informal to the formal economy by reducing adminsitrative formalities and proposing incentives for IPUs to formalize; and (iv) broaden the social protection system by extending social security coverage to workers in the informal economy (at the level of the CNaPS and other related services).

25. Promoting social security is a priority of the development strategy. This will contribute to the reduction of inequalities and the vulnerabilities of Malagasy workers through the access of rural and self-employed workers to the already existing social security mechanisms, in particular to health coverage for the workers and their families as well as to retirement pension. The promotion of social security to rural workers, who make up 82 percent of Malagasy workers, highlights the inseparable and complementary link between employment and social protection, one of the priorities and a condition for sustainable development clearly defined in the National Development Plan. The current Social Security Code in Madagascar is governed by Decree No. 69-145 of April 8, 1969, establishing the Social Security Code. Its coverage is limited and requires an overhaul to better meet the current and future challenges and needs. The government has requested the support of the ILO to revise the Social Security Code. A roadmap is being developed for the new code to be available around 2024. Meanwhile, the authorities could explore various mechanisms allowing all workers to benefit from social protection and to improve the offer of services and benefits, on the one hand, and to improve safety and occupational health at the enterprise level, including in the informal sector and in the agricultural sector, on the other hand.

26. Raising public awareness about tax law and procedures is also key, in parallel with enhancing the quality of the tax administration services and reducing the cost of formality and compliance by adopting an adequate legislative framework with micro-and-small enterprises to support the process of formalization.

27. Designing a simplified tax system that accounts for both the characteristics of the informal sector as well as the capacity of the tax administration is equally important (see Box). Although it is hard to tax because of its fragmented nature, the informal sector nevertheless has a

non neglible tax potential that could contribute to the country's efforts to mobilize fiscal revenues. This suggests the design of a tax policy that is specific to the IPUs while ensuring its viability via mainly the maximization of the gains while maintening the taxation costs at an optimal level for the tax administration. Progress in the field of digitalization offers new opportunities for taxing the informal sector.

Box 1. Taxation of Micro-Enterprises in Madagascar

Fostering formalization requires a simple tax system and reduced compliance costs. While Madagascar has recently made significant efforts to reduce administrative compliance costs, the main tax applying to micro-businesses could be further simplified.

The taxation of micro-enterprise is based on a flat rate levy. A single combined tax (*Impôt synthétique, IS*) of both income tax and VAT applies to business or individuals with a turnover lower than MGA 200 million (about USD 50 000) per year. The tax represents 5 percent of the businesses' turnover with a minimum tax of MGA 16 000. However, 2 percent of the amount of purchases of goods and services can be deduced from the tax as long as the business can provide invoices in line with the model established by the tax authorities. The same applies to personnel costs as long as they are subject to the personal income tax (IRSA, Impôt sur les Revenus Salariaux et Assimilés). The is complemented by *the Impôt Synthétique Intermittent* (ISI) which specifically targets the informal sector. Registered persons or businesses purchasing goods or services from the informal sector are required to withhold 5 percent of the amount paid (the rate climb to 10 percent when the transaction implies non-residents).

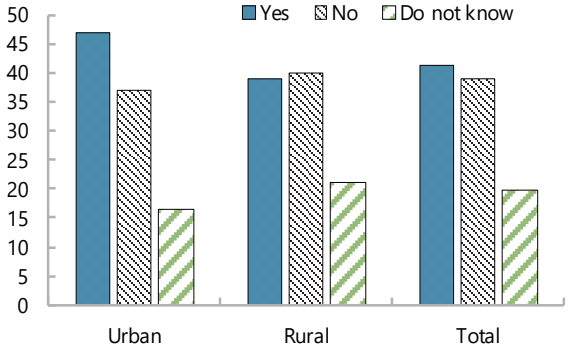
The tax system applying to micro-enterprises could be further simplified to avoid imposing a relatively large tax burden or significant administrative costs on micro-businesses. A tax rate of 5 percent of turnover can be significant for businesses with relatively low profit margins. And, while it can be reduced to 3 percent based on registered purchases of goods and services, benefiting from this deduction significantly increases administrative burden for micro-businesses which may not have the capacities to carefully account for all their operations. In this context, the authorities could envisage lowering the IS rate while keeping the minimum of perception. In addition, it would be also important to ensure that the IS rate is lower than the ISI rate to efficiently promote formalization.

With unfamiliarity with procedures and lack of awareness about companies' obligations being the main reasons cited behind non-compliance in the informal sector, it is essential to ensure that tax compliance is not too cumbersome. In this regard, recent efforts from the tax authorities to simplify procedures for registration and IS payment, including by digitalizing the declaration and payments processes are welcome. Stabilizing the system and avoiding conflictual signaling - by unduly questioning the eligibility to the regime and using excessive tax controls after the formalization of the units - are also key elements to build trust in the taxation system and facilitate the formalization process.

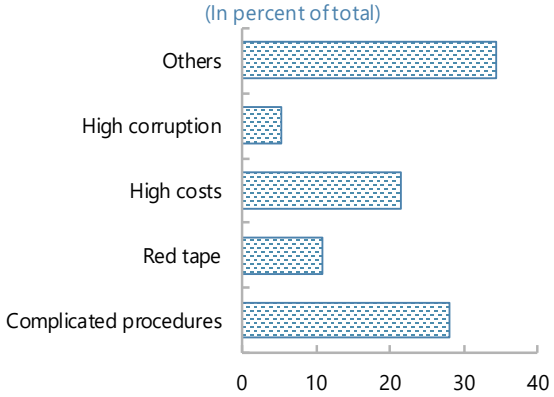
28. Alleviating financial constraints to increase and facilitate access and reducing the cost of financial services would support higher investment. To facilitate access to financing, the authorities could (i) set up a national guarantee fund with subsidized rates and a start-up fund to help companies to be compliant with regulation; (ii) design and implement effective regulations that reconcile financial stability and the opening of new financing channels for businesses; (iii) encourage investors' participation; and (iv) support the private sector through setting up a development bank and bringing more resources to formal financial intermediation at lower costs.

Figure 9. Informal Sector Key Characteristics

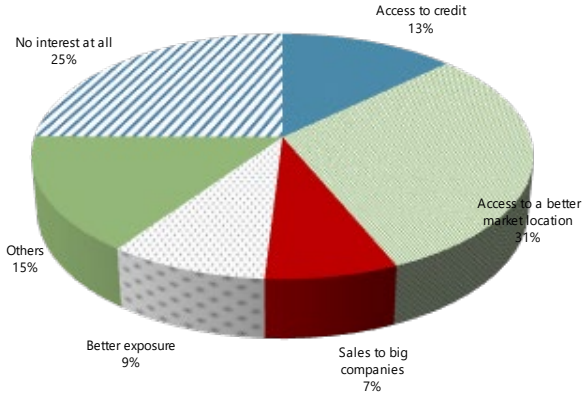
IPUs Based on their Willingness to Register their Business
(In percent of total)



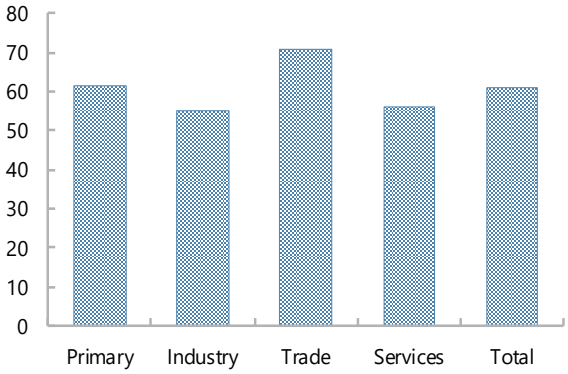
IPUs Based on the Reasons for not Completing the Registering Process
(In percent of total)



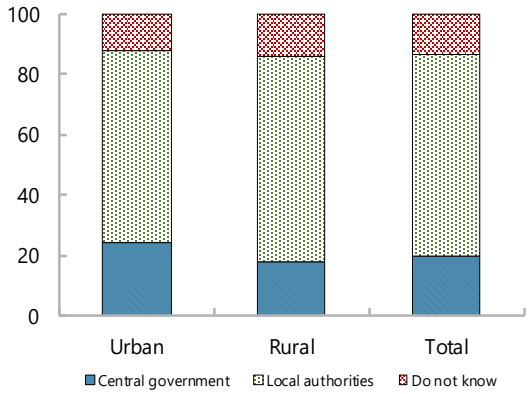
IPUs Based on their Main Interest to Register their Business
(In percent of total)



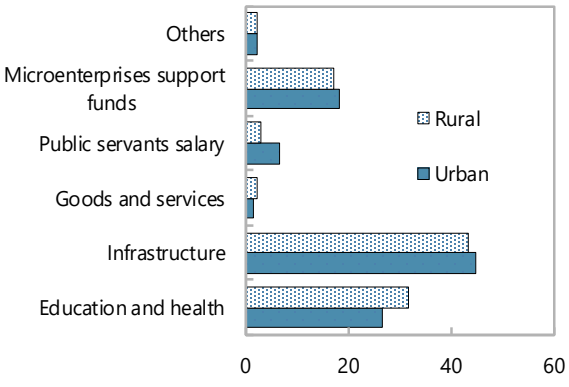
IPUs Based on their Willingness to Pay Tax
(In percent of total)



Main Beneficiaries of Tax Payment According to IPUs
(In percent of total)



Distribution of IPUs by the Uses of Collected Tax
(In percent of total)



Source: ENEMPSI 2012

FOOD INSECURITY AND CLIMATE SHOCKS IN MADAGASCAR[1]

Food insecurity dramatically increased in Madagascar over the last 10 years, hampering human development. The root causes of food insecurity in Madagascar are related to demographic vulnerabilities, multidimensional poverty, lack of education, as well as structural weaknesses in the food value chain and the lack of basic infrastructure, such as irrigation and transportation, that hamper agricultural activity development. Moreover, Madagascar is exposed to a large variety of climate shocks that climate change will likely exacerbate. The main policy recommendations to reduce food insecurity include i) improving the emergency response and preparedness, ii) policies to address structural food insecurity, by improving the food chain and addressing challenges posed by climate shocks, and iii) measures to improve Green PFM and C-PIMA to invest in long-term resilience and mobilize external financing.

A. Food Insecurity in Madagascar: Recent Developments

1. Food insecurity dramatically increased in Madagascar over the last 10 years, hampering human development. As of September 2022, 8.8 million people across Madagascar (about 33 percent of the population) are food insecure[2], an increase of one million in three months. As of November 2022, 2.22 million people in the Great South and Great South-East are facing emergency levels of food insecurity (Figure 1). The number of people in food insecurity is particularly higher over the lean season, but the situation remains critical throughout the year. Five million people are affected by recurring natural disasters, such as cyclones, floods, and droughts[3]. The prevalence of acute malnutrition[4] stands at 8 percent, while the prevalence of chronic malnutrition[5] stands at 40 percent, ranking Madagascar as the 10th most affected country by stunting.

[1] Prepared by Dominique Fayad (AFR), in close collaboration with Aminata Doucoure, Herilalaina Rambalo, and Federico Ramonda (all from the World Food Program). The analysis benefitted from helpful comments from the European Union (EU) and The Food and Agriculture Organization (FAO).

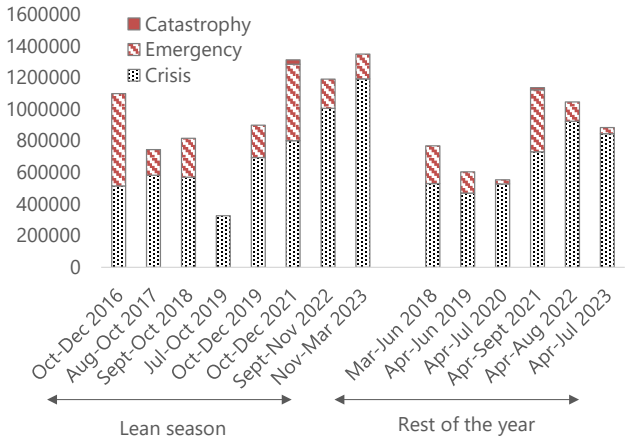
[2] According to World Food Summit in 1996, food security is defined when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.

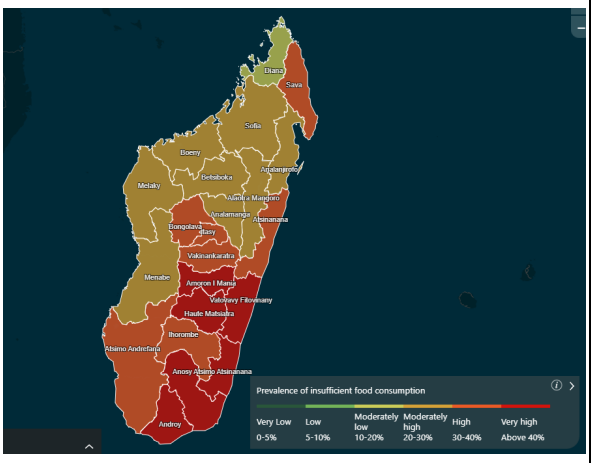
[3] According to UNDRR and UNDP.

[4] Also known as 'wasting', acute malnutrition is characterized by a rapid deterioration in nutritional status over a short period of time. In children, it can be measured using the weight-for-height nutritional index or mid-upper arm circumference.

[5] Also known as 'stunting', chronic malnutrition is a form of growth failure which develops over a long period of time, as a result of inadequate nutrition over long periods of time (including poor maternal nutrition and poor infant and young child feeding practices) and/or repeated infections. It is defined as the percentage of children, aged 0 to 59 months, who have low height for age. Height for age < -2 standard deviations from the median height for age of reference population = stunting. Height for age < -3 standard deviations from the median height for age of reference population = severe stunting.

Figure 1. Number of People in Food Insecurity and Hunger Map for November 2022

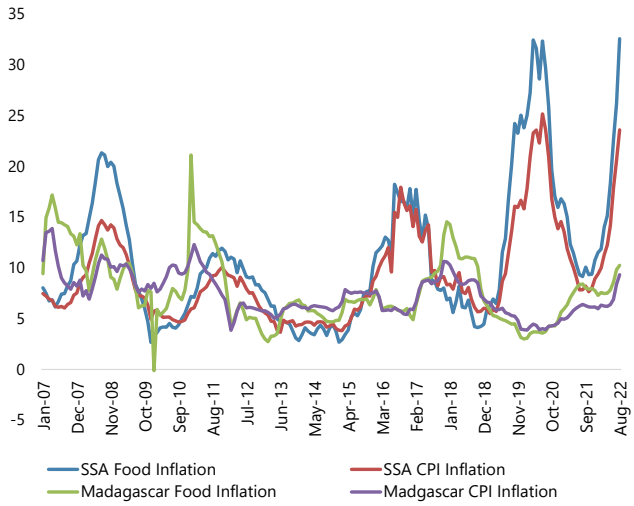




Source: Joint Malnutrition Estimates – WFP, UNICEF, WHO, World Bank
Note: People with insufficient food consumption refers to those with poor or borderline food consumption, according to the Food Consumption Score (FCS). The FCS is a proxy indicator for food security that measures the diversity of household diets, and how frequently food is consumed. The FCS is calculated using the frequency of consumption of eight food groups by a household during the 7 days before the survey using standardized weights for each of the food groups reflecting its respective nutrient density, and then classifies households as having 'poor', 'borderline' or 'acceptable' food consumption.

2. Extreme weather events, the COVID-19 pandemic, and the fallout from the conflict in Ukraine have exacerbated food insecurity. A prolonged period of exceptional droughts in the South since 2019 has reduced agriculture production, placing about 1 million people on average in food insecurity over the last 3 years, among which 250 000 in famine situation. Madagascar was hit by no less than 5 tropical weather events[6] in 45 days during the 2021/2022 cyclonic season, which meteorologic centers assessed as "normal" intensity based on historic trends for the whole season, but exceptional in terms of frequency. Heavy rains, strong wind, floods, and landslides caused extensive damage to the road network,

Figure 2. Madagascar and SSA: CPI and Food Inflation, 2007–2022
(Percent)



Source: INSTAT, IMF World Economic Outlook database. and IMF staff calculations.

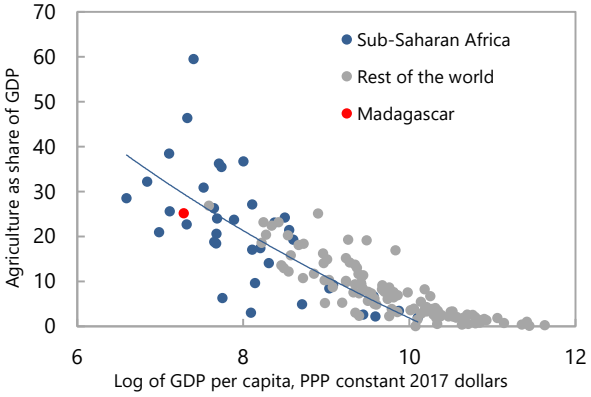
[6] Cyclones Batsirai and Emnati impacting the Est, and tropical storms Ana, Dumako, and Gombe.

dams, houses, schools and sanitary facilities, rice fields (many flooded twice) and orchards putting pressure on food prices and impacting subsequent harvest seasons. Despite the rainfall from Batsirai and Emnati cyclones in the Southeast, farmers' supply remains insufficient in areas that experienced protracted poor harvest seasons following droughts and pest damage to crops. The past cyclonic season also appears to have had a significant impact on cash crops production, such as cloves, coffee, and pepper, which are exported at 90 percent and constitute the most important source of revenue for the national economy. Up to November 2022, the cost of the food basket increased on average by 19 percent over the last three years, as a consequence to a decrease in farmer's supply as a result from a poor harvest following three consecutive years of drought in the Great South as well as an increase in transportation costs as a result of a rise in international oil prices and administrated pump prices. Although, Madagascar's food inflation remains much lower than SSA average (Figure 2), the cost of the average food basket on the markets of the Great South stands at MGA 2 013 (USD 0.45) per person per day, while about 85 percent of the population lives on less than USD 1.90 a day.

3. The 2022/2023 agricultural prospect is uncertain and food insecurity could further worsen. Despite the benefits of cyclone-induced precipitation in February 2022, the small size of the agricultural land in the Great South limits the amount of anticipated crops production. In addition, potential infestations, such as locust and armyworm may arise. The authorities have ignored calls by the FAO and other agencies to conduct preventive treatments and pest damage has already been widely observed by communities mainly on maize, sweet potato and to a lesser extent rice and cassava. Agricultural destruction in other regions is also severely impacting the prospects for the next agricultural campaign. As a result,1.5 million people are expected to experience emergency levels of food insecurity (IPC Phase 3) over April to July 2023.

4. Natural hazards, poor agricultural practices, the inadequacy of hydro-agricultural infrastructure and the lack of education, are identified as the root causes of malnutrition by the Malagasy authorities. Chronic extreme weather events, along with severe multidimensional poverty and structural agriculture vulnerabilities, make Madagascar's food supply chain Since 2019, periods of drought are increasingly frequent (Figure 5) and 2.8 million people was exposed to dysfunctional. With agriculture employing 83 percent of the population (Figure 3)[7], climate change is set to

Figure 3. Sub-Saharan Africa: Share of Agriculture and GDP per Capita, 2020



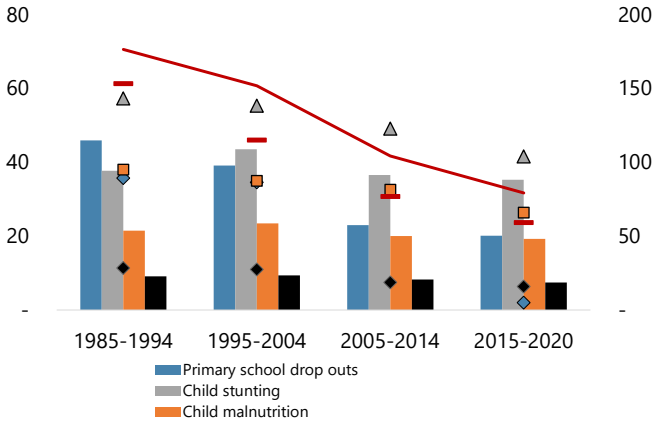
Sources: World Bank, WDI; and IMF staff calculations.

[7] According to the last Census in 2018, 83,2 percent of Malagasy households practice agriculture, 11.7 percent of which live in urban areas compared to 88.3 percent in rural areas.

exacerbate food insecurity and potentially imperil hard-earned development gains. Drought occurs often in the Great South, with an interval of around two years, while precipitations have been declining in the previous twenty years, as it has in practically every other region of Madagascar. Before the impact of the El Niño weather phenomenon in 2016, the last drought with high intensity and impact dates to 2009–2011, and affected 720,000 people. droughts[8] in 2021. The progression of the condition in this region is consistent with Burke et al. (year) prediction that meteorological drought caused by inadequate rainfall will rise in duration, frequency, and intensity. In the Great South of Madagascar, the degree of exposure to drought risk is very high and the impact of this deficit on agriculture is palpable. With a poor and predominantly rural population, the livelihood of the population depends on the agricultural sector and the resilience of households is diminished by the recurrent droughts. Increased food insecurity could affect child nutrition and educational attainment, worsening health and education outcomes, already much worse than SSA average (Figure 4). The 2030 UN Sustainable Development Goal 2 (SDG2) that aims to end hunger will be difficult to reach amid the "new normal" of frequent and recurring droughts, floods, cyclones, and rising temperatures.

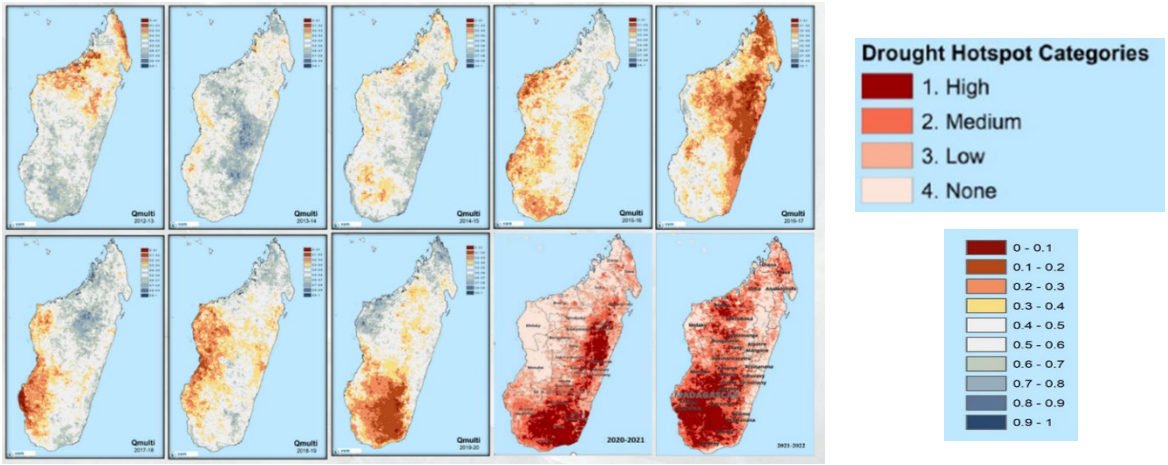
Figure 4. Madagascar and SSA: Child Health and Education Outcomes Related to Food Insecurity, 1985–2020

(Percent, unless otherwise indicated)



Note: Markers indicate Madagascar's indicators.
Sources: World Development Indicators. World Health Organization and IMF staff calculations.

Figure 5. Madagascar Drought Index 2012–2022



Source: Malagasy Meteorological Institute, WFP.

[8] Regional South African Vulnerability Analysis (rSAVA),

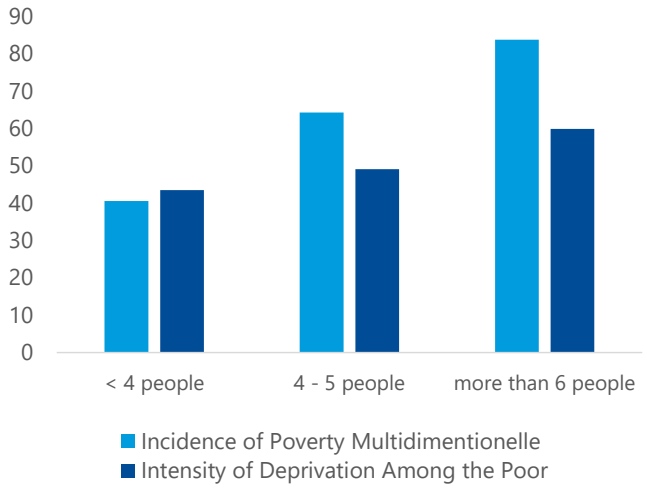
B. Demographic and Food Value Chain Vulnerabilities

The root causes of food insecurity in Madagascar are related to demographic vulnerabilities, and structural weaknesses in the food value chain, that hamper agricultural activity development.

Socio-Economic Vulnerabilities of the Food Insecure Population in Madagascar[9]

5. Household's structure, low education level, and poor living conditions in the Great South constitute challenges for subsistence. In the Great South, more than one-third of households have 4 to 5 members and about one-fourth have more than 7 members, in comparison to 4.3 members on average in rural areas at the national level and multidimensional poverty and the degree of deprivation are positively correlated with the number of individuals in the household (Figure 6). In areas with chronic vulnerabilities, above national average household size is an aggravating factor of precarious living conditions. On average, 78.5 percent of dwellings in the ten assessed districts are made of precarious materials (sheet metal, plank and others) in comparison to only 28 percent in the Betroka (regional granary area) where households' standard of living is moderately higher. Less than 15 percent of the Great South population attended primary education of which 35 percent dropped out of school, thereafter, leading to 80 percent of the regional population being very low qualified and about 45 percent analphabet, against 23 at the national level respectively. As a result, the inactive/active ratio is very high at about 48.4 percent in 2021 which puts households in risk of poverty trap and high vulnerability when disability exists.

Figure 6. Incidence and Intensity of Multidimensional Poverty by Household Size, 2021



Source: INSTAT

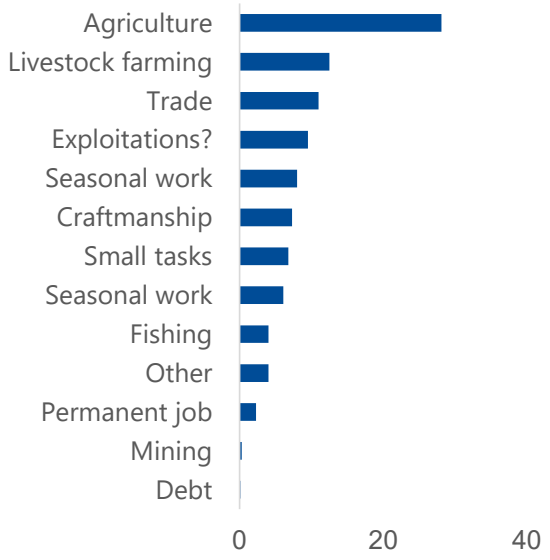
6. Households diversify their activities in order to earn enough income. An average household resorts to more than 13 activity types to generate income over one month, while 75 percent are hit by at least one natural hazard (droughts, pests and cyclones), food price or insecurity shock over 6 months. Agriculture, livestock, and trade account for the largest share of disposable income[10] (Figure 7). Rainfall deficit and drought account for most of the shocks affecting

[9] Madagascar Vulnerability Assessment Committee (mVAC): WFP, Unicef, FAO, BNGRC, ONN , MINAE , INSTAT, 2022. Evaluation Approfondie Multisectorielle Grand Sud de Madagascar. This assessment was made on 2477 households distributed in 250 Fokontany in the three regions of the Great South in order to inquire about living conditions, the evolution of the current campaign and to update of food security indicators in households.

[10] Nearly eighty-four percent (84 percent) of households practice agriculture, thirty-seven percent (37 percent) of livestock and about thirty-two percent (32 percent) for trade, the other activities cited are for the rest (mining operations and borrowing or debt are the least practiced by households).

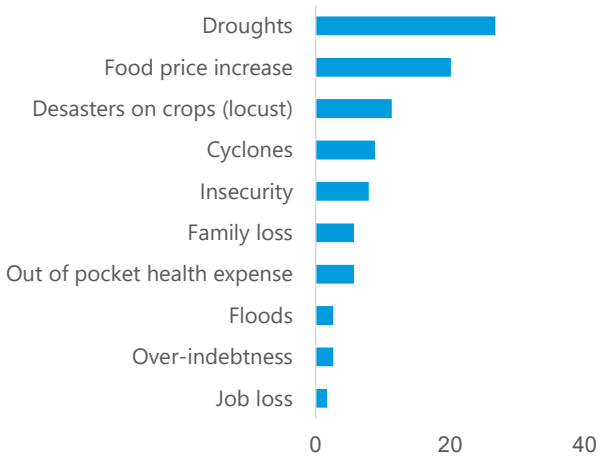
households in the ten districts of the Great South, followed by rising food prices and crop damage due to pests (Figure 8). Populations in districts with ports will be the least impacted by food price shocks as they can more easily access diversified food products and substitute their food consumption. Some districts with the lowest percentage of farming households affected by rainfall deficit and pests, diseases, locusts or caterpillars, have seen their cultivated areas reduced due to lack of means to protect their investments, hereby further hampering food capacity production. Half of the communities reported a 53 percent decrease in cultivated areas in 2021 compared to normal. Future production (high season) is expected to be 63 percent lower than normal due to weather conditions, pest infestation, the high cost of agricultural inputs, and the harvest coverage in terms of consumption varies between 1 to 5 months. In half of the districts, over-indebtedness is the fourth shock experienced by households as agricultural households borrow to buy additional seeds when the rain is delayed, and to buy food from traders between delayed cash transfer payments.

Figure 7. Household Income per Activities, 2022
(In percent of total income)



Source: MVAC

Figure 8. Types of Shocks Experienced by Households, 2022
(In percent of total households)



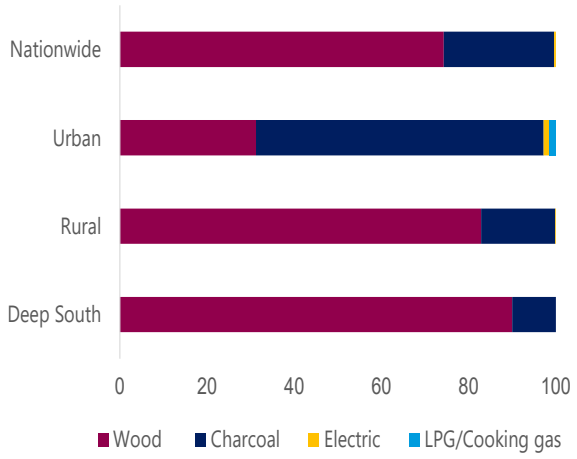
Source: MVAC

7. Women-led households are more vulnerable to food insecurity. Thirty-five percent of the households in the Great South are led by women, in comparison to 24 percent at the national level. In some Southern regions, the share of women head of households is about twice higher than the national average, due to the migration of men for economic reasons for periods longer than 6 months. A large share (37 percent) of households includes only one parent (separated, divorced, widowed and single) with a majority headed by women. Households headed by women [are poorer on average and therefore] spend relatively more on food than those headed by men. In addition to socio-economic factors (wealth at the household level), female-headed households have a higher risk of being severely food insecure compared to male-headed households as these households lack

a more stable source of income in the absence of spouses[11]. Larger households are more likely to be food insecure as they have more members to feed. Also, food insecurity in the Great South is also associated with a lack of access to improved water services. The hardship of fetching water from unprotected water supply points beyond the 30-minute journey time (including waiting time) is the responsibility of 95 percent of women.

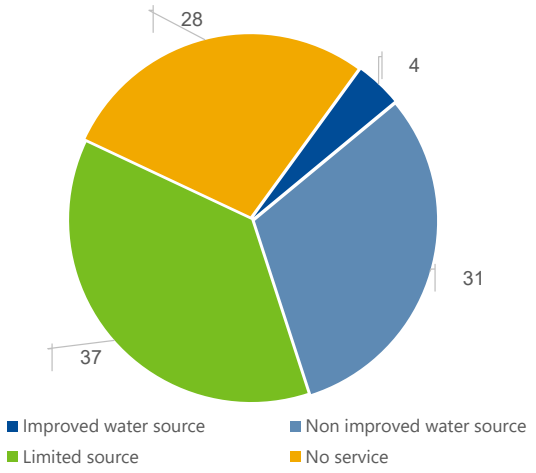
8. Poor energy sources and heavy reliance on primary biomass and charcoal increase vulnerability to food and climate shocks. The strong dependence on biomass --the direct use of wood as fuel is 76 percent in rural and 87 percent in the Great South (Figure 9)--with slow and difficult renewal due to the context of drought exposes communities in the short and medium terms to a risk of fuel shortage and damages the environment and population health, which in turns increase vulnerability to climate change (see next section), and the related price increase impacts households' already low purchasing power. Lack of income generation opportunities during drought and COVID-19 pandemic have pushed more people in rural areas to be involved with the commerce of charcoal, for trade in major cities and villages, putting more pressure on the rare forests of Southern Madagascar, and increase vulnerability to climate shocks. Acute respiratory infection affects 6.8 percent of children aged 6-59 months in the ten districts of the Deep South of Madagascar[12]. According to the World Bank, the productivity cost of the use of fuelwood for cooking borne by women is estimated at USD 4.71 billion annually, due to lost productivity from extended time spent on cooking-related tasks, including fuel collection, cooking, and stove cleaning.

Figure 9. Cooking Fuels, 2021
(In percent)



Source: WB, WFP

Figure 10. Households Access to Water in the Deep South, 2022
(In percent)



Source: WB, WFP

[11] From the Agricultural Production and Food Insecurity Assessment (EPASA), October 2022, an in-depth analysis of the factors that explain food insecurity (moderate and/or severe).

[12] INSTAT, UNDP. Analyse de la Pauvreté Multidimensionnelle à Madagascar, February 2021.

9. Access to quality water in the Great South is extremely limited, impacting population health through drinking and cooking. Only 4.2 percent have access to a quality water supply from an improved water source, compared to 27.7 percent at the national level. Almost one-third of women in charge of fetching water go directly to the pond or the river is in the irrigation canals where water quality is low because of long distance to water sources (Figure 10). As a result, diarrheal diseases, and febrile illnesses from all causes, including malaria, affect respectively 18.3 percent and 66.2 percent of children aged 6–59 months in the ten districts of the deep south of Madagascar.

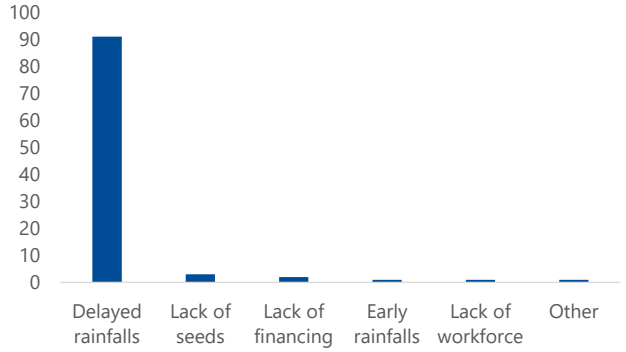
Structural Issues in the Food Value Chain

Agriculture

10. A survey[13] led by the Vulnerability and Assistance Committee identified the main obstacles to agriculture as perceived by farming households in the Great South. Climate is the first obstacle for a very large majority of the municipalities surveyed. The second impediment is the presence of pest followed by the high cost of agricultural inputs. the non-existence or the poor condition of infrastructure to support agricultural production (dams, irrigation canals) were identified as a third factor.

11. The strong prevalence of small farm holders (less than 100 acres) does not allow for food self-sufficiency. Agricultural techniques employed are generally traditional and essentially depend on natural conditions (rainfall). Among the households in the ten surveyed districts of the Deep South, 45 percent operate less than 50 acres, 34 percent between 50 to 100 acres and only 21 percent have more than 100 acres. In the South, the access to arable land is problematic as a great majority of the land is limestone, which worsens the impact of the rainfall deficit. In addition, some parts of the South are also affected by sand winds (Tiomena), which sand up the land, making agriculture impossible in some areas.

Figure 11. Causes of Delays in the Seedings Installation, 2022
(Percent)



Source: MVAC

12. Framers struggle to anticipate seeding due to rainfall unpredictability. Significant weather variability (delay of rain, drought, etc.) leads to delays in seeding and low production because of non-adaptation to change, which results in the lack of control over the planting of crops,

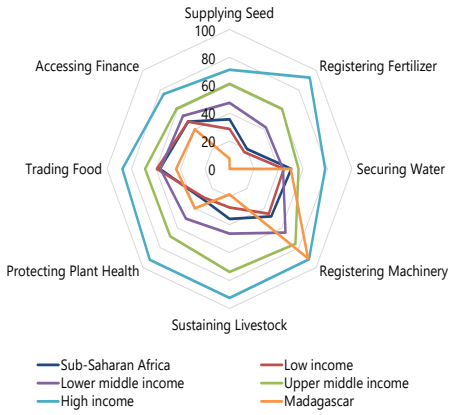
[13] Madagascar Vulnerability Assessment Committee (mVAC). Evaluation Approfondie Multisectorielle de la Sécurité Alimentaie – Grand Sud de Madagascar, April 2022. The analysis covers 2477 households spread over 250 Fokontany in the three regions of the Great South.

in particular the monitoring of agricultural calendars (Figure 11). Some crop diversification was observed, and more water resilient crops, such as maize, millet, sorghum, cassava and sweet potato serve as substitutes or supplements for rice during the lean season.

13. Low mechanization is a major constraint to higher agricultural production. Farming households use their own family labor and sometimes employees for seeding and other agricultural work. Although registering machinery is not assessed as an impediment to doing business in agriculture, low mechanization owing to a lack of equipment and energy access impacts production yields. Selling productive livestock is one of the common crisis strategies employed by households when they run out of food or have insufficient resources to purchase food during the lean season.

14. The lack of agricultural inputs and high prices constrain agriculture productivity and the ability to overcome lower rainfall shocks. The Great South suffers from a real lack of seed security and assistance does not follow local farming practices. Seeds supply accessibility is much lower than in other low-income countries. If a first sowing fails and requires a second attempt, farmers are in great difficulty to obtain seeds and only 10 percent of farmers use certified seeds. The low harvest of previous agricultural seasons did not allow for a satisfactory replenishment of seeds and the low purchasing power of faming households penalize any attempt to source seeds from markets due to inflation driven by structural high demand. Provision of seed accounts for 3.5 percent of all assistance received by households and 34.5percent of households received it. In the Southern part of Madagascar, less than half of the inhabitants have access to phytosanitary products due to affordability and availability issues. Other agricultural inputs such as organic fertilizers, chemical fertilizers, phytosanitary products and agricultural equipment, are available but often unaffordable, and fertilizers are not registered (Figure 12).

Figure 12. Enabling the Business of Agriculture Index
(0=lowest; 100= highest)

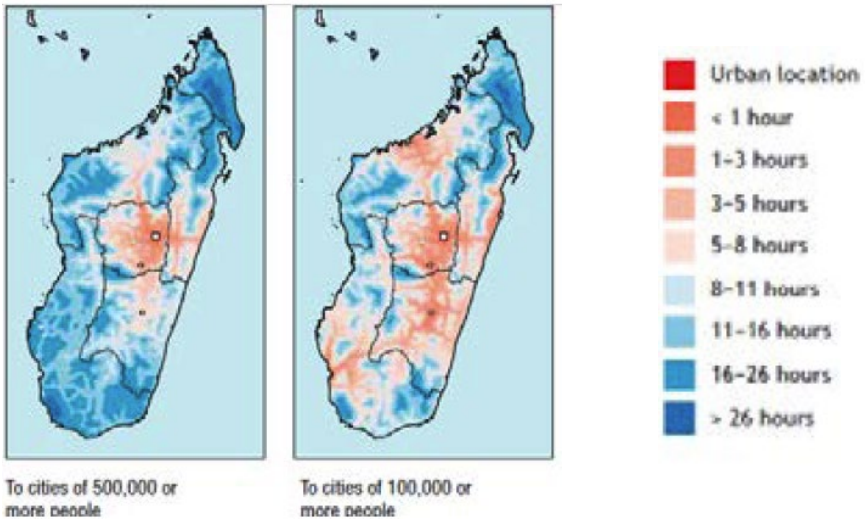


Source: Enabling Business in Agriculture, World Bank, 2019.

15. The hydro-agricultural network is inadequate for irrigation in the whole island and particularly in the Great South and the existing infrastructure mostly requires rehabilitation work. The low access to water sources for irrigation and to irrigation equipment force most of farmers to rely almost exclusively on rainfalls. The short period during which it rains (a few hours to a day at most) significantly limits the yield of cultivated area. Farmers are hesitant to invest in the purchase of equipment or the adoption of improved techniques, given that the level of production has been low in recent years. This leads to a weak performance of the sector which does not evolve.

16. The inadequacy of road infrastructure in rural areas limits access to markets and the distribution of food production. Farmers produce mainly for self-consumption and only sell production surpluses to meet their daily needs for non-agricultural products (soap, salt, sugar, lighting, etc.). Agricultural products for sale are not always processed and do not undergo any specific post-harvest conservation treatment, which make them more perishable in a context where transportation time and need for storage in high. The production and service infrastructures are outdated or even non-existent in some rural areas (Figure 13), and while rehabilitation activities were planned, inflation led to an increase in the price of construction materials (particularly cement and iron) and transportation costs (about 44 percent in July 2022), penalized these rehabilitation activities.

Figure 13. Access to Markets in Large Cities and Towns



Source: WB, adapted from IFPRI 2013.

Livestock and Fishing

17. Livestock represents a relatively small share of rural households' revenue but is a storage of value. Livestock farming is closely linked to agriculture with about 62 percent of households practicing it but also constitutes savings, as products are only sold in cases of extreme necessity, illness or death and generates only 12.5percent of revenues. Along with crop production, it constitutes the basic element of the economy and is an important source of income for the rural population. The species reared in the Great South are poultry, in particular local breed hens, small ruminants such as sheep and goats, and cattle. The breeding methods remain mainly traditional. Zebus play an important role in religious practices.

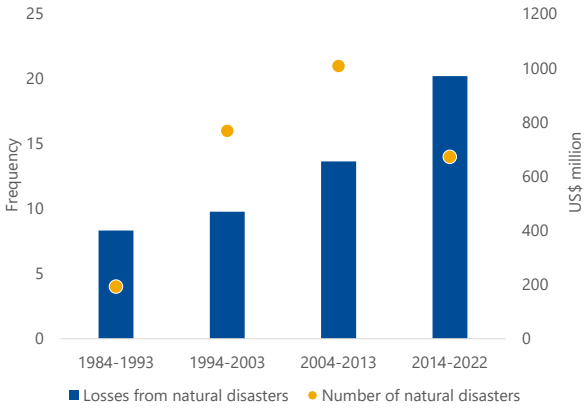
18. Insularity and climate change constitute the main bottlenecks in the fishing sector. Fishermen experience difficulties in selling products and decrease in prices due to insularity. The lack of equipment and the high price of inputs is challenging, as incomes from fishing do not ensure funding for the maintenance and renewal of equipment. A short survey of few fishermen conducted

by the WFP in Ambovombe, Androy revealed the need for fish conservation equipment: cold rooms or transformation tools for smoking or drying fish. In many places, the fish must be sold the very same day, unless it will be wasted. This also limits the exportation to other areas of the country and abroad, while the regions where the fish sector is more developed (Tulear) benefit from foreign investors activities.

C. Climate Related Food Insecurity Will Increase in the Medium-Term

19. Madagascar is one of the most vulnerable countries to climate change and one of the least prepared to absorb the shocks. Madagascar's exposure to recurrent natural disasters [14] inflicts recurring economic losses and threatens food security. Madagascar has been historically hit by a tropical cyclone every 0.9 years on average, while droughts and floods15 take place every 2.7 and 3 years respectively (EM-DAT, 2022, Figure 14). Natural disasters destroy capital and reduce output in the short run while also lowering potential growth in the long run. They reduce revenues and create spending needs, thereby worsening deficits, and increasing public debt. Although there is significant uncertainty on the future frequency of tropical cyclones, floods and droughts, their impact is expected to increase as the variance of temperature and precipitations rise. For instance, a typical tropical cyclone could become 18.4 percent more damaging by 2050 (Acevelo, 2016). A single weather disaster can significantly raise food insecurity, especially given agricultural productivity is already less than half the global average[16]. Looking ahead, a similar or stepped-up frequency and intensity of adverse weather events will further hamper food production and distribution (including damaging effects on transport routes) exacerbating food shortages and fuel food inflation with severe cascading consequences for the economy, hence the urgent need to improve resilience to climate shocks (Figure 15).

Figure 14. Historical Frequency of Total Losses from Natural Disasters in Madagascar



Source: EM-DAT, 2022 database.
Note: Includes the latest World Bank GRADE damages estimates for the Madagascar the 4 climate disasters from January 22 to February 23, 2022: Tropical Depression Invest 93S, Tropical Cyclone Batsirai, Moderate Tropical Storm Dumako and Tropical Cyclone Emnati.

[14] According to the EM-DAT database, Madagascar is mainly subject to cyclones, floods, and droughts. Viral diseases and insect infestations are not considered in this analysis.

[15] All floods are associated to cyclones (which is the main disaster type). There is only 1 historical occurrence of flash floods in EM-DAT and about half of all reported cyclones did generate floods. Historical cyclones' damages include floods.

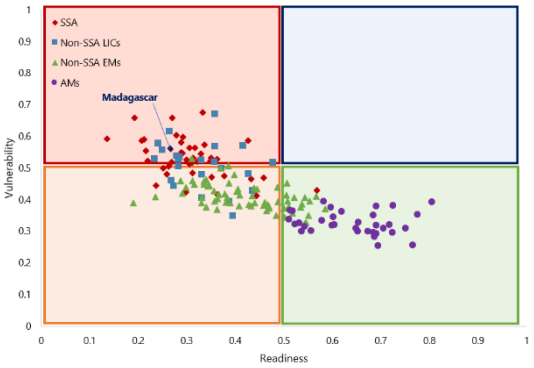
[16] Fuglie and others (2020), Ritchie (2022).

20. Madagascar is exposed to a large variety of climate shocks that climate change will likely exacerbate. Higher temperatures, rising sea levels, droughts, floods, storms (especially severe ones such as cyclones), and acidification (Figure 16) weigh on agricultural yields and weaken the nutritional value of food.

21. Climate change is expected to decrease agricultural production through three channels: (i) the loss of cultivable land because of erosion, more intense rainfall, cyclones, and floods (Llopis 2018); (ii) a decline in land productivity due to more severe drought and drought-induced pests including locust outbreaks; and (iii) the loss of labor productivity caused by extreme heat (Rakotondravony et al. 2018) which has already fallen by USD 95 per worker over the past 20 years (World Bank, 2022). Floods and tropical cyclones can reduce the volume of capital inputs by damaging agricultural infrastructure.

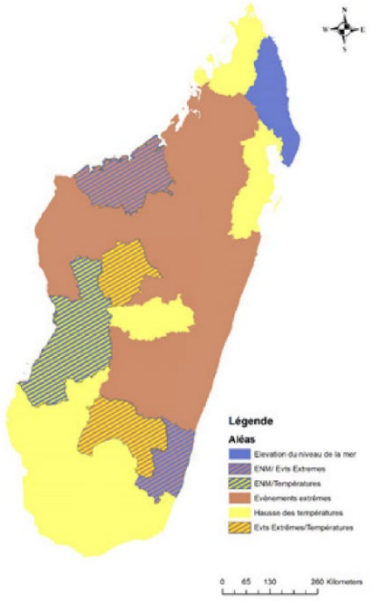
22. The slow-moving effects of climate change have been reducing the volume and productivity of the natural capital in Madagascar, in both terrestrial and marine ecosystems. Tree growth and reproduction have been affected, and the marine ecosystem has been impacted by coral bleaching, seagrass loss, fisheries loss, ocean acidification, and so forth (Cochrane et al 2019). The changes in natural capital have directly harmed the sectors of agriculture, fisheries, and tourism. The silting up of reservoir dams and irrigation canals linked to environmental degradation leading to erosion and climatic hazards, reduces the storage capacity of the water necessary for the irrigation of rice crops.

Figure 15. Vulnerability and Readiness to Climate Change



Source: Notre Dame Global Adaptation Initiative, 2020.
Note: Readiness measures a country's ability to leverage investments and convert them to adaptation actions (higher is better). Vulnerability measures a country's exposure, sensitivity and capacity to adapt to the negative effects of climate change (lower is better).

Figure 16. Major Climatic Hazards by Regions

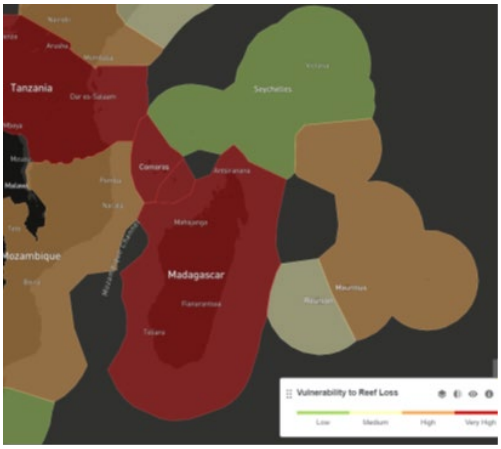


Source: National Adaptation Plan, 2021

23. Human footprints affect resilience to climate shocks. Poor land use practices and land degradation across the country exacerbate the risks from extreme events and are the largest contributors to Co2 emission. Agriculture contributes to 16 percent of Co2 emissions as subsistence

agriculture destroys forest and wetland carbon stocks rapidly. Deforestation destroys ecosystems and degrades dunes fixation, generating the silting up of crops. Vulnerability to climate change also impacts mangroves and coral reefs, with Madagascar being highly vulnerable to coral bleaching and reef loss (Figure 17) while the blue economy has a large potential for food diversification and new source of income for households, conditional on large investments in infrastructure and equipment.

Figure 17. Vulnerability to Coral Reef Loss



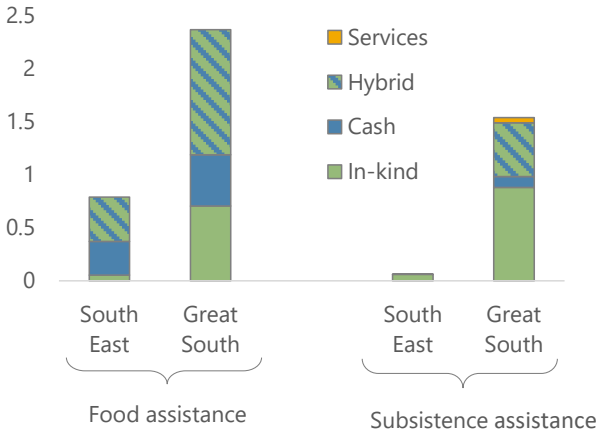
Source: Resource Watch West Indian Ocean.
Note: The Social Vulnerability index is based on the combination of the Reef Dependence index, Adaptive Capacity index, and exposure to reef threats (i.e., the Reefs at Risk integrated local threat index). The Reef Dependence index is based on the following inputs: reef-associated population, reef fisheries employment, reef-associated exports, nutritional dependence on fish and seafood, reef-associated tourism, and shoreline protection. An adaptive capacity index to reef loss based on the following inputs: economic resources, education, health (life expectancy), governance, access to markets, and agricultural resources.

D. Policy Recommendations to Reduce Food Insecurity

Emergency Preparedness and Response

24. The authorities have set up various emergency responses to the cyclonic disasters, droughts and food inflation. The authorities caped the prices of 4 main imported products: rice, oil, sugar, and cement, (without paying explicit subsidies) from April to July 2022 to contain the transmission of international inflation. In 2022, 4.7 million people benefited from cash and in-kind humanitarian and development partners' assistance for food and subsistence (Figure 18).

Figure 18. Development Partners' Assistance Beneficiaries, 2022
(Million people)



Source: Cluster SAMS Assistance.

25. The National Risk and Catastrophe Management Bureau (BNGRC) needs adequate financial and human resources to improve the crisis response at the local level. Historical data show that the budget allocation was often revied down from the LFI and amounts allocated end-up being significantly lower, except for transfers in 2020. The LFI 2023 allocates a budget of 15.6 billion to the BNGRC and projects an increase to 19.8 billion in 2024 and 22.4 billion in 2024.The BNGRC was set up as an administrative public institution under the technical supervision of the Ministry of the Interior and Decentralization.

26. The extension of the social safety net in preparation for shocks should aim to operationalize a flexible and responsive single registry, scale up school feeding programs and support financial inclusion. Measures should include:

- Harmonizing the targeting approaches and eligibility criteria, using community platforms for targeting beneficiaries and establishing evidence-based triggers for shocks and having a systematic response during lean seasons/hurricane seasons built into the system.

- Extending the social safety net to prevent people from adopting negative coping strategies and depleting their assets and help households maintain access to food and essential services for health and education during times of crisis. There is strong evidence that households receiving transfers through social safety nets spend more on food, which leads to increased food security.

- Further develop conditional cash transfers and social safety nets, remove financial barriers and promote health care, nutrition services and appropriate food and nutritional products.

- Scale up food supply to schools based on local production, use school feeding programs to reach shock-prone families, and provide family rations, while promoting school retention. Develop food education and vegetable garden training.

27. Measures to strengthen preparedness and collaboration between the central government, local authorities, communities, and international partners include:

- **Early warning system**: establishing a monitoring and early warning system on climate, hydrological, geological, vulnerability monitoring mechanisms to anticipate extreme weather events and floods, as well as health monitoring systems to detect epidemics.

- **Develop emergency response plans**: local authorities and communities should work with humanitarian organizations to develop and implement emergency response plans that include evacuation strategies, back-up mechanisms and support for the most vulnerable. Plans should also include provisions for the prevention and management of emergency-related conflicts.

- **Integrate the prevention of food security risks into strategies to combat climate change**: local authorities and relevant organizations should work together to develop strategies that include measures for the agriculture sector development and to prevent food security risks linked to climate change, such as crop diversification and improved resilience of food production systems, integrated management of natural resources, education programs to raise awareness of the impacts of climate change; promote sustainable agricultural practices.

- **Put in place programs to reduce the vulnerability of rural communities**: programs can include activities to strengthen the resilience of rural communities such as the promotion of food security, the diversification of sources of income and access to basic services, such as

drinking water and health care, as well as social protection mechanisms for the most vulnerable people.

- **Strengthen the coordination of international aid within national structures** for the efficient management and flexibility of resources: this includes i) partnership for research and development, ii) funding for sustainable initiatives and iii) cooperation for the implementation of policies and programs to support vulnerable populations.

28. Establishing a regional/community grain reserves for activation during lean periods or times of shocks to address gaps and limited reserves at the household level. Reserves are an effective mechanism for rapid intervention and the modalities can be varied and adapted to the context.

Policies to Address Structural Food insecurity, Improve Food Chains and Addressing Challenges Posed by Climate Shocks

29. Developing sustainable and climate-smart agricultural practices can help improve food systems resilience to climate shocks, including the use of conservation agriculture, drip irrigation and water management systems. It includes protecting agricultural land by preventing urban expansion on agricultural land, promoting sustainable land management and the implementation of policies to support smallholder farmers with training and communication for agricultural practices that preserve soil organic matter. This would also require greater education and awareness among the population and policy makers. Diversifying agriculture can help build resilient food systems to climate shocks or market disruptions. It can also increase food security by increasing crops variety.

30. Structural weaknesses of the food value chain can be addressed by providing access to affordable fertilizers and strengthening locust control would support food production and agriculture productivity. Access to agricultural services and equipment must be strengthened through the Agricultural Development Fund.

31. Energy-Water-Food Nexus and digital innovation in rural areas such as the rapid rural transformation project which establishes a hub to provide remote communities with scalable services can stimulate community growth and development. This may be supported by off-grid green energy solution with a capacity of 25kW as an entry point for various services like, supply of drinking water, internet connection, access to digital classrooms, access to information sharing (climate, agriculture, health, etc.), processing and conservation equipment to develop agricultural value chains, entrepreneurial opportunities, and facilitating access to local public administration services.

32. Some measures can reduce reliance on biomass as a cooking fuel and increase reforestation. Favoring more modern and cleaner cooking fuels and technologies, to decrease deforestation, CO2 emissions and negative impacts on health due to harmful smokes. Moreover, increasing the share of renewable energies in the national energy mix, including for isolated grids

still relaying on fossil fuels would reduce CO2 emissions, fuel costs and exposure to volatility of international markets. These measures should be implemented along with accelerating reforestation interventions at scale such as green belt, dune fixation, promote alternative energy sources to reduce pressure on the forest, and strengthen livelihoods to ensure forest sustainability.

33. Important investments are needed to rehabilitate and develop the road network, irrigation systems, electricity, and telecommunications infrastructure thereby addressing the root causes of food insecurity and facilitating the distribution of food, cash transfers and other goods. Investing in rural infrastructure, including the construction of water reservoirs, irrigation facilities and rural roads to facilitate access to markets by strengthening market connectivity to help farmers sell their production, and access to public and financial services.[17]

34. The gradual removal of distortive exoneration on rice imports may boost local production competitiveness on the domestic market and can incentivize investment in the sector. Imported rice is exempt from custom duty and the tax expenditure is estimated at MGA 124bn (0.2 percent of 2021 GDP)[18]. The import of other milled or semi-milled rice – lightly processed products – dominates total rice imports with over 92 percent of the total for 2019, 2020, and 2021. The authorities rely on imported rice to stabilize prices in a context of insufficient domestic supply, but customs tax exemptions are not appropriate or effective in controlling or stabilizing rice prices and a comprehensive tax reform of the sector would be needed to boost production. The exemption of rice from domestic VAT accounts for almost three-quarters of total domestic VAT tax expenditures and amounts to 4.7 times the tax expenditure on imported rice. Small producers would not be affected by the removal of the VAT exemption as they fall under the VAT applicability threshold while larger cooperatives could deduct VAT on intrants from tax declarations. At the sectoral level, agricultural inputs (including for crops and corn and soybean seeds) are largely exempt from domestic VAT, and imported agricultural materials and equipment also benefit from significant VAT exemptions.

35. Improving nutrition can be achieved by improving access to nutritious and affordable food, through greater local production and food supplementation programs for the most vulnerable households. Promoting the economic inclusion of the most disadvantaged populations by providing economic opportunities, such as vocational training programs and microcredits would help people lift themselves out of poverty and reduce food security.

Improving Green PFM and C-PIMA to Invest in Long-Term Resilience and Mobilize External Financing

36. Improving planning and implementation of the policies to address food insecurity and build resilience to climate and climate change requires accounting for natural disasters in baseline macro-fiscal projections. The 2023 Budget Law (LF) does not unfortunately integrate

[17] See Box 4 in the Staff report for the 2022 Article IV Consultation and Third review under the ECF on Improving the Financial Inclusion of Smallholder Farmers.

[18] IMF Technical Assistance Report, November 2021. Réformes Fiscales pour Accroître les Recettes.

climate shocks in the baseline projections underpinning the budgeting exercise nor a climate risk analysis to the baseline. The principal caveat with regards to climate-macroeconomic programming are:

- Official macroeconomic and fiscal projections do not factor in climate and climate change risks even though the country is being consistently and increasingly hit by natural disasters.
- Consistency and realism across all the overarching documents of the country's climate strategy should be ensured. Growth projections reflect the authorities' objectives and are not adjusted for possible climate shocks.[19].
- The macroeconomic impacts of climate are only mentioned in a paragraph of the Annex of the LF, among the risks lists of risks to the real economy.
- The LF 2023 misses a discussion on contingency plans for budget reallocation in the case of a series of severe climate events during the 2022/2023 cyclonic season, or on the role of public policies to address the *Kere* (chronic food insecurity in the Great South). Additional spending needs are dealt with in a reactive and ad-hoc manner, through supplemental budgets and emergency donor funding, rather than pre-emptively through contingency measures (e.g., adequate provisions commensurate to the expected level of risk) in initial budgets.
- An annex dedicated to climate risk should provide an overall picture of all the policies in place at the Primature and the line ministries and their financing as a basis for planning and to manage public resources efficiently.
- A comprehensive reporting on implementation progress and use of funds (currently lacking) climate mitigation and adaptation is essential for better policy management and unlocking future financing.

37. Ongoing public financial management (PFM) and public investment management (PIM) reform efforts provide an opportunity to increase the hitherto very limited focus on climate and include:[20]

- Strengthening the relations between the Ministry of Environment, Ministry of Economy and Finance, and line ministries at the planning stage, and mainstreaming climate change concerns into comprehensive sectoral strategies.
- Identifying those infrastructure assets most vulnerable to climate change and defining maintenance methodologies by main sectors, building on efforts in the road sector.

[19] See Box 3 in the Staff Report for the 2022 Article IV Consultation and Third Review under the ECF on Strengthening Budget Credibility.

[20] See IMF, Madagascar Climate Macroeconomic Assessment Program, 2022.

- Defining a methodology to integrate climate change into ex-ante project assessments and criteria for project prioritization.

- Introducing climate budget tagging e.g., through the ongoing work on the public investment manual, to create capability for identifying and tracking spending on adaptation and mitigation, and to create and gradually enrich a document or annex dedicated to climate change in the annual budget.

38. The 40-months Extended Credit Facility (ECF)[21] arrangement supported by the IMF, focuses on sustaining inclusive growth and addressing long-term fragilities through maintaining macroeconomic stability, improving governance, and creating fiscal space for much-needed investment in physical and human capital. Among the program objectives, improving budget execution and public financial management in general is a prerequisite for more effective fiscal policy, particularly in responding to shocks. Strengthening social safety nets and social policy management tools are important objectives of the program and monitored through performance criteria and the development of a shock-responsive cash transfer program is an authorities' commitment. Capacity development to achieve these objectives is provided through an extensive PFM technical assistance program, in particular with a long-term resident expert on the budget expenditure tagging. Finally, Madagascar benefitted from an SDR allocation of US$322 million on August 23, 2021, that can be used[22] to finance the implementation of the water pipeline project in the Great South and other PEM objectives related to food security, adaptation to climate change and sustainable development, providing exemplary practices in public procurement contract awards apply.

39. International financing can be unlocked by improving the knowledge of the donor landscape and the capacity to meet requirements for receiving financing. This can be complemented by measures to tap private sector finance by facilitating risk assessment and transparency of the policy environment. The OECD climate finance database reported US$1.29 billion in climate funding for climate related projects committed to Madagascar between 2015 and 2019, mainly focused on the agriculture, energy, and other multisector sectors. Bilateral and multilateral climate funds, such as the European Development Fund (EDF) and the Green Climate Fund (GCF), provided approximately US$377 million (29 percent) of this funding (Figure 19 and 20).

[21] Request for a 40-Month Arrangement under the Extended Credit Facility-Press Release; Staff Report; and Statement by the Executive Director for Republic of Madagascar.

[22] See Box 1 of the First Review under the ECF arrangement Staff Report for details on the "Modalities of the Use of the SDR Allocation for Budget Financing".

Figure 19. Climate Funding to Madagascar

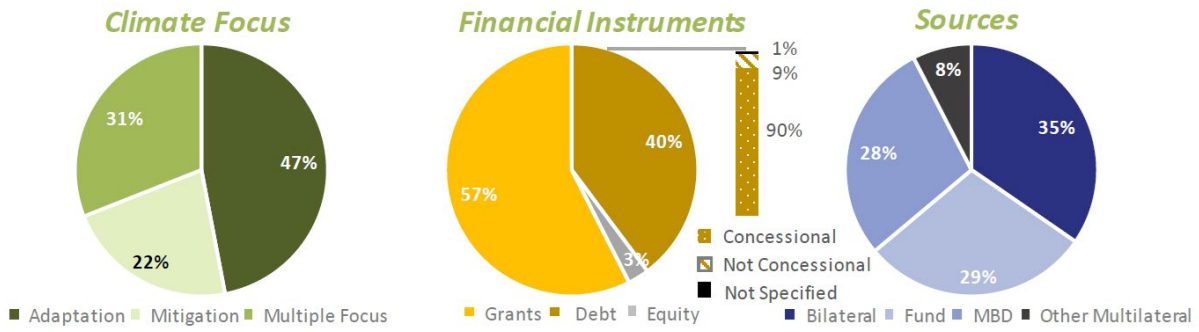
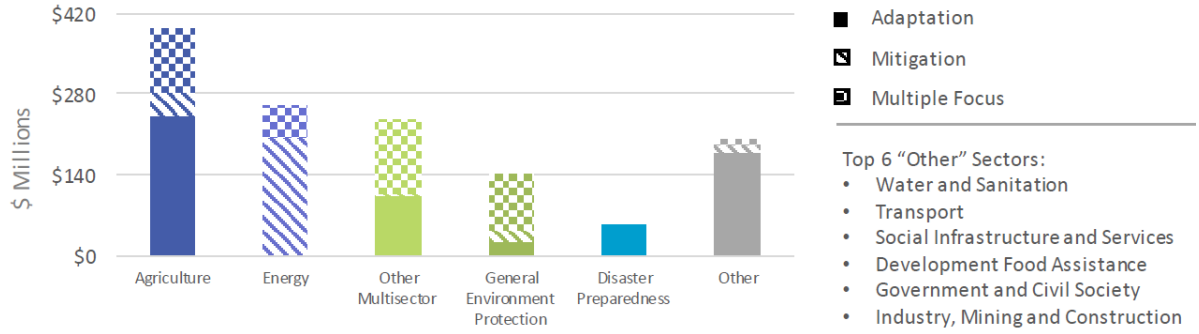


Figure 20. Funding Committed by Sectors



Source: Climate Finance Advisor, 2021

40. More resilient infrastructures to climate shock could considerably reduce the reconstruction costs and free financial resources and human effort for other development needs. As a result of the four tropical storms in Madagascar in 2022, the total damage in the infrastructure sector (mainly roads and railways) has been assessed around USD170 million (according to the Global Rapid Damage Estimation (GRADE) Report for Madagascar, February 2022). If the roads and railways had been more resilient, the damage would have been reduced by USD85 million[23]. On the other hand, adaptation investment could cost between USD25 million and USD115 million, depending on the cost assumption (the LMIC average is 5 percent, while the Madagascar has assumed 25 percent in general), so may have paid off from one year's climate events alone.

[23] See Table 4 of the CMAP for description of "Major infrastructure investments in adaptation: costs and benefits".

References

Acevelo, 2016. “Gone with the Wind: Estimating Hurricane and Climate Change Costs in the Caribbean”.

Burke, E.J., Brown, S.J. and Christidis, N. (2006) Modelling the Recent Evolution of Global Drought and Projections for the Twenty-First Century with the Hadley Centre Climate Model. Journal of Hydrometeorology, 2006.

Fuglie, K., Gautam, M., Goyal, A, and Maloney, W .F. 2020. Harvesting Prosperity: Technology and Productivity Growth in Agriculture. Washington, DC: World Bank.

IMF, 2021. “Republic of Madagascar: Request for a 40-Month Arrangement under the Extended Credit Facility-Press Release; Staff Report; and Statement by the Executive Director for Republic of Madagascar.

IMF, 2022. “Republic of Madagascar: First Review Under the Extended Credit Facility Arrangement-Press Release; Staff Report; and Statement by the Executive Director for Republic of Madagascar.

IMF, 2022. “Republic of Madagascar: Second Review Under the Extended Credit Facility Arrangement-Press Release; Staff Report; and Statement by the Executive Director for Republic of Madagascar”.

IMF, 2022. “Republic of Madagascar: Technical Assistance Report-Climate Macroeconomic Assessment Program”.

INSTAT, PNUD, 2021. « Analyse de la pauvreté multidimensionnelle à Madagascar ». Antananarivo, Madagascar.

Llopis, J. C. 2018. Down by the riverside: cyclone-driven floods and the expansion of swidden agriculture in South-western Madagascar. Pages 241-268 in J. Abbink, editor. The environmental crunch in Africa: growth narratives vs. local realities. Springer International, New York, New York, USA.

MVAC , 2022. Evaluation Approfondie Multisectorielle de la Sécurité Alimentaire Grand Sud de Madagascar. Antananarivo, Madagascar.

Plan National d’Adaptation au Changement Climatique (PNA) Madagascar. December 2021.

Rakotondravony, H. A., I. Abdallah, H. Andrianaivo, L. N. Andrianarison, K. Hetz, P. T. Mahatante, H. N. Masezamana, N. A. H. Rakotoarivony, R. P. Rakotonaivo, S. Ramanantsialonina, J.-F.

Randrianjatovo, A. A. Rasamison, and M. S. (adelphi/GOPA). 2018. État des lieux des études de la vulnérabilité à Madagascar: revue bibliographique. Antananarivo, Madagascar. GIZ, Bonn, Germany.

Ritchie, H. 2022. "Increasing Agricultural Productivity across Sub-Saharan Africa is One of the Most Important Problems this Century." Our World in Data, April 4.

World Bank. 2019. Enabling the Business of Agriculture. Washington, DC.

World Bank, 2022. Madagascar Country Environmental Analysis. Washington, DC.

World Food Program (WFP). 2022. Hunger Map. Washington, DC.

UNDRR, UNDP, UNOCHA. 2012. Rapport sur l'Evaluation des Capacités en Matière de Réduction des Risques de Catastrophes à Madagascar.