

# Loss and Damage in Madagascar: Paddling Against a Stream



## MADAGASCAR AT A GLANCE

**Capital:** Antananarivo

**Population:** 29.2 million

**Surface Area:** 587,295 km<sup>2</sup>

**Human Development Index:**

In 2022, ranked 173 of 191 countries

World's fourth highest rate of chronic malnutrition

**Poverty Rate:** 81 percent

**Climate Risks:** Floods, droughts, cyclones

Aerial photos of the center of Vohipeno. Two weeks after tropical storm Ana entered Madagascar affecting more than 131,000 people, Cyclone Batsirai made landfall in Madagascar on February 5, 2022. [Photo by Tofy Rabenandrasana/CRS]



## Madagascar: a case study in climate change

Even with aggressive action to prevent and adapt, it will not be possible to avoid harmful impacts from climate change.<sup>1</sup> Mostly least developed countries and small island states will be most affected not

<sup>1</sup> IPCC, 2022, "Summary for Policymakers," in: *Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, eds. H.-O. Pörtner, et al. (Cambridge, UK and New York, NY, USA: Cambridge University Press), 3–33, doi:10.1017/9781009325844.001

only due to geography, but also because they lack resources to prepare and respond to climate change. In United Nations climate negotiations, the term *Loss and Damage* has come to be used to refer to the harms that communities and individuals experience from climate change that are not prevented or avoided. These harms can come from sudden events like cyclones and flash floods, or slow changes like sea-level rise or a declining water table. The losses can have clear monetary value or be non-economic changes that are equally harmful. To date, the policy discussions on *Loss and Damage* has focused on rather esoteric issues, like negotiating texts and financing facilities.

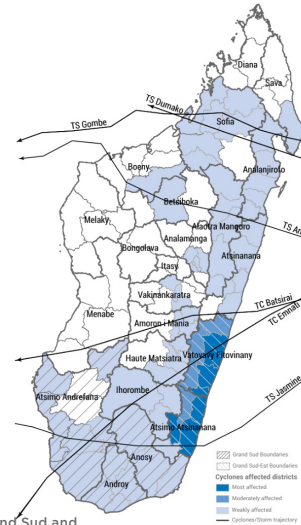
But, Catholic Relief Services (CRS) has learned through decades of experience that good policy should be informed by the lived experience of people. Therefore, we embarked on a case study to better understand the economic and non-economic losses and their impact. We look at the case of Madagascar, specifically Mananjary in the Vatovavy Region on the south-east coast, to better understand the loss and damage caused by two cyclones in the span of less than three weeks. The objective of the case study is to learn from people experiencing climate change to support policy makers in formulating long-term solutions to deal with the impacts of climate shocks that cannot be avoided.

In 2022, southern Madagascar faces the fifth year of a devastating drought causing severe food insecurity, which the UN describes as “the only - maybe the first - climate change famine on earth.”<sup>2</sup> Poor households have fully exhausted their reserves, driving communities to adopt extreme coping measures, and many rely on humanitarian assistance, supplemented by market purchases to meet their food needs.<sup>3</sup> Humanitarian analysts expect an “emergency” food security situation, or IPC 4, to emerge in the coming months.<sup>4</sup>

The south-east of Madagascar, including Mananjary, faces a different form of the climate crisis. On February 5, 2022, tropical cyclone Batsirai (Category 4) hit the southeast coast of Madagascar bringing over 150km/h winds and rain to communities along the coast, ravaging homes, buildings, farms, schools, and over 20 roads and 17 bridges were destroyed, making the worst-affected areas inaccessible by road. Around 10,900 homes were damaged or completely destroyed, and 69 health care centers were damaged.<sup>5</sup> The Mananjary district was badly damaged (see Figure 1.)

2 “In Madagascar, pockets of famine as risks grow for children, warns WFP,” (United Nations, 2021), accessed October 28, 2022, <https://news.un.org/en/story/2021/11/1104652>  
 3 “Madagascar Economic Update,” (World Bank, 2022), accessed October 28, 2022, <https://bit.ly/3Wc6pci>  
 4 “Food Security Outlook Update,” (Famine Early Warning Systems Network, August 2022), accessed October 28, 2022, <https://fews.net/southern-africa/madagascar/food-security-outlook-update/august-2022>  
 5 Friederike E. L. Otto, et al., “Climate change increased rainfall associated with tropical cyclones hitting highly vulnerable communities in Madagascar, Mozambique & Malawi,” (World Weather Attribution, n.d.), accessed October 28, 2022, <https://www.worldweatherattribution.org/wp-content/uploads/WWA-MMM-TS-scientific-report.pdf>

FIGURE 1 : CYCLONES AND STORM AFFECTED AREAS



Source: Madagascar, Grand Sud and Grand Sud-Est Response Overview, UN FAO, July 2022.

In the midst of recovery from the Batsirai cyclone, a second Category 1 cyclone, Emnati, hit the same area not two weeks later, bringing heavy rains and winds and delaying any recovery from the first cyclone. Rainfall in Mananjary during Emnati was recorded at 109 mm, coming after the torrential rains of Batsirai just 18 days prior.<sup>6</sup> (see Figure 2.)

FIGURE 2: MAP OF STORMS

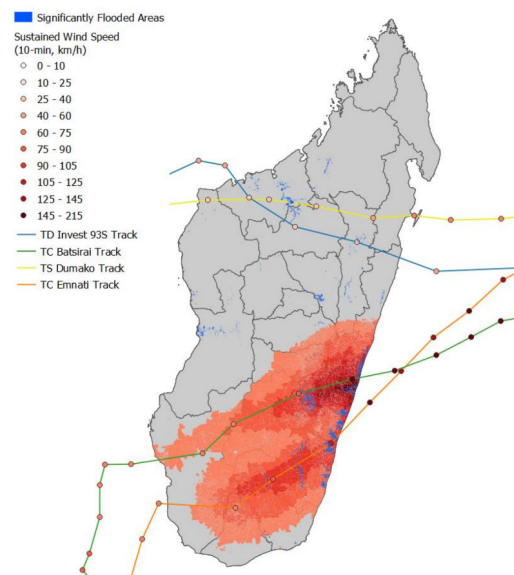


Figure 2 shows the tracks, 10-min sustained wind speeds (in km/h) at 6-hour intervals and flood footprints of the four damaging events in the 2021-22 cyclone season in Madagascar.

6 Rashmin Gunasekera, et al., “Global Rapid Damage Estimation (GRADE) Report Madagascar (January 22 - February 23, 2022): Tropical Depression Invest 93S, Tropical Cyclone Batsirai, Moderate Tropical Storm Dumako and Tropical Cyclone Emnati” (World Bank Group, et al., 2022), 31.

In fact, Madagascar was hit by four tropical storms and cyclones in a period of three months. Coastal areas suffered significant losses with up to 90 percent of houses being destroyed and up to 80 percent of farmlands being flooded.<sup>7</sup> According to Madagascar’s National Office for Risk and Disaster Management (BNGRC), 521,000 people were affected by these cyclones – particularly in the southeast regions of the country. The Vatovavy Region around Mananjary had 225,242 people in need of immediate assistance.<sup>8</sup> The two cyclones killed 136 people.<sup>9</sup>



Makeshift homes using what was left after the cyclones. Thousands of families lived like this for weeks or months following the cyclones. [Photo by CRS staff]

Nearly 80 percent of households in the southeast of Madagascar live off an income of less than \$1.25 a day – less than \$400 in a year. Relying on agriculture on small plots of land is what sustains most rural households. The damage of a cyclone destroying a home can be devastating for a household. In the Mananjary region, a basic house using local materials will cost between 1.5-2 million ariary (\$400-\$500 USD) or about a year’s income. For houses that add a tin roof or more solid structures, the cost will rise to 5-6 million ariary (\$1200-\$1500 USD). In the aftermath of the cyclones, the government and relief agencies joined together to provide assistance to households but could only provide about 350,000 ariary (\$60 USD) per household in an effort to provide some support to those most in need. Not everyone could be helped.

While this support helped families, the burden of a lost home meant that many struggled to get their lives back on track. For weeks following the cyclones, sometimes months, households were forced to live in makeshift houses (see photograph

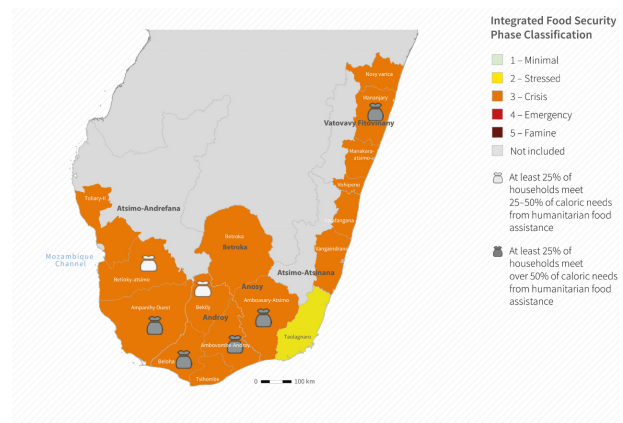
with an improvised home for a family of five). With no supplies, buckets, or utensils, daily life and basic hygiene were difficult to maintain. Security threats were increased as well as people were forced to stay outside or travel from their makeshift houses to access food or clean water.

In Mananjary and the surrounding Vatovavy Region, assessing the damage in surveys after the cyclones:

- **70 percent** of rice cultivation was damaged
- **70 percent** of manioc cultivation was damaged
- **50 percent** of cloves, vanilla, and coffee were damaged, although peppers fared a bit better
- **\$50 million** ariary damage to residential dwellings
- **\$30 million** ariary damage to non-residential buildings
- **\$60 million** ariary damage to infrastructure
- **\$50 million** ariary total agricultural losses<sup>10</sup>

Long after the cyclones, the effects are still being felt and the harm continues. Excess moisture and flooding have caused reduced food production and increased the risk of hunger. Roots and tubers were affected as excess moisture and sodden ground rotted the plants, spoiling foods that are used as buffer crops in times of food insecurity. Food markets around Mananjary have been disrupted for months after the cyclones and prices have been volatile.<sup>11</sup> (see Figure 3.)

**FIGURE 3: PROJECTED ACUTE FOOD INSECURITY SITUATION (SEPTEMBER-NOVEMBER 2022)**



Source: IPC. 2022. Madagascar (Grand South & Grand South-East): Projected food security and nutrition situation, September–November 2022. Rome, Italy. [Cited 28 July 2022]. [https://www.ipcinfo.org/fileadmin/user\\_upload/ipcinfo/docs/IPC\\_Madagascar\\_AcuteFoodSecur\\_22Apr23Mar\\_Snapshot\\_English.pdf](https://www.ipcinfo.org/fileadmin/user_upload/ipcinfo/docs/IPC_Madagascar_AcuteFoodSecur_22Apr23Mar_Snapshot_English.pdf)

7 United Nations Office for the Coordination of Humanitarian Affairs, “SOUTHERN AFRICA: Cyclone Season Flash Update No. 6 (Tropical Cyclone Batsirai) (UN-OCHA, February 13, 2022) 3.  
8 Ibid

9 “Madagascar: Humanitarian Snapshot – May 2022,” (UN OCHA, May 31, 2022), accessed October 28, 2022, <https://reliefweb.int/report/madagascar/madagascar-humanitarian-snapshot-may-2022>

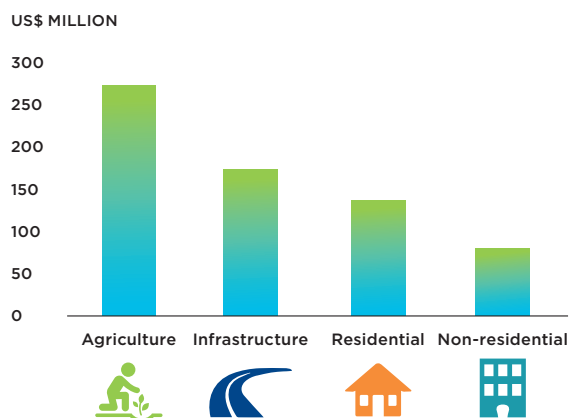
10 Gunasekera, et al., “Global RApid Damage Estimation (GRADE) Report Madagascar,” 31.

11 “Rapport Market Functionality Index (MFI) dans les régions du Grand SUD et Grand Sud-Est,” (Cash Working Group, March 2022), accessed October 28, 2022, [https://fcluster.org/sites/default/files/documents/mad\\_cwg\\_rapport\\_mfi\\_mars22.pdf](https://fcluster.org/sites/default/files/documents/mad_cwg_rapport_mfi_mars22.pdf)

Humanitarian organizations are still calculating the losses from these events and putting in place urgent responses to restore shelter, replace schools, and provide basic services and life-saving assistance. But more important is to observe that the disaster was not a singular event with a quick recovery, but a shock causing lasting scars and undermining future development. The growing intensity and increasing rhythm of disasters is impeding the effective response and recovery to these events.

The losses and damage span a range of economic, human, cultural, psychological, social, livelihood harms. 2022 has been a very hard year. Estimates by the World Bank for the damage caused by the four tropical storms could amount to \$660 million or 4.8 percent of Gross Domestic Product (GDP), with reconstruction and recovery efforts extending over a decade in the most affected areas. Agricultural losses would account for 42 percent of estimated damages.<sup>12</sup> (see Figure 4.)

**FIGURE 4: STORM LOSSES**



**Figure 4:** Estimated damages from the four tropical storm systems in 2022.

Source: GFDRR, D-RAS, World Bank

Unfortunately, this climate chaos is likely a part of the future. Madagascar is characterized by high vulnerability to climate change and low readiness due to high poverty rates. The Notre Dame Global Adaptation Initiative, which surveys a wide set of indicators on vulnerability and readiness ranks Madagascar as 167<sup>th</sup> of 182 countries with an urgent need for investment and innovation to improve readiness.<sup>13</sup> We can expect more extreme events in the coming years. And this makes achieving even modest development and social improvement goals much harder.

<sup>12</sup> “Madagascar Economic Update,” (World Bank, 2022), accessed October 28, 2022, <https://bit.ly/3Wc6pcl>

<sup>13</sup> Notre Dame Global Adaptation Initiative, accessed October 28, 2022, <https://gain.nd.edu/our-work/country-index/>



## Climate change causing more intense, damaging cyclones



Days after the cyclone, even when schools were destroyed, students came out to study wherever they could – improvising their own structure. [Photo by CRS staff]

Tropical storms, drought, and cyclones are common in Madagascar’s southeast region. But climate change is intensifying the storms, making them more destructive with heavier rainfall, slower movement and more flooding.<sup>14</sup> The damage from cyclones is made worse because Madagascar has suffered extensive deforestation and land degradation, leading to intense flooding and soil loss.

When disasters happen communities band together to survive and recover. Neighbors lend canoes to move belongings away from floods, share food and provide shelter to people in need. Wealthier households provide assistance to more vulnerable families. However, the increasing strain has forced households to sell assets like livestock or slaughter them for family consumption. Some households take on debt with high-interest loans to pay for necessities. These losses are harder to recover. Indebtedness is a common experience among residents and a source of stress and psychological anxiety. Social cohesion is highly valued by communities, but the recurring shocks have led to a decrease in trust across communities. Residents are less able to rely on family support or that from

<sup>14</sup> Maya V. Chung, et al. “Climate change is probably increasing the intensity of tropical cyclones,” (NOAA, March 31, 2021), accessed October 28, 2022, <https://www.climate.gov/news-features/understanding-climate/climate-change-probably-increasing-intensity-tropical-cyclones>

the community.<sup>15</sup> The disasters displace people directly, but also drive some to migrate to larger cities and towns in search of work and shelter.

Although Madagascar is a low-income country, policy makers have taken steps to address climate change. Madagascar produced a National Climate Change Policy and created a Directorate of Climate Change under the Ministry of Environment and Forests in 2010. Its National Strategy for Disaster Risk Management aligns with the goals of the UN Sendai Framework which promotes reduction of disaster risk and losses in lives, livelihoods and health. Madagascar has also developed and implemented a Strategic Program for Climate Resilience.<sup>16</sup> The country submitted a national plan for climate action to the UN in 2016,<sup>17</sup> and a national climate adaptation plan which was updated

in 2021.<sup>18</sup> Still the government of Madagascar has very few resources to build climate resilience and address climate change loss and damage.



## A race against climate change to build resilience; disasters impede response and recovery

CRS has been working in Madagascar since 1962 providing humanitarian assistance and addressing issues of chronic poverty and injustice through community development programs. Building resilience to extreme weather has been a priority for CRS. For example, in 2012, when two cyclones hit Madagascar displacing families and destroying homes, CRS led a project to build more resilient homes for the most vulnerable community members using local materials and local expertise.<sup>19</sup>

More recently, CRS has been working with farmers to develop new strategies to grow cash crops mixed with

15 Adventist Development and Relief Agency, “FIOVANA Refine & Implement (R&I) Year Research Study, ADRA FIOVANA Resilience Study,” (unpublished USAID draft report, June 5, 2021), 25.

16 Andriamanalinarivo, Remi Rolland; Faly, Aritiana Fabien et al. “Madagascar, a country resilient to the effects of hazards and protected from damage for sustainable development,” (United Nations Office for Disaster Risk Reduction, GAR Contributing Paper, 2019), 21, accessed October 28, 2022, <https://www.undr.org/publication/madagascar-country-resilient-effects-hazards-and-protected-damage-sustainable>

17 “Madagascar’s intended nationally determined contribution,” (Republic of Madagascar, n.d.), accessed October 28, 2022, <https://www.v-20.org/wp-content/uploads/2020/10/Madagascar-INDC-Eng-1.pdf>

18 “Plan National d’Adaptation au Changement Climatique (PNA) Madagascar,” (Republic of Madagascar, December 2021), accessed October 28, 2022, <https://unfccc.int/sites/default/files/resource/PNA-Madagascar.pdf>

19 “MADAGASCAR Remote Programming for Resilient Homes,” (Catholic Relief Services, 2018), 4, accessed October 28, 2022, [https://www.crs.org/sites/default/files/tools-research/case\\_study\\_12\\_madagascar\\_1.pdf](https://www.crs.org/sites/default/files/tools-research/case_study_12_madagascar_1.pdf)

### IMPROVING LIVELIHOODS, BUILDING RESILIENCE, HELPING NEIGHBORS



Picture of Baomahinty Ndrianjanirina with one of his five children. [Photo by CRS staff]

Baomahinty Ndrianjanirina is 36 years old and father of five children in Vatovavy in Madagascar’s southeast. He used to practice tavy agriculture, but now he uses agroforestry techniques to grow vanilla, wild pepper, cloves and cacao. He helped form a cooperative promoting sustainable farming techniques combining spices and other cash crops with fruit, legumes and cacao. He also manages a nursery for the cooperative. He has been able to build a sturdy dwelling for his family. Like all farmers in this region, he did not escape the two cyclones Batsirai and Emnati. However, resilient farming techniques supported by a CRS project—hedgerows, windbreaks, cover crops, terrace crops—helped to minimize the damage. Those techniques are intended to help farmers cope with climatic shocks. For agriculture, agroforestry was found to be a positive mitigation practice.

Vanilla is a high value crop and critical to his livelihood with cacao being new for him, but with market opportunities already identified. When asked why he thinks his crops fared better than others, he says that the mix of trees helped protect his vanilla and cacao plants whereas others do not have this type of protection. Most trees that he did lose (i.e. cloves) were mainly due to the fact they were older and roots were not as strong anymore. Baomahinty and others in his community received food assistance after the disaster.

CROP	% LOSS	AVERAGE % LOSS OF FARMERS IN AREA
Vanilla	30%	60-70%
Cloves	40%	50%
Cacao	10%	50%

food crops and endemic species. Part of the program is to help shift livelihood strategies away from “slash-and-burn” style agriculture known as “tavy”, which is a primary driver of deforestation, land degradation, habitat loss and increased climate vulnerability. Instead, CRS has supported communities to practice agroforestry to diversify products available for sale and for consumption, and to smooth income sources throughout the year. Agroforestry can also help restore forest cover and improve soil retention. Farmers can mix spices, cash crops such as coffee, forest products such as medicinal plants.

Prior to the cyclones and storms, the farmer cooperatives in Mananjary were on a positive path to increased production and developing strong commercial relationships for their products. However, two cyclones in a matter of two weeks was a big setback. Nonetheless, CRS has found that agroforestry can help to mitigate the impact of cyclones. For example, one household might have 1500-2000 trees on a hectare of land if fully used. Based on data from a post-cyclone survey, CRS found that on average, farmers lost between 40-60 percent of cash crops. For farmers working with CRS on agroforestry, while these crop losses certainly hit households hard, the fact that they had diversified and that they were trees meant they still retained much of their investment.

Considering the urgent needs, CRS pivoted work to respond to the disaster and support recovery. CRS is providing funding to support seed distribution, reconstruct tree nurseries and replant saplings. CRS integrates cash transfers that consider losses and damage among affected communities. Cash for shelter was provided to families for rehabilitation of damaged houses and cash for rent for those who lost their homes. To support livelihoods, cash transfers were provided for agricultural recovery. A more comprehensive approach is needed, however, to address the range of damage and losses, including livelihoods, shelter, etc.<sup>20</sup> In the Mananjary district, more than a quarter of the population relies on humanitarian food assistance for much of their caloric nutrition.<sup>21</sup>



## What is needed?

“ In 2022 alone, five cyclones struck in only two months — 178,000 hectares of arable land were flooded and destroyed. How many high-level meetings, summits and international conferences have we already had? How many statements and commitments have we made? Let us now turn these words into action.”

— MADAGASCAR PRESIDENT ANDRY RAJOELINA, SPEAKING TO THE UNITED NATIONS, 21 SEPTEMBER 2022

Countries like Madagascar have yet to see fulfilled the promises made towards support for mitigation and adaptation. In 2009, \$100 billion annually was promised for climate finance for Global South countries that still has not been provided by the Global North. However, the shortfall is -bigger than that. Previous commitments do not fully account for the reality faced by some of the poorest communities, the loss and damage they are experiencing now from climate change. The United Nations Framework Convention on Climate Change should robustly embrace the need to address loss and damage now and in the future. And the starting point should be COP 27 in Egypt in 2022.

The international community needs to create a new funding mechanisms to compensate for the Loss and Damage caused by climate change. This is a different category of problem and different needs than for climate mitigation and adaptation.

As many Global South countries are facing a double blow of rising loss and damage and sovereign debt distress, new loss and damage financing should not add to debt loads. Further, as debt is an obstacle to making the necessary investments to avert, minimize, and address climate change loss and damage, debt relief should be part of a climate change agenda.

20 CRS Asante grant proposal, 2022.

21 FOA, “Madagascar Grand Sud and Grand Sud-Est: Response overview | July 2022, (FOA, 2022), 4, doi: org/10.4060/cc1599en



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Catholic Relief Services | 228 W. Lexington Street, Baltimore, MD 21201, USA | [crs.org](http://crs.org) | [crsespanol.org](http://crsespanol.org)  
For more information, contact [gina.castillo@crs.org](mailto:gina.castillo@crs.org).