= Cyclone Haruna =

Tropical Cyclone Haruna was a deadly storm that produced widespread flooding and a disease outbreak in southwestern Madagascar . The ninth system of the season , Haruna developed in the Mozambique channel in the middle of February 2013 between Mozambique and southwestern Madagascar . Initially moving northward over Mozambique , the disturbance later moved slowly southward , gradually strengthening into the eighth named storm of the season and later into an intense tropical cyclone . The Météo @-@ France office in Réunion (MFR) ? the official Regional Specialized Meteorological Center in the basin ? estimated the cyclone attained peak 10 minute sustained winds of 150 km / h (90 mph) . Haruna made landfall near Morombe in southwestern Madagascar on February 22 . It weakened significantly while crossing the country , and MFR discontinued advisories on February 24 after the storm had emerged into the Indian Ocean .

Before Haruna struck Madagascar , a pre @-@ existing system produced deadly flooding , and when the cyclone crossed the country , it added additional rainfall to the region . Flooding was worst in Toliara where a dyke burst , flooding much of the town and leaving residents without water or power . Many villages in southwestern Madagascar lost access to clean water , prompting various international agencies to deploy teams to decontaminate wells . Haruna destroyed 7 @,@ 402 houses , which left 13 @,@ 882 people homeless . Most of the displaced people were able to leave their shelters by early April . The cyclone damaged rice and maize crops along the coast , although there were extended residual effects when a locust outbreak occurred , affecting half of Madagascar 's farmlands by July 2013 . Throughout Madagascar , Haruna killed 26 people and injured 127 directly , and there were outbreaks of various diseases in the storm 's aftermath .

= = Meteorological history = =

In the middle of February , an area of convection , or thunderstorms , persisted in the Mozambique channel . It had an associated circulation and rainbands to the east of the center , and was related to the monsoon trough . The system was located within an area of warm sea surface temperatures of over 29 ° C (84 ° F) and steadily decreasing wind shear . A ridge to the south caused the system to initially track to the north . By February 16 , the system had moved over Mozambique and turned to the east , although by that time it had become better organized with the convection wrapping into the center . Subsequently , the system moved southward due to a weakness in the ridge , with conditions favorable for tropical cyclogenesis such as low wind shear and good divergence . On February 18 , the Joint Typhoon Warning Center (JTWC) issued a tropical cyclone formation alert , and at 1200 UTC that day , Météo @-@ France (MFR) initiated advisories on Tropical Disturbance 09 .

Upon being classified , the disturbance had a broad circulation that was difficult to locate , with moderate convection in its eastern periphery . The thunderstorms organized further , and MFR upgraded the disturbance to a tropical depression at 0000 UTC on February 19 . Three hours later , the JTWC began issuing advisories on Tropical Cyclone 16S , and at 0600 UTC that day , MFR upgraded the depression to a moderate tropical storm after an advanced scatterometer indicated winds of over 65 km / h (40 mph) ; as a result , the National Weather Service of Madagascar gave it the name Haruna . By that time , the circulation had become better organized with increased rainbands , and with an anticyclone aloft , the storm developed well @-@ defined outflow . The structure of Haruna continued to become more symmetrical with a large radius of maximum winds , developing a ragged eye early on February 20 . Based on the improved appearance , MFR upgraded Haruna to a severe tropical storm at 0000 UTC that day . About 12 hours later , the agency upgraded Haruna further to tropical cyclone status , with 10 minute winds of 120 km / h (75 mph) . That day , an approaching trough weakened the ridge to the south , causing the cyclone to slow and move erratically . While Haruna was approaching the southwestern coast of Madagascar , it developed a 120 km (75 mi) wide eye , and the eyewall passed over Europa Island . Initially , MFR estimated that the storm would intensify to intense tropical cyclone status , and the agency assessed that Haruna reached 10 minute winds of 150 km / h (90 mph) on February 20 . The next

day , JTWC estimated peak 1 minute winds of 185 km / h (115 mph) . In contrast , MFR estimated at that time that the cyclone had peaked when the eyewall thunderstorms warmed , followed by the eye becoming less organized and the winds decreasing .

While moving slowly to the east @-@ southeast , Haruna re @-@ intensified early on February 22 to its previous MFR peak intensity . At around 0230 UTC that day , the cyclone made landfall about 55 km (35 mi) south of Morombe in southwestern Madagascar . Haruna quickly weakened below cyclone status , and while over land it accelerated to the southeast . On February 23 , Haruna weakened to an overland depression with 10 minute winds of around 45 km / h (30 mph) . A few hours later , the system emerged into the Indian Ocean near Fort Dauphin as a tropical disturbance . With generally favorable conditions , convection reorganized slightly and the system redeveloped outflow to the south . Early on February 24 , Haruna re @-@ intensified into a moderate tropical storm , although soon after it weakened again due to cooler waters , increasing shear , and dry air . At 1200 UTC , MFR issued its last advisory after Haruna began losing tropical characteristics , designating it as a subtropical depression . The next day , the JTWC also discontinued advisories on the storm , noting that Haruna was dissipating about 665 km (415 mi) south @-@ southwest of Réunion .

= = Impact and aftermath = =

On Europa Island in the Mozambique Channel , Haruna produced wind gusts of 144 km / h (90 mph) during the passage of the eyewall . Before the cyclone struck Madagascar , the intertropical convergence zone had caused flooding in the country that killed four people and caused widespread road disruption . Officials prepared by collecting supplies in the capital Antananarivo beginning on February 20 , and sending an emergency crew to the expected landfall location . Residents were evacuated using boats and canoes to shelters .

For several days while offshore western Madagascar , Haruna dropped greater than normal rainfall . The storm ultimately made landfall about 15 hours faster than anticipated . Winds and rainfall from Haruna damaged houses and power systems , and also damaged 265 classrooms and 16 health facilities . There was also damage to the rice and maize crops from high winds near the coast , causing food shortages . Rains from the storm caused a dyke along the Fiherenana River to break , which flooded a large region and forced about 6 @,@ 000 people to evacuate their homes . The flooding from the dyke break was worst in Toliara , where most residents lost access to fresh water and power . Flooding in the city caused the temporarily closure of the airport there . The town of Morombe was temporarily isolated after the road was blocked . Power outages affected Morombe , Toliara , Sakaraha , and Betioky Sud . Downed trees had affected roads near Toliara but were quickly removed . About 1 @,@ 050 houses were flooded , another 691 lost their roofs , and 7 @,@ 402 were destroyed , leaving 13 @,@ 882 people homeless . Overall , Haruna killed 26 people and injured another 127 .

There were initial difficulties in distributing aid to areas of southwestern Madagascar due to prevailing unsettled weather , along with fuel shortages . Workers used boats to rescue people in flooded areas . Members of the Madagascar Armed Forces , along with about 200 Red Cross volunteers , assisted in evacuations and aid distribution , and the Red Cross also provided free medical consultations to thousands of people . Following the storm , there were increased levels of malaria , dysentery , and childhood diarrhea in the area around Toliara , and there was a locust outbreak . Increased locust activity persisted into the summer , and had been occurring since late 2012 ; this caused continued food shortages , and by July the locusts were affecting about half of the country 's farmlands . To prevent further spreading of disease , officials provided vaccinations and sprayed insecticide . In isolated villages in southwestern Madagascar , residents faced food shortages , while in some areas , the water supply was contaminated . Within a few weeks of the storms , many residents whose dwellings were not destroyed were able to return to their homes . In Toliara , about 4 @,@ 000 students were initially unable to return to school due to being displaced . In the middle of March , 1 @,@ 948 displaced people stayed in a military camp or two schools , but most returned home by early April . Repairs to the dyke in Toliara began in early April , and were

expected to take about a month and a half .

On February 23 , the prime minister of Madagascar issued an appeal to the international community for assistance . In Toliara , United Nations agencies , including the World Food Programme , and non @-@ governmental organizations worked together to provide food for 3 @,@ 000 people in six shelters . The World Food Programme sent a truck with 1 @,@ 050 tons of food to Toliara , including corn and legumes . A few days after Haruna struck , the French Red Cross sent a ship to Toliara with 35 tons of supplies , including for housing and water . The International Federation of Red Cross and Red Crescent Societies authorized funds to help up to 10 @,@ 000 affected residents . Handicap International provided food and shelter to 547 people in Toliara . Action Against Hunger sent a plane with 15 tons of supplies , including water treatment units , to Madagascar after the storm . By March 20 , 1 @,@ 330 wells were disinfected by various crews . On March 1 , the European Commission donated ? 200 @,@ 000 for immediate relief . The Red Crescent Society of the United Arab Emirates sent about 80 tonnes of food , medicine , and building supplies to the country .