

# Experience of Mozambique in monitoring weather phenomena as way to reduce natural risk disaster

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Mozambique is the third most exposed African country to natural disasters such as floods, droughts, cyclones and tropical storms, which tend to turn into calamity. This susceptibility of the country to climate variability due to geophysical and human factors.

Because the location of the country, downstream of major river basins, the floods that have occurred in Mozambique, are common and result from torrential rains in and outside the country in neighboring countries, namely, Zambia, Zimbabwe, South Africa, Swaziland and Malawi .



More than eight million Mozambicans were affected by natural disasters in recent years, particularly in the 80, 90 and 2000. Mozambique has a total of 53 calamities in the last 45 years around 1.17 average per year. The floods of 2000 were vast, reached the provinces of Maputo, Gaza, Inhambane, Sofala and Manica, having affected the seven river basins: Maputo, Umbeluzi, Incomati, Limpopo, Save, Buzi and Pungwe a population of about five million.



During the period of civil war the Mozambican state created the National Emergency Council (CNE). The Department of Prevention and Combat of Natural Disasters (DPCCN) - that already existed - was virtually transformed into a CNE logistics agency to purchase and distribute food products by affected war and drought.

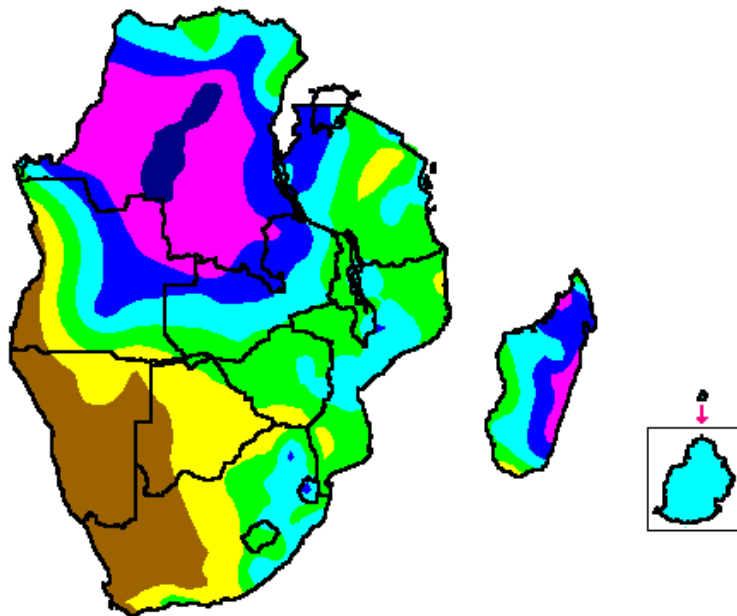
With the end of the war, the DPCCN was restructured to adapt to the new situation and be more concerned with the prevention of the effects of natural disasters. Thus was born the National Institute of Natural Disaster Management (INGC).



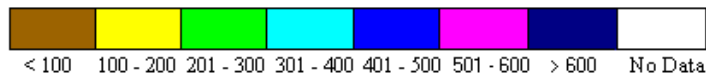
In order to mitigate the effect of natural disasters, Mozambican state annually create a contingency plan before the rainy and cyclone season and also law of calamities.

# Prediction of the rain season

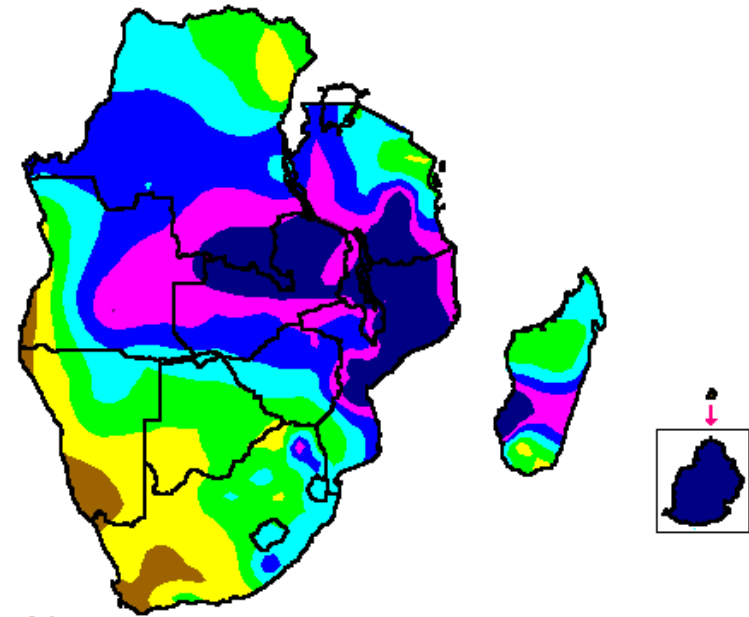
OND 30 YEAR MEAN  
1971 - 2000



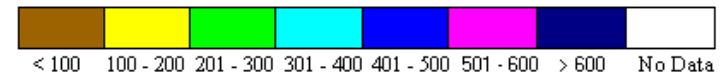
Key (mm)



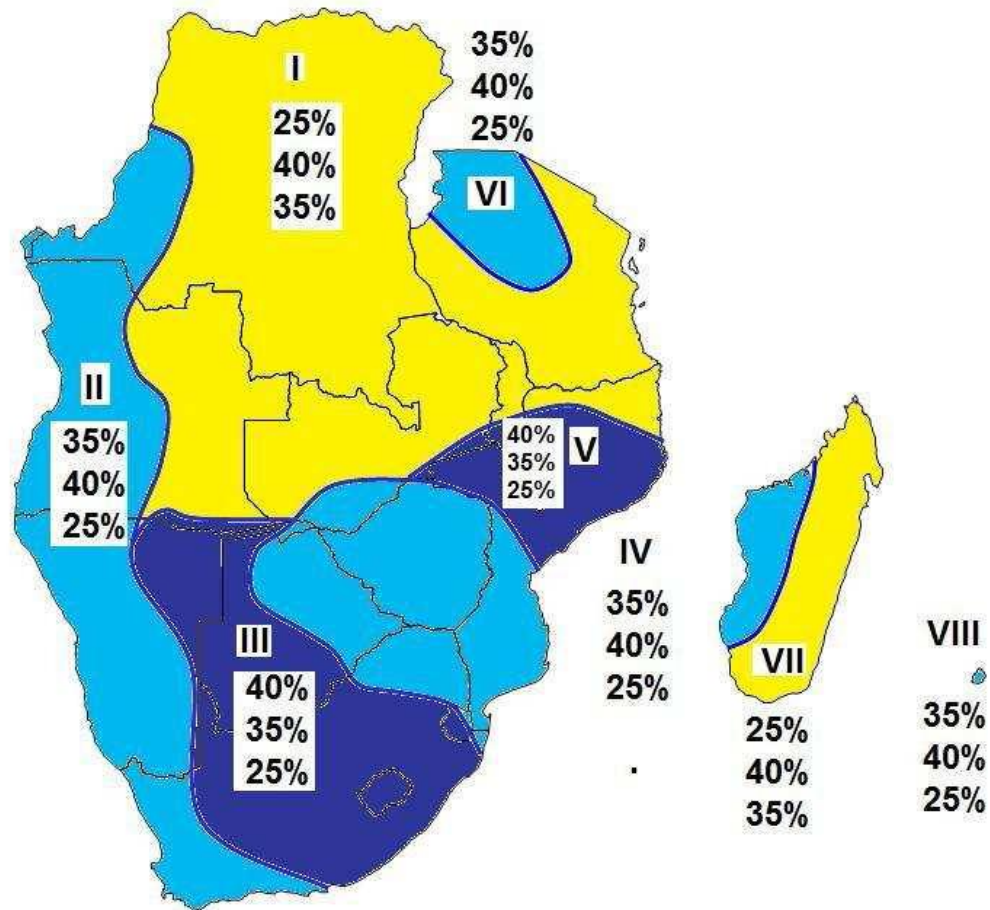
JFM 30 YEAR MEAN  
1971 - 2000



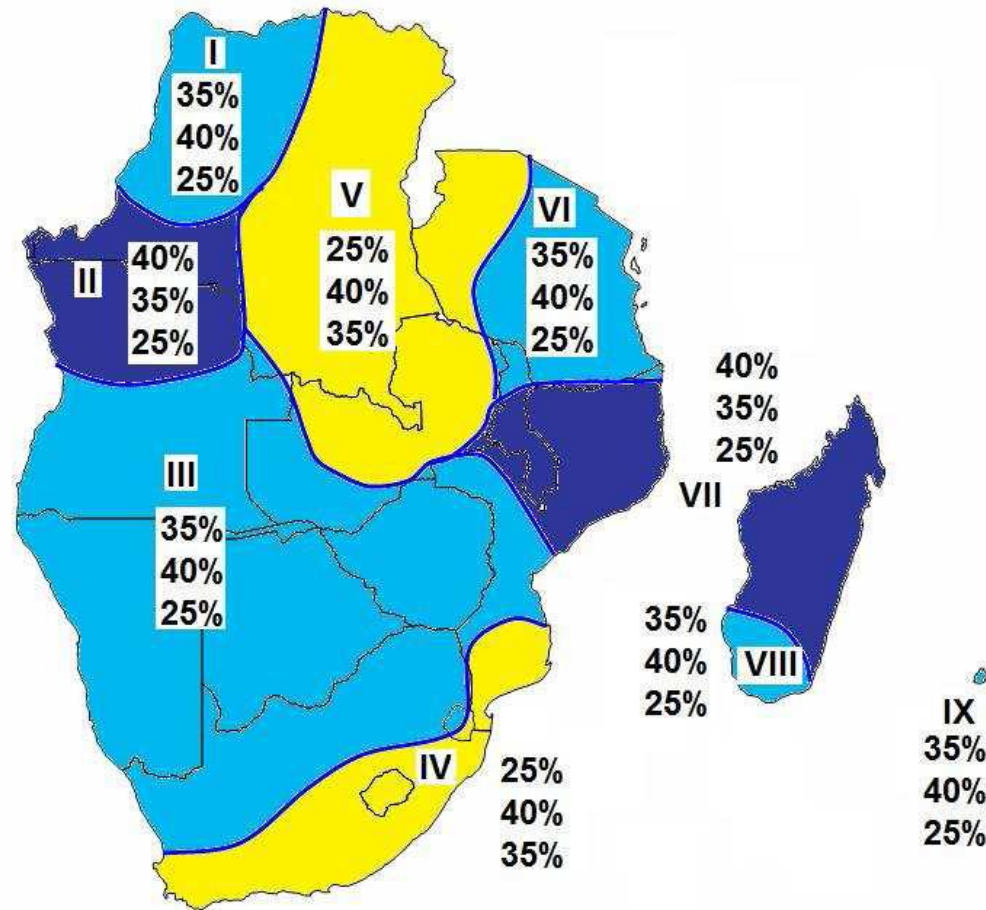
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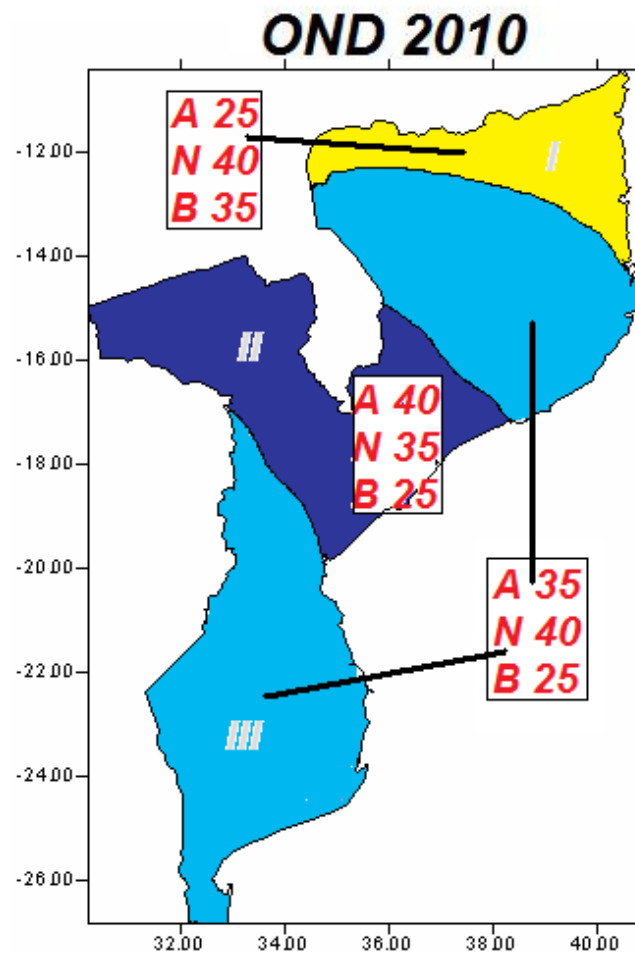
# October, November and December



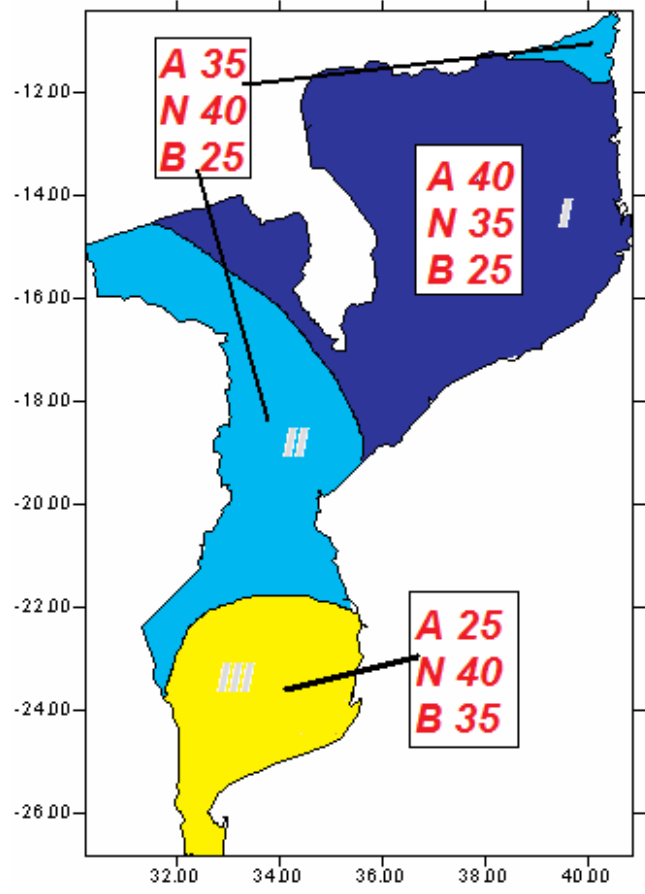
# January, February and March



# Forecast rainfall to Mozambique



# JFM 2011





During the year and the rain season  
INGC uses the following sites for  
monitoring natural phenomena



# Cyclones monitoring

www.mtotec.com

Aplicativos primeiros passos Free Hotmail Suggested Sites Web Slice Gallery Importado do Firefox TRMM NEXSAT, NRL/SPSS Ne... Observações globais - ... Severe Weather Infor... Centro de Previsão do...

A tradução falhou devido a um erro no servidor. Tentar novamente

## MTOTEC

### Cyclone basin of the South-West Indian Ocean Bassin cyclonique du Sud-Ouest de l'Océan Indien

Jeu di 20 Fevrier 2014

**INDIAN OCEAN / OCEAN INDIEN**

- Surface analysis / Analyse surface
- Satellite imagery / Image satellite
- Upper level winds / Flux en altitude

*Reunion Island (forecast)  
La Réunion (prévisions)*

**TROPICAL SYSTEM / SYSTEME TROPICAL**


- Cyclone advisory / Bulletin cyclone
- Trajectory / Trajectoire
- Satellite imagery / Image satellite

Other informations / Autres informations

Home

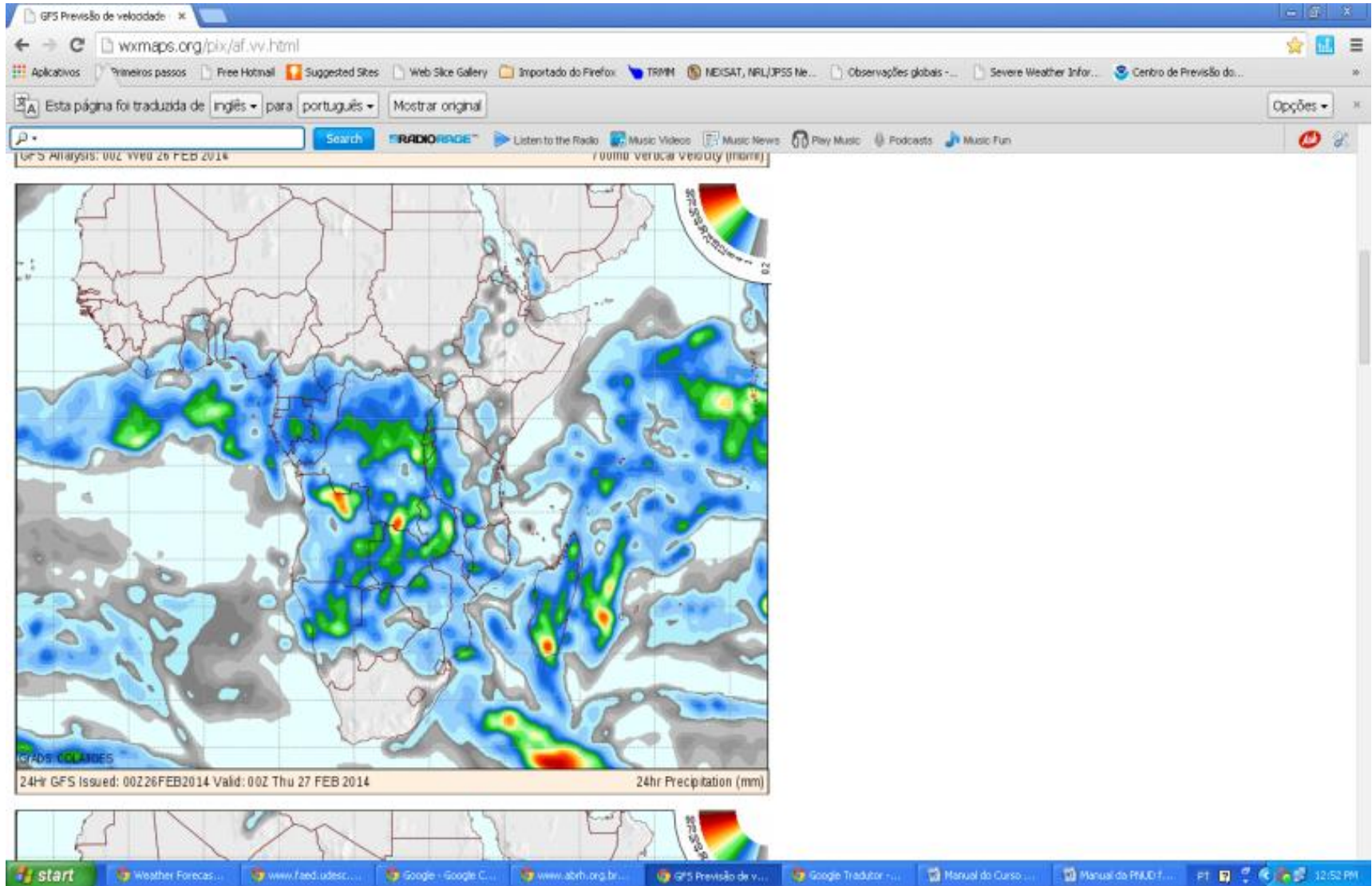
Contact

**EN COURS : NR12 (GUITO)**



start | Google Chrome | SALVADOR | Endereços da net. pa... | manual PMJD - Micros... | Document1 - Microsof... | Unfilled Document - ... | PT | 10:40 AM

# Precipitation Monitoring



## Data Displayed:

### GPM Multi-satellite (IMERG) Precipitation

- 30 Minute Accumulation ([download .kml](#))
- 1 Day Accumulation ([download .kml](#))
- 7 Day Accumulation ([download .kml](#))

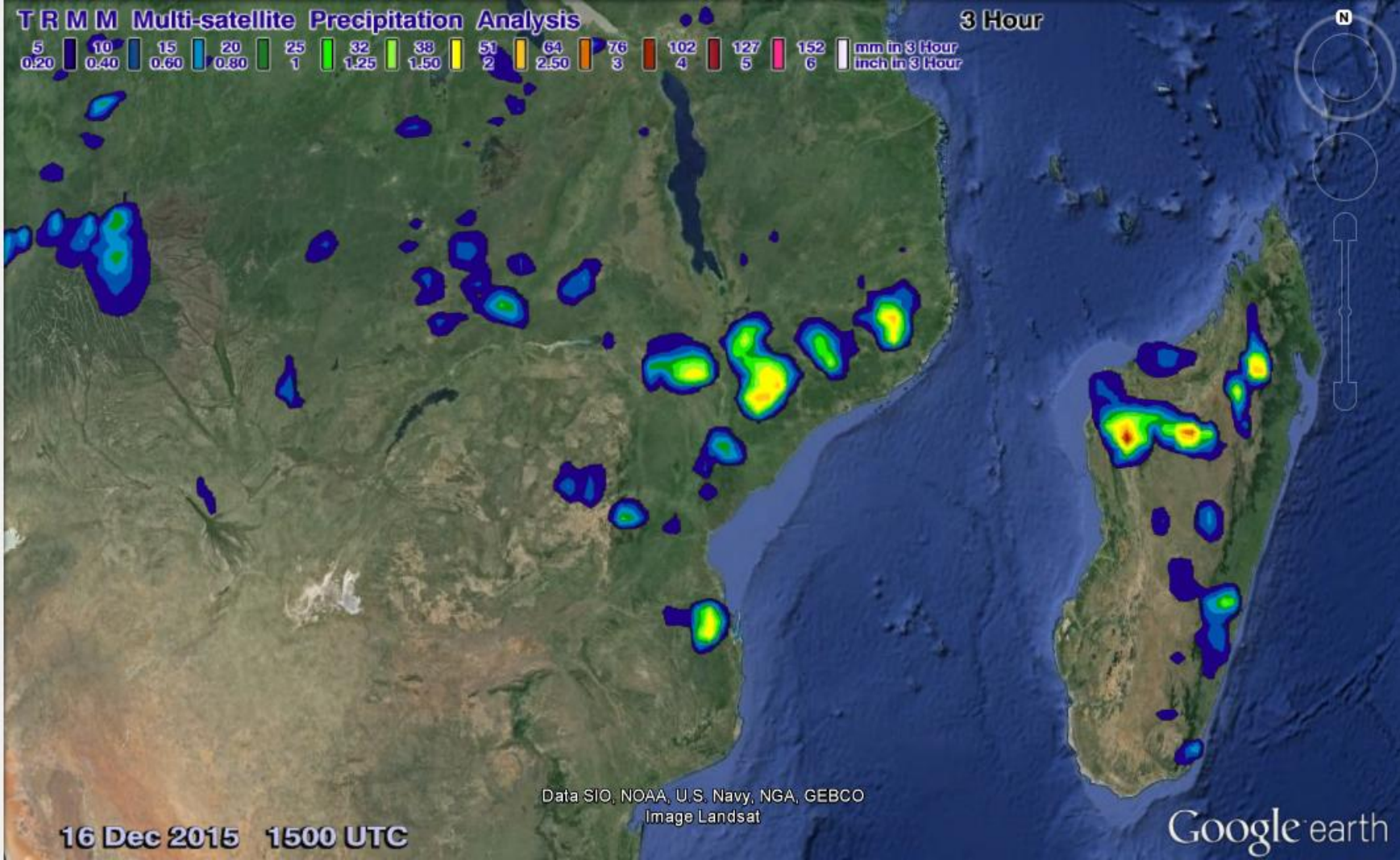
### TRMM (3B42) Rainfall

- 3 Hourly Rainfall Accumulation with Clouds ([download .kml](#))
- 30 Day Rainfall Averages ([download .kml](#))
- 24 Hour Flood Potential ([download .kml](#))

Last Updated:

# T R M M Multi-satellite Precipitation Analysis

3 Hour



Data SIO, NOAA, U.S. Navy, NGA, GEBCO  
Image Landsat

16 Dec 2015 1500 UTC

Google earth

# Lightning Monitoring

The screenshot shows a web browser window displaying the freemeteo.com website. The browser's address bar shows the URL: freemeteo.com/default.asp?pid=306&la=1&gid=1040652&mfreq=004&mfvar=CPRAT. The website header includes the freemeteo.com logo and the text "weather forecasts for the entire planet". Below the header, there are navigation tabs for "Current Weather", "Today", "Tomorrow", "Week", "Map", "Feeds", and "E-mail". A search bar is present with the text "city or village, mountain, lake..." and a "GO" button. The main content area is titled "Weather Maps" and shows a map of Africa with a "Chance of thunder" overlay. The map is titled "Africa, Chance of thunder" and "Convective Precipitation (mm)". The local time is "Thursday, 27 February 11:00". On the left side, there is a "Mozambique Weather" section with a dropdown menu for "Mozambique" and a "Quick Pick" list of cities including Maputo, Beira, Nampula, Chimoino, Cidade de Nacala, Quelimane, Tete, Xai-Xai, Maxixe, and Lichinga. Below this, there is a "Select by Region:" section with a dropdown for "Cabo Delgado" and a list of major cities including Pemba. On the right side, there is a login form with fields for "Email:" and "Password:" and a "Forgot your password?" link. At the bottom, there is a Windows taskbar with several open applications including "SALVADOR 2 (F:)", "Manual da PNU...", "Entrada (21) - ...", "www.cis.ufpr...", "Mapas Grécia...", "Weather Maps...", "TRMM - Google...", "Microsoft Powe...", "Google Earth", and "PT". The system clock shows "10:36 AM".

# Burning and forest fires Monitoring

The screenshot displays the FAO Web Fire Mapper interface within a web browser. The browser's address bar shows the URL `geonetwork4.fao.org/firemap/`. The page header includes the FAO logo and the text "Food and Agriculture Organization of the United Nations for a world without hunger". The main title "Web Fire Mapper" is prominently displayed in a large, stylized font, with "Global Fire Information Management System" written below it. The central part of the interface is a map of Southern Africa and Madagascar, with labels for countries: ANGOLA, ZAMBIA, MALAWI, MOZAMBIQUE, ZIMBABWE, NAMBIA, BOTSWANA, SOUTH AFRICA, and MADAGASCAR. Major cities like Johannesburg, Maputo, and Durban are also marked. A red banner at the top of the map area reads "Centro and zoom em". To the right of the map is a control panel titled "Incêndios" (Fires). It includes a "Bookmark visão atual" link, a dropdown menu for "Fonte dos dados" (Data Source) set to "Resposta Rápida MODIS", and another dropdown for "Fonte de satélite" (Satellite Source) set to "Aqua & Terra". Below these are options for "Período de tempo" (Time Period) with radio buttons for "Últimas 24 horas", "Últimas 48 horas" (selected), "Passados 72 horas", and "Passados sete dias". A note indicates that fires from the last 24 hours are shown in red ("vermelha") and older fires in orange ("laranja"). At the bottom of the control panel, there are fields for "Início" (Start) and "Fim" (End) dates, both set to 2014-03-01 and 2014-03-03 respectively. The browser's taskbar at the bottom shows the Windows Start button and several open applications, including "SALVADOR 2 (F...)" and "Manual da PNUD final...". The system clock in the bottom right corner shows "12:46 PM".

Advanced Fire Information System - Mozilla Firefox

Arquivo Editar Exibir Histórico Favoritos Ferramentas Ajuda

AFIS - Pesquisa do Google Home Advanced Fire Information System

southernafrica.afis.co.za/#

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**afis** Advanced Fire Information System

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Logout Request Layers Places Date Query Base Layer Help

Hours

- Low Intensity
- Medium Intensity
- High Intensity
- Extreme Intensity

MSG / GOES Active Fires Today

- Low Intensity
- Medium Intensity
- High Intensity
- Extreme Intensity

Current fire danger and wind

- Low
- Moderate
- Dangerous
- Very Dangerous
- Extreme

MODIS Burned Areas Last 4 Months

- MODIS True Colour: Latest
- MODIS False Colour: Latest
- MODIS True Colour: Previous
- MODIS False Colour: Previous
- Land Cover (NLC 2000)
- Next satellite overpass coverage

Google

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start EOS20 - Mozilla... Advanced Fire I... Google Tradutor... Downloads SALVADOR 2 (F...) Manual de PMJD... 2 Google Chrome AFIS.pdf - Adob... Microsoft Power... 10:49 AM

# Earthquakes Monitoring

Firefox | Seismic Monitor - Recent earthquakes o... | www.iris.edu/seismon/ | Google

Magnitude 8 6 4  
Age Today Yesterday Past 2 weeks Past 5 years

## Seismic Monitor

click on map to zoom

See Large Screen View

IRIS <http://www.iris.edu> | UTC 2014 Mar 14 11:25:07

North Pacific Ocean | Longitude 132 W | Latitude 12 N

Help | Earthquake Headlines | Last 30 Days Earthquakes | Special Events | Plate Tectonics | Education Links

New: [Earthquake browser with 3D viewer!](#) Nuevo: [Navegador de Terremotos con Vista 3D!](#) y [Boletines en español!](#)

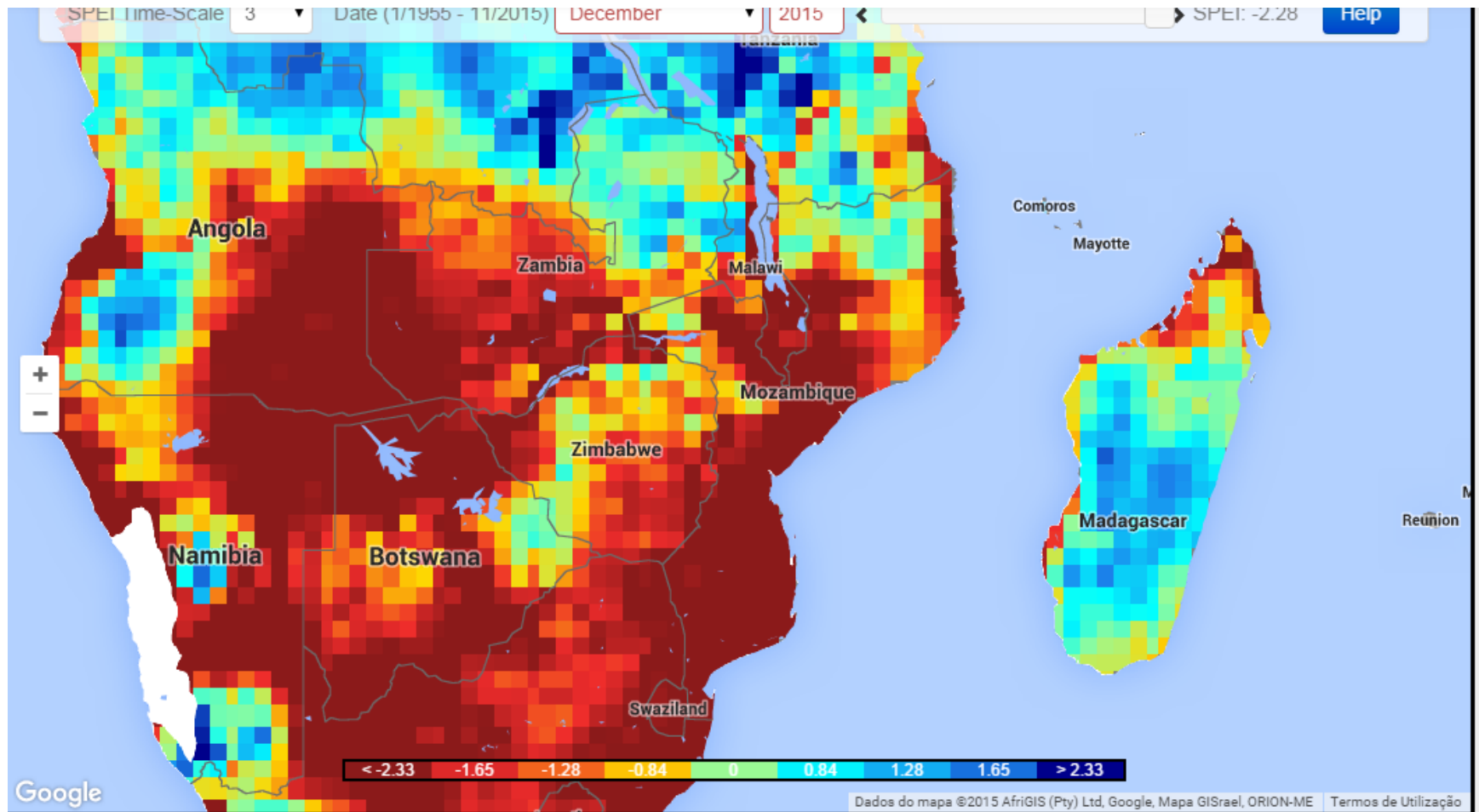
IEB is a new, interactive map that not only shows the latest earthquakes but allows you to display thousands of quakes from an archive of 3.4 million spanning from 1970 to minutes ago. It's the IRIS Earthquake Browser, or just [IEB](#), and one of many features is that you can rotate quakes in [3D!](#) (No Flash or Java used)

IRIS Earthquake Browser

Desktop | 1:28 PM | 3/14/2014



# Drought Monitoring







República de Moçambique  
Província de Gaza

## MAPEAMENTO DE RISCO A DESASTRES

Programa Conjunto das Nações Unidas de Redução de Riscos de Calamidades e Preparação para Emergência



### DISTRITO DE MASSINGIR

Maputo, Agosto de 2010

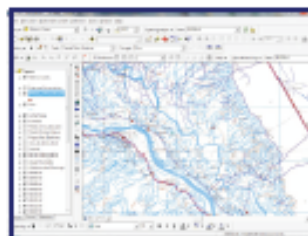


### III. OBJECTIVO DO MAPEAMENTO DE RISCO

O mapeamento de risco tem como principal objectivo identificar, descrever e delimitar as áreas de risco aos desastres naturais, em particular a cheia e seca. Os objectivos específicos deste trabalho são:

- Mapeamento das actividades económicas dominantes em cada posto administrativo e no distrito em geral;
- Identificação das principais infra-estruturas (saúde, educação, água) existentes no posto administrativo e as condições de acesso àqueles serviços básicos;
- Delimitação dos níveis de risco e descrição dos seus impactos.

### IV. METODOLOGIA



Para a elaboração deste estudo, recorreu-se inicialmente a revisão bibliográfica sobre calamidades naturais, relatórios e planos de contingência entre outros assim como a digitalização de cartas topográficas a escala 1:50.000.

Em seguida foram realizados dois trabalhos de campo. O primeiro que visava a recolha de informação qualitativa a três níveis: provincial, distrital e comunitária sobre a percepção e historial das cheias e secas assim como o mapeamento de risco. O segundo trabalho de campo consistiu na validação dos mapas produzidos.

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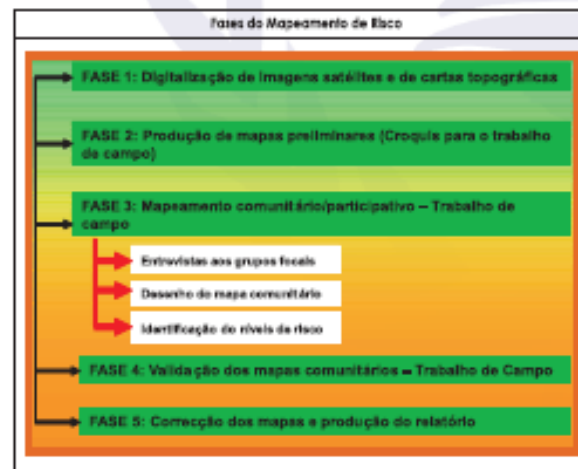


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Os dados recolhidos no campo, foram posteriormente cruzados com a informação de imagens satélites e mapa topográficos. Este cruzamento, ajudou na delimitação das áreas cobertas por cada nível de risco as cheias e secas.



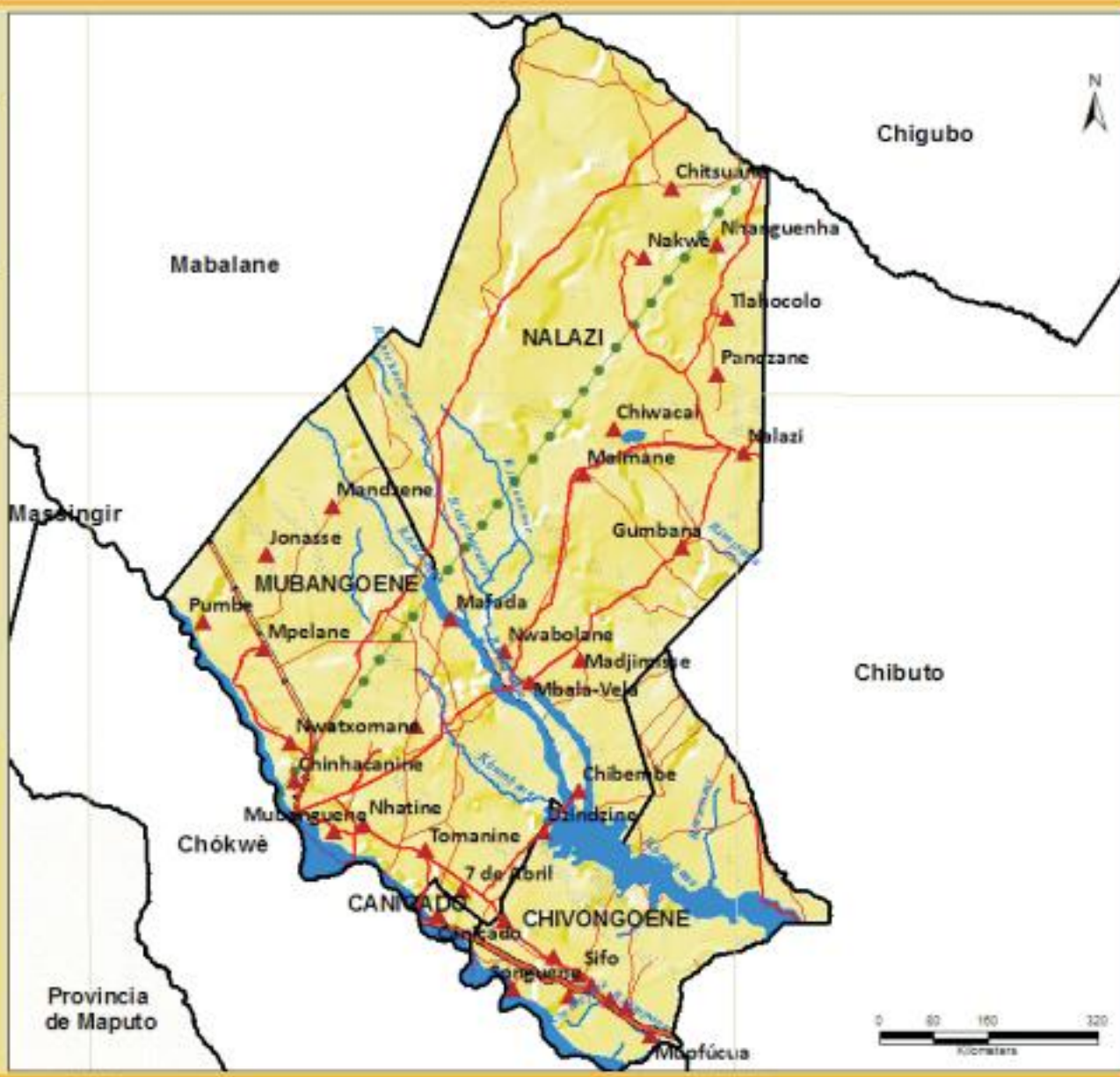
Foi recolhida informação adicional relativa a outros problemas que são relevantes de acordo com a realidade de cada distrito, tais como o conflito homem vs fauna bravia, queimadas descontroladas, erosão, saneamento do meio entre outros. Veja ao lado as etapas do mapeamento das áreas:



# Distrito de Guija

## Legenda

- ▲ Aldeia
- Est. Terra-Batida
- Est. Asfaltada
- Caminhos
- Pipeline
- Lago bambene
- Rios
- ⋯ Areas Humidas
- Limite - P. Adm.



32°40' E

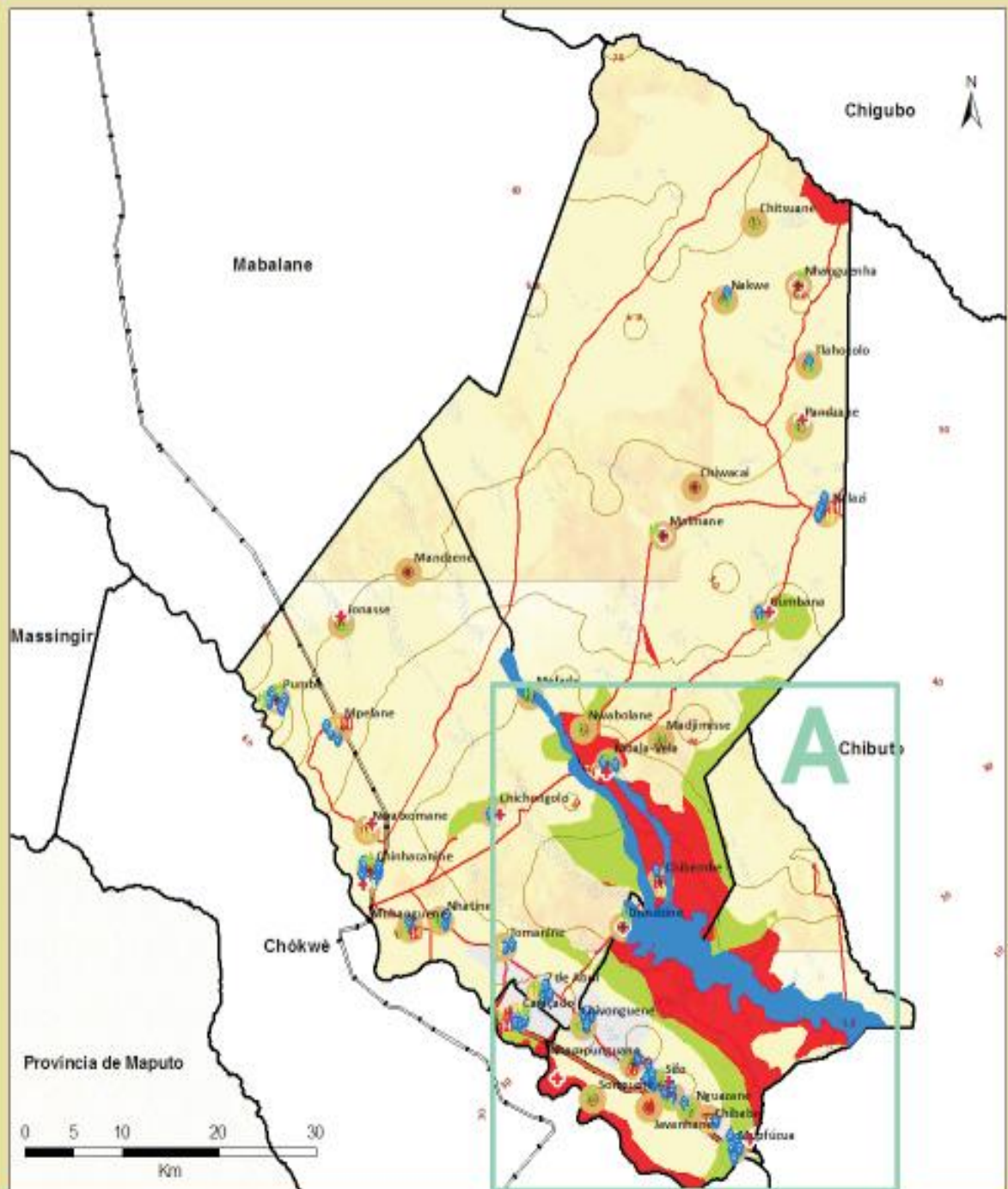
32°20' E

32°40' E

32°20' E

30°55' S

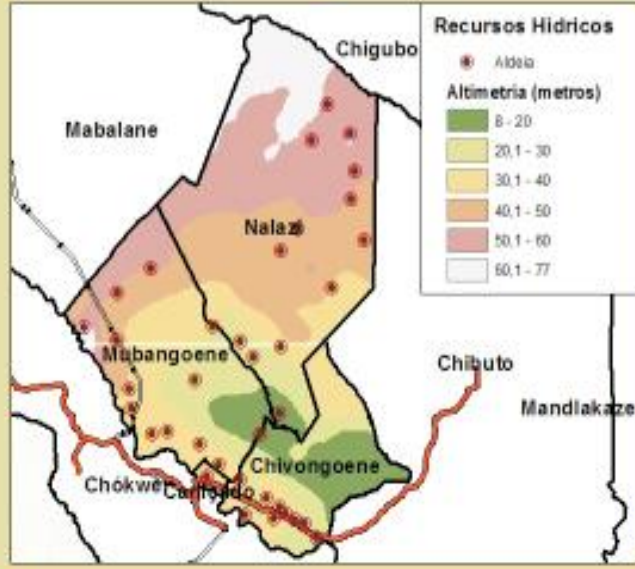
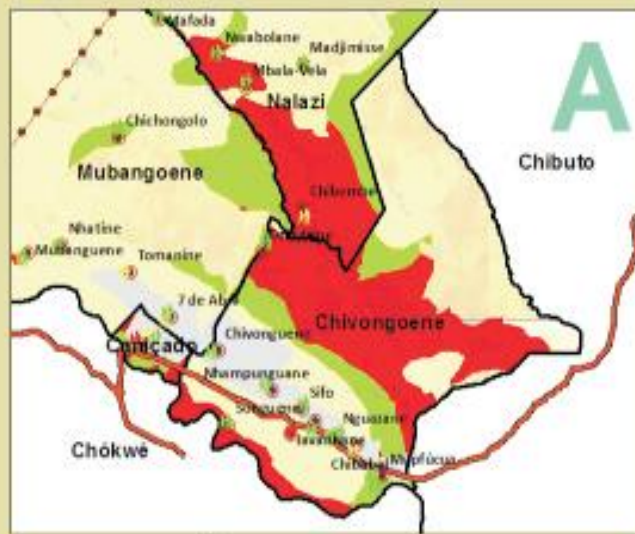
30°55' S



### Áreas de Risco a Cheia: Distrito de Gulja

**Legenda**

● Aldeia	Escolas	◆ Fontes de Agua	— Est. Terra Batida
■ Nível de Cheia NA	● EPC	● Unidades Sanitarias	— Est. Asfaltado
■ Alto	● ESG 1	● C.S. Comunit.	— Curvas de Nível
■ Moderado	● ESG 1 e 2	■ PS	● Lago bambene
			■ Áreas Húmidas



Thanks