

EUROPEAN COMMISSION



Humanitarian Aid



ZGIS

# Geoinformation for Disaster Risk Reduction *South Eastern Africa*

## **DIPECHO-SEA**

*« Providing Geographical Information Systems (GIS) technical support for Disaster Risk Reduction programs implemented by DIPECHO partners in the South East African and South West Indian Ocean region »*

**Arnaud RAULIN – Project manager**

*United Nations International Conference on Space-based Technologies for  
Disaster Risk Management:*

*"Best Practices for Risk Reduction and Rapid Response Mapping"*

*Beijing, China 22-25 November 2011*

# GI4DRR – [www.gi4drr.org](http://www.gi4drr.org)

## Fundings

EUROPEAN COMMISSION



Humanitarian Aid



Let's improve the world, together.



UNITED NATIONS  
Office for Outer Space Affairs

## 15 partners in 4 countries

### Malawi



### Madagascar



### Mozambique



### Comoros



# GI4DRR – [www.gi4drr.org](http://www.gi4drr.org)

## Principal objective

*To contribute to support the DIPECHO partners and beneficiaries in **the practical application of GIS tools to address disaster preparedness and response planning challenges** faced by local institutions, authorities and communities.*

## Specific objectives

Creation of a **common GIS based dialogue** among regional DIPECHO partners that support disaster preparedness activities through:

- 1) the promotion of **existing GIS DRR support agencies and mechanisms**;
- 2) the creation of a regional **multi-lingual DRR database**;
- 3) the development of **improved hazard and vulnerability mapping**

# 1) Promotion of GIS/DRR support agencies and international mechanisms

## Seminars



Antananarivo  
12/11/2010



Lilongwe,  
16/11/2010



Maputo  
15/04/2011

## objectives

- To provide a **general introduction** to GIS and space-based information for DRR;
- To describe **existing international mechanisms**;
- To **explain the role of UN-SPIDER** and its cooperation and coordination with these mechanisms.

## Results

- 150 participants from ministries, national institutions, NGOs, donors and UN
- Started the identification of a UN-Spider focal point in each country

## 2) Regional multi-lingual DRR database

### Objectives

To improve DRR related knowledge about areas supported by DIPECHO partners, by:

- **Providing** a thematic data set;
- **Facilitating** data exchange;
- **Promoting** data collection.

### Approach

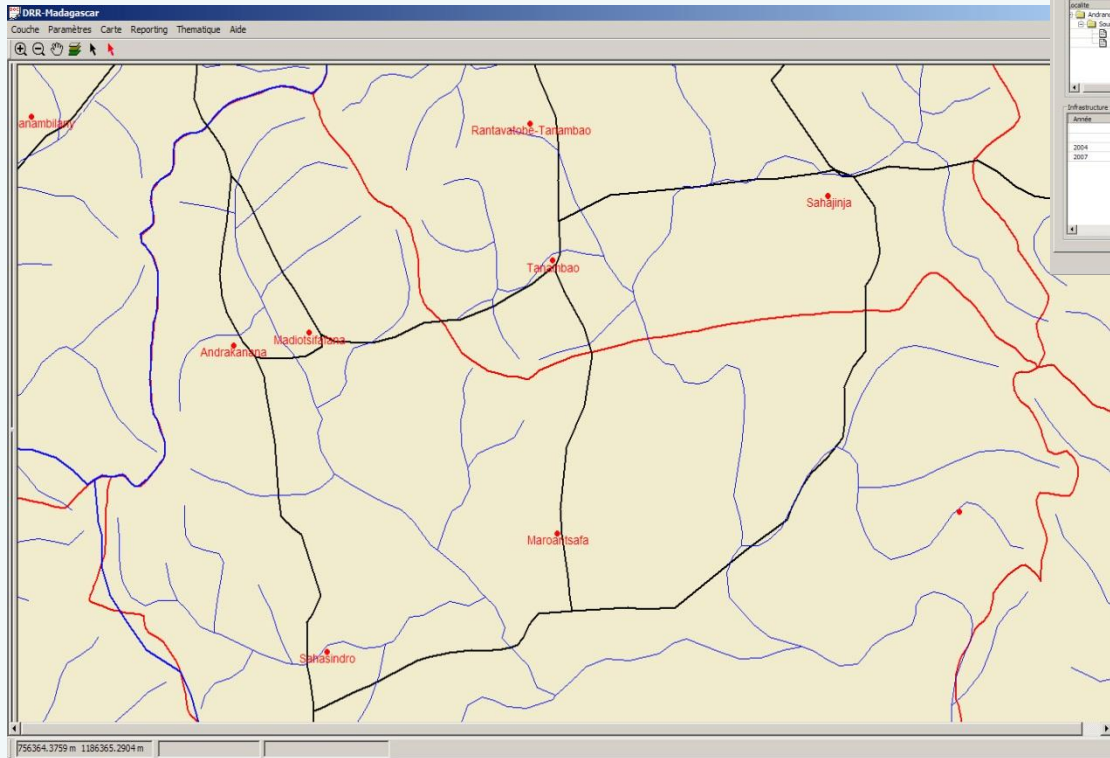
In collaboration with partners, definition of DRR data sets related to 5 thematics:

- Early warning system;
- Capacity building;
- Infrastructures;
- Wash-sanitation;
- Food security.

## 2) Regional multi-lingual DRR database

### Local database

C++ / Windows Linux compatible



The 'Consultation Informations' window displays three data tables. The first table, 'Sources', has columns for 'Année', 'Nbre', 'Lac', 'Put', and 'Point'. The second table, 'Infrastructure', has columns for 'Année' and 'Put'. The third table, 'Lettre', has columns for 'Année', 'Lettre Publique', and 'Lettre Indiv.'. The data is as follows:

Année	Nbre	Lac	Put	Point
2004	3	5	7	5
2007	8	8	9	28

Année	Put
2004	9
2007	8

Année	Lettre Publique	Lettre Indiv.
2004	8	7
2007	9	8

**Data visualization:** Vector background and tree tables  
Data query: geographic query by pointing

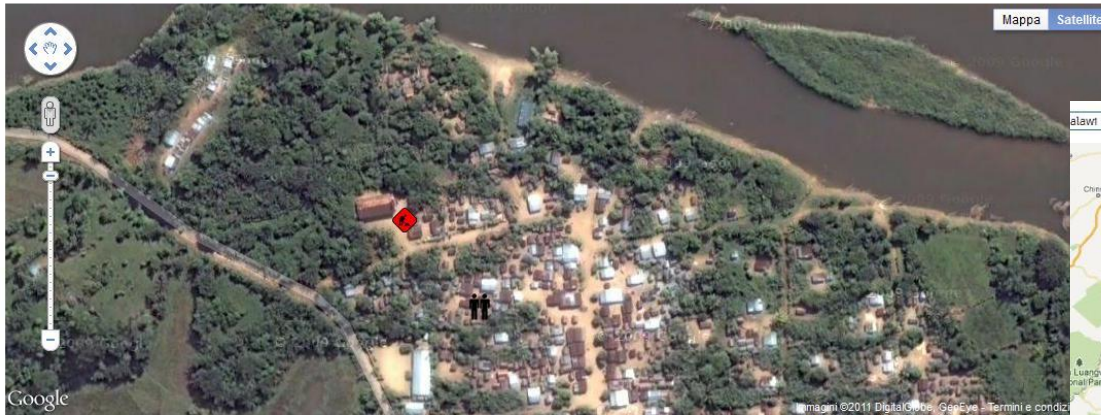
**Data entry and editing :**

- through editing interface by pointing and entering
- Through XML files import

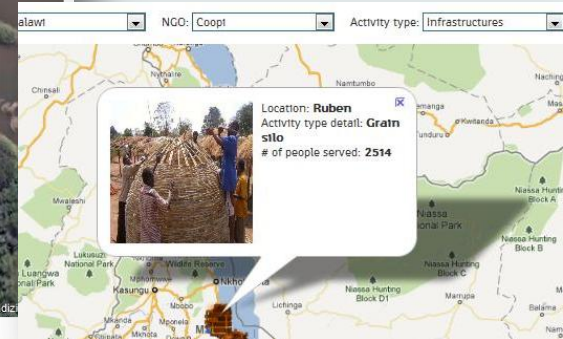
## 2) Regional multi-lingual DRR database

Online database [www.qi4drrdb.coopi.org](http://www.qi4drrdb.coopi.org)

Country: Madagascar NGO: Medair CH Activity type: Select an activity type



Linux / Apache Webserver / MySQL database



Show 10 entries Search:

Country	NGO	Activity type	Location	Status	# villages served	# people served	Established by	Date
Madagascar	Medair CH	Early Warning System - other	Aérodrome Maroantsetra	Not active	N/A	N/A	MEDAIR	40817

**Data visualization :** Googlemap background and tables.

Data query: drop down menus Country / NGO / Activity type

**Data entry and editing :**

- Online through restricted area
- Using E-tablets with Android application Open Data Kit (ODK)

<b>NGO</b>	GOAL	<b>Number of villages served</b>	N/A
<b>Activity type</b>	Early Warning System	<b>Number of people served</b>	N/A
<b>Activity type detail</b>	rain gauge	<b>Who did establish it?</b>	GOAL
<b>Location</b>	Malekesa	<b>When was it established?</b>	2010
<b>Latitude</b>	-16.97573	<b>Information collected/read by</b>	Local committee, Governmental officer
<b>Longitude</b>	35.27105	<b>Information transmitted by</b>	Cellphones
<b>Altitude</b>		<b>Past data</b>	data kept by the area civil protect committee
<b>Status</b>	1	<b>Note</b>	

# 3)

## Pilot projects GI/DRR

### Objectives

To promote the use of Geographic Information among DIPECHO partners, by:

- Promoting the use of **Participatory GIS** (PGIS) (*Kienberger, 2010*);
- Exploring **possibilities offered by Geographic Information** to solve problems met by partners

### Training sessions



Salima

30/11 to 4/12/2010



Sambava

13 to 17/12/2010



Nampula

18 to 22/04/ 2011

About **60 participants** from 12 DIPECHO partners

- Introduction to GI concepts and its application to DRR
- Definition of a pilot project with each NGO

### Field missions

Implementation of the pilot projects in the area of intervention of the DIPECHO partners



## 3.1)

# Pilot projects GI/DRR Participatory GIS

## Definition

### Participatory mapping based on a satellite image

*PGIS is a participatory mapping method facilitating the integration of local knowledge and perceptions in geographic information systems in order to improve decision making in the context of Disaster Risk Reduction.*

## Methodology

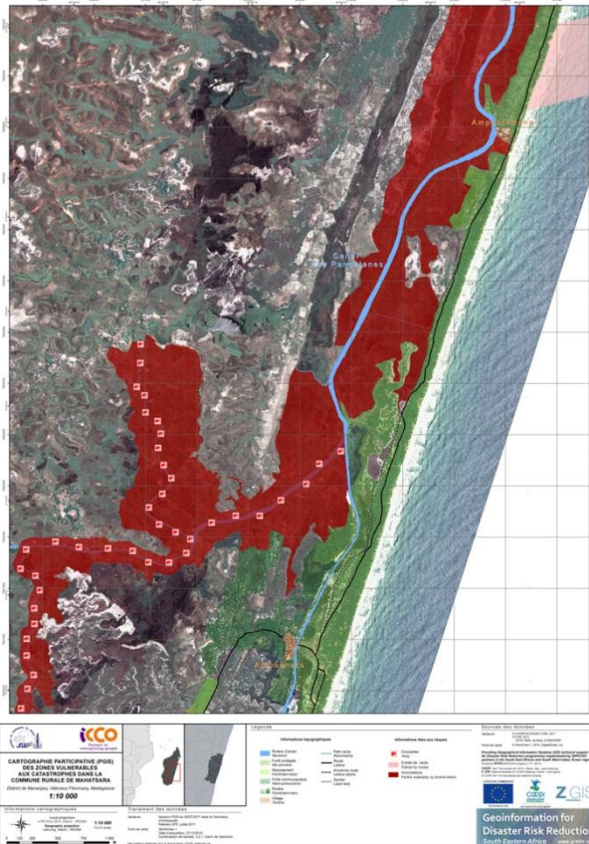
- **Image acquisition:** Very High Resolution images (Quickbird, GeoEye, Worldvision) or medium resolution images (LandSat 5 and LandSat 7)
- **Pre-processing:** Layer stacking, Pansharpening, Printings
- **PGIS session** with local communities or local authorities, who represent on the satellite image areas where hazards occur
- **Digitizing and layout creation**

# 3.1)

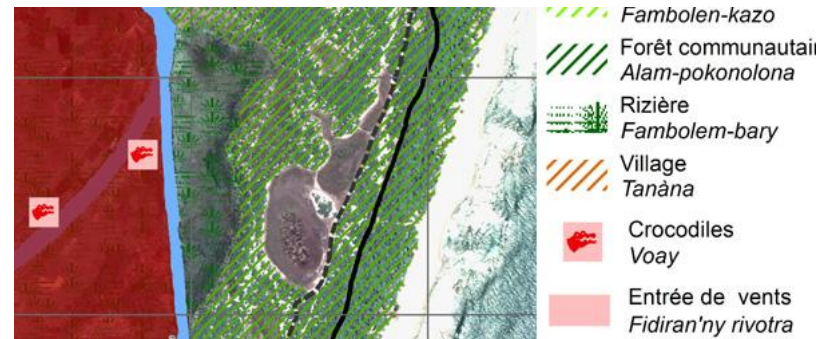
## Pilot projects GI/DRR Participatory GIS

### PGIS at community level

8 NGO in 3 countries - 9 maps produced



Fokontany Amboanafo, Commune rurale de Mahatsara-Sud, district de Mananjary, Madagascar, 05/07/2011



# 3.1)

## Pilot projects GI/DRR Participatory GIS

### PGIS at district level

4 NGOs in 2 countries - 6 maps produced



Mossuril District , Mozambique, 26/04/2011



# 3.1)

## Pilot projects GI/DRR Participatory GIS

	Community level	District level
Images	(Very) High Resolution	Medium resolution
Area	Small	Large
Cost	Expensive	Free
Participant comprehension	Fast	Longer
Technical skills	High	Medium
Sharpness	High	Medium

### Uses according to needs

Activity design

Project design

**Chronological approach** = Overview at district level and close-up at community level

# 3.1)

## Pilot projects GI/DRR Participatory GIS

### PGIS vs classical participatory mapping

*Both*

- To collect data at a **scale often not existing** in national institutions
- To transmit a **harmonized vision and a common perception** of the area from the participants to the investigators;
- To **create a dialogue** on issues not necessarily discussed outside of the session time.

#### Pros

- Faster
- Sharper (no distortion)
- More complete / less omissions
- Different and fun

#### Cons

- Could be expensive
- Technically complicated for some steps
- Constraint to reality lowering the collection of information related to perception

## 3.2)

Pilot projects GI/DRR

# Innovative approaches GIS/DRR

## Objectives

*Exploring possibilities offered by Geographic Information  
to solve problems met by partners*

## Approaches

- **Data acquisition / Management**
- **Data analysis**
- **Communication**

## 3.2)

Pilot projects GI/DRR

# Innovative approaches GIS/DRR

## Data acquisition / Management

*To provide data or manage existing data for the partners*

- 25 200 Km<sup>2</sup> of high resolution images - SPOT 5 - provided for free by Planet action [www.planet-action.org](http://www.planet-action.org)



## 3.2)

Pilot projects GI/DRR

# Innovative approaches GIS/DRR

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- 1 148 km<sup>2</sup> of high resolution TerraSAR-X DEM over Grande Comore provided by EADS / ASTRIUM





## 3.2)

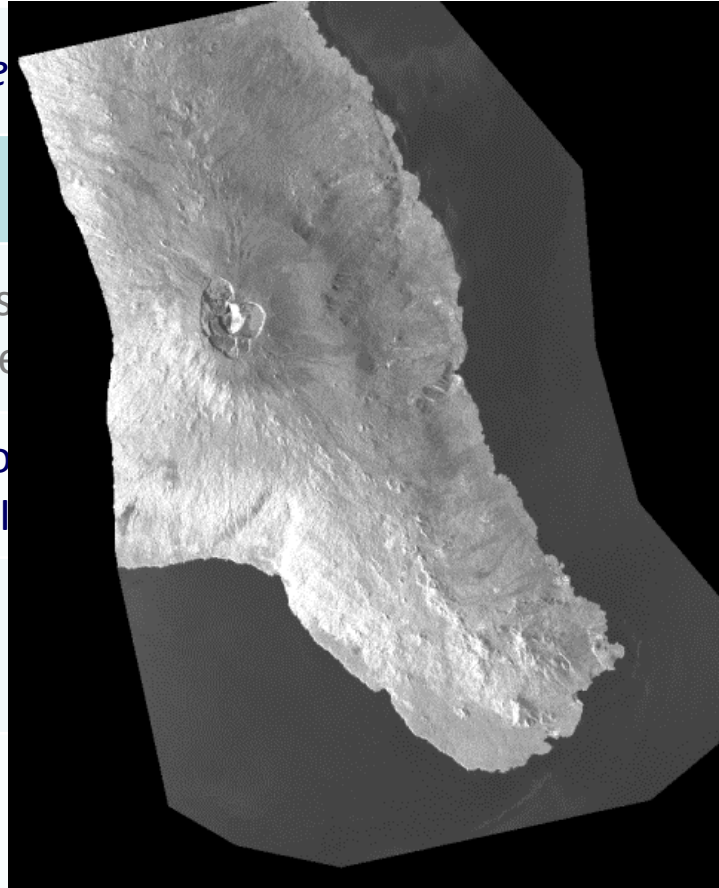
Pilot projects GI/DRR

# Innovative approaches GIS/DRR

## Data acquisition / Management

To provide

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partners



Comore



## 3.2)

Pilot projects GI/DRR

# Innovative approaches GIS/DRR

## Data acquisition / Management

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- Existing Data Management: **Organization** (geodatabase) , **Improvement** (topology) **update** (field collection)

## 3.2)

Pilot projects GI/DRR

# Innovative approaches GIS/DRR

## Data analysis

*To perform data analysis to facilitate partners' tasks*

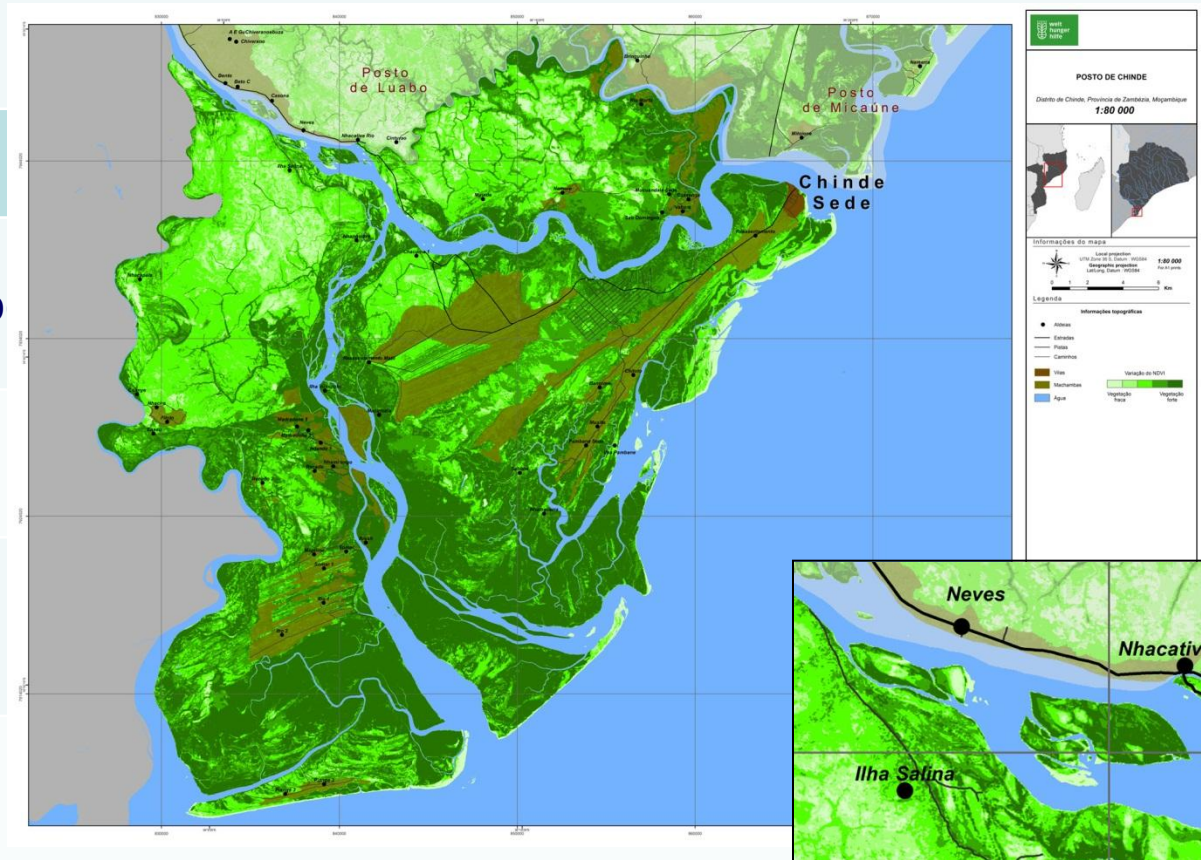
Updated topographic maps and Hazard mapping in Chinde district (Mozambique)

# 3.2)

## Pilot projects GI/DRR Innovative approaches GIS/DRR

### Data analysis

Updated top



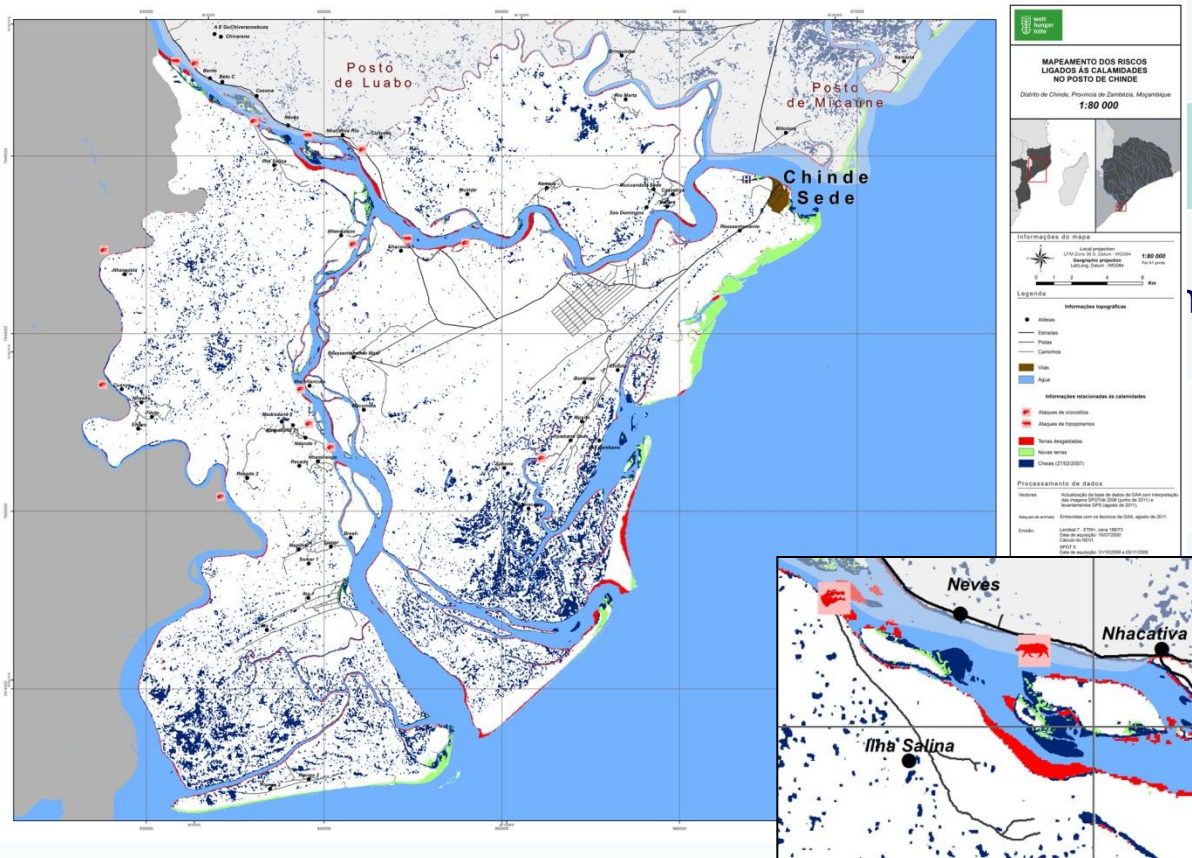
ibique)

# 3.2)

## Pilot projects GI/DRR Innovative approaches GIS/DRR

### Data analysis

Updated top



ambique)

## 3.2)

Pilot projects GI/DRR

# Innovative approaches GIS/DRR

## Data analysis

*To perform data analysis to facilitate partners' tasks*

Updated topographic maps and Hazard mapping in Chinde district (Mozambique)

Identification of suitable areas for agriculture, Ilha do Moçambique district (Mozambique)

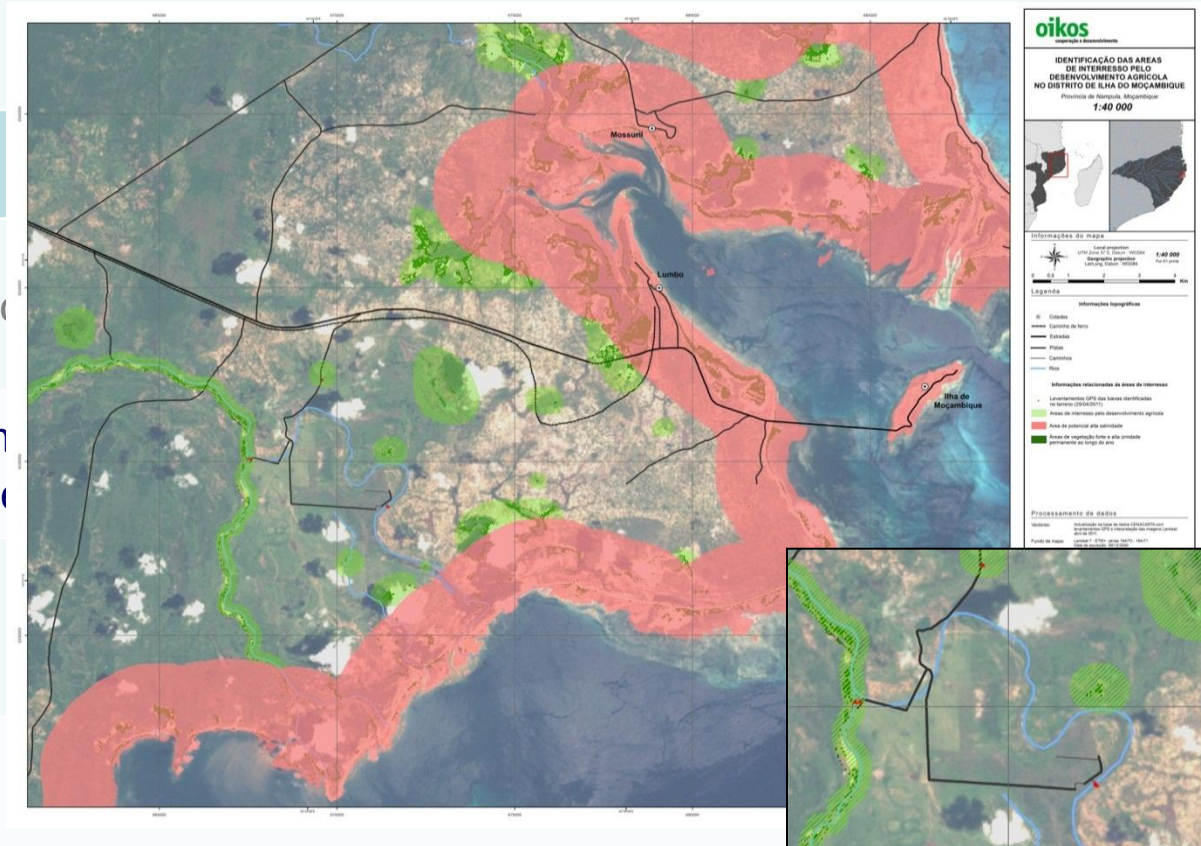
# 3.2)

## Pilot projects GI/DRR Innovative approaches GIS/DRR

### Data analysis

Updated topographic map

Identification of agricultural interest areas (Mozambique)



(Mozambique)

## 3.2)

Pilot projects GI/DRR

# Innovative approaches GIS/DRR

## Communication

*To test innovative communication technology in real conditions*

Tablet SAMSUNG GALAXY GT-P1000

Operating System Android 2.2 (FroYo)

ODK Collect 1.1.5.apk (<http://opendatakit.org>)

Field activities monitoring (Madagascar and Malawi)

**Live data transmission through GPRS network**





# GI4DRR – [www.gi4drr.org](http://www.gi4drr.org)

## To conclude

- Strong participation: institutions, on the field, data providers.
- High needs and strong interest from the field
- Technical challenge
- Need for scientific validation
- Data sharing issues

## ... Dipecho 3

Moving from « making for » to « making with »

## Open issues

- Targeting the planning **within the communities** through the integration of maps as planning instruments
- Integration of **'participatory' maps within NSDI** an open issue

# Thank you

## GI4DRR – [www.gi4drd.org](http://www.gi4drd.org)

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