



Space technology and
management of the First
September flood in Burkina
Faso “From Charter
activation to rapid mapping”

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Introduction

Location

Located in west Africa with
Capitale : Ouagadougou

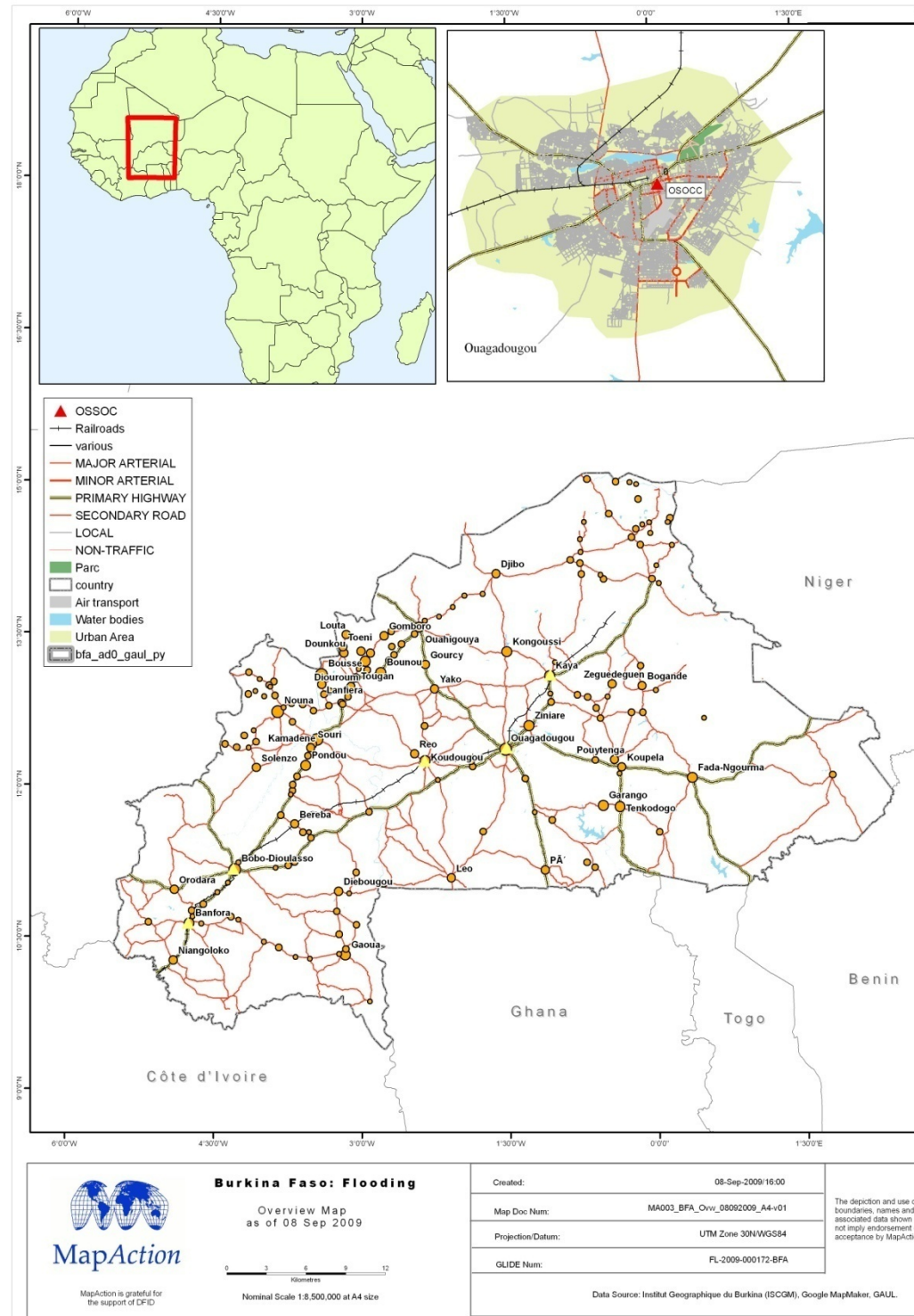
Population (2005 estimate)
:13 millions

Population Density :48/km²

Area : 274 000 km²

80 % of population are
involved in agricultural
activities

Sahelian climate [only 4-
6 months of rain season]



Types of Disaster in Burkina Faso

Main disaster Burkina Faso:

1. Drought
2. Flood

3. Bush fire,
4. Epidemic Diseases (Meningitis, yellow fever, measles, etc.
4. Locust invasion
5. Humanitarian crisis

•Sécheresse



Inondations à Bama au Burkina Faso, en 2007



Les déversements des déchets industriels dans certains cours d'eau (Ouaga-Bobo)



Les épidémies



Grippe aviaire

Crises humanitaires



Background

With the climate change, Burkina is in permanent situation of flooding. It was observed:

- **1988** in 16 provinces, 142 villages affected, 14900 victims, 975 houses destroyed, several barns, livestock, poultry and fields destroyed. **Damage estimated at \$ 50 000.**
- **1992:** 9 provinces, 64 towns affected, 21,400 victims, 3,400 homes destroyed, 17 dams and water reservoirs damaged, 300 ha of crop destruction and widespread loss of livestock and poultry. **Damage estimated at \$ 2 497 600 .**
- **1994:** flooding in 20 provinces, 68000 victims, 106,560 ha of crops destroyed, 22 dams and water reservoirs damaged. **Damage estimated at \$ 1 142 570 .**
- **2006:** 07 regions affected, 11170 casualties, **damage costs estimated at 1 671 121 \$**
- **2007:** 13 regions with 33 provinces affected. : 111 356 victims, 14 222 households, 76 injured 60 casualties, 18 150 houses destroyed, 2080 granaries carried, 222 cattle, 559 small ruminants and poultry decimated 19 437

September 1, 2009 Food in Ouagadougou

The causes of flood in Ouagadougou should be:

- absence of an urban development plan taking into account the risk management
- the uncontrolled development of spontaneous Habitat
- Climate Change

Then, September 1, 2009 unusually severe rains fall down in Burkina Faso with **263 mm in 12 hours**, causing heavy damage in Ouagadougou and in other cities in Burkina Faso

Balé, Banwa, Kossi, Nayala and Sourou provinces have been affected by the flood.

The Flood of 1st September, 2009, Ouagadougou



- All five districts around Ouagadougou had been affected and 8 people died. 50% of the city's territory has been affected.
- Key infrastructures damaged includes **the Central University Hospital; bridges, dams and roads;**
- schools; 111 public and private schools (666 classrooms)
- Many small farmers are affected by the flood
- the main water purification plants for the city are out of use
- Etc.
- **More than 250 Houses destroyed**

Total damage urgently need is estimated to 10.687.022 Euro





National and International response to the disaster

Country & bilateral response

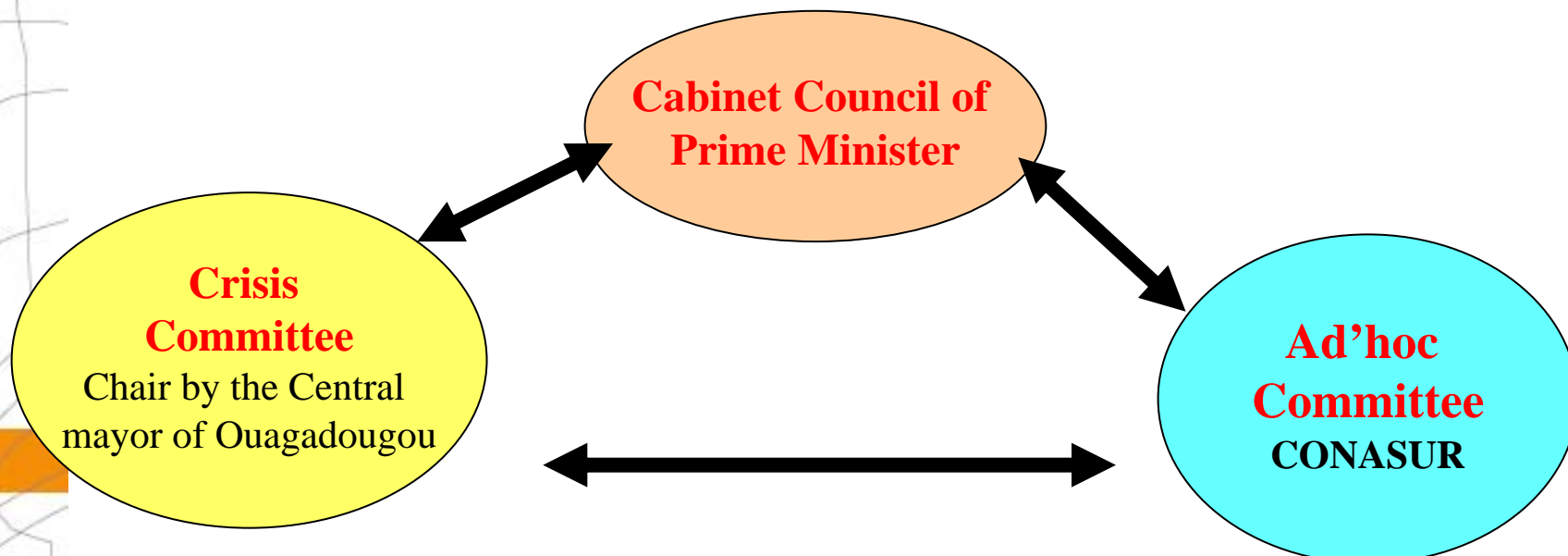
President of B.F launched National Solidarity week on 7 Sep.

Over **13 Million euro** has been donated to the appeal for victims of the flooding by .

- Private sector businesses,
- Individuals, government institutions
- Religious and traditional bodies.
- National institutions .
- NGOs
- UN organisations UNICEF, UNFPA, UNHCR, WHO
- France
- Japan,
- etc

3 governmental coordinating bodies:

- ✓ Cabinet Council, chaired by the Prime Minister
- ✓ Crisis Committee, chaired by the Mayor, meets daily to monitor the situation and reports to the Prime Minister's cabinet.
- ✓ Ad hoc committee, chaired by CONASUR, which oversees the allocation of humanitarian assistance



Meeting coordination

- Inter-Agency coordination –
- **Contact List** have been updated
- **Meeting schedule coordinate** by **UNDAC** team with the regional office for West Africa and the Field Coordination Support Section on daily basis
- Coordination all humanitarian activities

Health sector – WHO

WATSAN sector– DGRE

Food Security sector –

Protection sector –

Shelter/NFI sector



Space technologies and disaster management

CONASUR

- **Set up ministries with a mandate to develop and implement the national disaster management plan and programs.**
 - **Coordination internal and external**
 - **Public advocacy (Inform, sensitize and educate the communities in the culture of prevention of natural calamities)**
 - **Instutional capacities bulding (Human ressorces)**
 - **Develop National standards**
 - **Develop policy and legislation**

Space technology Network

The national program in charge of management of space technology is **PNGIM [National program of information management on environment]**.

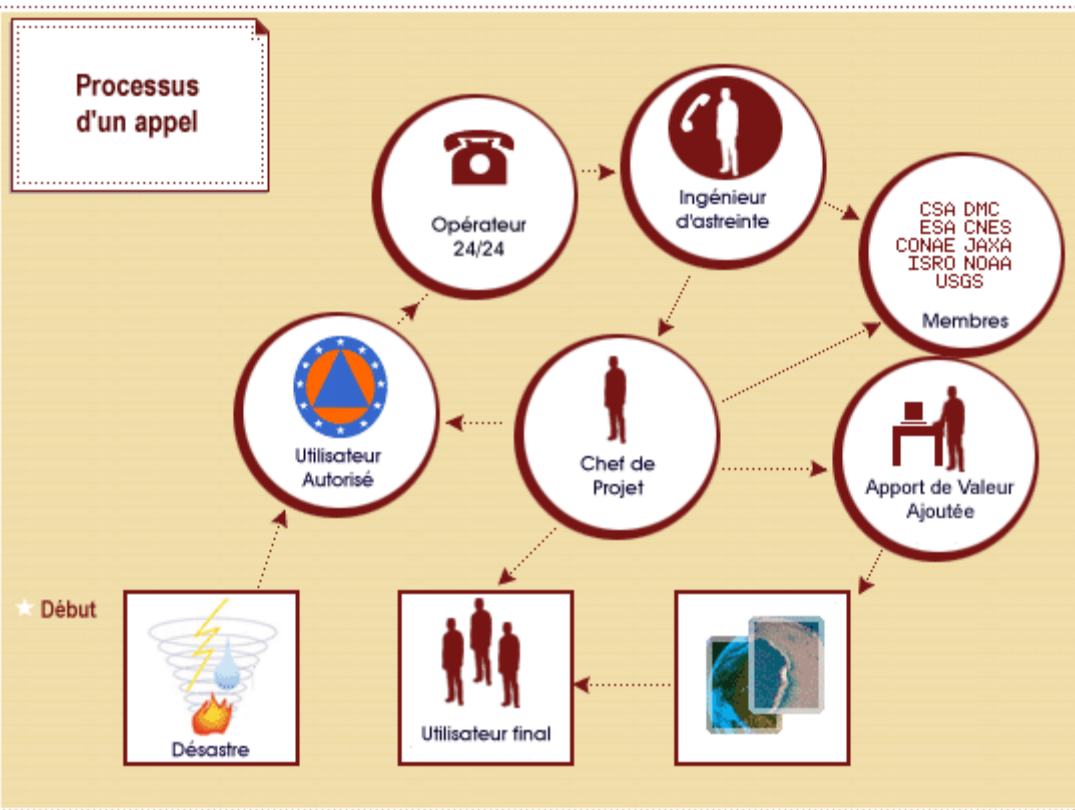
Responsible for coordinating all activity in space technology

- **Housing in the Ministry of Environment and Life Environment**, This program runs a network of **45 Government an Privates institutions**.
- The network is based on sharing data,
- Develop application prevention, management in case of disaster
- The PNGIM often organizes meetings for consultation in the light of environmental information exchange

Role of space technology agency, in flood management

- Call for charter Activation
- Base maps
- Technical support for flood management
- Contact list, participating to the meeting
- Flash appeal of OCHA

Charter – Activation



September 1, 2009 : Day of flooding

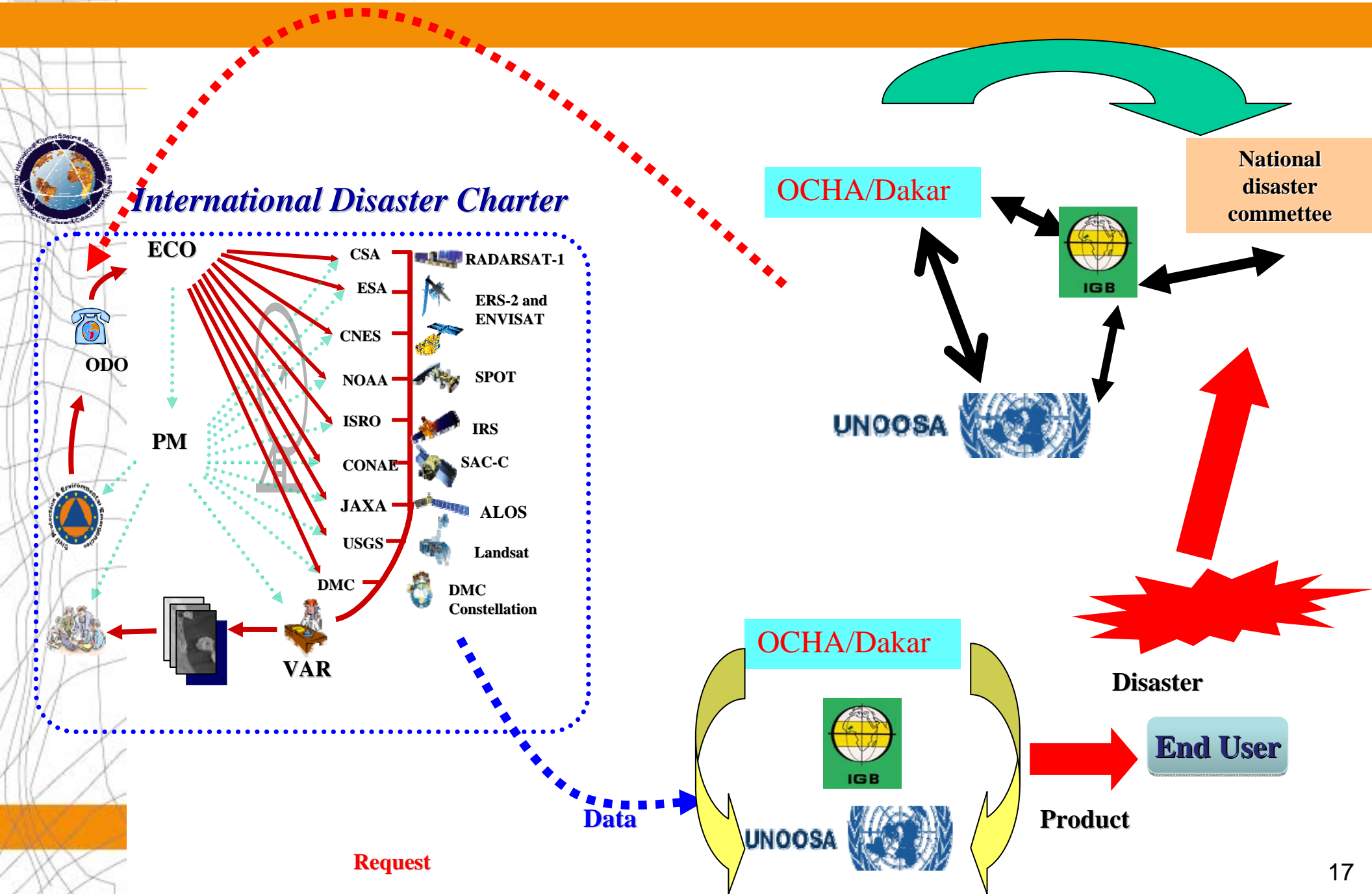
Septembre 2, 2009 : Mail to UN-SPIDER (Shirish, Joerg)

This email have been copying to OCHA ROWA

Charter request form have been sent for OCHA with coordinates of the affected aera

September 3, 2009: Receiving the email of activation of the Charter [SPOT, LAOS, JAXA, RADARSAT, etc] and confirmation,

How does it work?





RAPID MAPPING IN SITUATION OF DISASTER

Rapid mapping for Emergency Response

« rapid mapping » and « asset mapping », consist to provide maps in case on disaster for assesment, planning and management of disaster in order to make decision and appropriate response to the crisis

Information provided within & outside Burkina

- **Reference maps** available within 6 hours over crisis area IGB;
- **Situation Assessment maps** available within 24 hours & daily updated;
- **Forecasts of evolution** of situations to be made available.

Links with preparedness, early warning & alert systems (e.g. meteorological,etc ...)

Main Users: national Civil Protection authorities, Government

Coordination of mapping

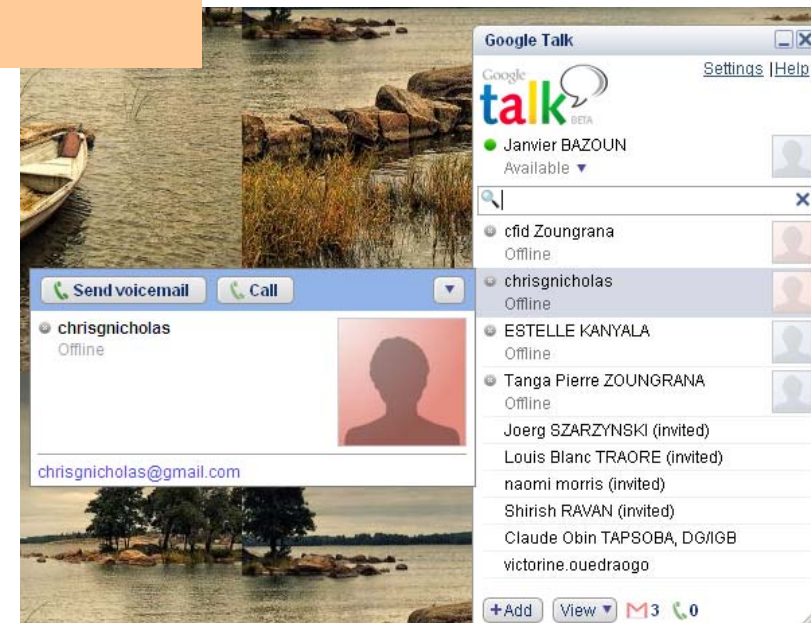
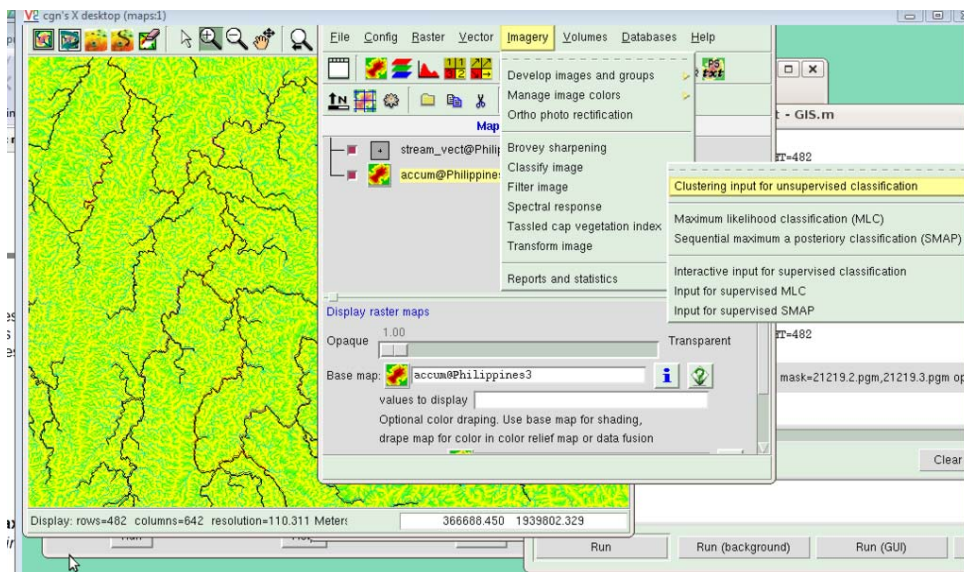
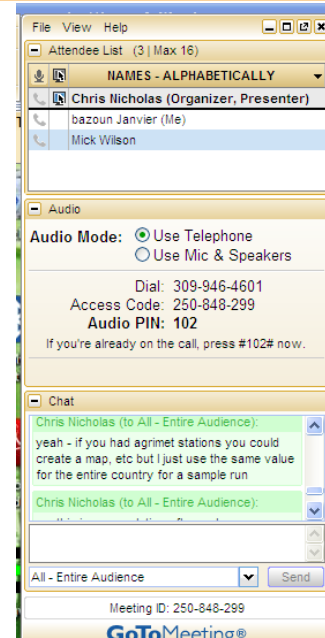
- Map action under UNDAC, is the responsible of coordination of rapping mapping of the disaster
- In coordination with other institution produce maps of 88 sites
- Some institutions contribute to mapping activities
 - IGB (Charter activation, mapping and field work with GPS)
 - Centre SIGET-A, for mapping,
 - DGRE, Water information System
 - Direction General de l'urbanisme et des Travaux Fonciers (DGUTF) for cadastral data of Ouagadougou
 - Ministry of Health, Healh information system
 - SP/CONEDD, National system on environment information
 - INSD, Population data
 - DGPER, agricultural information data
 - Some international organizations : FEWSNET, WHO.

- Imagery from charter.
- Archive imagery and vector data from geoeye, google,
- Field GPS survey , hotling : Mapaction, IGB
- Generation of DEM (Mapaction)
- Base maps (topo map, Landuse, cadastral maps)

Cyber conference training for data processing

UN-SPIDER, Web training through web conference (go to meeting, Google talk)

- Downloading of data
- Image processing (Slope, watershed, etc)
- Software,
- tools utilities (QGIS, Grass)





OUTPUT OF MAPPING

Provinces affected by the disaster in Burkina



MapAction

Burkina Faso - Inondations Provinces sinistrees (au 17 sept 2009)

La carte montre les provinces sinistrees par les inondations au Burkina Faso et le nombre d'hommes, de femmes et d'enfants victimes au centre du pays (Province Kadiogo).

0 30 60 90 120 150
kilometres

Scale 1:3000000 at A3 size

Created 17_SEP 2009 / 09:00mm

Map document MA026_BFA_ProvSinistrees_17Sept2009_A3_v01

Projection / datum UTM Zone 30N / WGS84

GLIDE Number FL-2009-000172-BFA

The depiction and use of boundaries, names and associated data shown here do not imply endorsement or acceptance by MapAction.

- Ville
- Capitale
- Route Nationale
- Cours d'eau

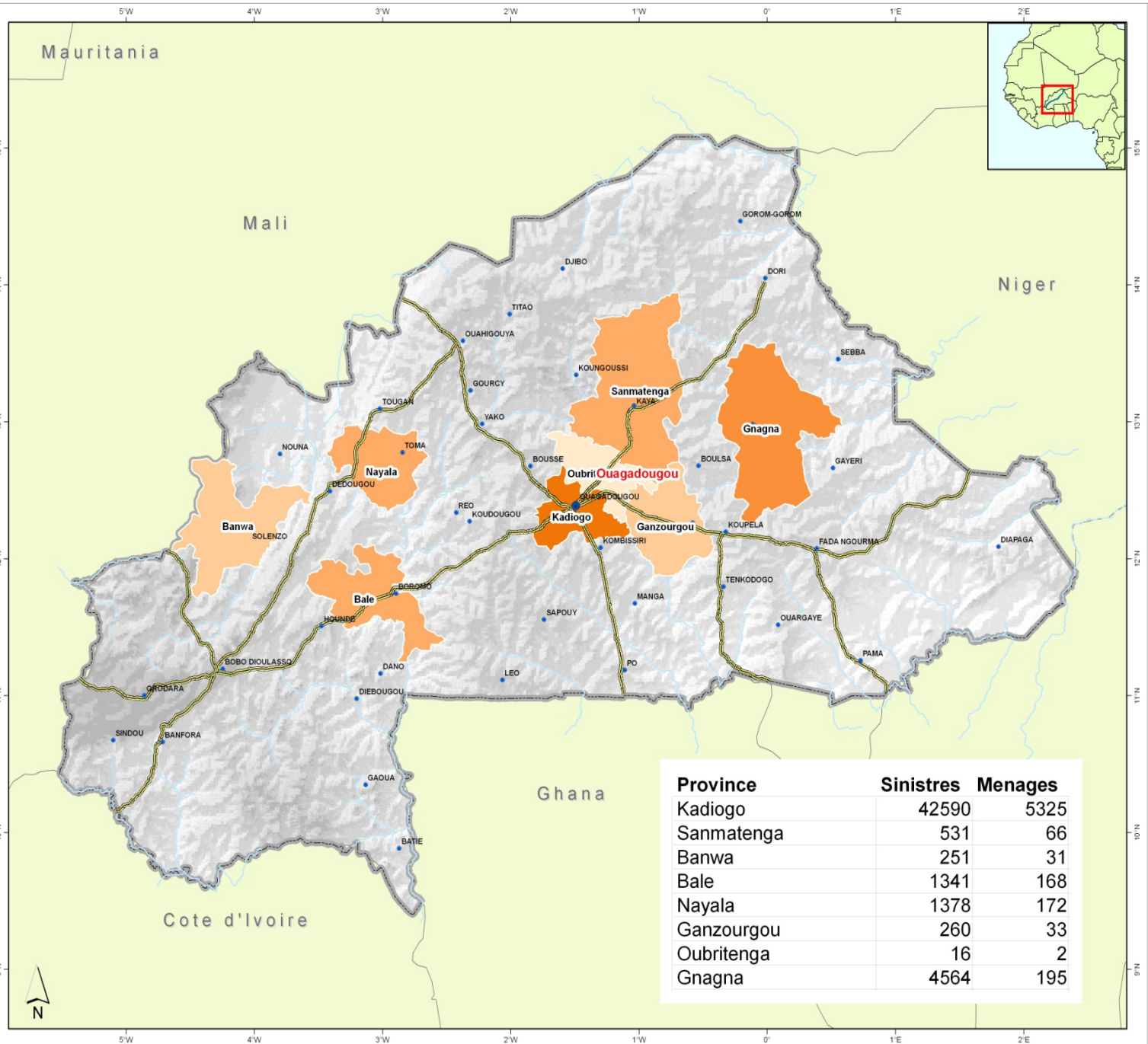
Provinces sinistrees

- 16
- 16 - 500
- 500 - 1500
- 1500 - 4566
- 4566 - 42590

Data sources:
SALB, Institut Geographique du Burkina, Google, FAO, ASTER, CONASUR

www.mapaction.org
burkinafaso@mapaction.org

MapAction is grateful for the support of DFID



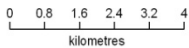
Province	Sinistres	Menages
Kadiogo	42590	5325
Sanmatenga	531	66
Banwa	251	31
Bale	1341	168
Nayala	1378	172
Ganzourgou	260	33
Oubritenga	16	2
Gnagna	4564	195

Identification of displaced by district



MapAction

Burkina Faso
Donnees des
recensements de
deplaces au 5
Septembre 2009



Scale 1:100000 at A3 size

Created 10 SEP 2009 / 17:00

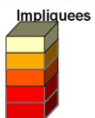
Map document Ma005_BFA_Ouagadougou_10_09_09-v02-A3

Projection / datum UTM Zone 30 N / WGS84

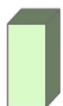
GLIDE Number FL-2009-000172-BFA

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Personnes deplacées



Maisons Touchees

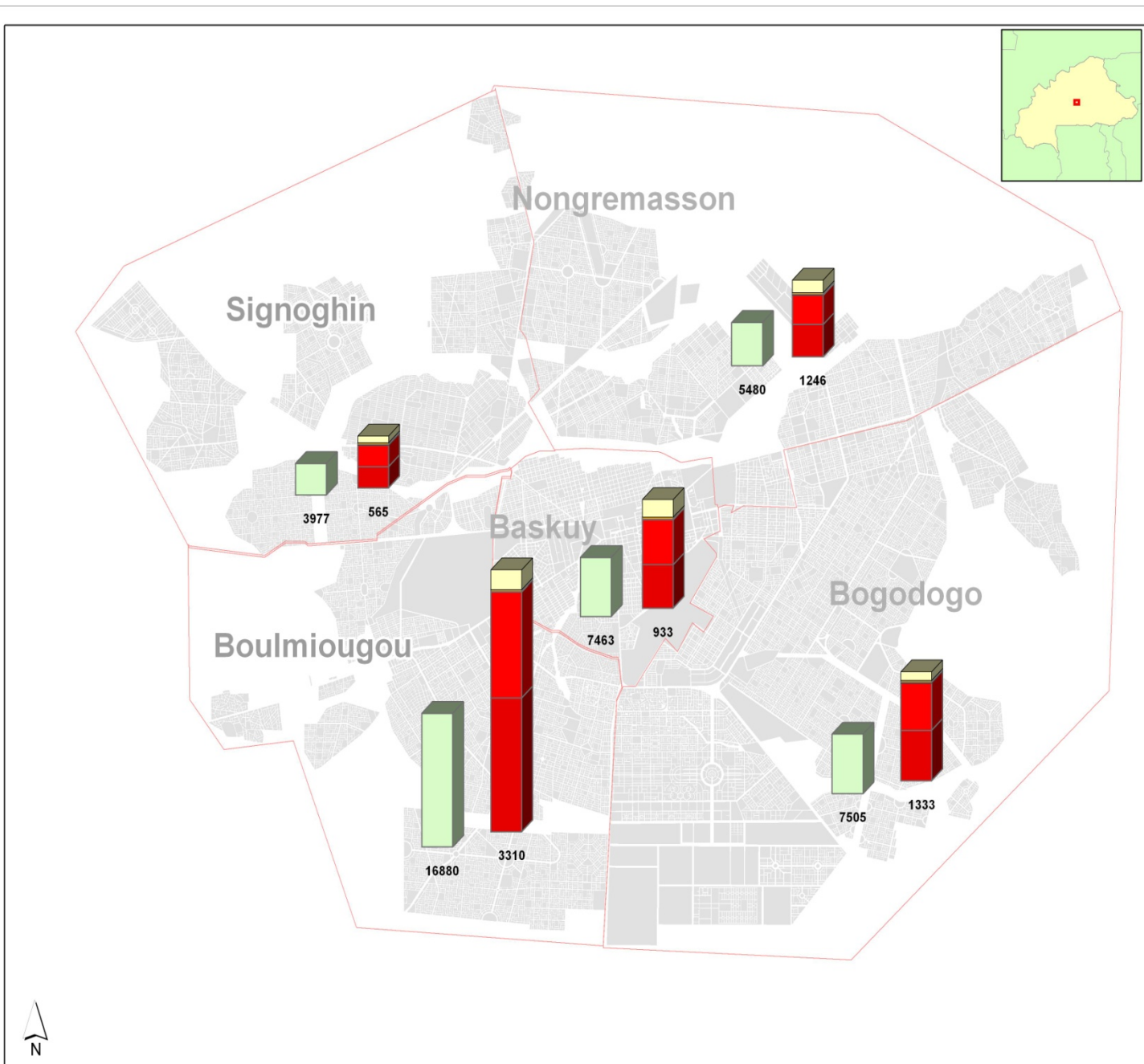


Total Maisons Touchees

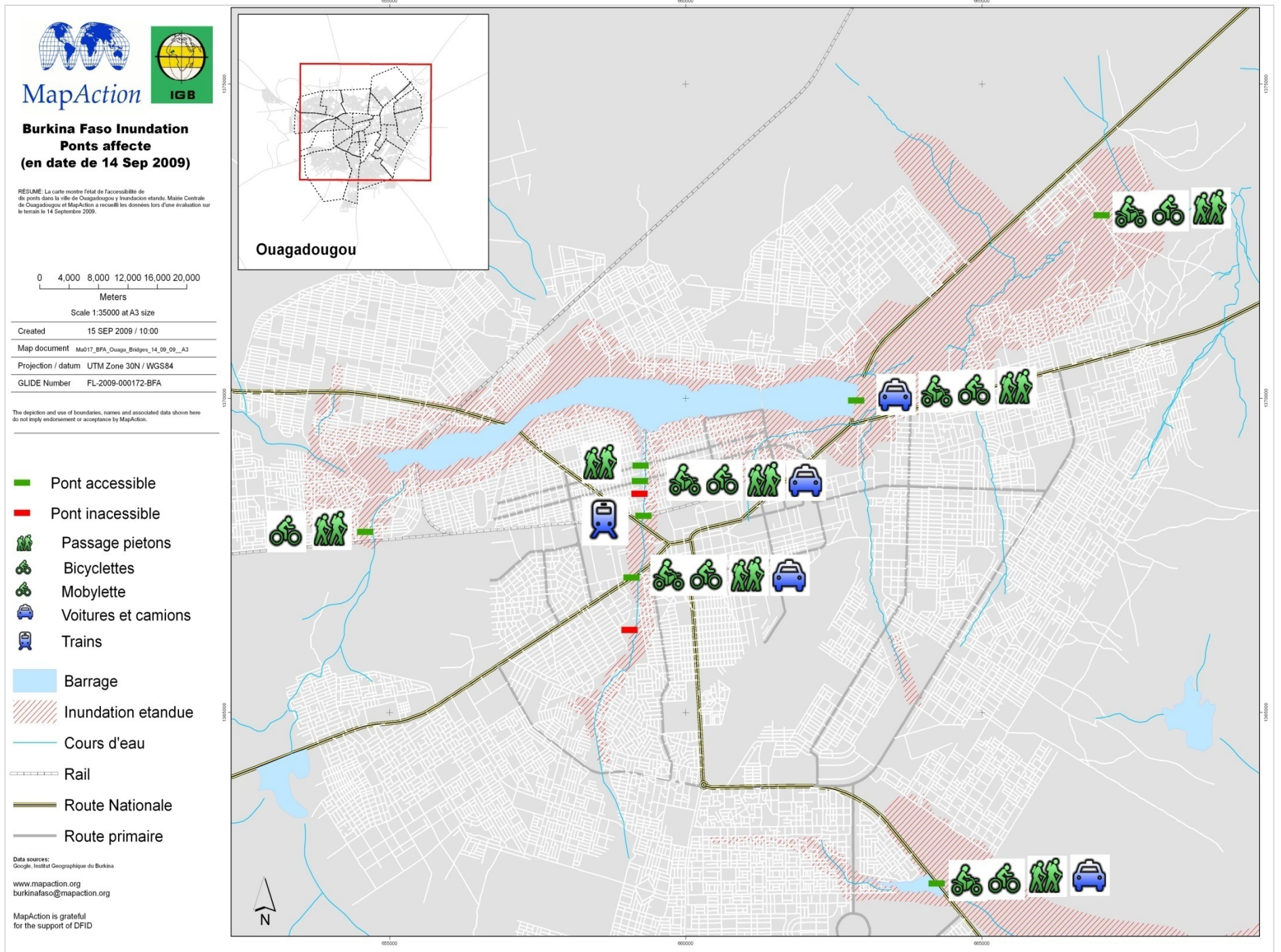
Data sources:
 Croix Rouge Burkinabe, Institut Geographique de Burkina

www.mapaction.org
 burkinafaso@mapaction.org

MapAction is grateful
 for the support of DFID



Dams affected map



Potential IDP relocation sites



Burkina Faso: Flooding - Potential IDP relocation sites

35 sites selected by the Major of each district in Ouagadougou as possible sites for IDP relocation.



Scale 1:100000 at A3 size

Created 15 SEP 2009 / 15:00

Map document MA018_BFA_Ouagadougou_pot_IDP_13-09-09-v3_A3

Projection / datum UTM 30N/ WGS84

GLIDE Number FL-2009-000172-BFA

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- Potential IDP Sites
- OSOCC
- Area of potential IDP Sites
- Arrondissements
- Zones (sectors)
- Buildings
- Permanent water bodies
- Rivers

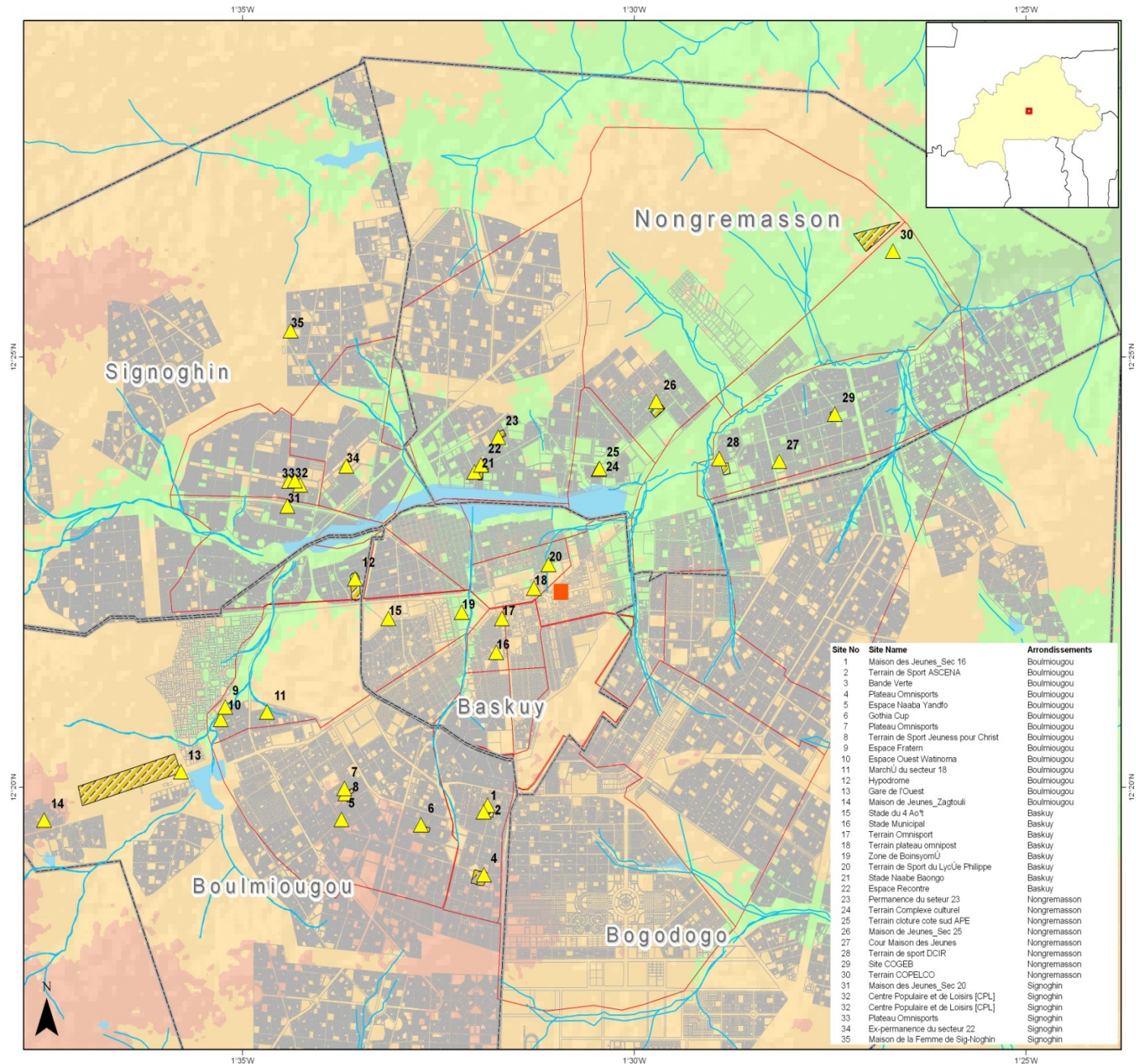
Elevation (m)

- 213 - 273
- 273 - 291
- 291 - 313
- 313 - 340
- 340 - 394

Data sources:
ASTER, Direction Generale Urbanisme, Google,
Institute Geographique du Burkina.

www.mapaction.org
burkinafaso@mapaction.org

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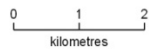
Site No	Site Name	Arrondissements
1	Maison des Jeunes_Sec 16	Boulmiougou
2	Terrain de Sport ASCENA	Boulmiougou
3	Bande Verte	Boulmiougou
4	Plateau Omnisports	Boulmiougou
5	Espace Naaba Yandfo	Boulmiougou
6	Sothia Cup	Boulmiougou
7	Plateau Omnisports	Boulmiougou
8	Terrain de Sport Jeunesse pour Christ	Boulmiougou
9	Espace Fratern	Boulmiougou
10	Espace Ouest Watnoma	Boulmiougou
11	Marché du secteur 18	Boulmiougou
12	Hypodrome	Boulmiougou
13	Gare de l'Ouest	Boulmiougou
14	Maison de Jeunes_Zagtolli	Boulmiougou
15	Stade du 4 Août	Baskuy
16	Stade Municipal	Baskuy
17	Terrain Omnisport	Baskuy
18	Terrain plateau omnispot	Baskuy
19	Zone de Boisyomou	Baskuy
20	Terrain de Sport du Lycée Philippe	Baskuy
21	Stade Naaba Baongo	Baskuy
22	Espace Recointe	Baskuy
23	Permanence du secteur 23	Nongremasson
24	Terrain Complexe culturel	Nongremasson
25	Terrain cloture cote sud APE	Nongremasson
26	Maison de Jeunes_Sec 25	Nongremasson
27	Cour Maison des Jeunes	Nongremasson
28	Terrain de sport DCIR	Nongremasson
29	Site COGEB	Nongremasson
30	Terrain COPELCO	Nongremasson
31	Maison des Jeunes_Sec 20	Signoghin
32	Centre Populaire et de Loisirs [CPL]	Signoghin
32	Centre Populaire et de Loisirs [CPL]	Signoghin
33	Plateau Omnisports	Signoghin
34	Ex-permanence du secteur 22	Signoghin
35	Maison de la Femme de Sig-Noghin	Signoghin

Extend of flood



Burkina Faso: Flooding in Ouagadougou as of 03 Sept 09

SUMMARY: Map shows the extent of flooding from data collected by the Institut Geographique du Burkina on 3 Sept 09



Scale 1:100000 at A3 size

Created 16 SEP 2009 / 09:00

Map document MA024-BFA-FloodExtent_16-09-09-A3

Projection / datum UTM Zone 30N / WGS84

GLIDE Number FL-2009-000172-BFA

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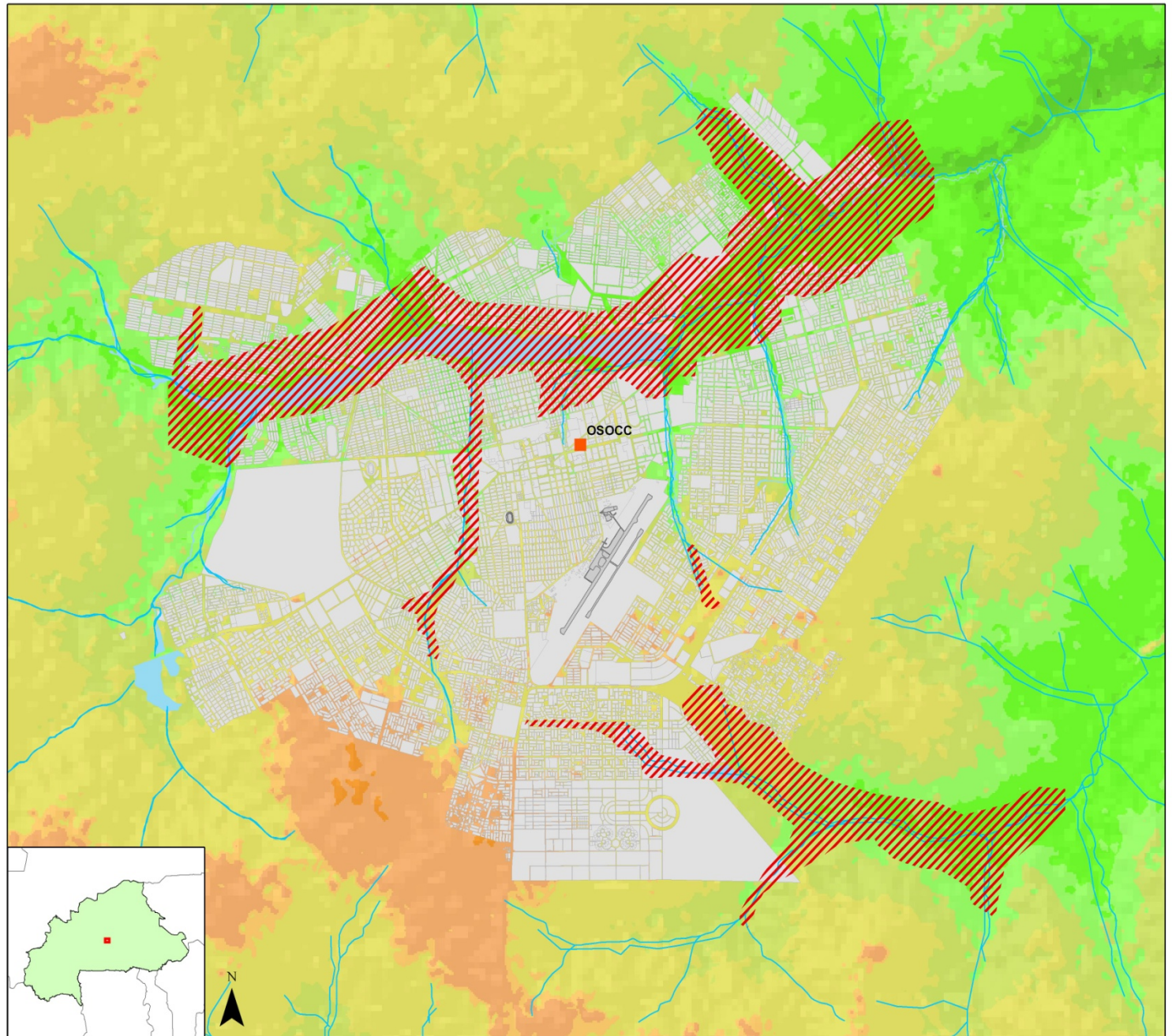
- Flood Extent
- Water courses
- Buildings
- Permanent Water

- Elevation (m)
- 213 - 273
 - 273 - 291
 - 291 - 313
 - 313 - 340
 - 340 - 394

Data sources:
Institut Geographique du Burkina, Water Department,
ASTER

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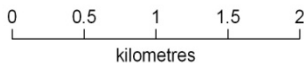
Damage area



MapAction

**Burkina Faso
Flooding**

**Damaged Areas
Data collected 10th
September**



Scale 1:100000 at A3 size

Created	11 SEP 2009 / 18:00
Map document	Ma007_BFA_Ouaga_DamagedArea10_09_09-A3
Projection / datum	UTM 30 N WGS84
GLIDE Number	FL-2009-000172-BFA
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- UNDAC Assessment
- OSOCC
- Water Bodies
- Rivers
- Railway
- Buildings

Data sources: Institut Geographique Burkina,
Water Department, Direction Generale Urbanisme

www.mapaction.org
burkinafaso@mapaction.org

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1°30'W

Conclusion

It is clear that :

- National solidarity launched by the president and bilateral response,
- Humanitarian institutions, UN
- Activation of charter
- Mapping activities

Were a great help for flood management

But ...

- **Data Acquisition**

- Vector data sent we received are not useful for flood management : local base maps are more precise
- Some archive imagery are not used because of the quality
- We were waiting the imagery from charter webpage. At the end, we receive just one map of UNOSAT,
- The product really used is Aster imagery

- **Mapping activities**

- Not real implication of GEOINFORMATION COMMUNITY in mapping activity
- Lack of national spatial infrastructure for disaster management
- Human resources (CAPACITY BUILDING)

- Training of GIS community in disaster management rapid mapping and modelling
- Workshop for sensitizing decision makers to the importance of integration of space technology in disaster management.
- This will help the community to:
 - ❖ Define procedures (EO data acquisition)
 - ❖ Document sensor specifications and application scenarios
 - ❖ Customize software for image analysis
 - ❖ Set up a server infrastructure for data exchange (OGC compliant)



**Thank you for your
attention!**