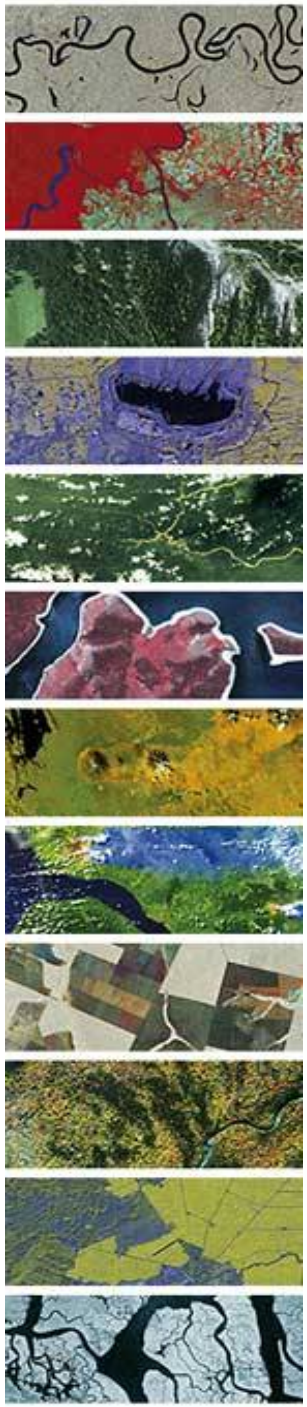
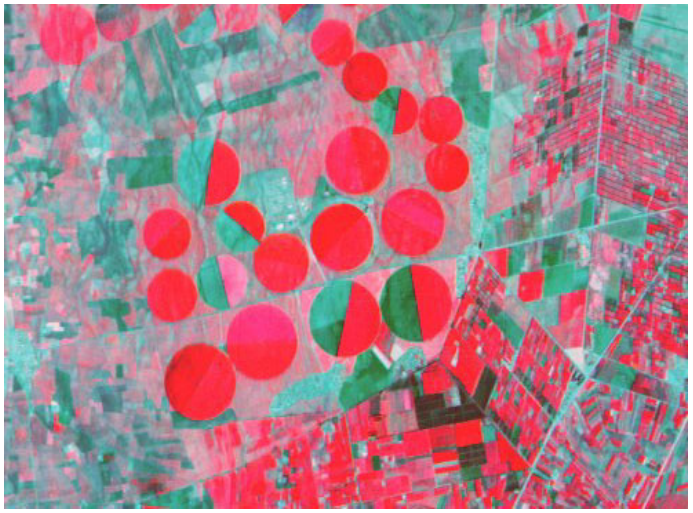


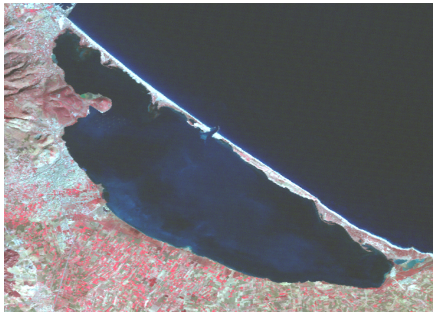
Centre Royal de
Télédétection Spatiale

المركز الملكي
للاستشعار البعدي
الفضائي

Royal Center for Remote Sensing

Strategic tools for decision making





CRTS, Avenue Allal Elfassi, secteur 21, Hay Ryad, Rabat, Morocco,, www.crts.gov.ma

CRTS Vision

CRTS aims to be the national reference Centre in the field of Geo-Information production and in carrying out R&D and Capacity Building activities in Earth Observation techniques and related services and products applied to Earth and Environment Sciences to contribute in the development and prosperity of Morocco.

CRTS

Strategic Objectives

- Providing support to decision-makers in all sectors.
- Working with various government departments on different joint projects.
- Participating in several national commissions and working groups, to enhance the national sovereignty in outer space affairs.
- Empowering Moroccans in Earth Observation scientific techniques and applications and enhance their skills.
- Raising community awareness of space technology and its applications.
- Creating a productive environment conducive of researches and initiatives.
- Acting as an effective global organization and contributor through the development of a cooperative regional and international network of Earth Observation technology and its applications.
- Establishing appropriate infrastructure for Geo-Information data and services in the country.

CRTS

The CRTS missions are (1/3)

- Promotion and integration of Earth Observation technologies to **enable Morocco to effectively use and exploit satellites data and applications** **to meet needs of users and decision makers** involved in Socio-economic and development projects at the national level :

  - Development of application packages for use in departments and agencies in charge of the management of agriculture production, natural resources, environment, disaster, security and land development

  - Strengthening of indigenous capacity in strategic disciplines of remote sensing and spatial data; and

  - Involvement of relevant user agencies in the development of application packages.

CRTS

The CRTS missions (2/3)

- **Coordinate satellite data acquisition and management** to facilitate, to all users, an ***easy*** and ***rapid access*** to space and satellite data adapted to their ***needs*** and ***requirements***.

  – Establish and strengthen national capability in real-time and the continuous acquisition of remote sensing satellite images;

  – Provide and distribute remote sensing satellite images (including value-added products) to users by acting as the sole distributor of remote sensing satellite images to government agencies.

The CRTS missions (3/3)

- **Capacity Building to maximize the use of Remote Sensing in the country through** providing ***of training and education*** opportunities in Earth Observations Science and technologies and carrying ***out R&D actions and programs*** to ensure sustainability

Value Added Services

CRTS

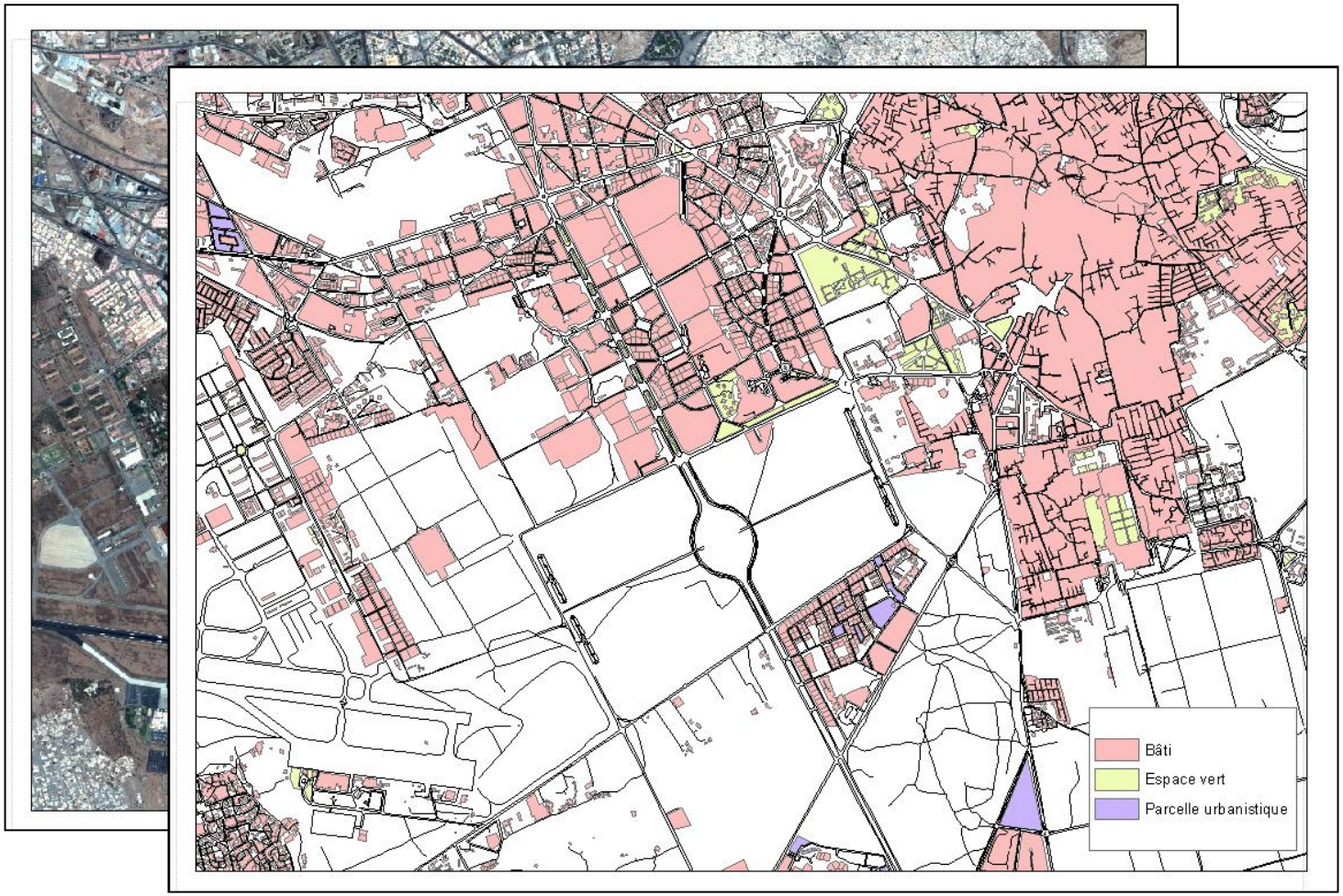
CRTS conducts value added services as per a client's request through analysis or studies, e.g.:

- Civil Development and Construction
  - Site surveying
  - Monitoring Projects Development
  - Engineering and survey
- Change Detection
- Infrastructure development
  - Urban and Rural Planning
- Environment
  - Monitoring land degradation
  - Water water resources monitoring
  - Land Cover/Land Change detection (vegetation, landscaping, desertification)
- Disaster Management and Emergency Responses

CRTS

Water supply :

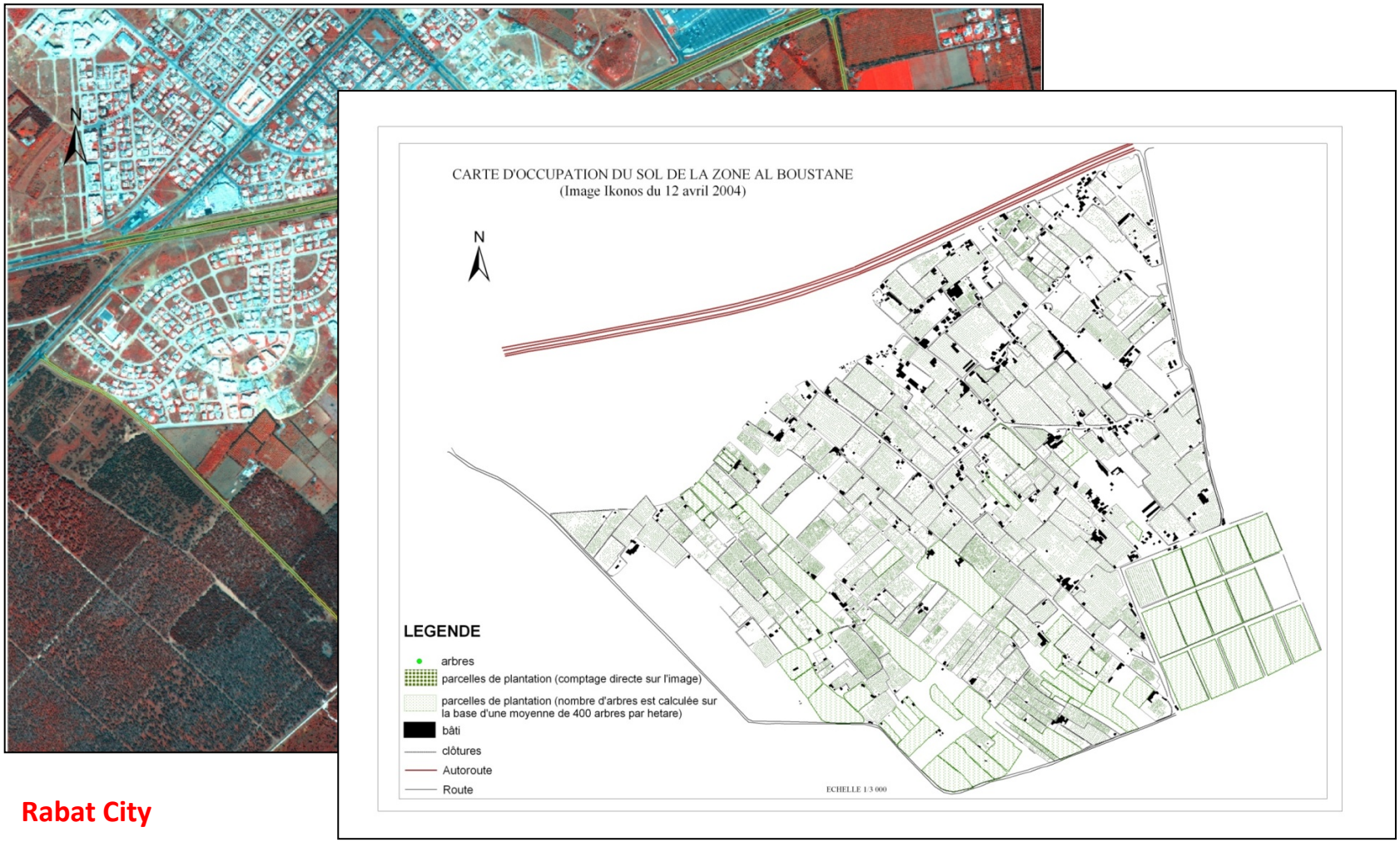
Production of geo-information data for GIS applications for companies in charge of water distribution



Marrakech region

Urban development management:

Production of geo-data for urban planning

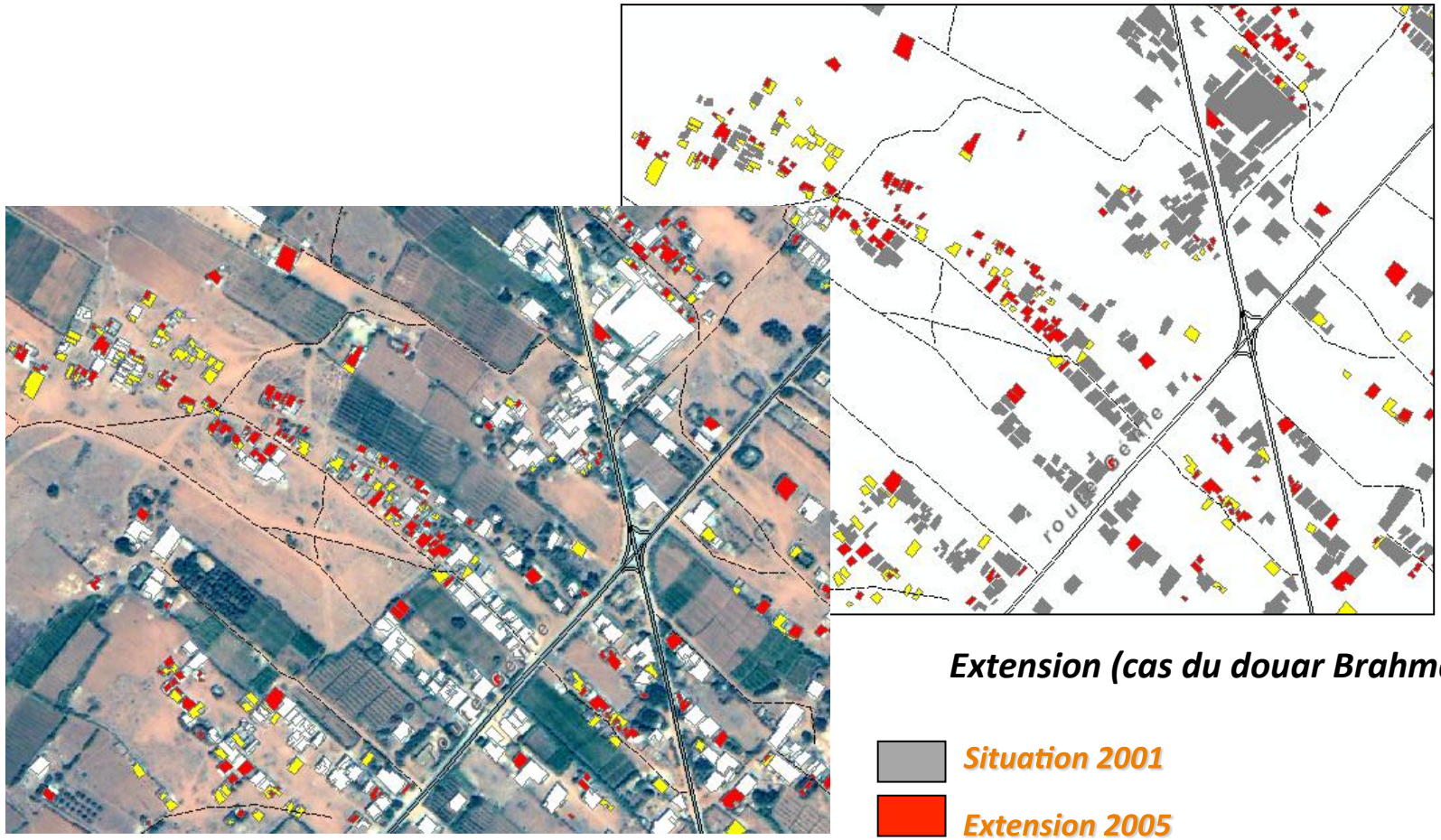


Rabat City

CRTS

Urban development management:

Urban extension control to assist local authorities



Extension (cas du douar Brahma)

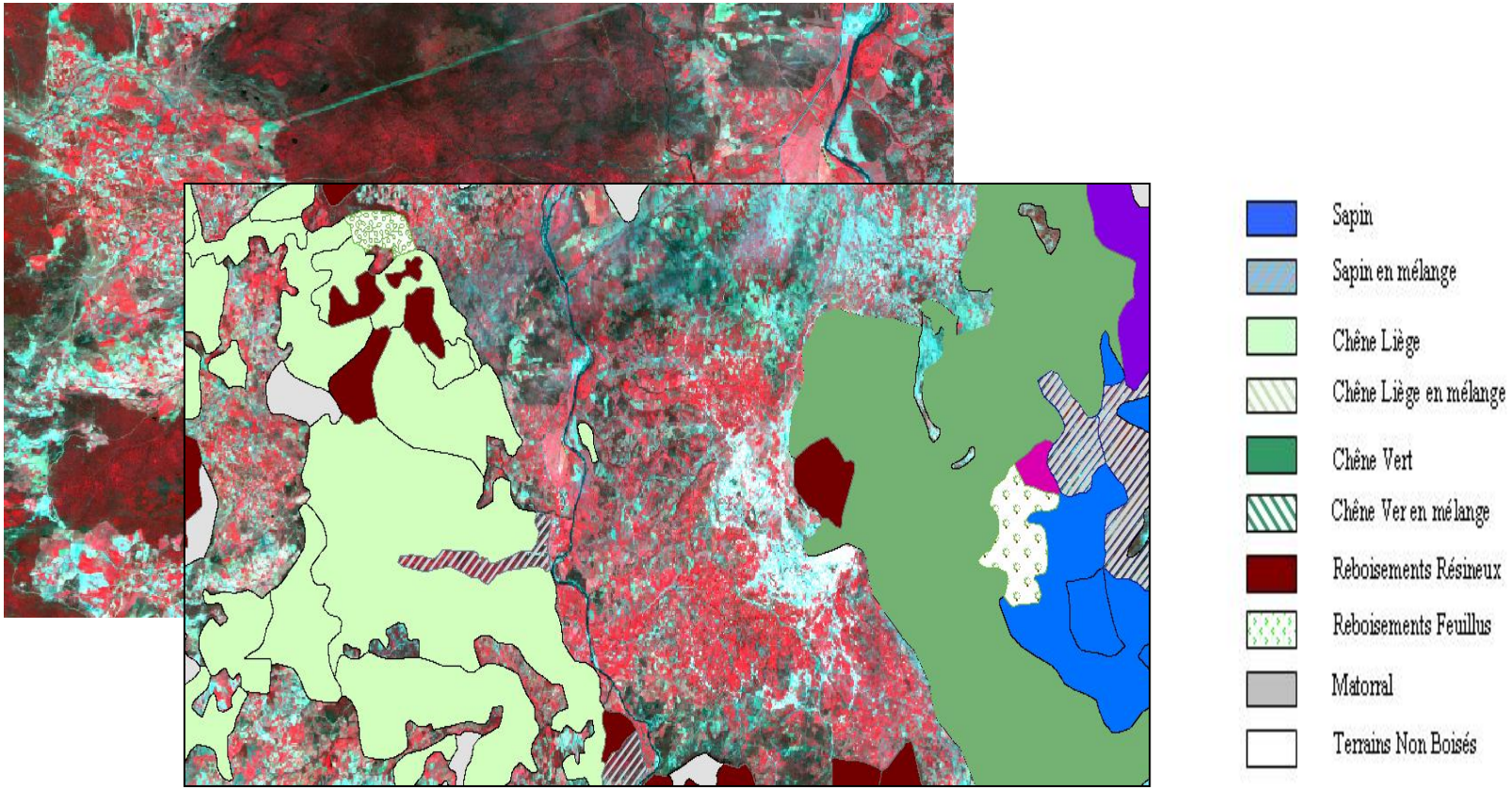
Situation 2001

Extension 2005

Extension 2006

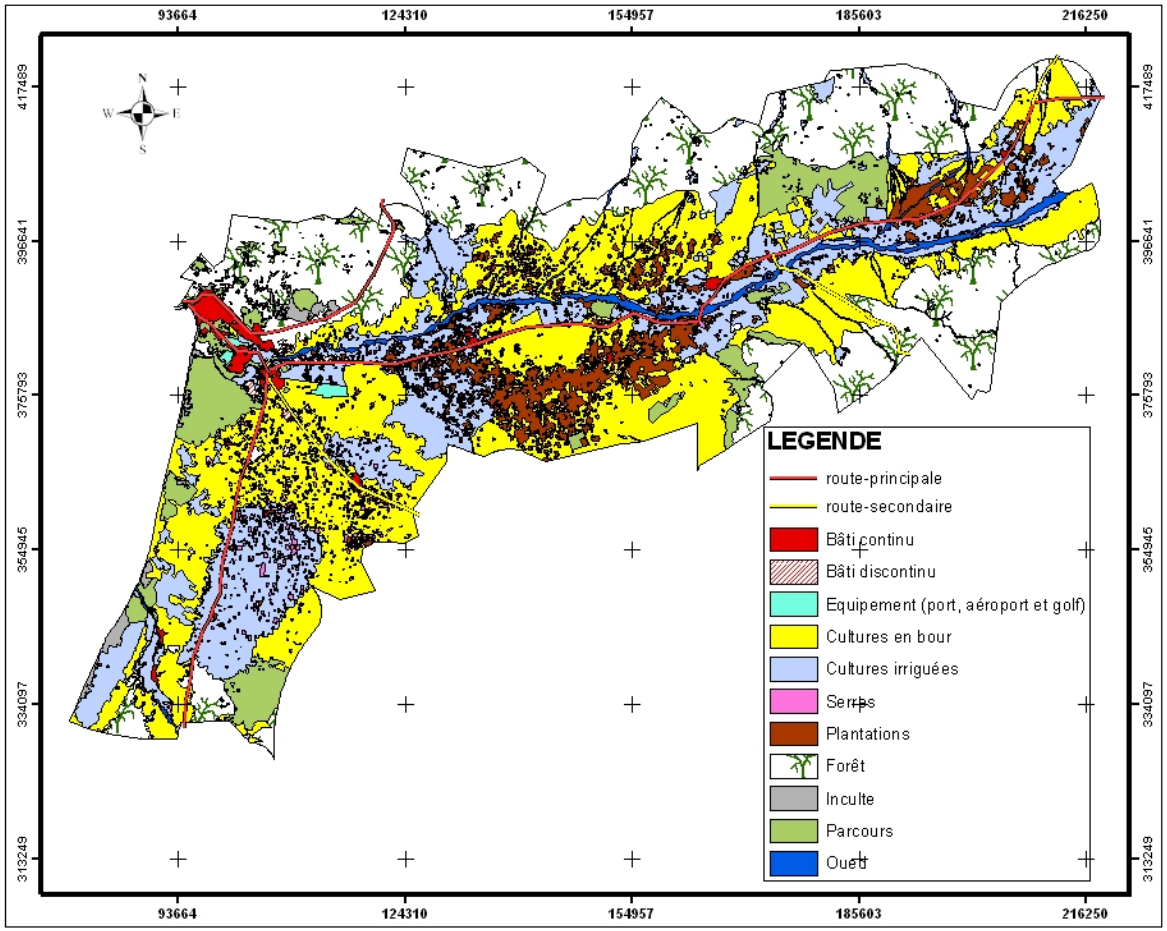
CRTS

Forest resources management
Forest resources inventory



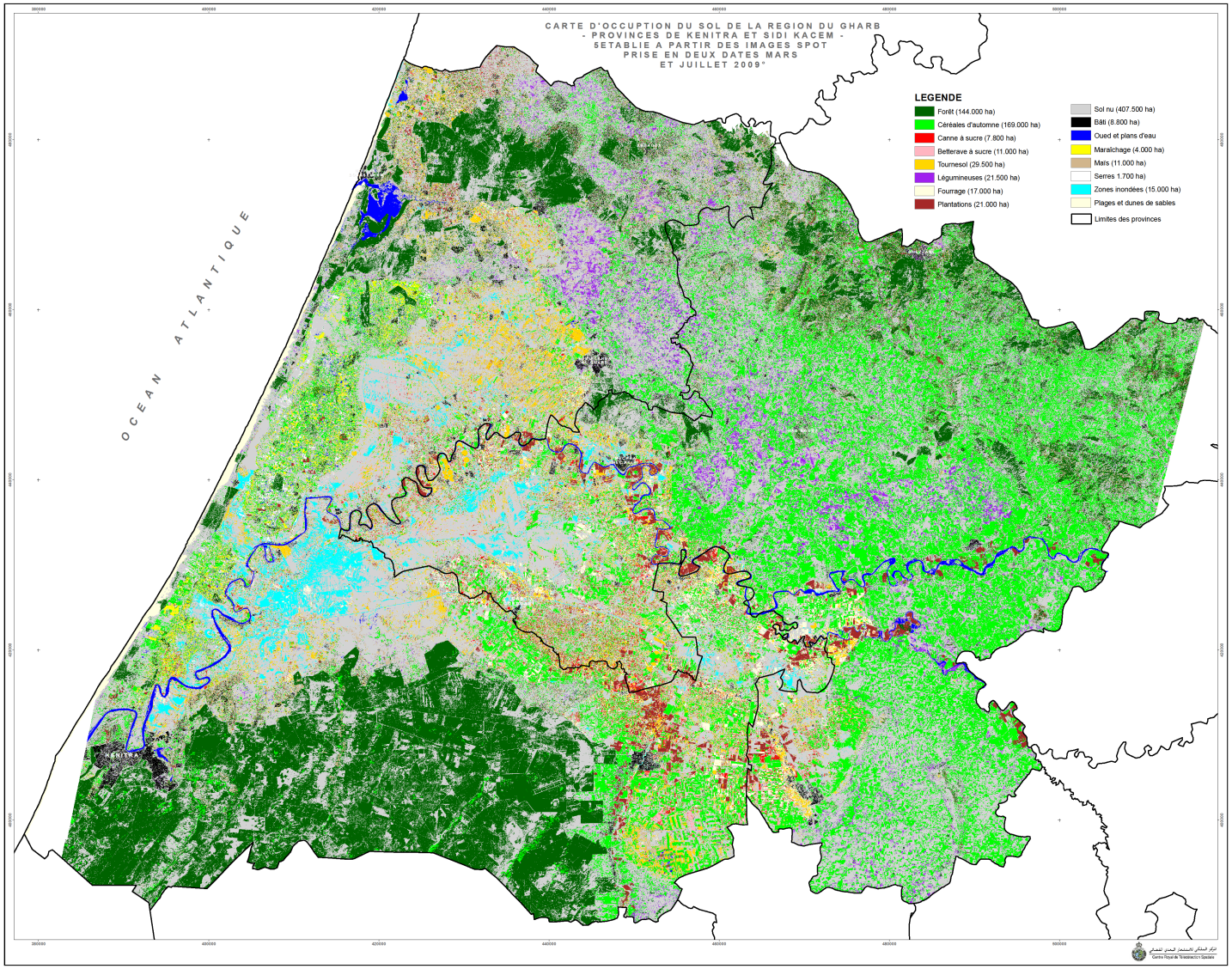
Agriculture resources management

Urban growth impact on arable lands



Agriculture resources management

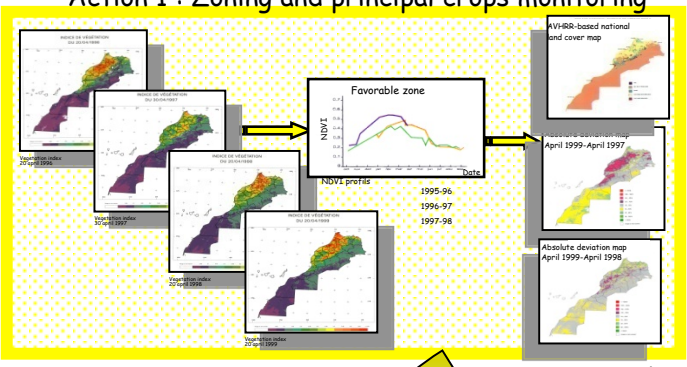
Regional land use maps



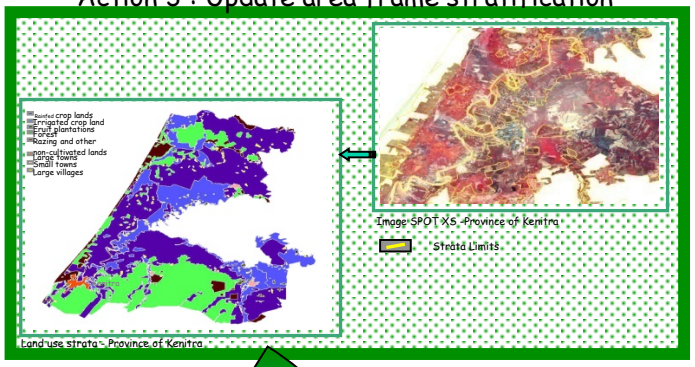
AGRIMA PROJECT

REMOTE SENSING APPLIED TO AGRICULTURAL STATISTICS

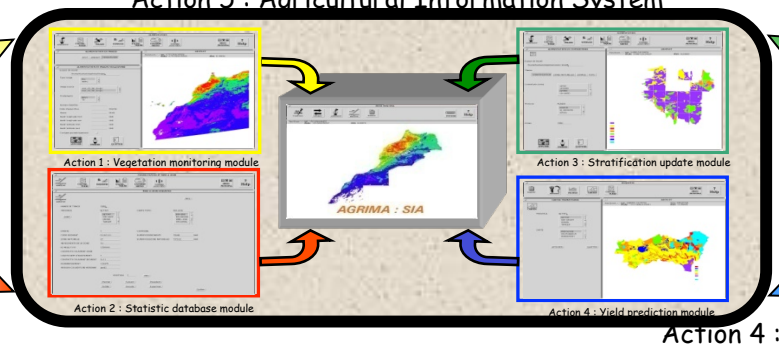
Action 1 : Zoning and principal crops monitoring



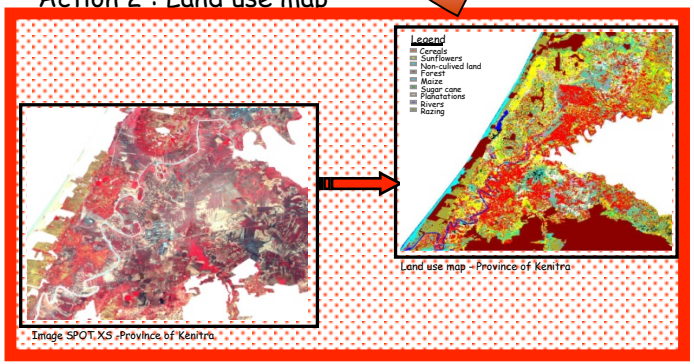
Action 3 : Update area frame stratification



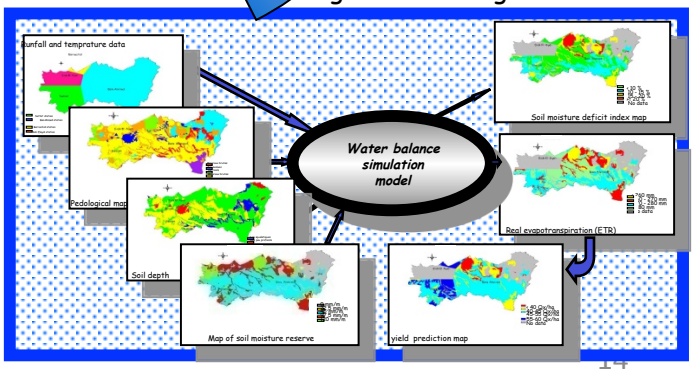
Action 5 : Agricultural Information System



Action 2 : Land use map



Action 4 : Agrometeorological model



Agriculture resources management

Monthly Bulletin to monitor cereal cultures

Main users :

- Ministry of Agriculture
- Ministry of Interior
- Agriculture Development Agency
- Central Bank
- Insurance Institutions
- Research Community

CENTRE ROYAL
DE TELEDETECTION SPATIALE

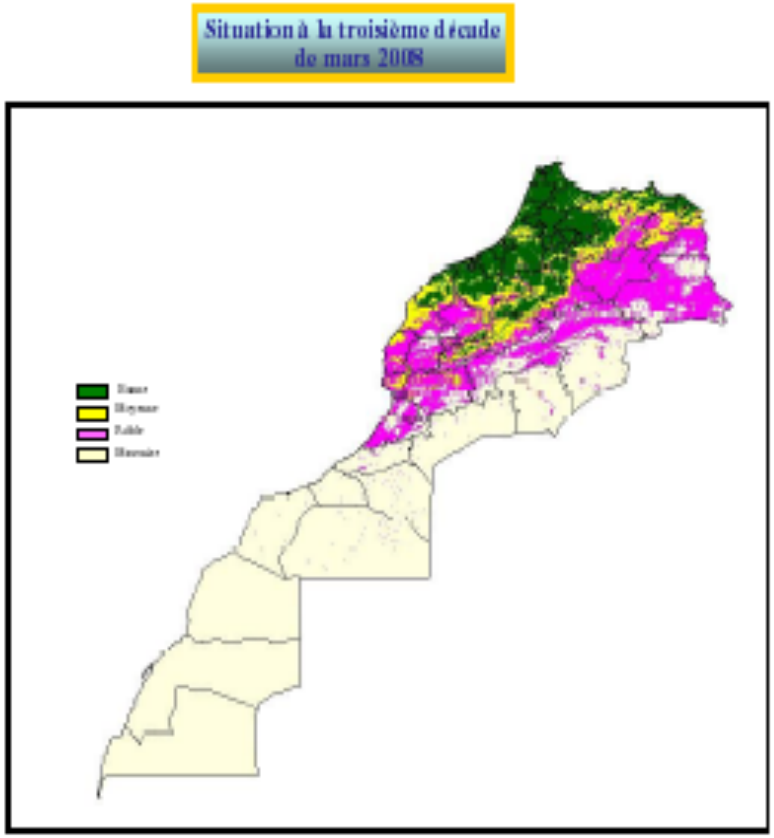
المركز الملكي
للاستشعار البعيدي الفضائي

BULLETIN DE SUIVI GLOBAL DE LA CAMPAGNE AGRICOLE PAR TELEDETECTION

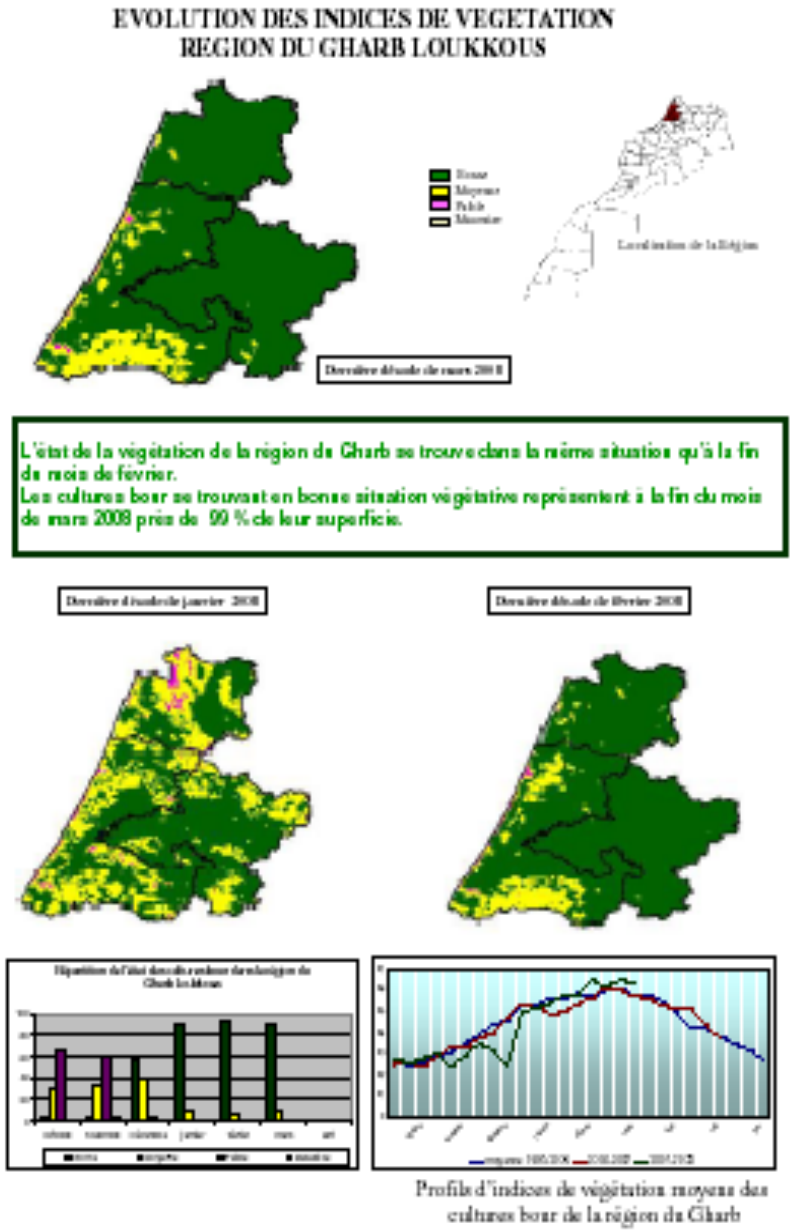
Situation au 31 mars 2008

N°6-2007-2008

Agriculture resources management

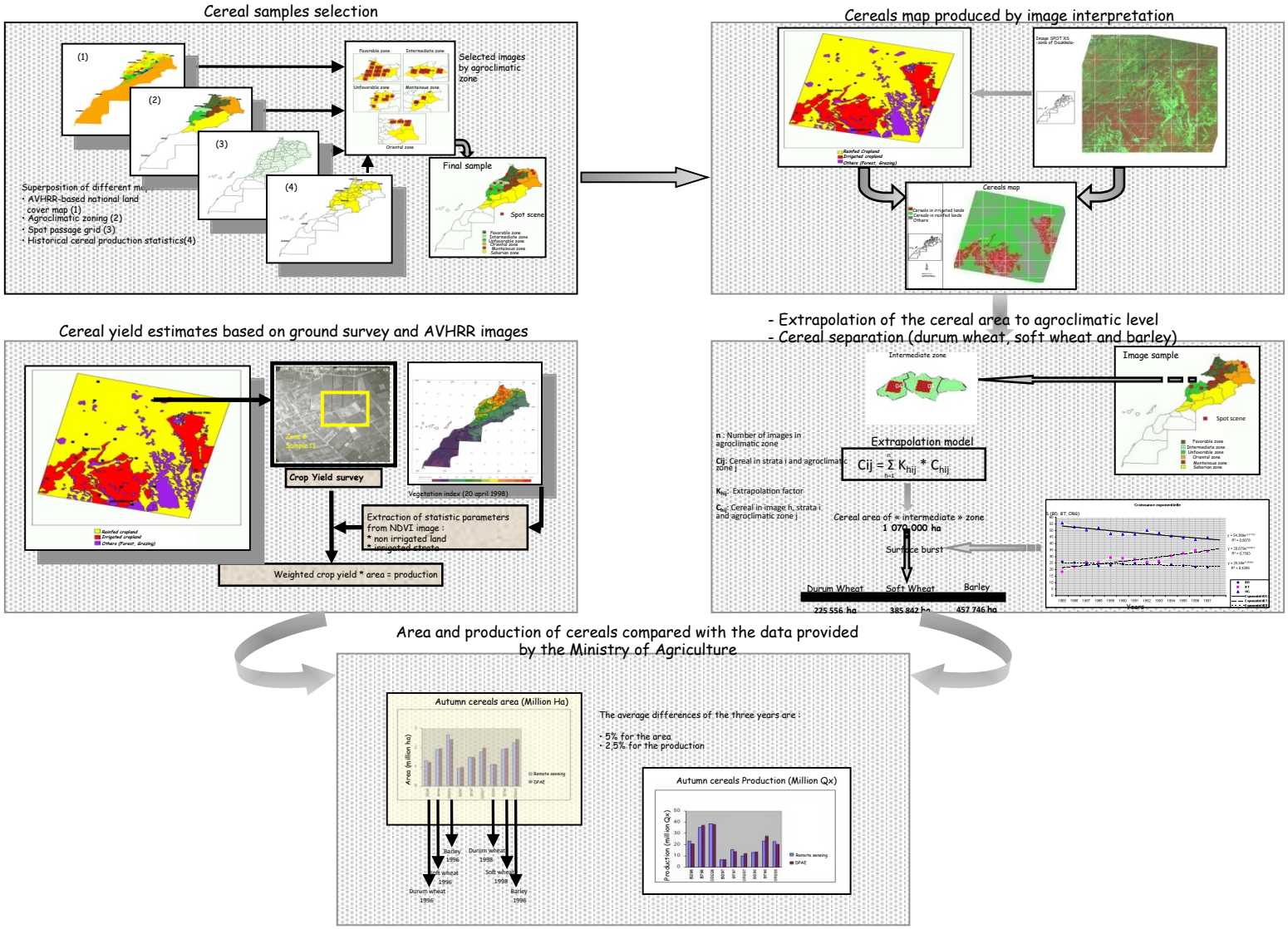


A la troisième décade de mars 2008, l'état de la végétation est resté globalement stable et en bonne situation, par rapport au mois précédent sur les régions du nord, de la façade atlantique situées au nord de Casablanca, du Saïs et des côtes méditerranéennes de l'Oriental.
On note une dégradation par rapport à la fin du mois de février dans les régions se situant au sud de la Chaouia.

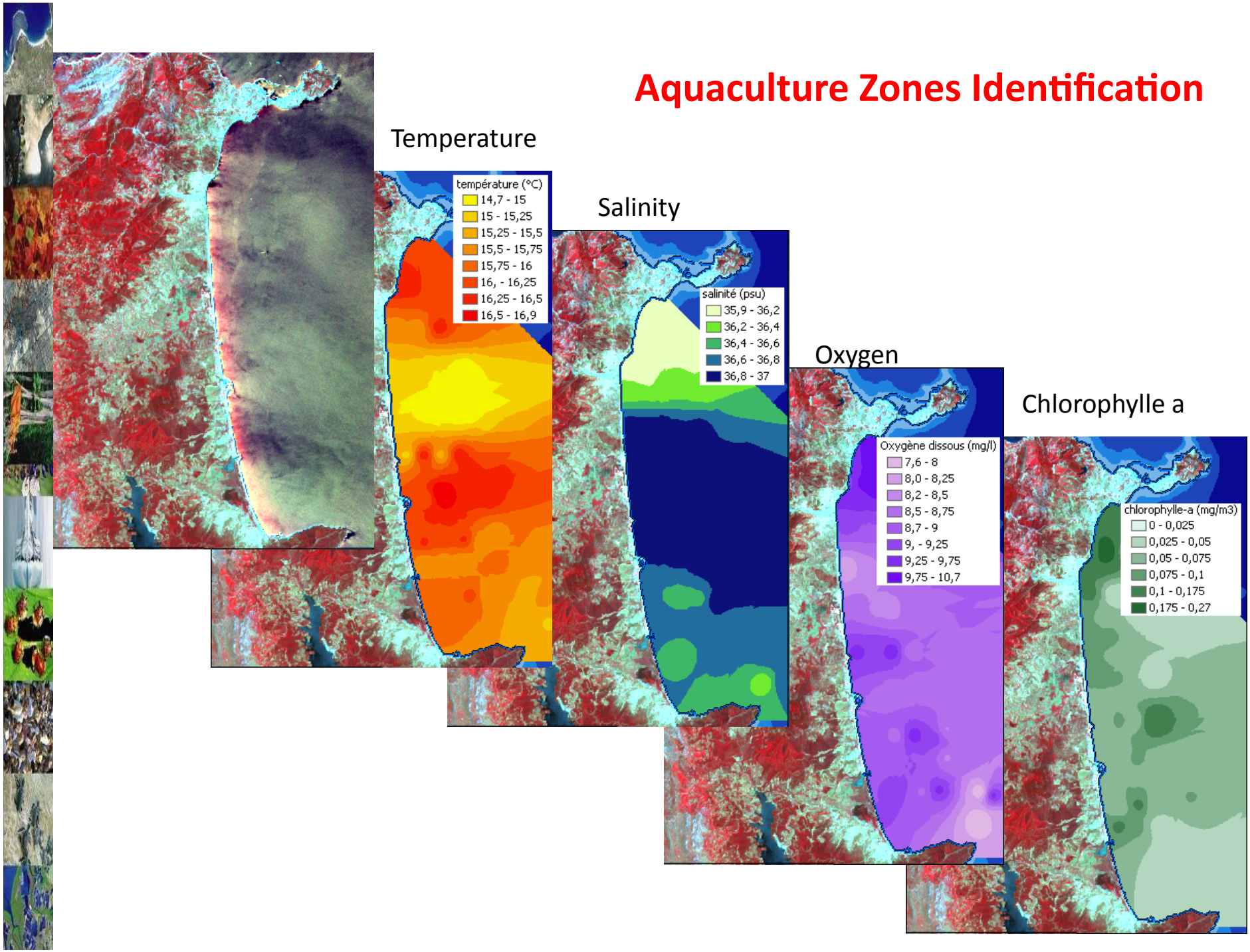


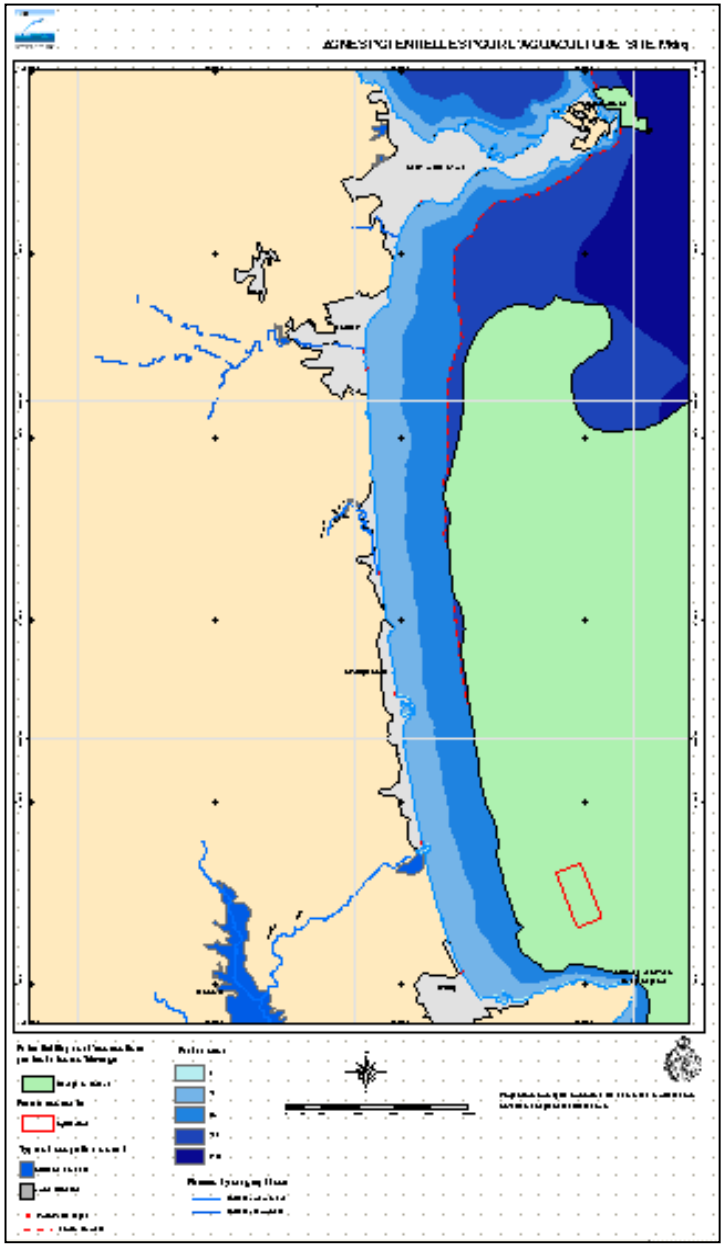
Agriculture resources management

National program for cereals monitoring (area and production)



Aquaculture Zones Identification

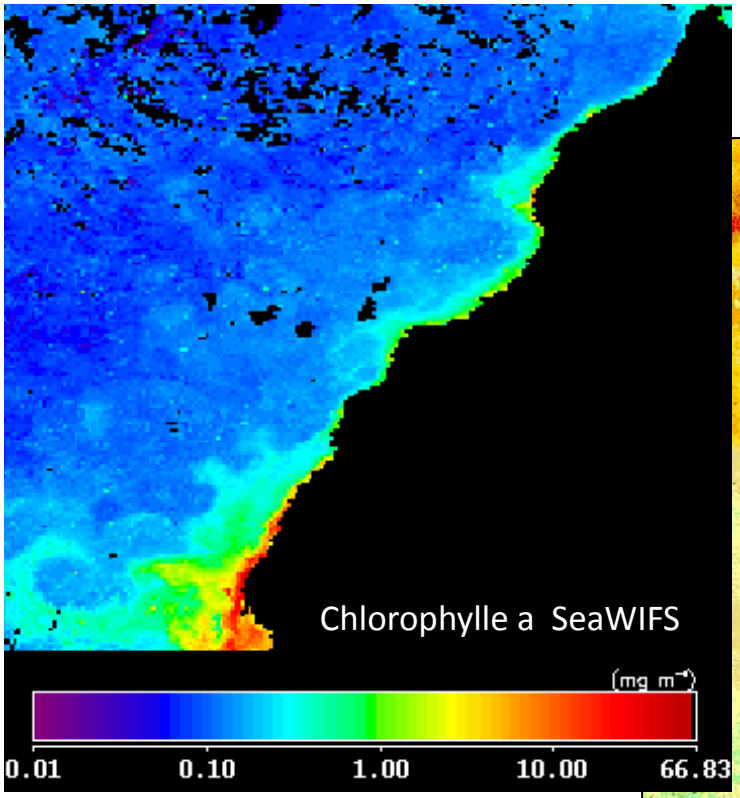


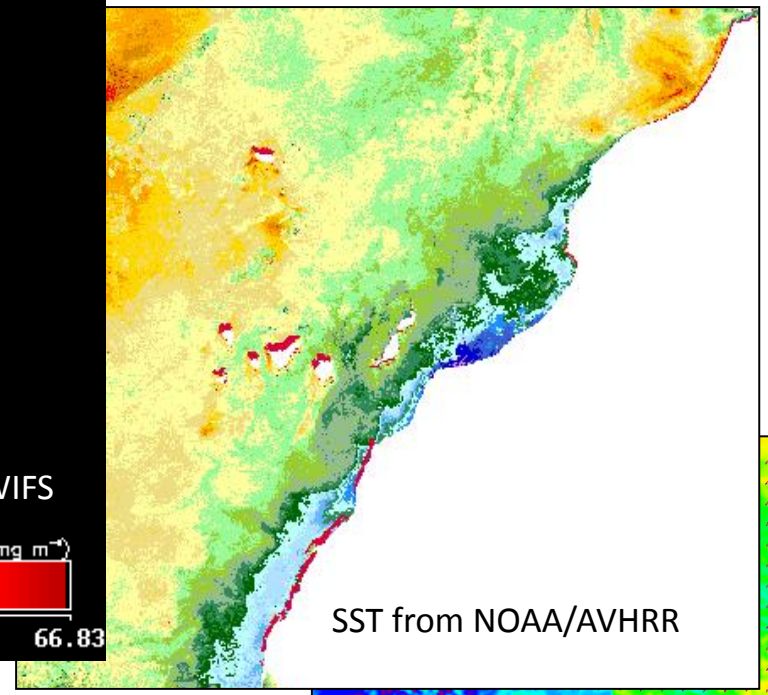


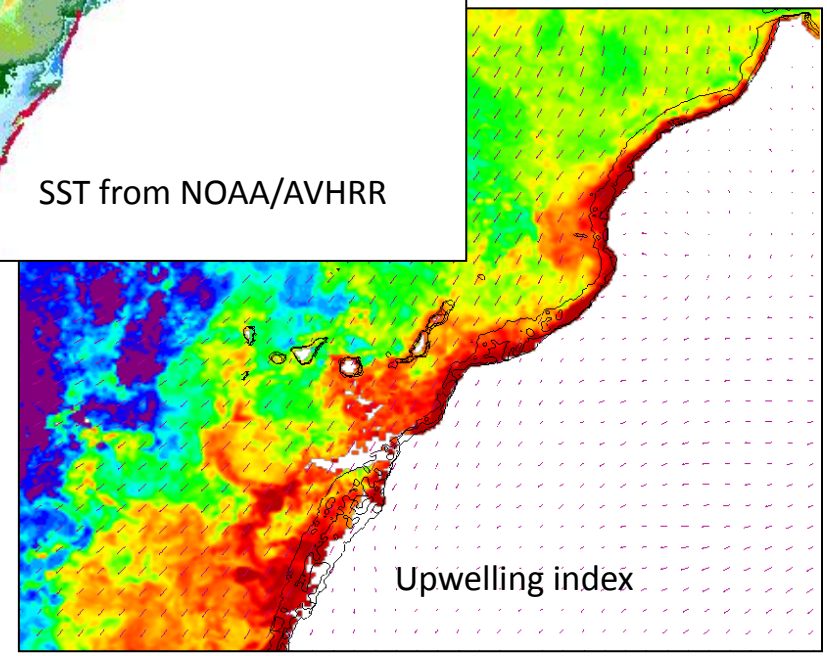
Aquaculture Zones Identification

This remote sensing and related technologies based system was developed under a collaborative project between CRTS, INRH (Department of Fisheries)

Fisheries : location and evolution of Upwelling areas





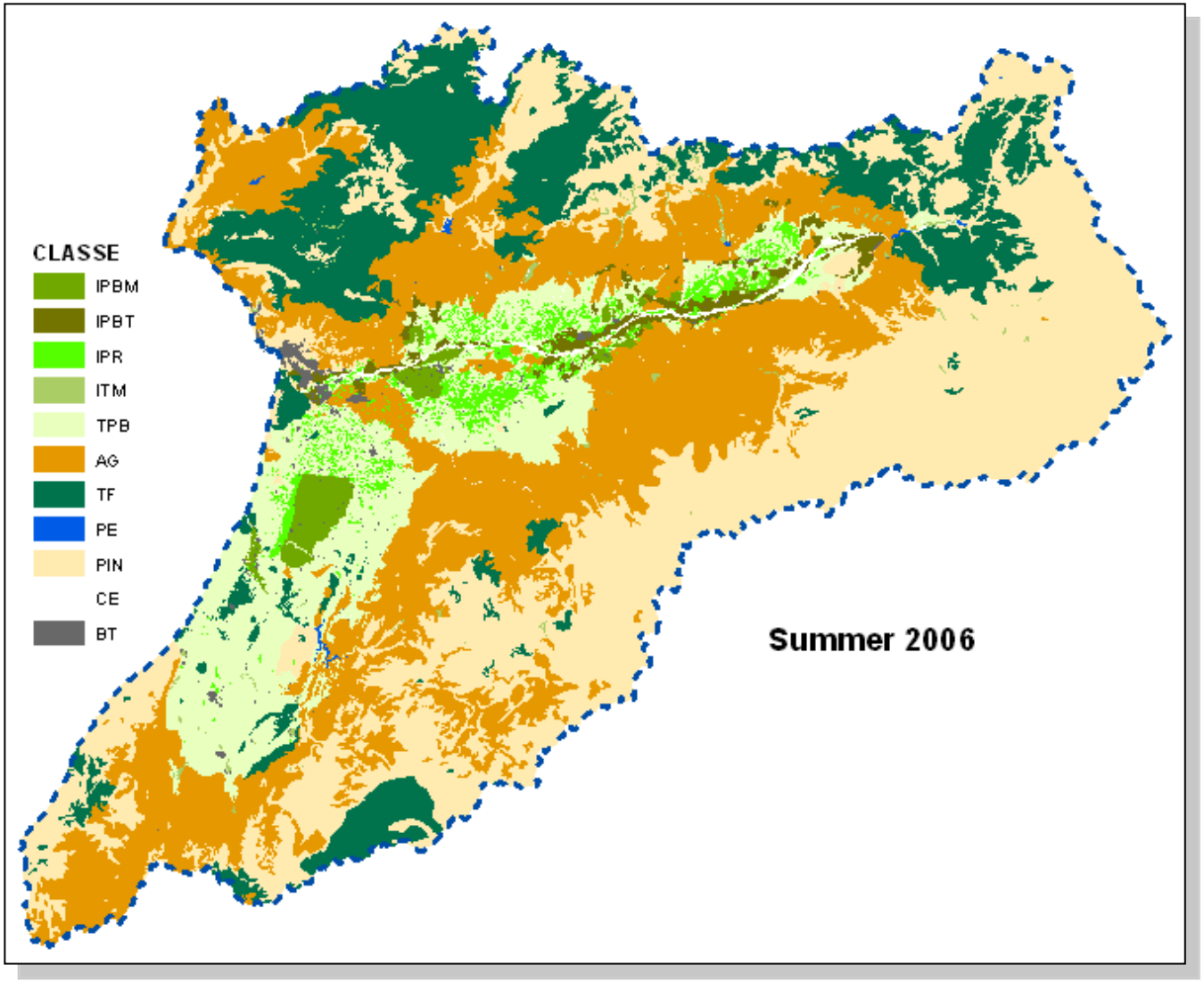


Characterization of the Up welling phenomenon a long the Moroccan coasts

- Operational processing capacities based on several sources of satellite data (NOAA, SeaWifs, MODIS, …)
- Production of periodic Up welling indexes taking into consideration regional specifications

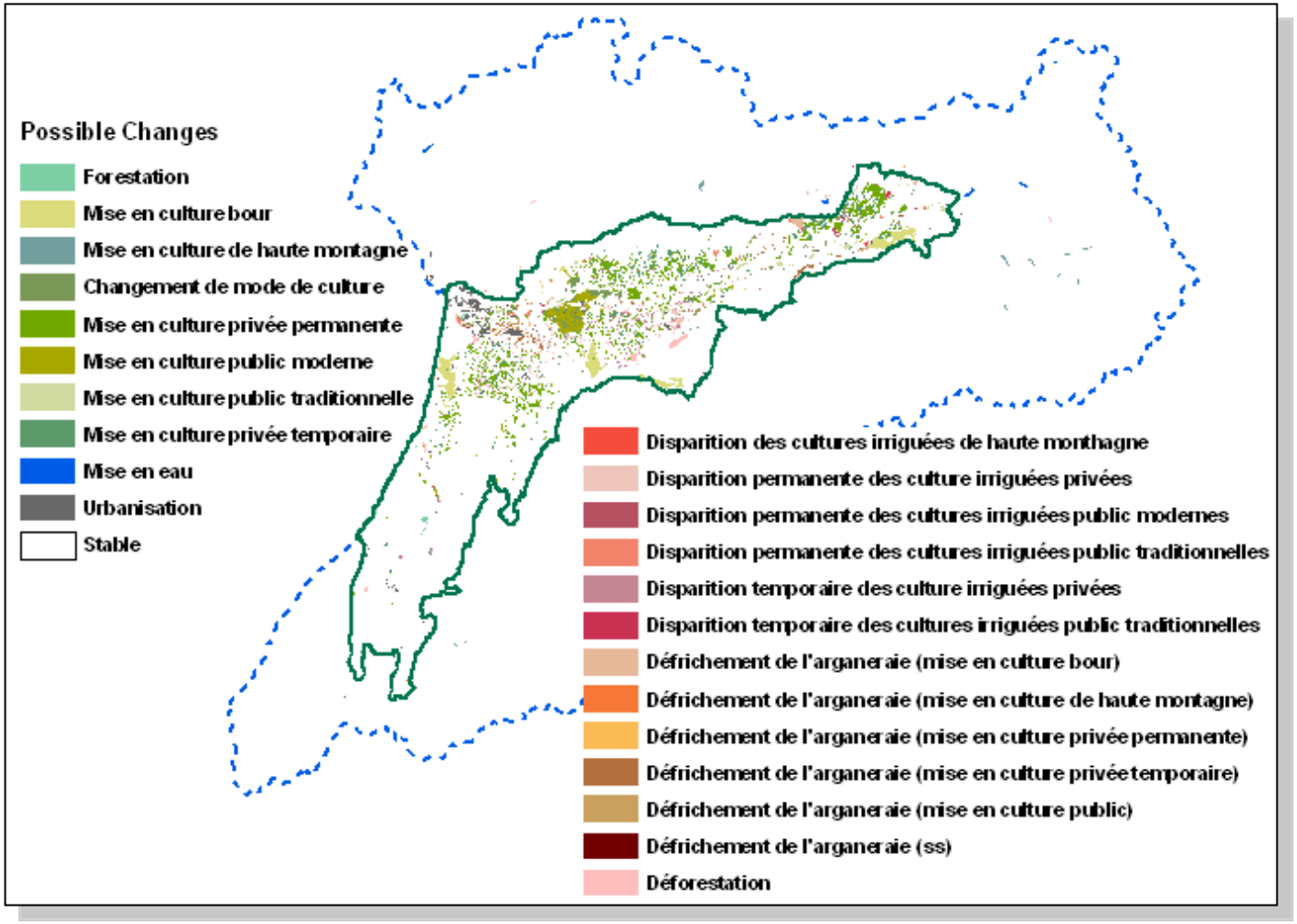
Monitoring of Irrigated Zones Extension

Land cover / Land use map



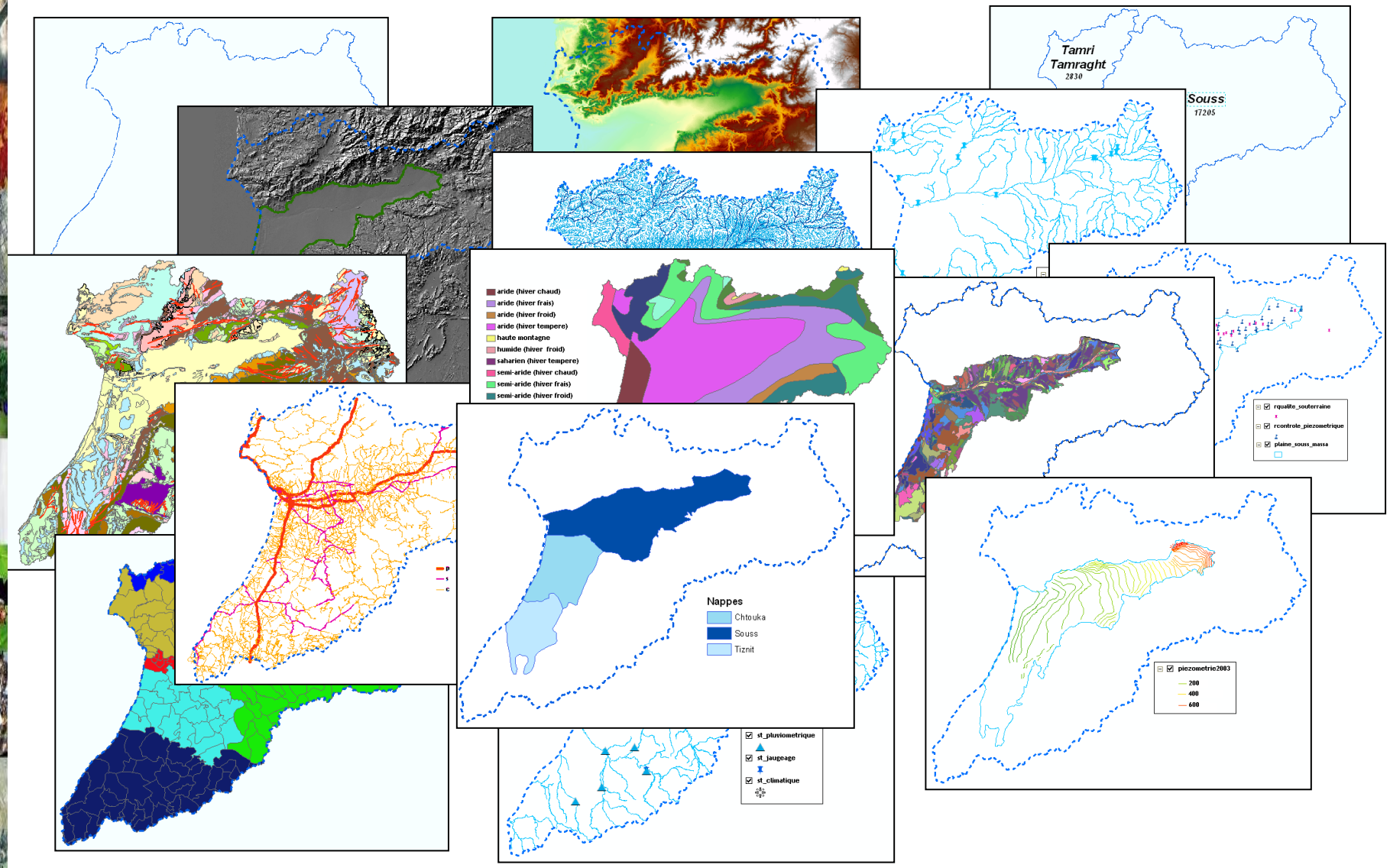
Monitoring of Irrigated Zones Extension

Change analysis

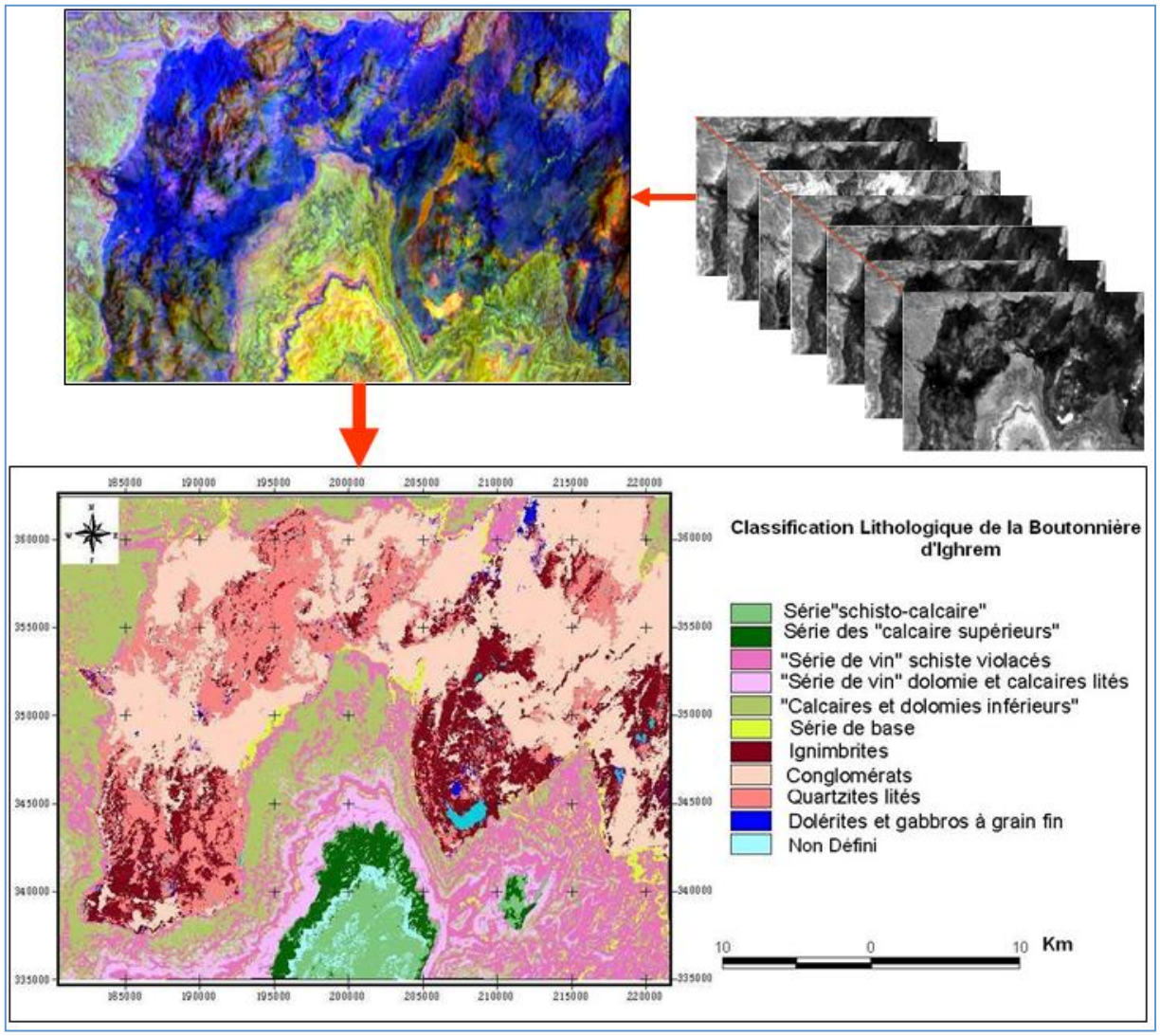


Water Resources Management

Système Intégré d'Aide à la Décision (SIAD) / Base de Données SIG



Water Resources Management



- **Information géologiques** : Résultat de la classification lithologique de la boutonnière d'Ighrem

Water Resources Management

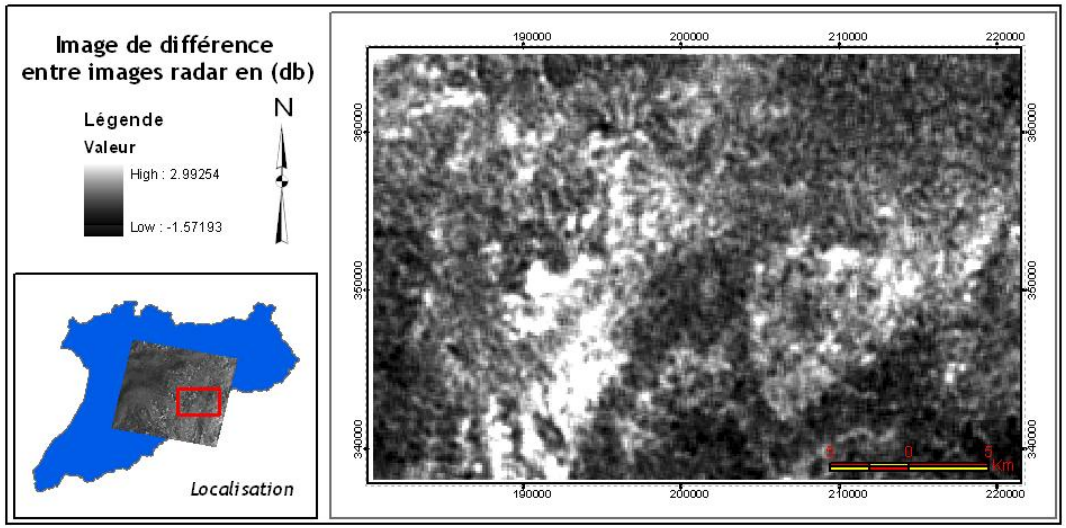
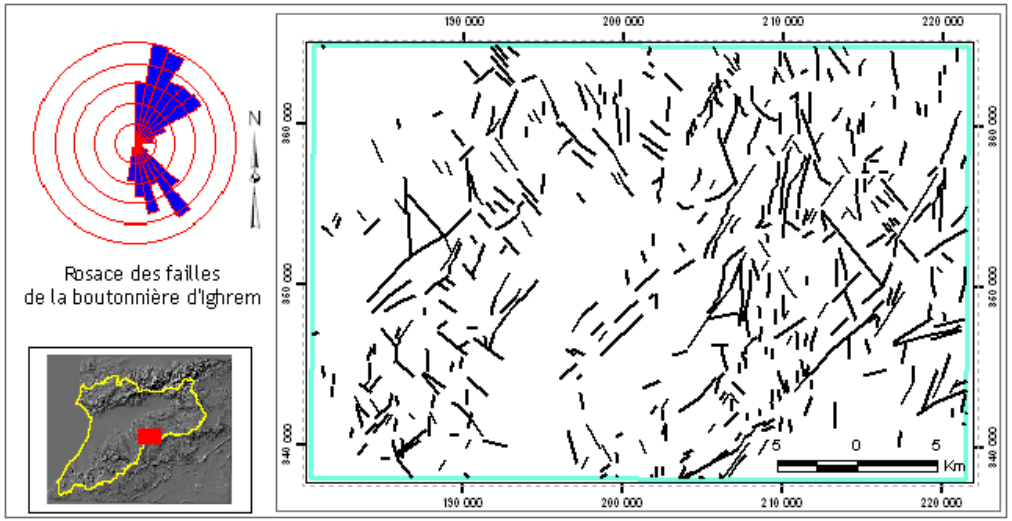
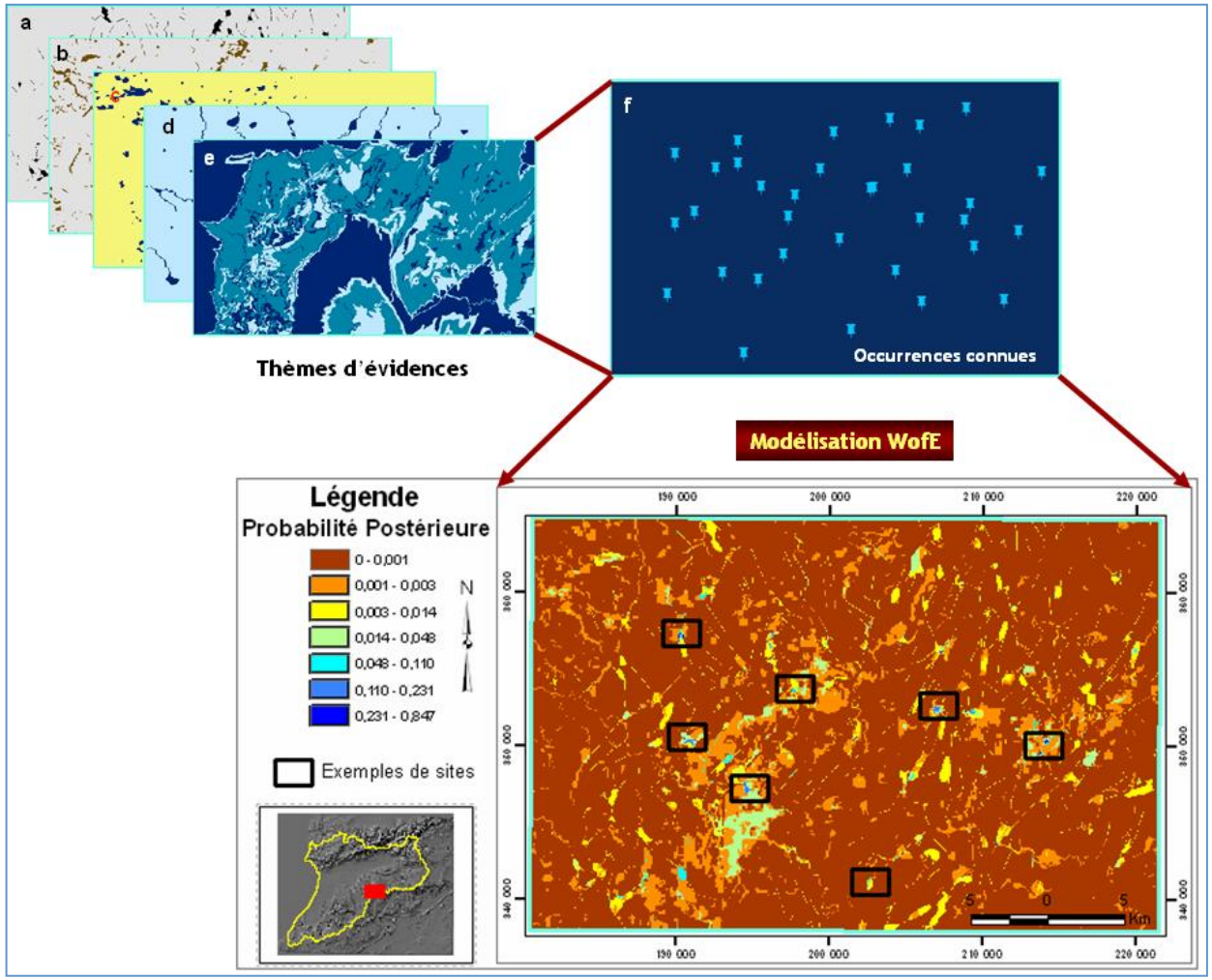


Image de différence entre images radar



Carte des failles et leur diagramme de rosace directionnelle



Résultat de la modélisation : Identification de sites potentiels

(combinaison des thèmes d'évidences, a : les failles, b : la géomorphologie, c : l'humidité, d : l'hydrologie, e : la perméabilité ; et f : les occurrences connues)

Disaster Management

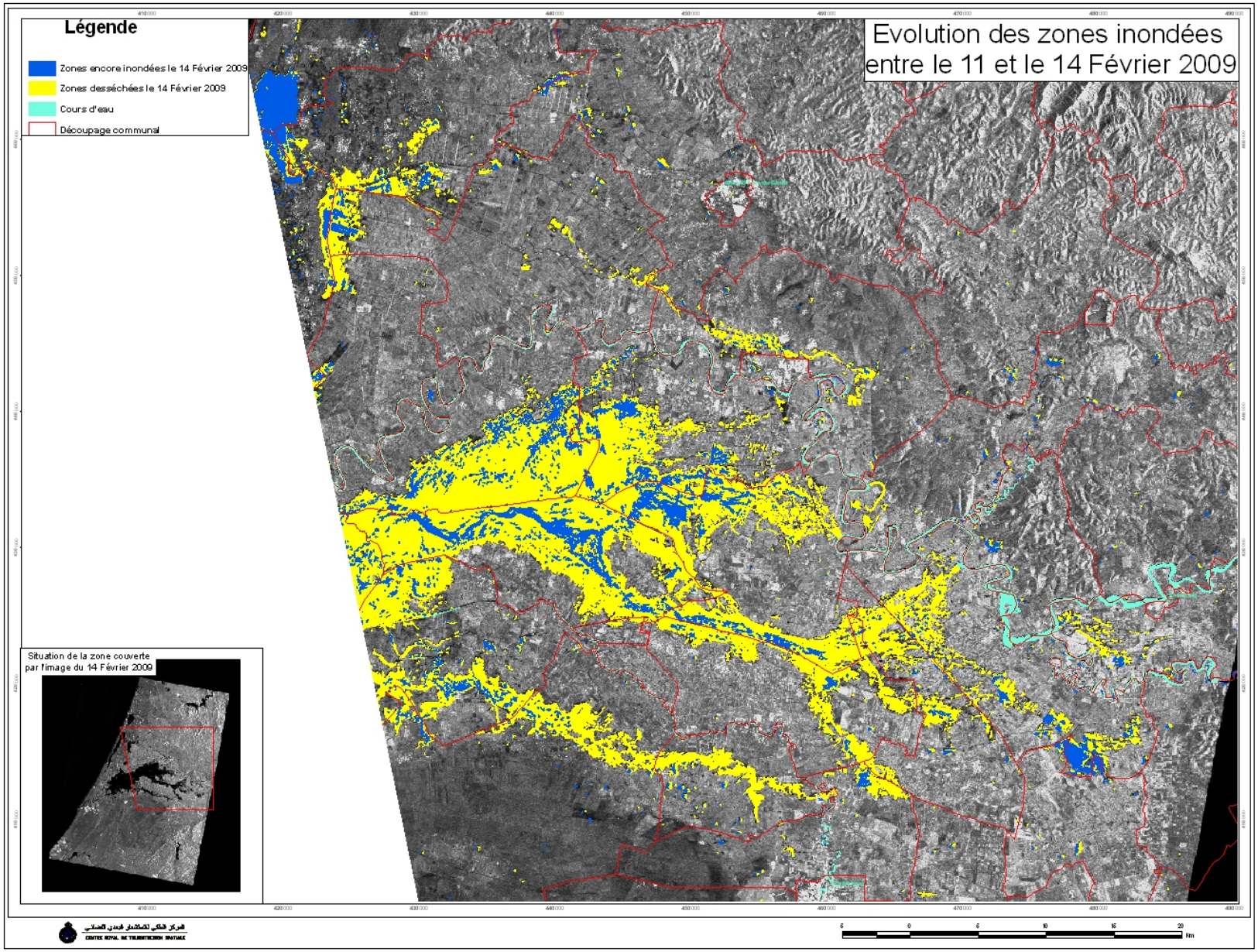
- Disaster management activities

  - are implemented to support the national authorities in charge of Security and relevant agencies in the management of major disasters in the country.

  - include processing and analyzing of satellite images, and disseminating value-added data and related information .

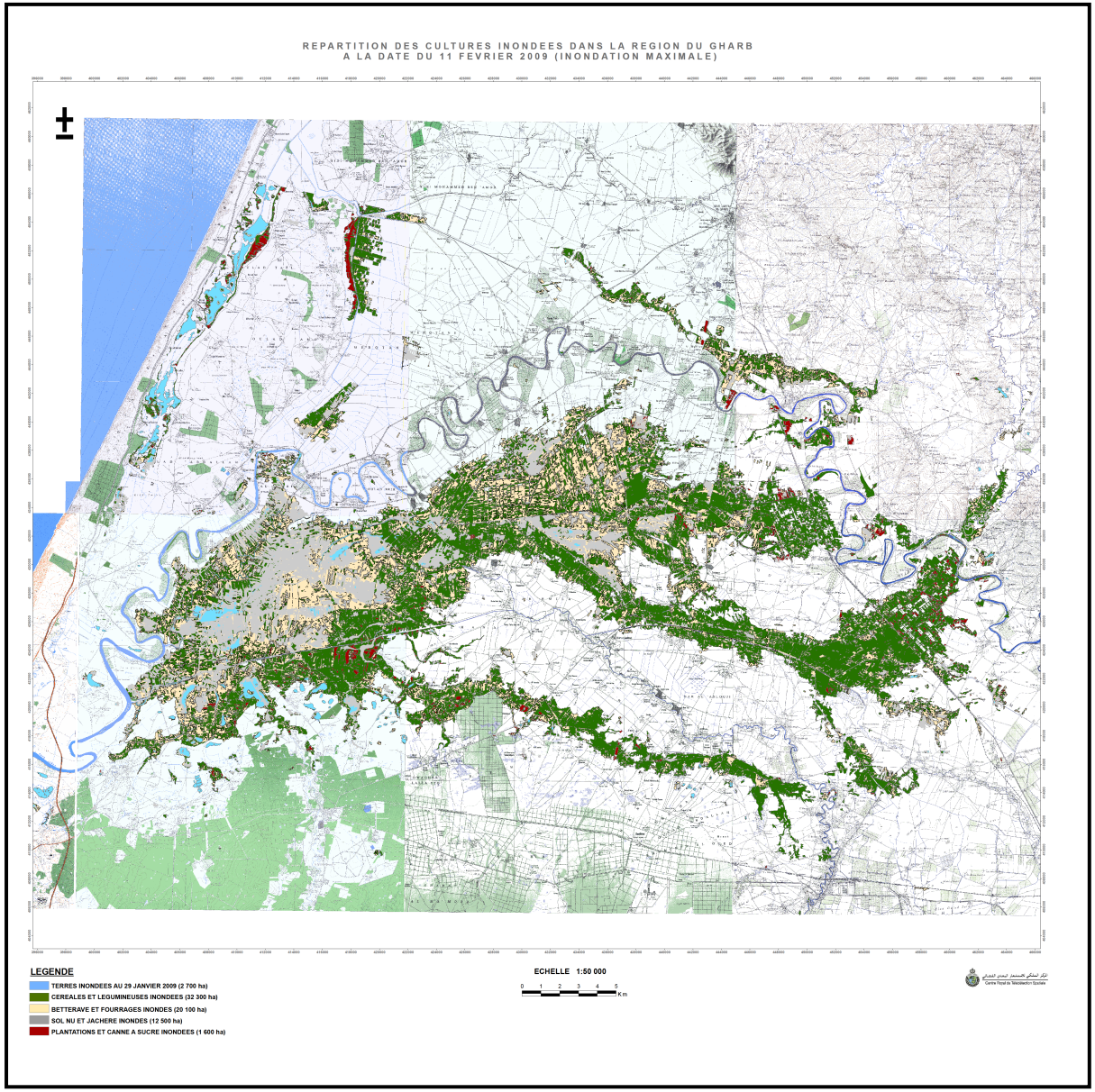
Flooded areas : cartography and follow up

Gharb region, Feb 2009



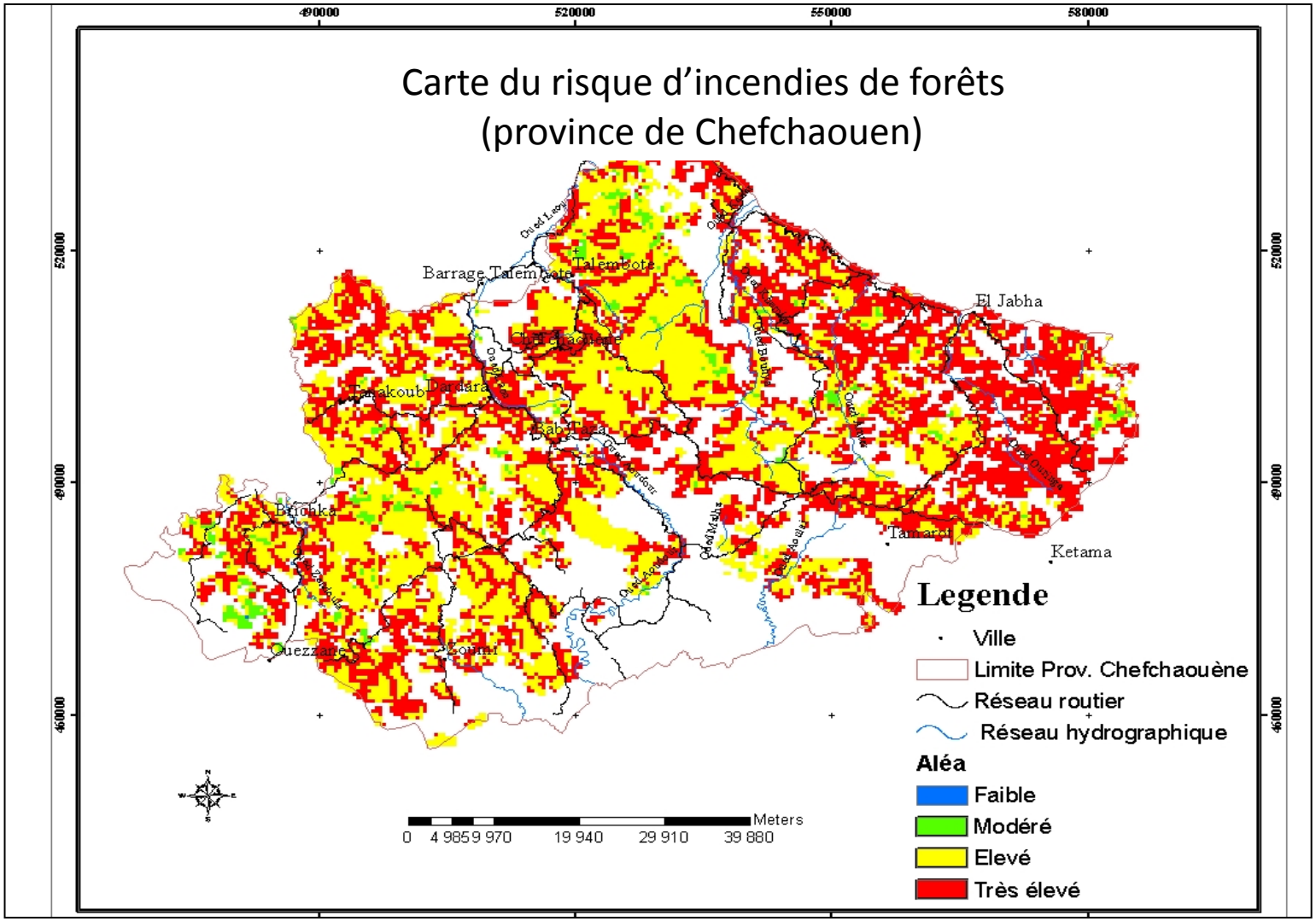
Flooded areas : Damages assessment

Gharb region, Feb 2009



Forest fires : vulnerability map

Chefchaouen region



Forest fires : cartography of burned zones and damages evaluation

Ouazzan region, August, 2004

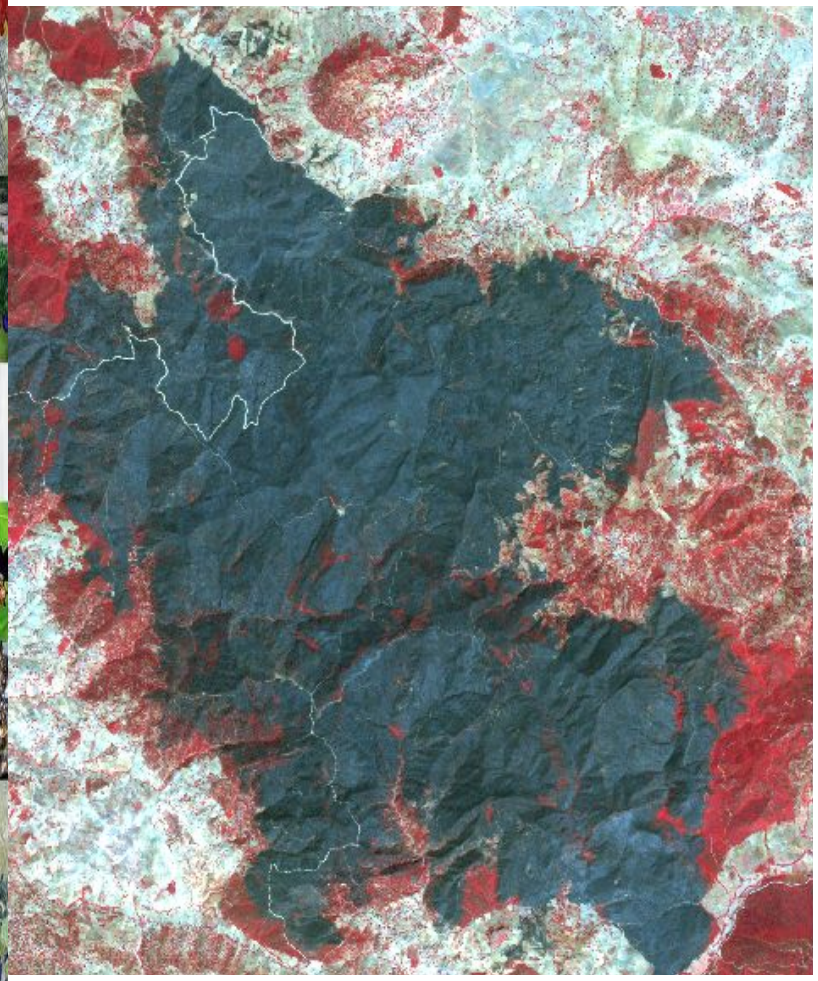
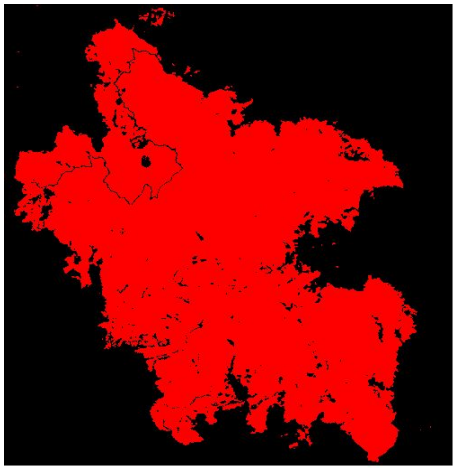
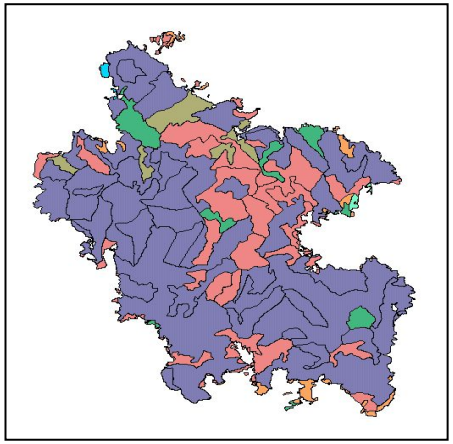


Image SPOT-XS acquise après le feu, Août 2OO4

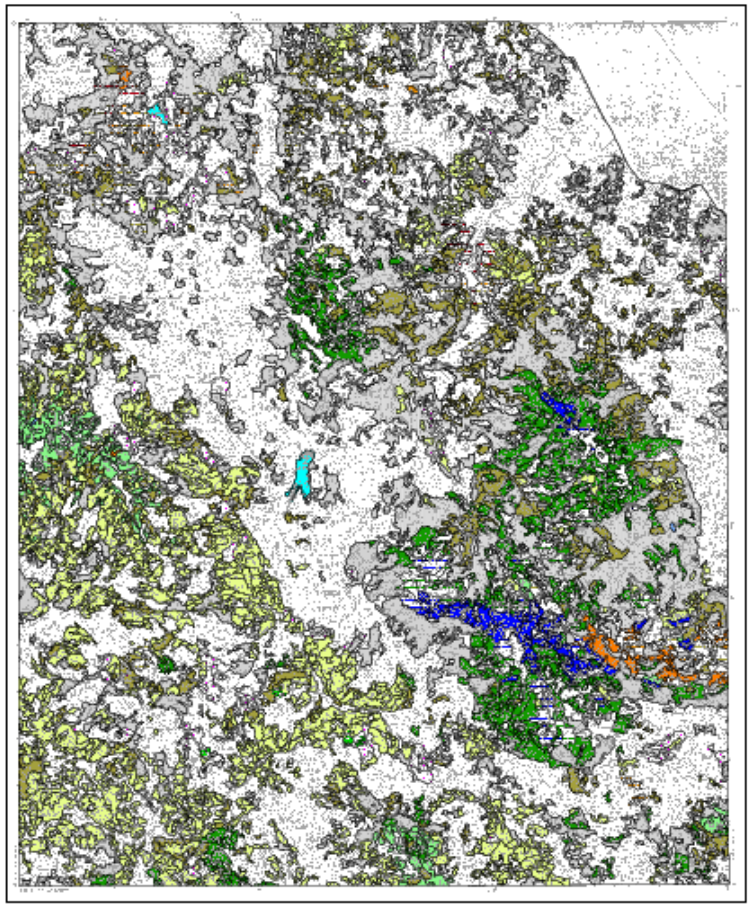


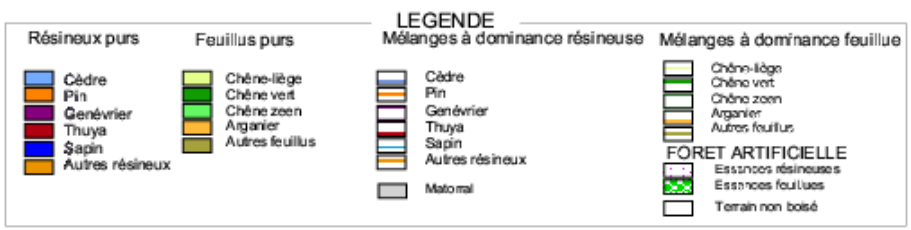


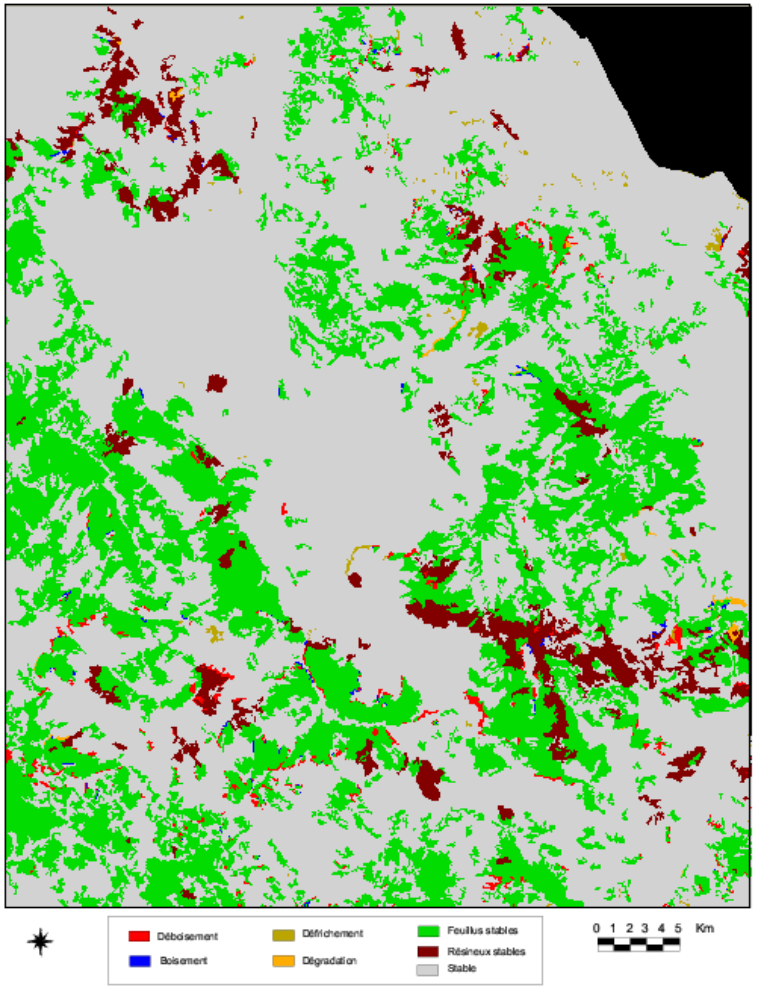
Forest Species	Area (ha)
Chêne liége	761,404
Chêne Vert	6,624
Feuillés	118,869
Matorral	142,127
Reboisement feuillé	6,999
Reboisement Résineux	2717,074
Terrains non Boisés	67,36
Total	3820,457

Commune	Area (ha)
Zoumi	2733
Beni Qoulla	1087
Total	3820

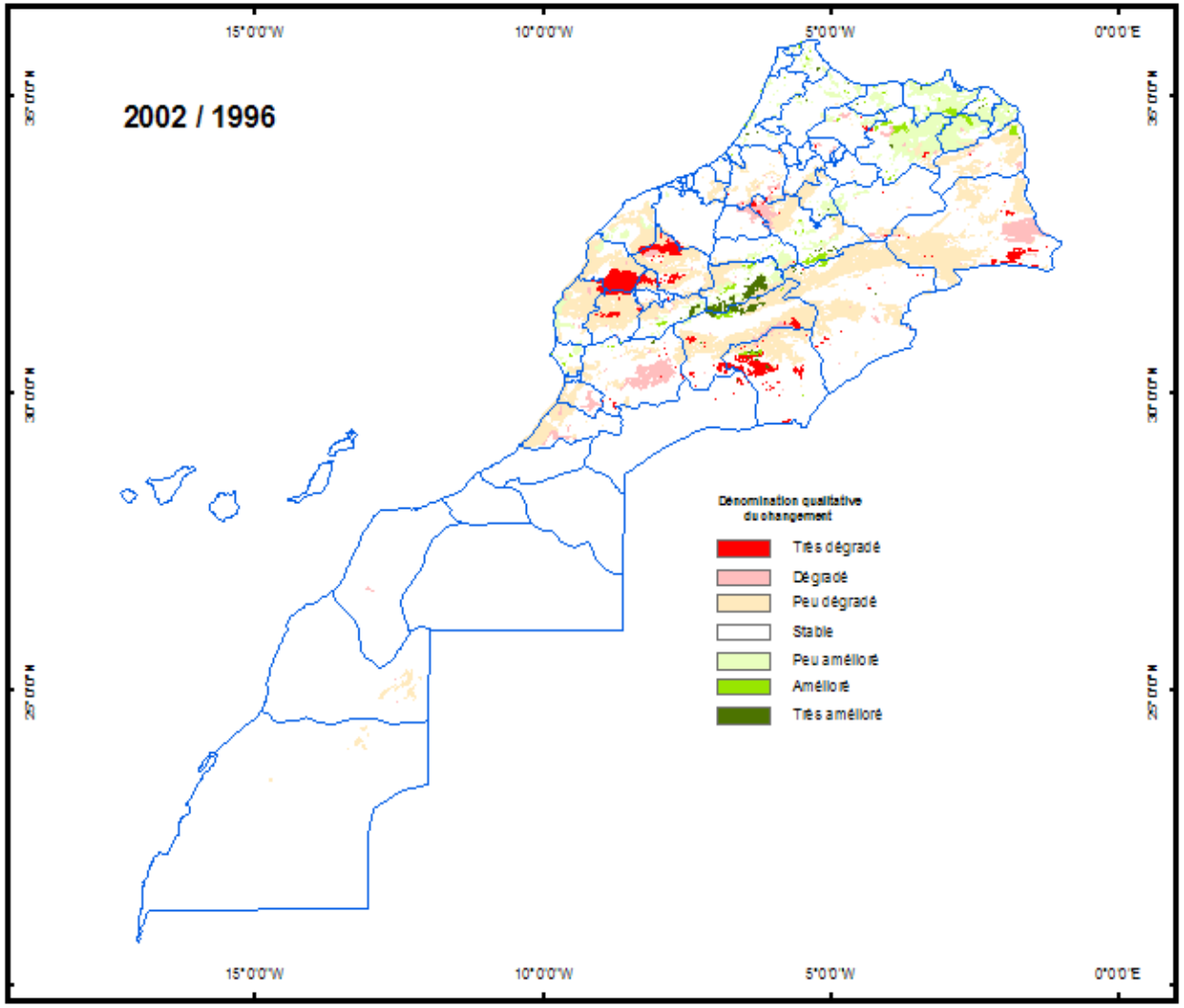
Forest changes







Vegetation changes / Desertification



Buildings damages modeling
TSUNAMI Hazards

Rabat-Salé Region

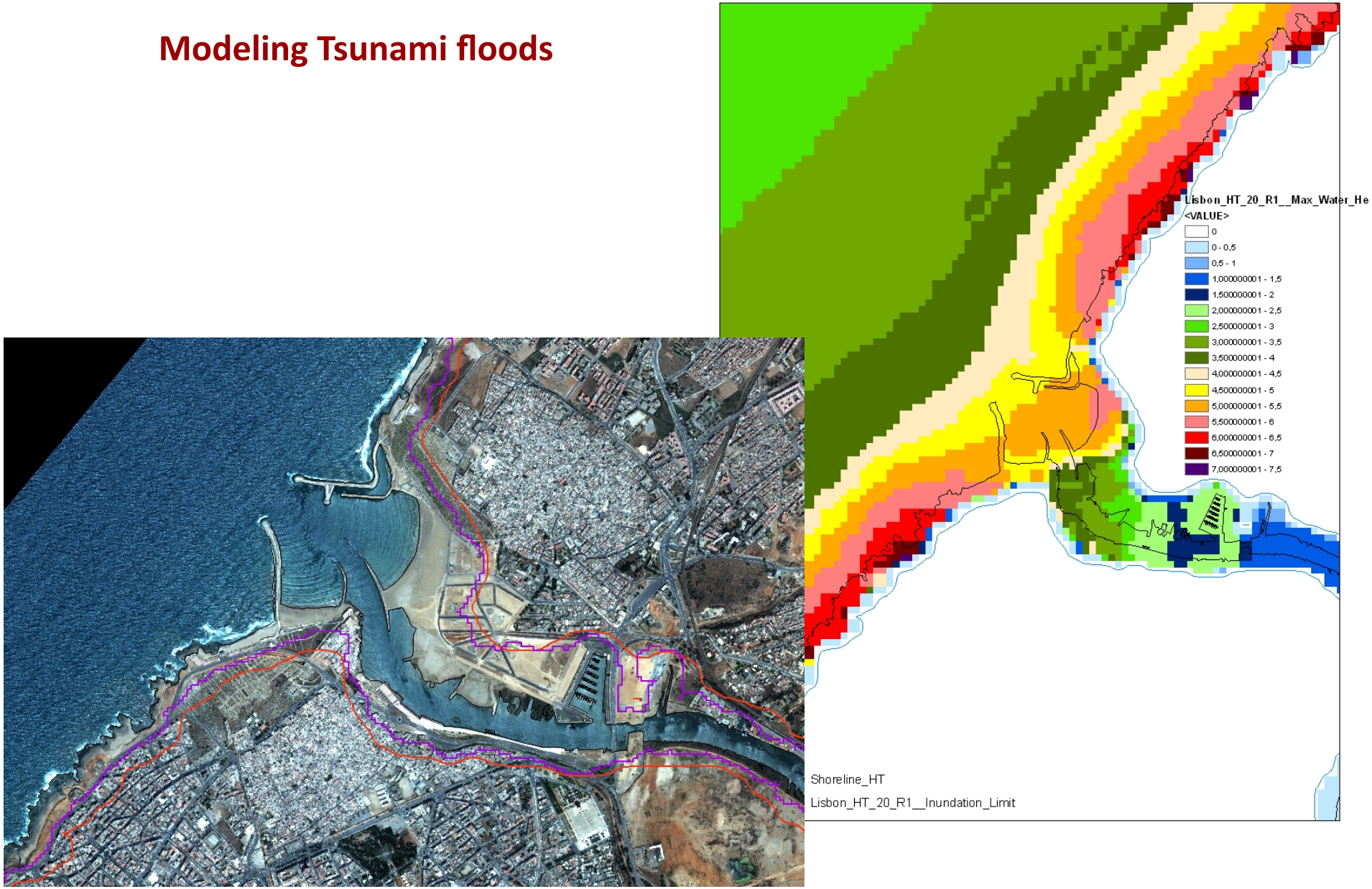
SCHEMA project (n° 030963)

Scenarios for Hazards-induced Emergencies Management

المركز الملكي للإستشعار البعدي الفضائي
Centre Royal de Télédétection Spatiale

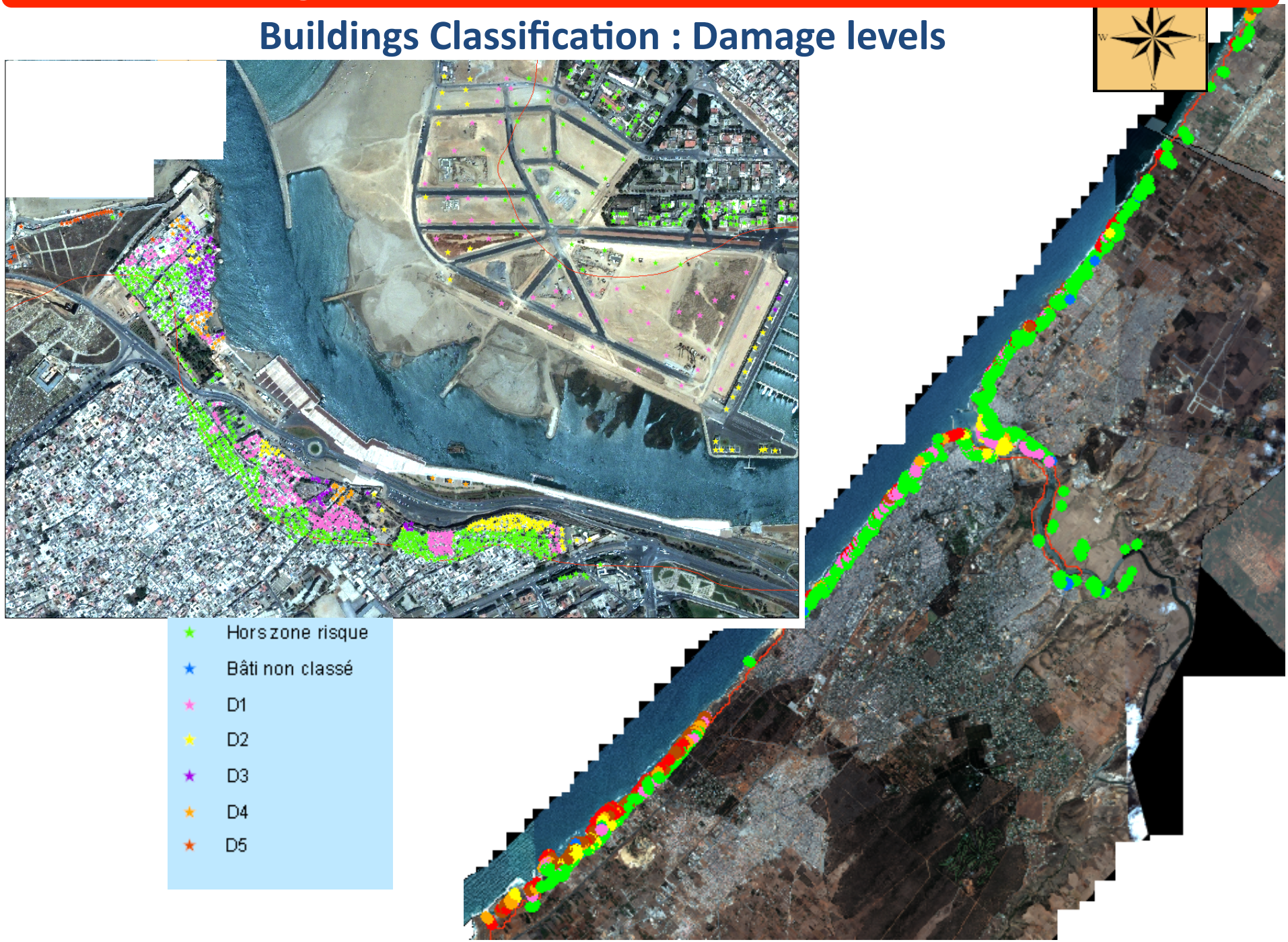
Disaster Management

Modeling Tsunami floods



Disaster Management

Buildings Classification : Damage levels



Data management system

المركز الملكي للاستشعار البعدي الفضائي
Royal Centre for Remote Sensing

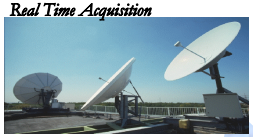
NOAA

MERIS/ENVISAT

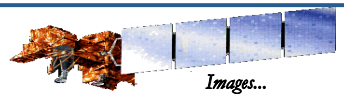
MODIS (Aqua & Terra)

MSG

Real Time Acquisition



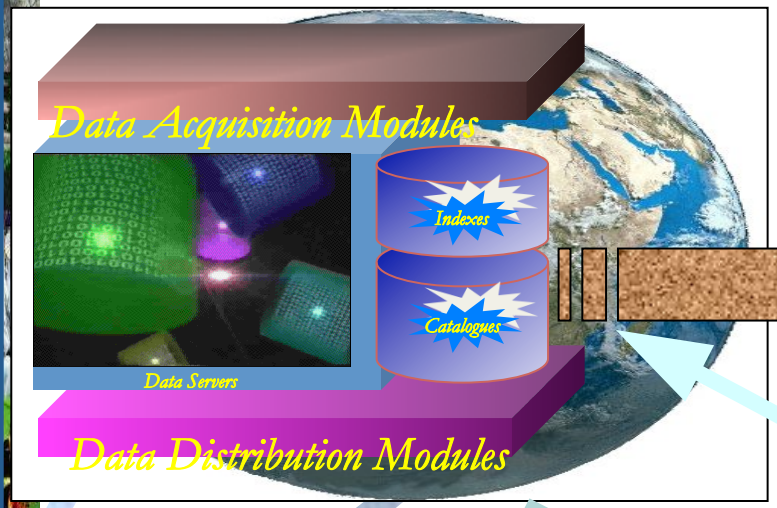
Data sources



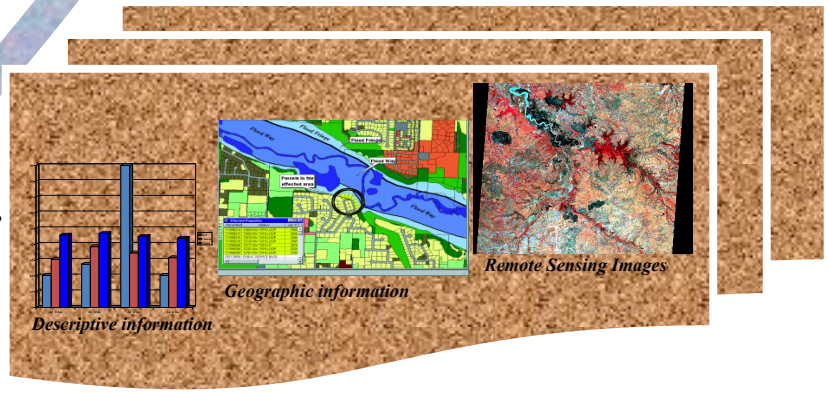
Images...

Processing Units

Meilon

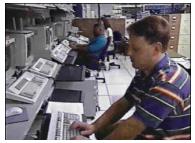


The Database



Internet, direct access...

Users (private, public...)



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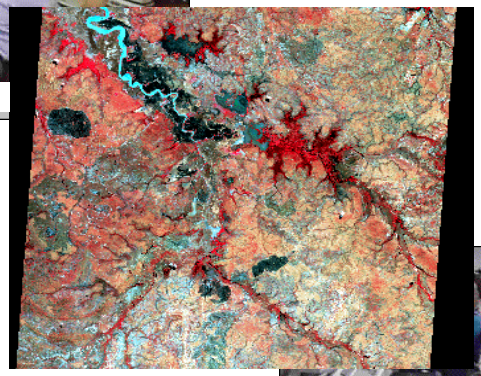
Integration in the Archiving Management System (SGA)

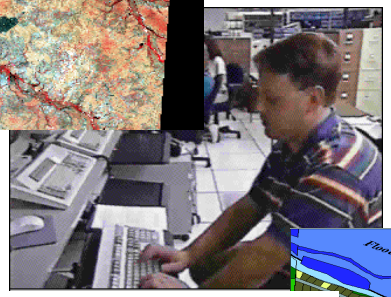
Technical context

✓ Contracts of distribution with the international suppliers of the images (Astrium/SPOT Image, EGEOS,….)

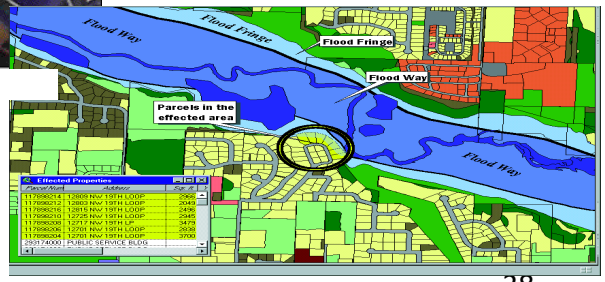
✓ Technical assistance for the choice of images



✓ Cost optimization and reduction of the delivery times



✓ Data adaptation and preparation to meet to end-user's needs



Legal context

✓ Décret n°2-89-520 en date du 18 Déc. 1989 portant création du CRTS

✓ Circulaire du Premier Ministre n° 14/2003 du 4 Déc. 2003 sur l'importation et la distribution des images satellite au Maroc

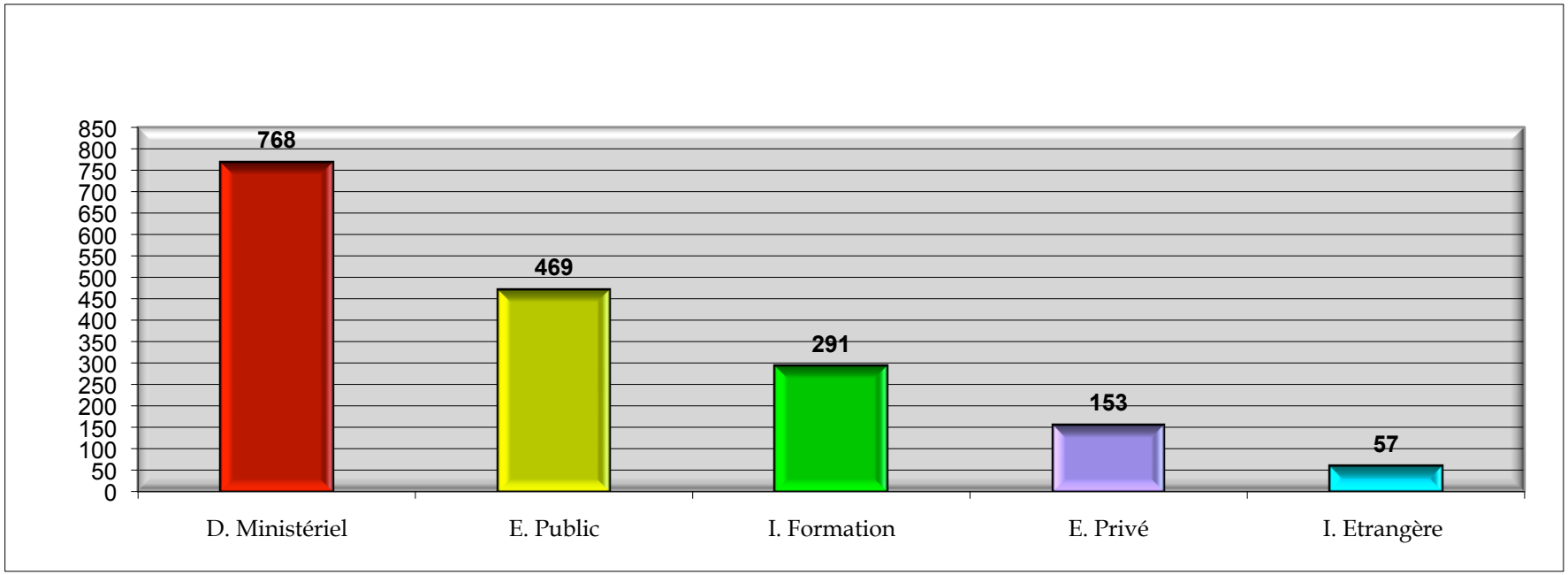
Capacity Building : Training, R&D, Outreach

Training and R&D activities

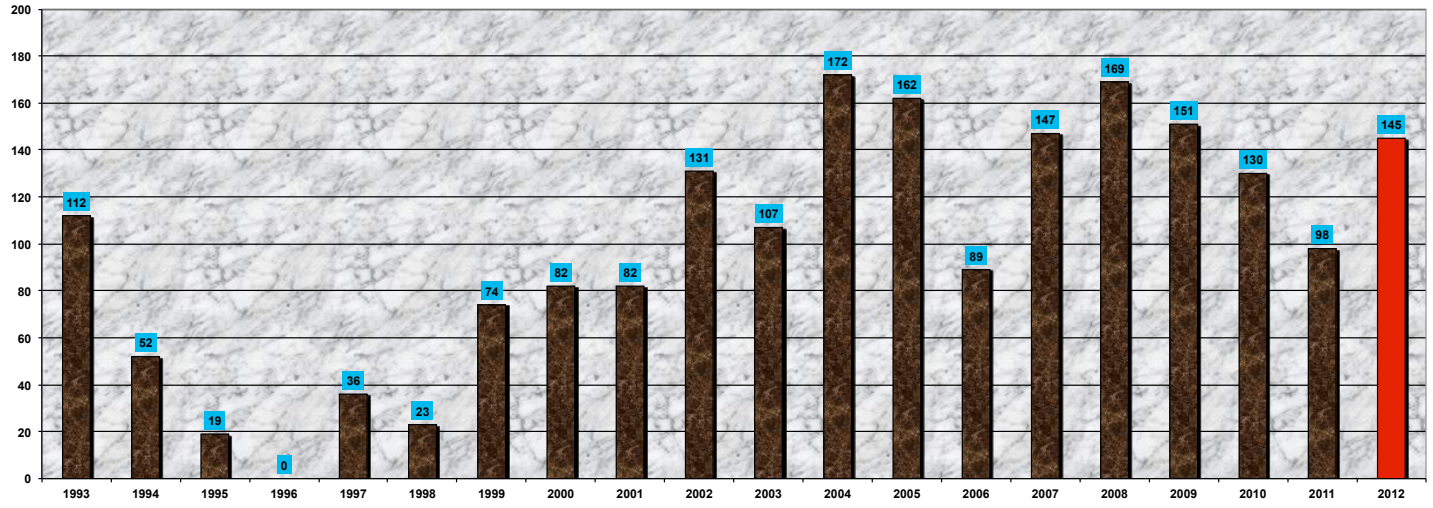
Objectives : Enlarge users community and enhance national capacities

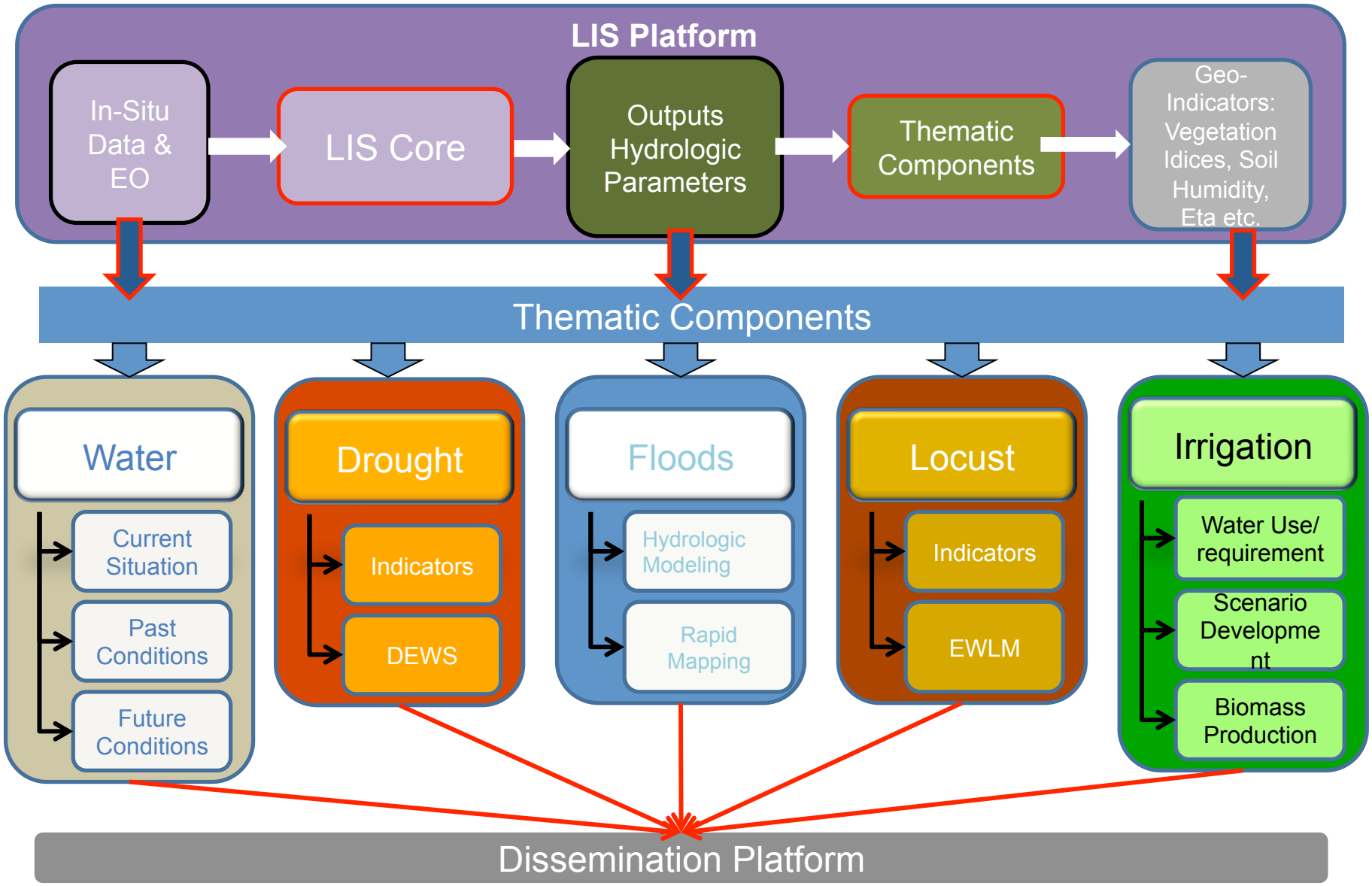
- **Dedicated infrastructures**
- **Annual program : Up to 10 training sessions / Year**
- **Beneficiaries : National and from the region**
- **Cooperation with international organizations (ESA, FAO, COSPAR, ECSL, UNESCO/IOC, OADA…)**

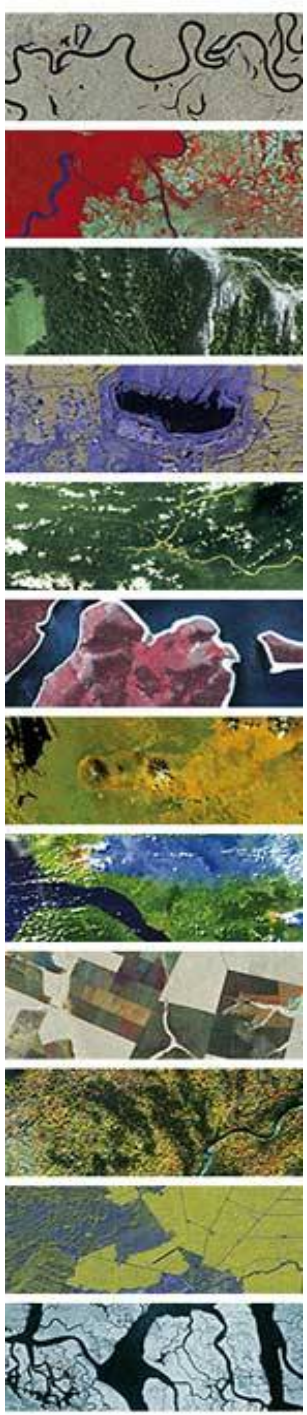
Participants / origin



Evolution of Participation
1993-2012




LIS Platform
In-Situ Data & EO
LIS Core
Outputs Hydrologic Parameters
Thematic Components
Geo-Indicators: Vegetation Idices, Soil Humidity, Eta etc.
Thematic Components
Water
Current Situation
Past Conditions
Future Conditions
Drought
Indicators
DEWS
Floods
Hydrologic Modeling
Rapid Mapping
Locust
Indicators
EWLM
Irrigation
Water Use/ requirement
Scenario Developme nt
Biomass Production
Dissemination Platform

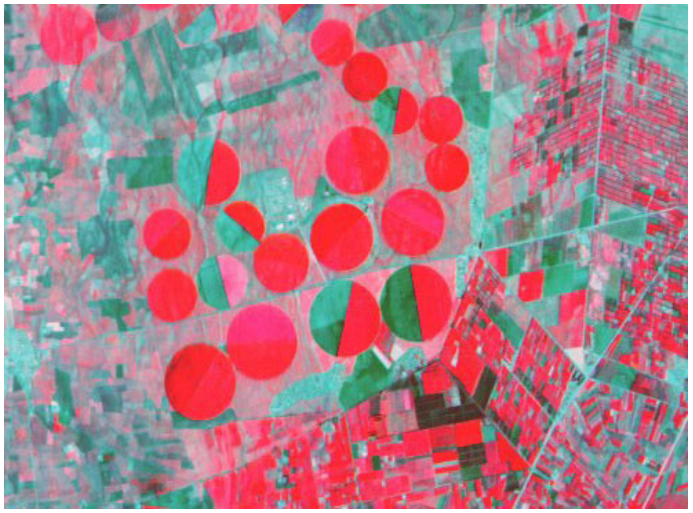


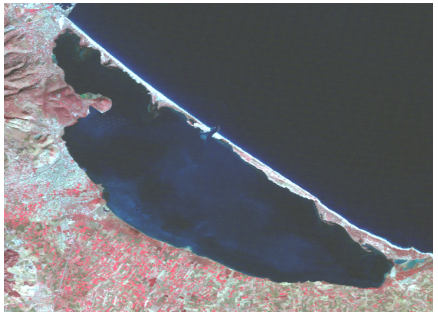
Centre Royal de
Télédétection Spatiale

المركز الملكي
للاستشعار الفضائي

Royal Center for Remote Sensing

Strategic tools for decision making





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