CNES Strategy for Health and the Environment

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CNES Tele-Health Programme

- Telemedicine (diagnosis, data collecting networks)
- Humanitarian aid
- Education and Training
- Health and the Environment = Tele-epidemiology
Telemedicine facilities and networks

- Maritime
- Aeronautics
- Expeditions, trekking
- Humanitarian aid and Refugees
Telemedicine in French Guyana
Epidemiological Data Collecting Network and Diagnosis
Telemedicine network, Senegal

- Mother and child care,
- Echography in isolated areas,
- High risk pregnancy (HTA),
- High mother-child mortality,
- Collaboration with the Ministry of Health of Senegal
Epidemiological Data Collecting Network in Senegal

- Users (~30) using varied equipment: PDAs, PCs, portables
- Epidemiological data emails (~200 per month)
- Relations between isolated sites and the capital (Dakar) via satellites and/or fiber links
- Number of epidemiological reports in 2001: ~500
- Extension of the Emercase network from 2003
Health and the Environment – The context

Figure 2: Foyers aviaires confirmés au 21 juin 2006.
Health and the Environment – The context

Chikungunya and Dengue - Indian Ocean update. Status as of 17 March 2006

- India - Andhra Pradesh State
- India - Orissa State
- Maldives

Data Source: WHO/EPH
Map Production: Public Health Mapping and GIS
Communicable Diseases (CD), World Health Organization

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Health and the Environment – The context

Contexte National

Localisation des écuries « séro-positives » (West Nile) en Camargue

Écuries « séro-négatives »  Écuries « séro-positives »

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Tele-epidemiology – The concept

- Infectious transmissible diseases
- Water borne
- Air borne
- Vector borne (mosquitoes, rats, birds, flies, …)

- Understanding the « mechanism »…on the ground
- Identifying key parameters……………and space contribution
- Developping « adapted products » …with and for users
- End to end system, integrating space component
Tele-epiemiology - Satellites and Health

- **Air borne diseases**
  Atmospheric chemistry / Air pollution / meteorology instruments
  To detect and quantify pollutants and particles, pollens, aerosols

- **Water borne diseases**
  Water color / coastal measurement / meteorology instruments
  To detect water surface temperature, chlorophyll, sediments, yellow matter, algal bloom, tides, ...

- **Vector borne diseases**
  Remote sensing (optic and radar) / altimetry / meteorology instruments
  To detect bridging sites, environmental changes, vulnerability

- **Epidemiological Data collecting**
  Data collecting systems
  To strengthen public sanitary systems
Tele-epidemiology - Towards EWS (early warning systems)

- Anticipate / Alea (ex: anticipate mosquito production)
- Anticipate / Disease Transmission Risk (alea+vulnerability => risk)
- Optimize public sanitary system response / epidemic
- Reduce epidemic impacts
  sanitary impact (mortality, sickness)
  economical impact
Tele-epidemiology – Vector borne disease
From Rainfall Event to Vectors’ Aggressiveness

Aedes vexans (%) versus pond distance (meter)

Cumulative frequency (%) versus pond distance (meter)

AGGRESSIVENESS OF Aedes

Rainfall

DAYS

UN-SPIDER, 2009
Tele-epidemiology – Vector borne disease

Barkedji Turbid Pond

ZPOM 08/26/03

NDTI

ZPOM: zone potentially occupied By mosquitoes
Tele-epidemiology – Vector borne disease

ZPOM interannual variability

False color composite 2003

False color composite 2006

ZPOM min 2003

40239ha
20.3% of area

ZPOM min 2006

9569ha
4.8% of area

ZPOM max 2003

67572ha
34.1% of area

ZPOM max 2006

12864ha
6.5% of area
Tele-epidemiology – Vector borne disease

From Remote Sensing to Risks

Ponds
ZPOM
ZPOM
Hazard
Vulnerability
Risks

Same parks...

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Projet Paludisme à Dakar
IMTSSA, (thèse Vanessa Machault)

Distribution globale du paludisme

SPOT5 10m
Classification urbaine
Données entomologiques
Tele-epidemiology – Water borne disease

Cholera
Projet
VIBRIOSea

Données Spatiales

Concentration en Chlorophylle (84 Log C)

Températures

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CNES Health and the Environment Cooperations

Countries involved in projects
CNES Health and the Environment Cooperations

At Thematic level
- Scientific
- Capacity building
- Application development

Thanks to
- National programme (call for innovative projects)
- Bilateral Cooperations between space agencies
- International programmes: GEO, CEOS, UN-SPIDER
GEO workplan 2009-2011

HE-09-01: Information Systems for Health

Improve in-situ environmental and health data collection for the utilization and validation of remotely-sensed data

Explore how GEOSS will support the collection & distribution of information and meet the diverse needs of the health community

Develop a global public health information network database to improve health decision-making at the international, regional, country and districts levels

Priority / WHO’s OpenHealth information tool and other environmental and health information systems to the GEO portal and GEOSS Common Infrastructure (GCI)
GEO workplan 2009-2011

HE-09-02 : Monitoring and Predicting Systems for Health

Support the development of operational health-related applications
Connect established and emerging cross-cutting observing systems to monitoring and predicting systems for health
Include and consolidate contributions from different, not yet coordinated systems

a) Aerosols impacts on health and environment
b) Air quality observations, forecasting and public information
c) Global monitoring plan for persistent organic pollutants
d) Global monitoring plan for atmospheric mercury
GEO workplan 2009-2011

HE-09-03 : End to end Projects for Health

Develop and implement end-to-end health-environment projects to advance the application of observation, monitoring and forecasting systems to health decision-making processes.

Initiate efforts to establish a global health-climate Community of Practice in response to the 61st World Health Assembly’s resolution on ‘climate change and health’

a) Implement a meningitis decision-support tool

b) Implementation of a Malaria early Warning System

c) Ecosystems, biodiversity and health: decision-support tool and research
GEO Task for Health and CEOS-GEO actions

HE-09-01: Information Systems for Health
CEOS-GEO HE-09-01_1 Critical space-based imagery for health monitoring, forecasting and modeling of health issues
CEOS-GEO HE-09-01_2 Global smoke plumes and dust forecasting product

HE-09-02: Monitoring and Prediction Systems for Health
CEOS-GEO HE-09-02b_3 Air quality observations forecasting and public information

HE-09-03: End to End Projects for Health
CEOS-GEO HE-09-03a_5 Implementation of a Meningitis decision-support tool
CEOS-GEO HE-09-03b_1 Towards a global coordinated Malaria Warning system
CEOS-GEO HE-09-03b_2 Malaria risks in Thailand
CEOS-GEO HE-09-03b_4 Plan to integrate in situ vegetation health data to improve global VHI products in affected countries
Main ideas

- Applications Development Programme is USER driven
- Supporting scientific applied developments
- Transferring science into operational services
- Sustainable services (the users should be able to pay)