

# **Rapid Assessment of Vulnerability and Identification of Adaptation Activities**

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# Key Questions for Rapid Assessment

- 1. What is the **spatial character** of the country in terms of social, economic and environment?
- 2. How will climate hazards likely evolve under climate change guided by **general conclusions** from the IPCC about future extremes?
- 2. What are vulnerable sectors, regions and communities?
- 3. What are community options to enhance adaptive capacity, increase resilience, increase coping ability?
- 4. How can information be packaged and used to explore NAPA activities in public consultations?

# Main Steps

- Characterization & trend analysis
  - Trends in extremes
  - Trends in climatic indices
  - Spatial characterization using GIS and remote sensing
  - Thresholds and pivotal points (turning points)
- Impacts of past policies
  - basic human needs in the 1970's
  - structural adjustment in the 1980's
  - privatization and institution building in the 1990's
  - poverty reduction in the 2000's
  - next: ??????

# Main Steps

- **Assessment of Climate Hazards and Risks**
  - Analysis of historical trends and characterization of potential future hazards and risks
  - IPCC/WMO has standard software and methodologies
- **Assessment of Vulnerability**
  - At appropriate scales of intervention (household, district etc)
  - Overlays of exposure, population, etc in GIS, outputs to include potential affected population and some idea of cost?
- **Useful examples include**
  - World Food Program methods for analyzing food security using mapping analysis
  - Famine Early Warning Systems (FEWS) for food security
  - use of GIS to evaluate sea-level-rise and flooding, etc



# Main Steps

- What is national planning strategy and methods?
  - Talk to your planners
- Elaboration of coping strategies and other intervention measures
  - Talk with stakeholders

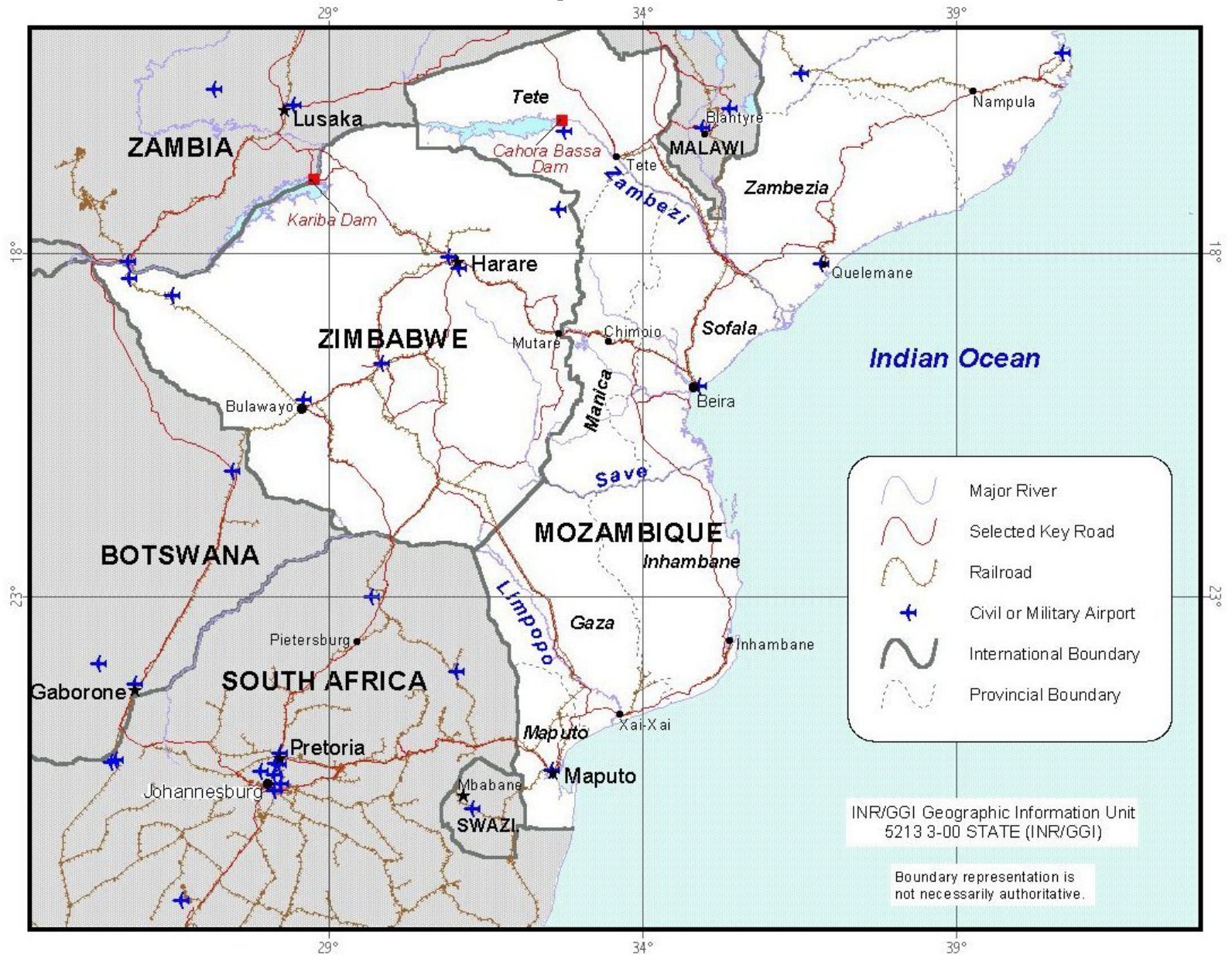
# Main Inputs ....

- GIS data (see CD-ROM from NAPA Primer)
  - Admin boundaries, land cover maps, watershed maps and water bodies, infrastructure, etc
- Climate data
  - Daily climate data from weather stations
  - Gridded data from CRU/IPCC DDC
  - Summaries and assessments from past studies (trends, etc)
- Socio-economic data
  - Population by management unit (TA), economic data, indices of socio-economic status (education, poverty, income, etc)
- Background documents and assessments

# Few Examples of GIS products

- These use existing data from public databases available in most LDCs
- Uses software and techniques used in most countries
- Can be done over days and weeks or hours if needed, by trained GIS personnel

# Mozambique Disaster Area Feb 2000

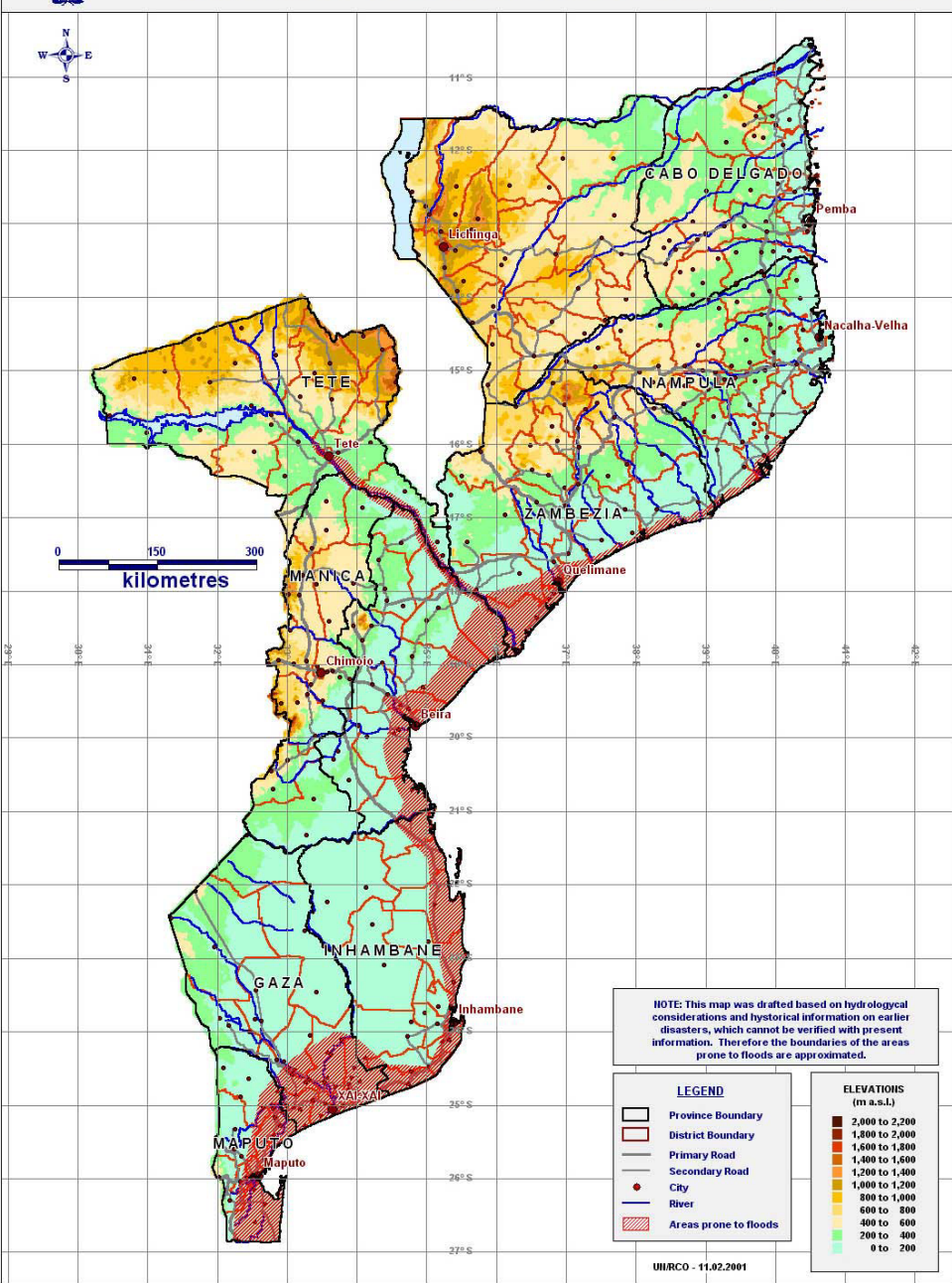








# POTENTIAL FLOODING AREAS IN MOZAMBIQUE



0 150 300  
kilometres

**NOTE:** This map was drafted based on hydrological considerations and historical information on earlier disasters, which cannot be verified with present information. Therefore the boundaries of the areas prone to floods are approximated.

**LEGEND**

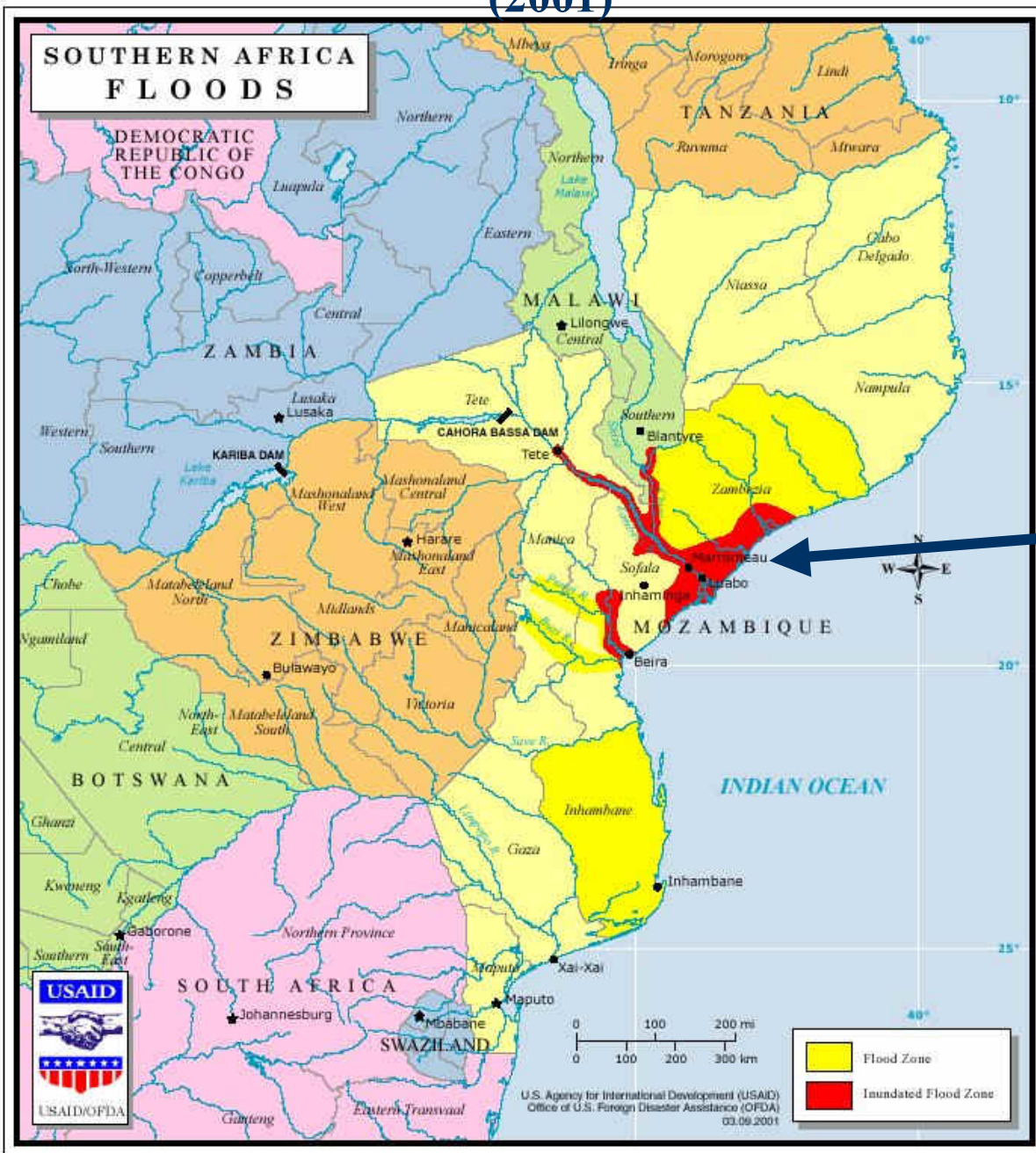
- Province Boundary
- District Boundary
- Primary Road
- Secondary Road
- City
- River
- Areas prone to floods

**ELEVATIONS (m a.s.l.)**

- 2,000 to 2,200
- 1,800 to 2,000
- 1,600 to 1,800
- 1,400 to 1,600
- 1,200 to 1,400
- 1,000 to 1,200
- 800 to 1,000
- 600 to 800
- 400 to 600
- 200 to 400
- 0 to 200



(2001)



Look here:  
Lower Zambezi

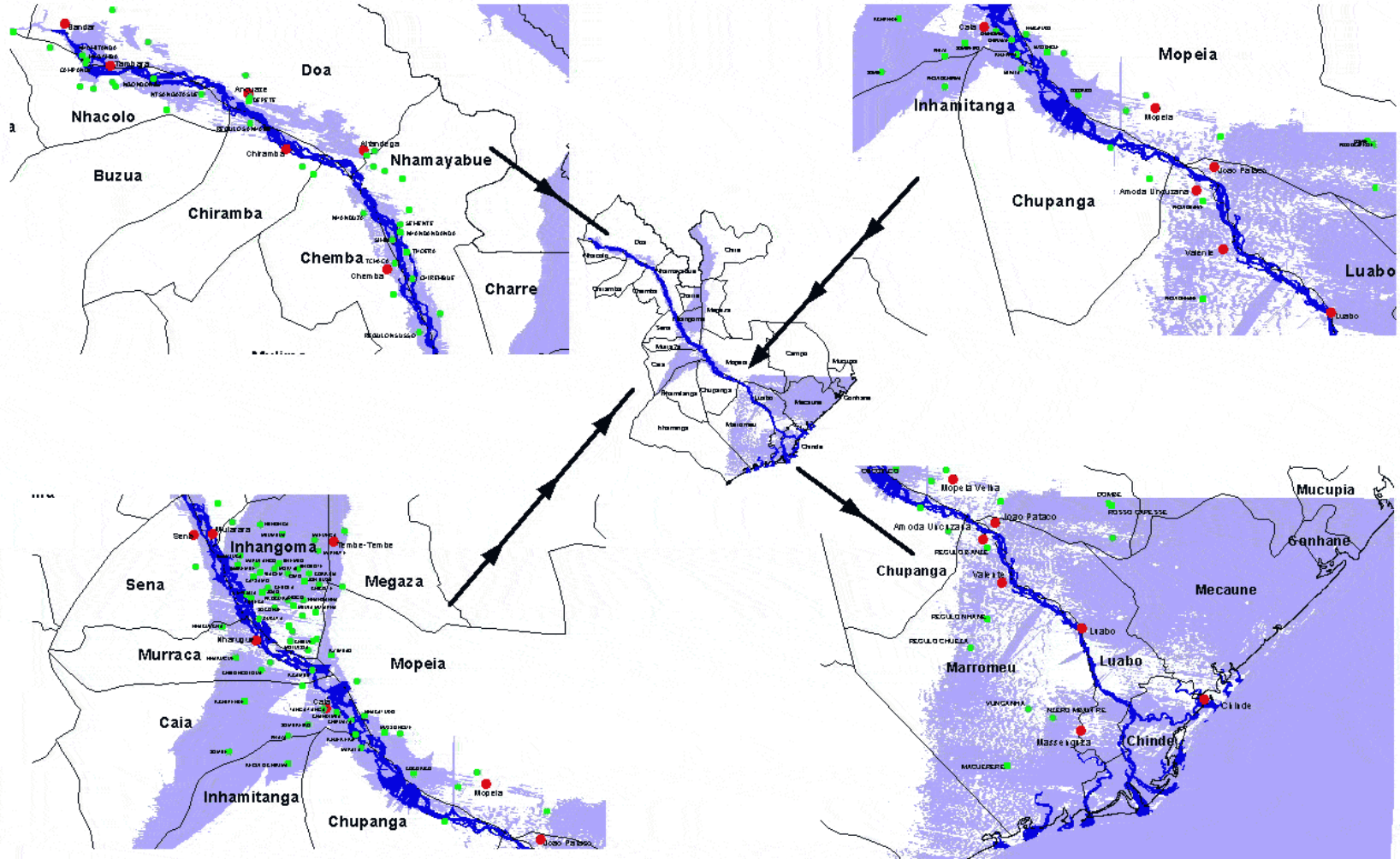


# Zambese Basin Flood Risk Map



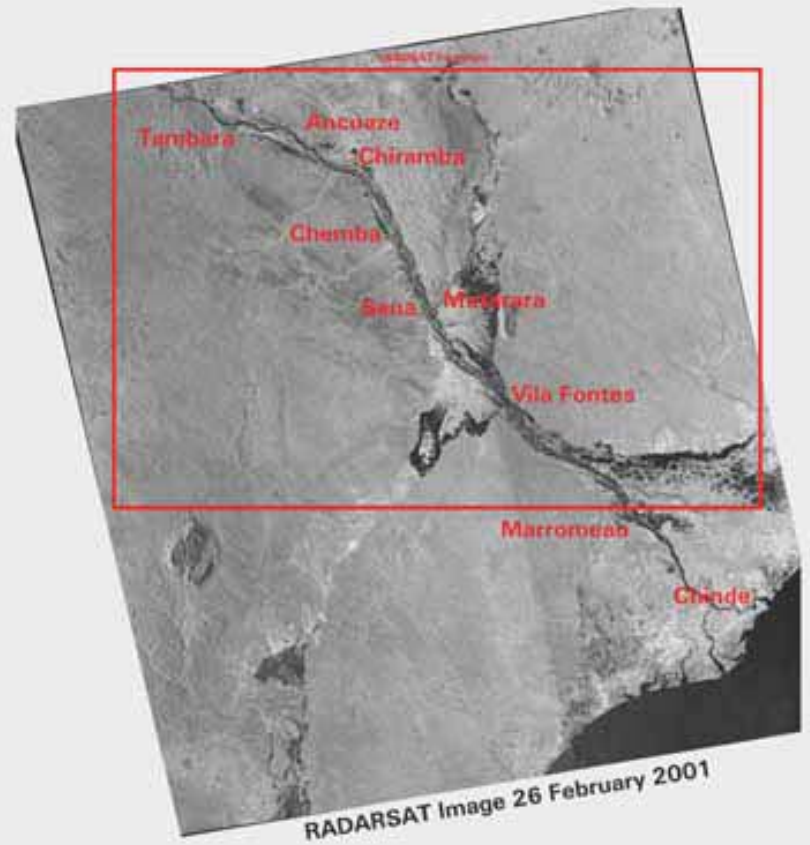
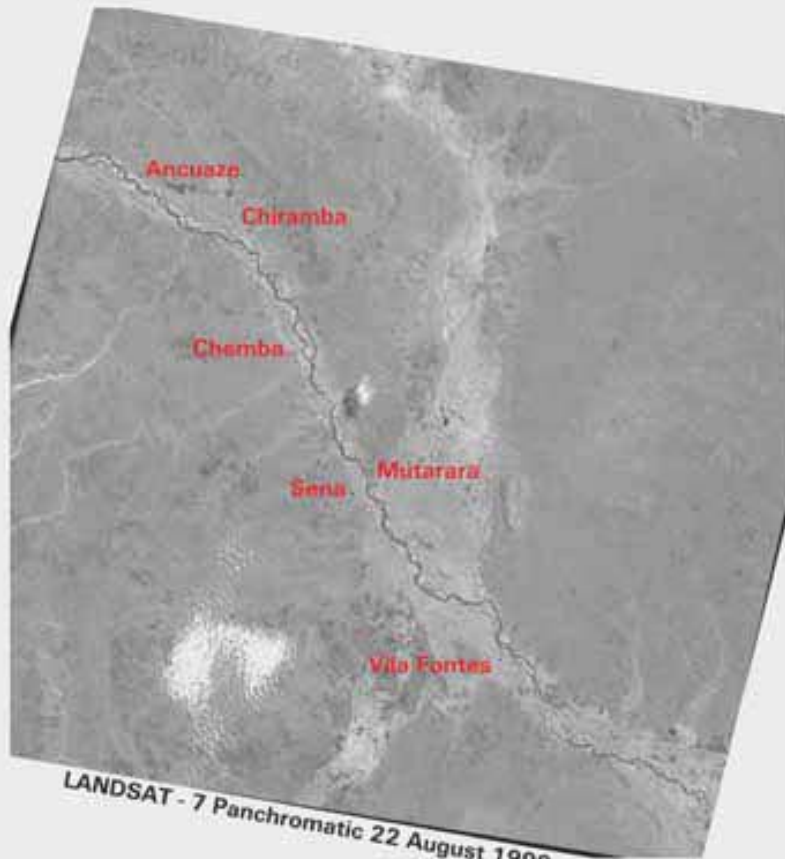
The flood risk maps are based on a sustained release of 12,000 cubic meters/second of water from Cabora Bassa Dam.

- Major Population Centers
- Village Locations
- Administrative Post Boundaries
- Normal River Channel
- Potentially Flooded Areas

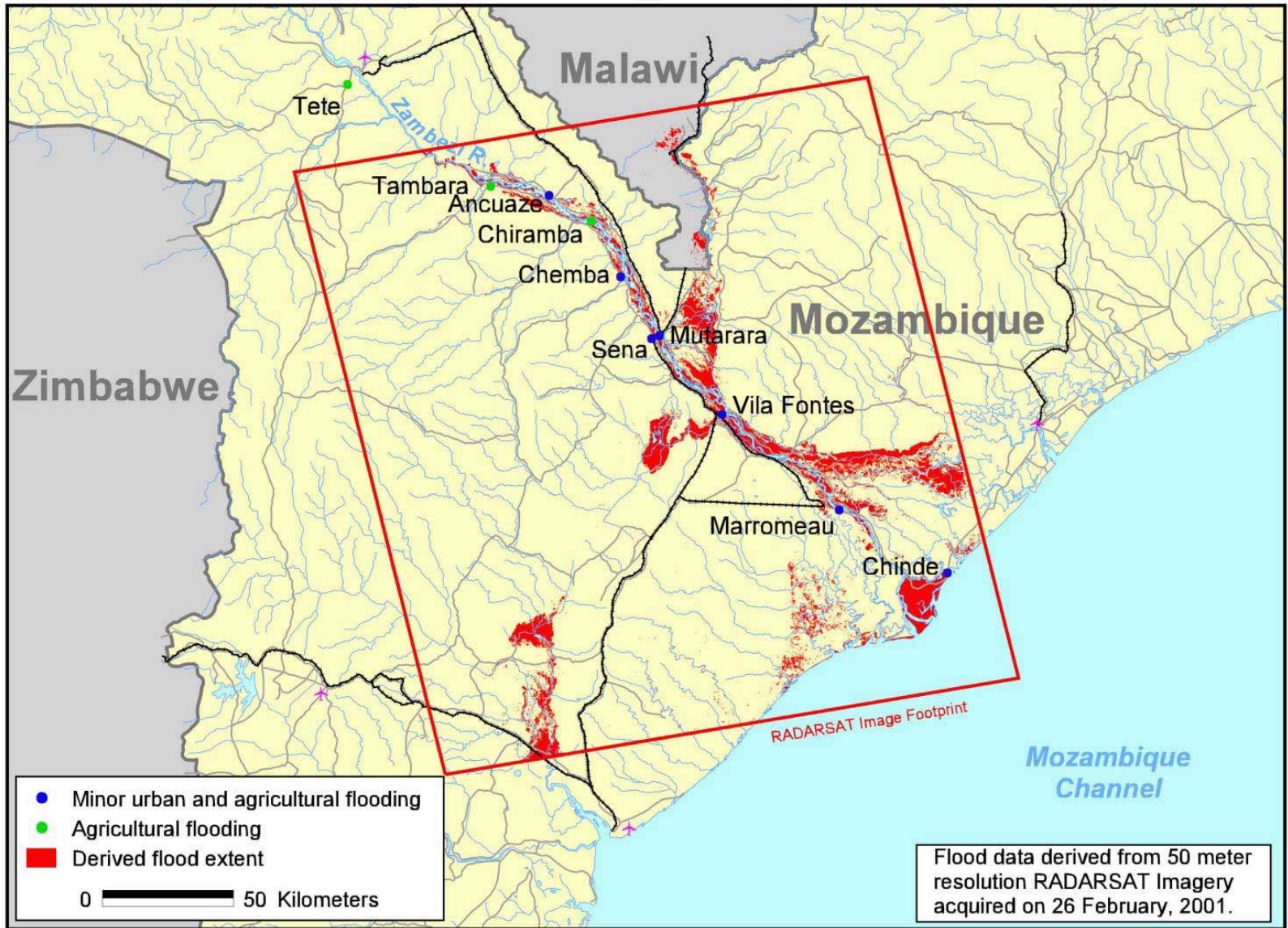




# Mozambique: Zambezi River Valley Seasonal Comparison

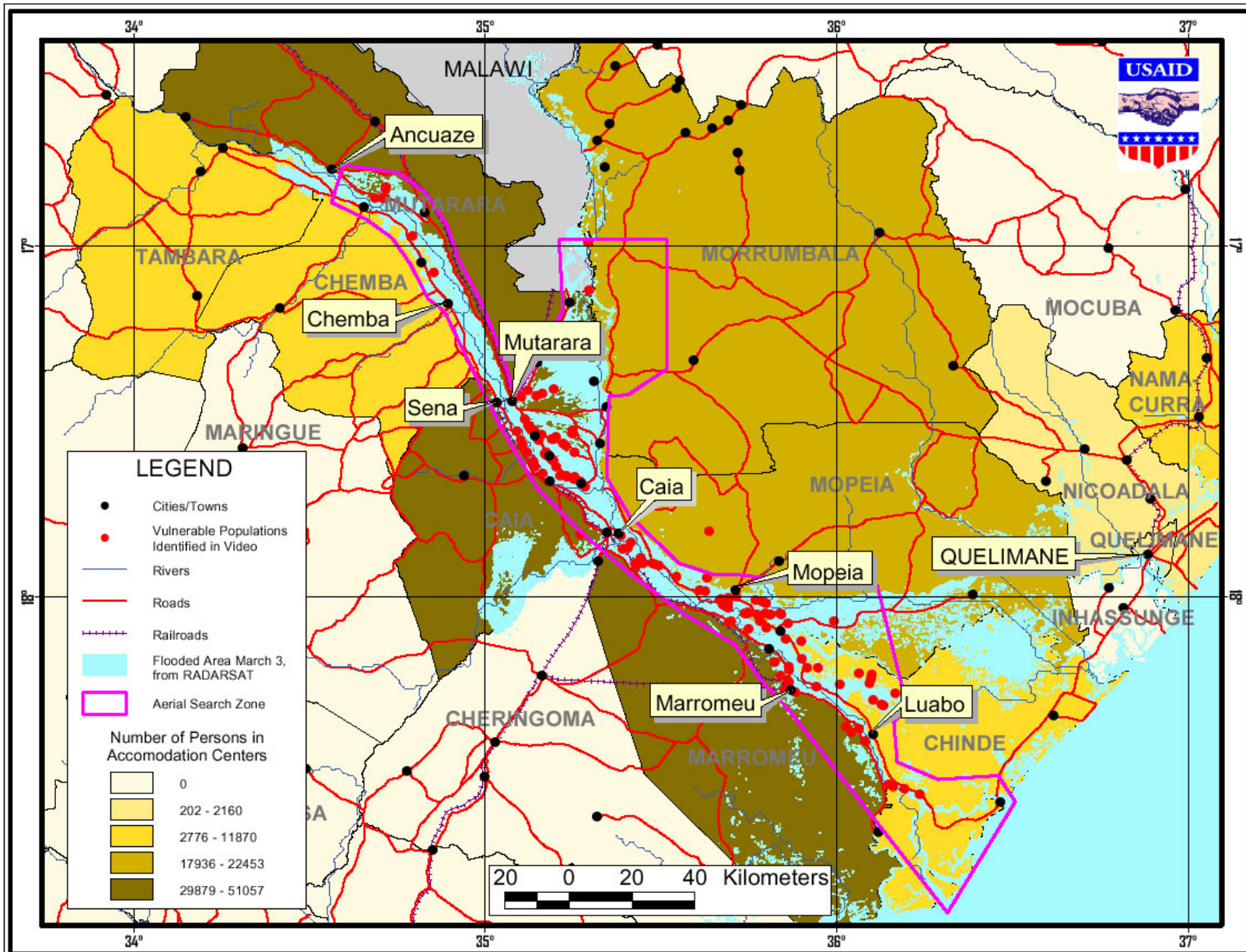


# Mozambique: Zambezi River Flooding

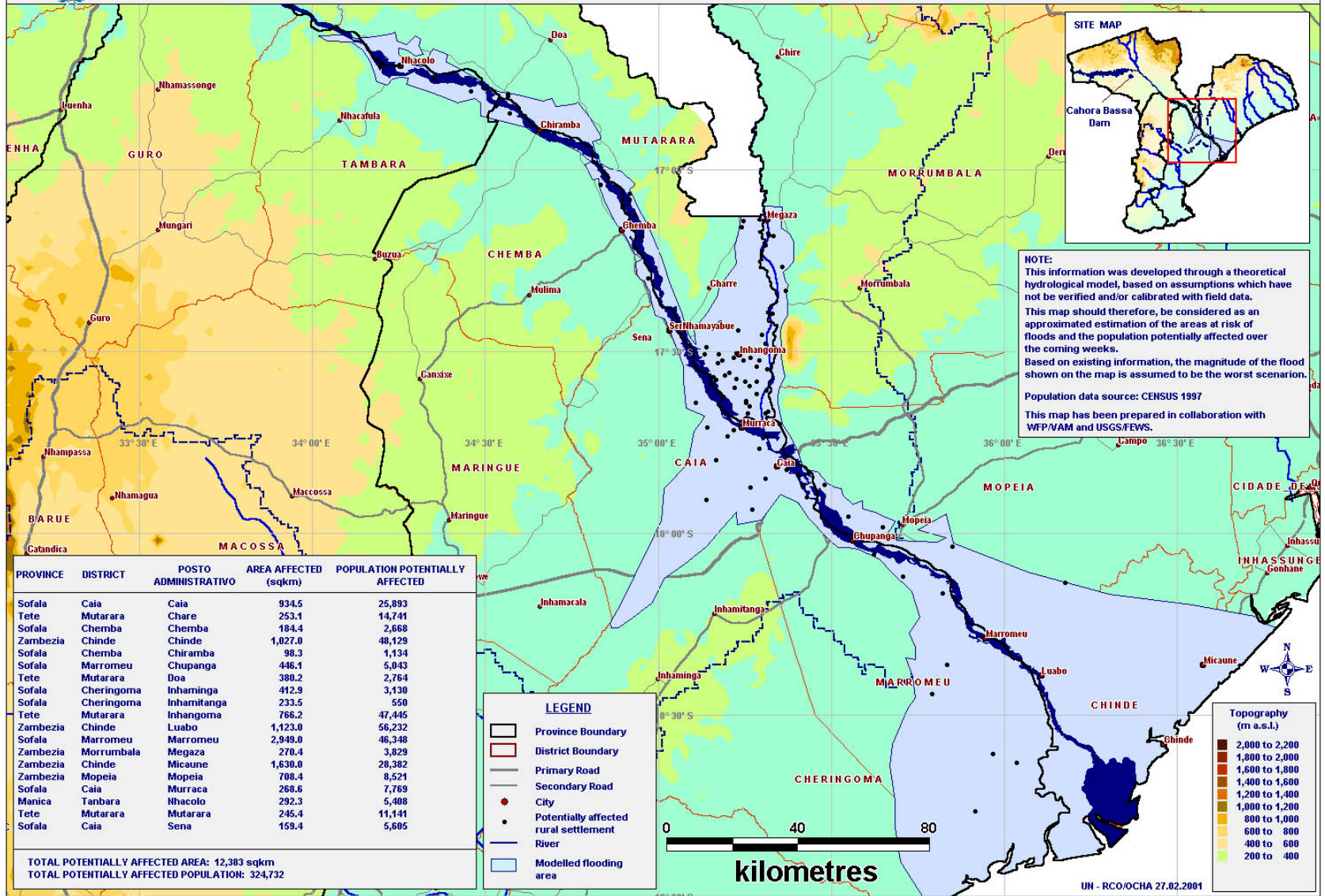




# Aerial Search Results: Mozambique 2001



# ZAMBEZE LOWER RIVER BASIN - FLOOD RISK MAP AND AFFECTED POPULATION



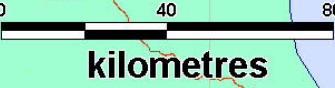
**NOTE:**  
 This information was developed through a theoretical hydrological model, based on assumptions which have not been verified and/or calibrated with field data. This map should therefore, be considered as an approximated estimation of the areas at risk of floods and the population potentially affected over the coming weeks. Based on existing information, the magnitude of the flood shown on the map is assumed to be the worst scenario. Population data source: CENSUS 1997. This map has been prepared in collaboration with WFP/NAM and USGS/FEWS.

PROVINCE	DISTRICT	POSTO ADMINISTRATIVO	AREA AFFECTED (sqkm)	POPULATION POTENTIALLY AFFECTED
Sofala	Caia	Caia	934.5	25,893
Tete	Mutarara	Chare	253.1	14,741
Sofala	Chemba	Chemba	184.4	2,668
Zambezia	Chinde	Chinde	1,027.0	48,129
Sofala	Chemba	Chiramba	98.3	1,134
Sofala	Marromeu	Chupanga	446.1	5,043
Tete	Mutarara	Doa	380.2	2,764
Sofala	Cheringoma	Inhamitanga	412.9	3,130
Sofala	Cheringoma	Inhamitanga	233.5	550
Tete	Mutarara	Muracaca	766.2	47,446
Zambezia	Chinde	Luabo	1,123.0	56,232
Sofala	Marromeu	Marromeu	2,949.0	46,348
Zambezia	Morrumbala	Megaza	270.4	3,829
Zambezia	Chinde	Micaune	1,630.0	28,382
Zambezia	Mopeia	Mopeia	708.4	8,521
Sofala	Caia	Murraca	268.6	7,769
Manica	Tanbara	Nhacolo	292.3	5,408
Tete	Mutarara	Mutarara	245.4	11,141
Sofala	Caia	Sena	159.4	5,605

TOTAL POTENTIALLY AFFECTED AREA: 12,383 sqkm  
 TOTAL POTENTIALLY AFFECTED POPULATION: 324,732

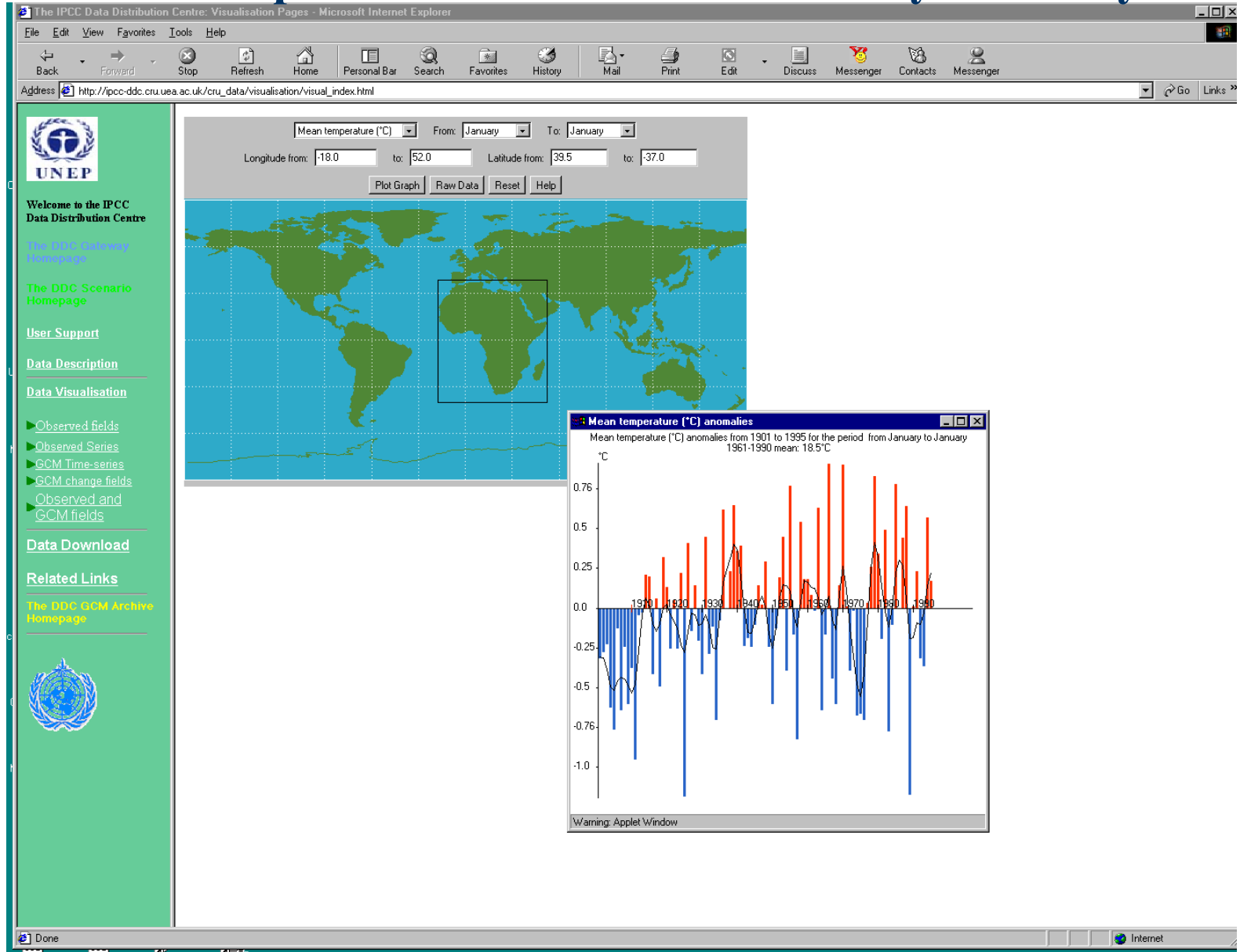
**LEGEND**

- Province Boundary
- District Boundary
- Primary Road
- Secondary Road
- City
- Potentially affected rural settlement
- River
- Modelled flooding area



**What are data sources?**

# IPCC Data Distribution Center: Web data tool showing temperature variation for January over 95 years



Source: [http://ipcc-ddc.cru.uea.ac.uk/cru\\_data/visualisation/visual\\_index.html](http://ipcc-ddc.cru.uea.ac.uk/cru_data/visualisation/visual_index.html)



# Can show January to December temperature (also rain etc)

The screenshot shows a Microsoft Internet Explorer browser window displaying the IPCC Data Distribution Centre website. The address bar shows the URL: [http://ipcc-ddc.cru.uea.ac.uk/cru\\_data/visualisation/visual\\_index.html](http://ipcc-ddc.cru.uea.ac.uk/cru_data/visualisation/visual_index.html). The page features a navigation menu on the left with sections like 'Welcome to the IPCC Data Distribution Centre', 'Data Description', 'Data Visualisation', 'Data Download', and 'Related Links'. The main content area includes a world map with a search interface for 'Mean temperature (°C)' from 'January' to 'December', with longitude and latitude coordinates. A blue arrow points from the text 'Box over Gambia' to a small box on the map over the Gambia region. An inset window titled 'Mean temperature (°C) anomalies' displays a bar chart of temperature anomalies from 1901 to 1995, with a mean of 27.84°C. The chart shows a significant peak in the late 1930s and a dip in the late 1970s. The taskbar at the bottom shows various open applications and the system clock at 8:55 AM.

Mean temperature (°C) From: January To: December  
Longitude from: -16.0 to: -10.0 Latitude from: 16.0 to: 10.5  
Plot Graph Raw Data Reset Help

Mean temperature (°C) anomalies  
Mean temperature (°C) anomalies from 1901 to 1995 for the period from January to December  
1961-1990 mean: 27.84°C

Warning: Applet Window

Box over Gambia

# IPCC Web sites for all reports online (see NAPA CD Tool later)

Intergovernmental Panel on Climate Change - Microsoft Internet Explorer

Address <http://www.ipcc.ch/>

WMO INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE UNEP

IPCC web sites

- About IPCC
- Activities
- Publications
- Official Documents & Schedules
- Press releases, Speeches & Presentations
- Other links

Search

### IPCC Third Assessment Report - Climate Change 2001

[Full text of Three Working Group contributions](#)

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Download Summaries for Policymakers (SPM), Technical Summaries (TS) and the Synthesis Report in PDF

- ▶ WG I "Climate Change 2001: The Scientific Basis"  
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- ▶ WG II "Climate Change 2001: Impacts, Adaptation and Vulnerability"  
[SPM](#) | [TS](#)
- ▶ WG III "Climate Change 2001: Mitigation"  
[SPM](#) | [TS](#)
- ▶ "Climate Change 2001: Synthesis Report"  
[SPM](#) | [SYR](#)

Summaries in UN languages will be available soon.

### IPCC Special Reports [Full text]

[How to order your copy](#)

- ▶ The Regional Impacts of Climate Change: An Assessment of Vulnerability
- ▶ Aviation and the Global Atmosphere
- ▶ Methodological and Technological issues in Technology Transfer
- ▶ Emissions Scenarios
- ▶ Land Use, Land Use Change and Forestry

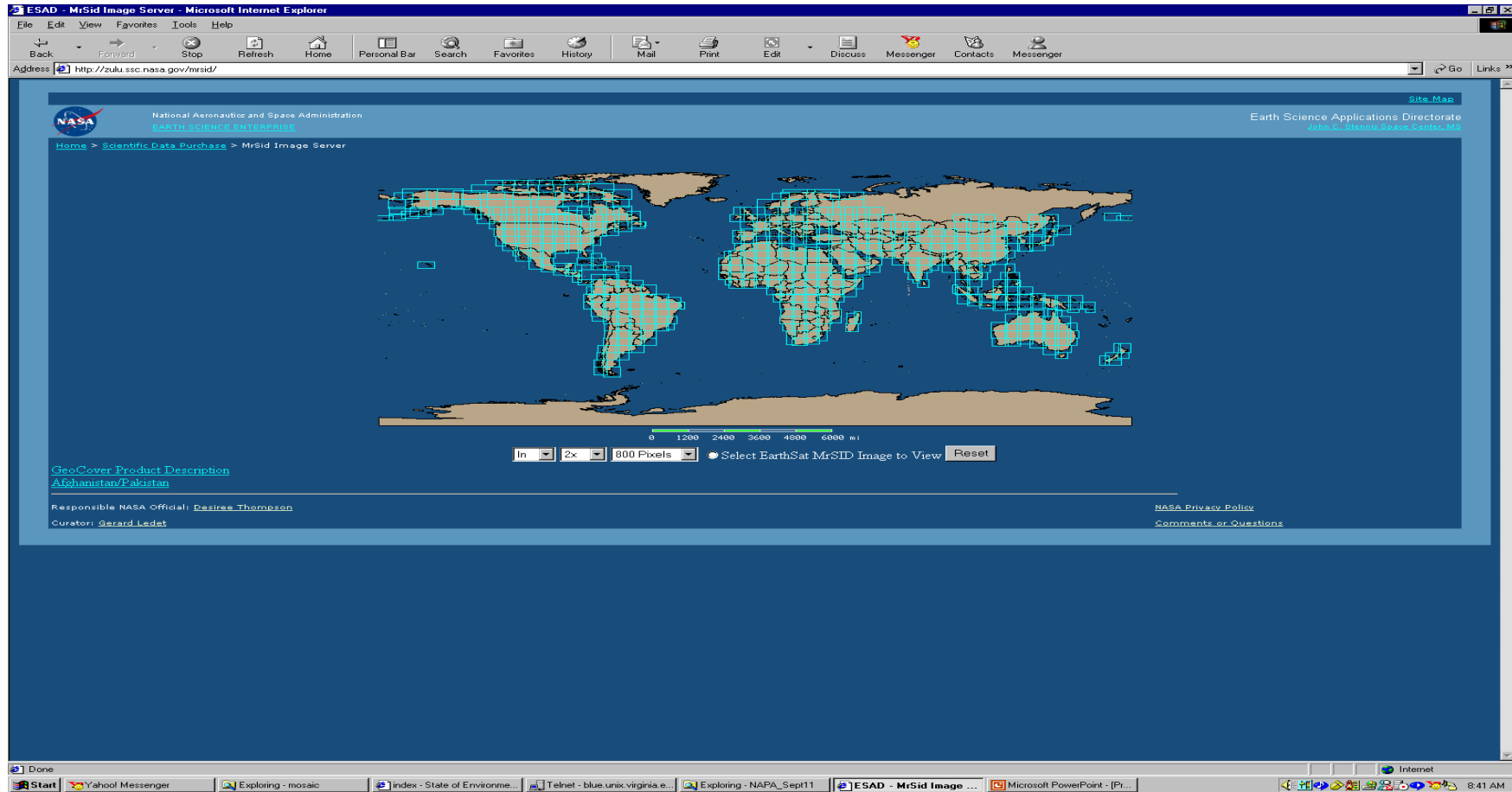
Done Internet

<http://www.ipcc.ch>

Basis for your science,  
Also use local studies



# Remote Sensing Data Available from Landsat (for 1990, 2000 coming) Showing Land Surface at 30 meters, available for download! Useful for visual displays and mapping ...



Source: <http://zulu.ssc.nasa.gov/mrsid/>

# Example of product over Zimbabwe/Lower Malawi/Mozambique


## Next showing the Shire River, Lake Kariba, Lower Zambezi River

ESAD - MrSid Image Server - Microsoft Internet Explorer

File Edit View Favorites Tools Help

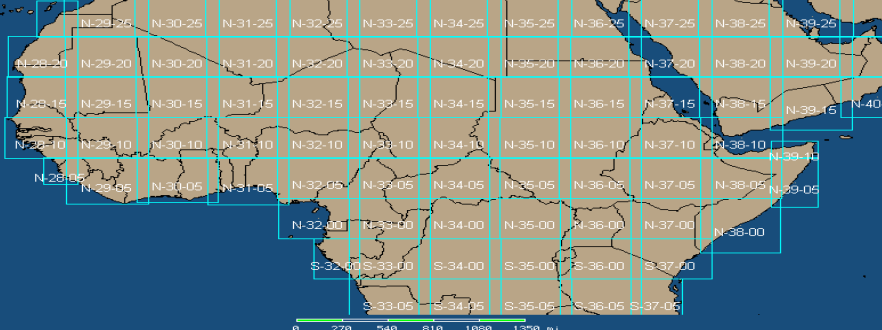
Back Forward Stop Refresh Home Personal Bar Search Favorites History Mail Print Edit Discuss Messenger Contacts Messenger

Address <http://zulu.ssc.nasa.gov/mrsid/mrsid.pl>

 National Aeronautics and Space Administration  
EARTH SCIENCE ENTERPRISE

Earth Science Applications Directorate  
JAMES C. BRIDGES, SCIENTIST, MS

Home > Scientific Data Purchase > MrSid Image Server



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In 2x 800 Pixels Select EarthSat MrSID Image to View Reset

[GeoCover Product Description](#)  
[Afghanistan/Pakistan](#)

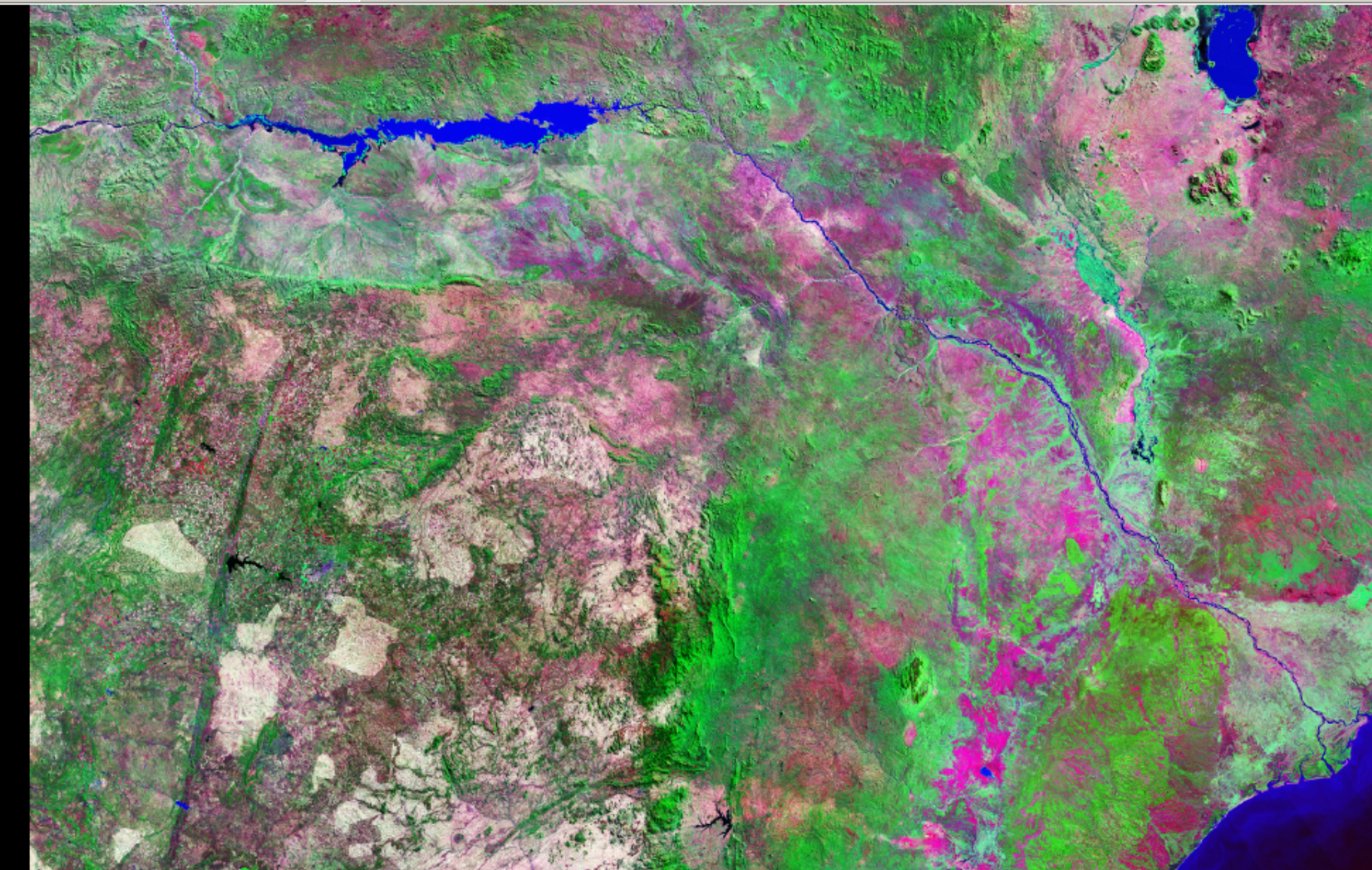
Responsible NASA Official: Desiree Thompson  
Curator: Gerard Ledat

[NASA Privacy Policy](#)  
[Comments or Questions](#)

Done

Start Yahoo! Messenger Exploring - mosaic Intergovernmental Panel o... Telnet - blue.unix.virginia... Exploring - My Documents ESAD - MrSid Image ... Microsoft PowerPoint - ID... ESAD - MrSid Image Serv... 9.03 AM





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PCS\_WGS84\_UTM\_zone\_36N

Scale 1:3074586 (1 cm=30745.9 meters)

# NAPA CD Tool Contents

- Copies available for LDCs
- Includes GIS data, remote sensing data, documents and several websites
- See handout with contents list!
- Can arrange a display for those interested



# Main Outputs of Rapid Assessment

- Maps, tables, etc showing vulnerability
  - Overlays of threats and population/other infrastructure
- Major threats and potential impacts
  - E.g. flood plains, etc
- Suggestions on how to cope and build resilience
  - List of potential actions for key areas identified from multistakeholder consultation

# Concluding Remarks

- GIS and remote sensing are powerful tools for visual display and quick spatial analysis (also for more complicated models)
- Allows for new tasks such as address issues of land tenure, land ownership at a grand scale to empower the poor ...
- Lots of information available for free assembled by major users such as government, researchers and NGO's