Rapid Assessment of Vulnerability and Identification of Adaptation Activities

Paul V. Desanker

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

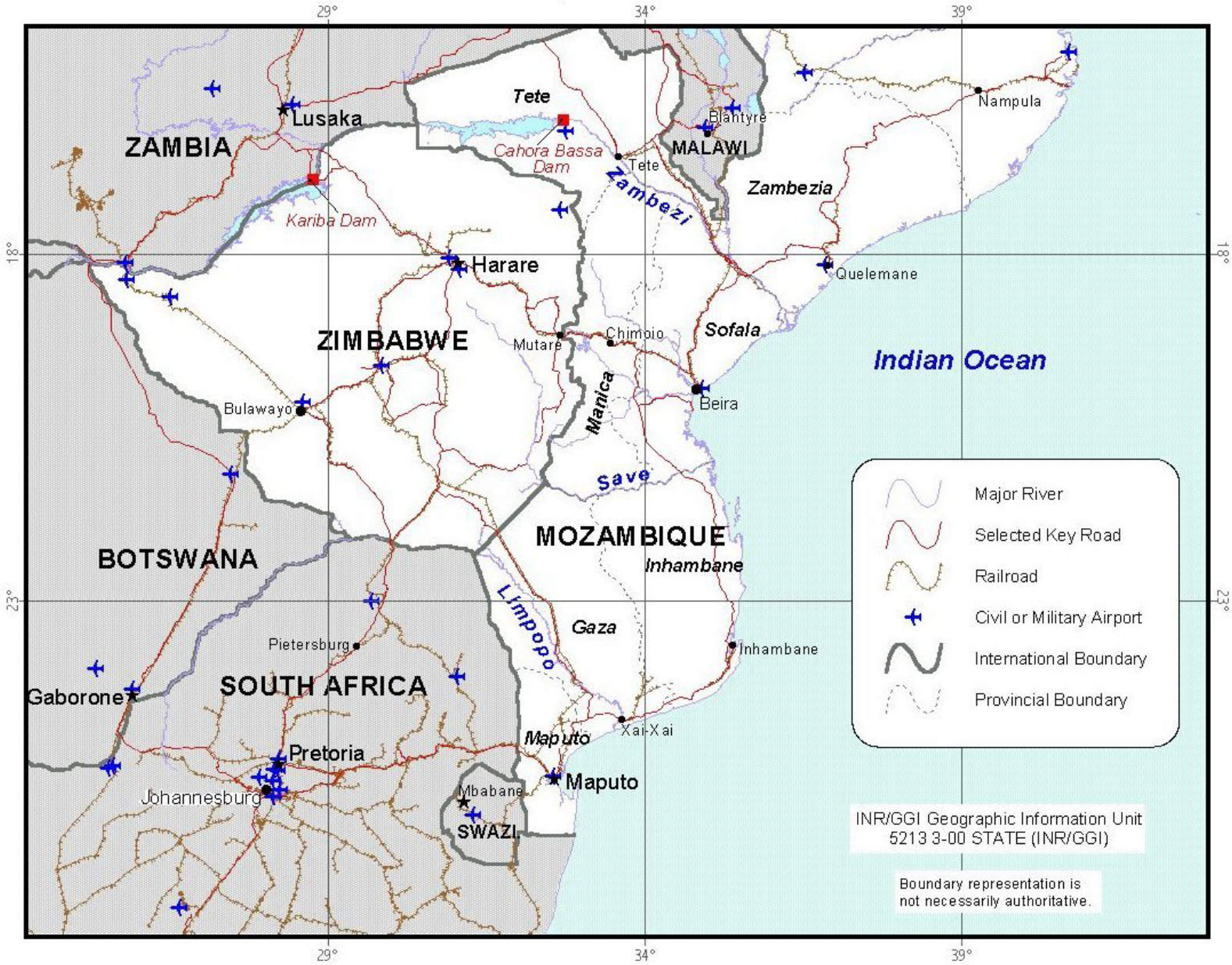
Main Inputs ….

- 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

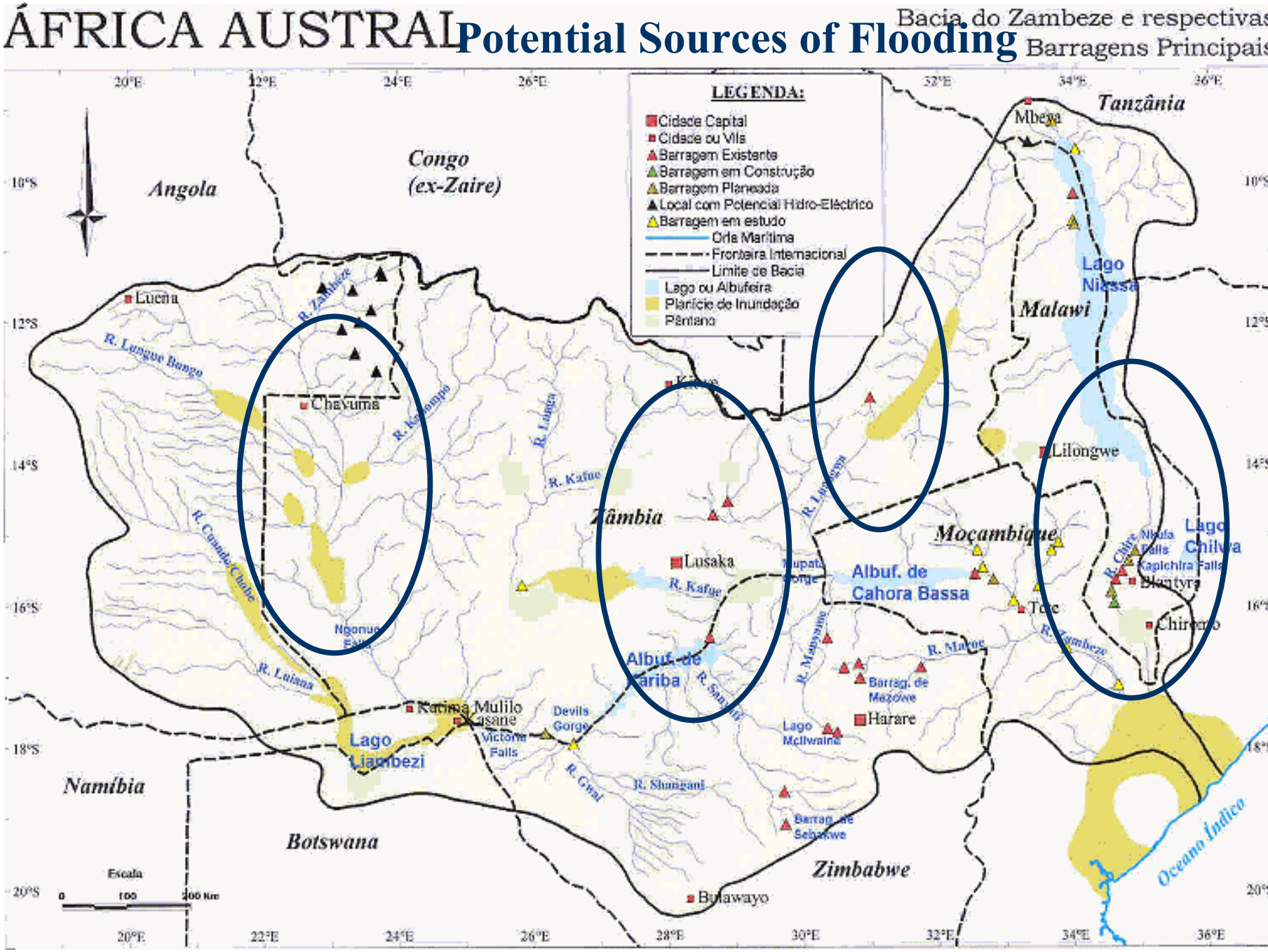
Few Examples of GIS products

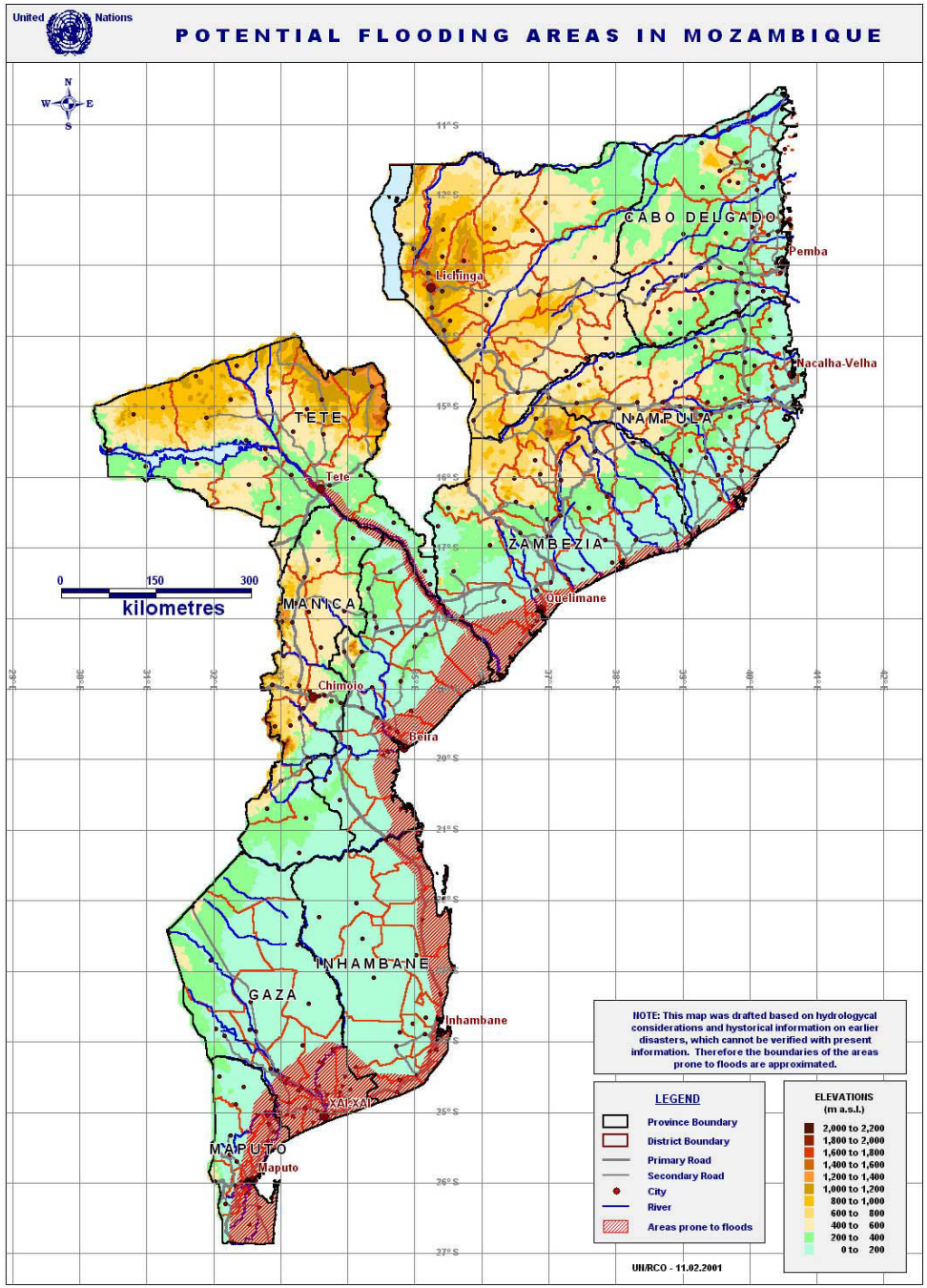
- These use existing data from public databases available in most LDCs
- Uses software and techniques used in most countries
- Can be done over days and weeks or hours if needed, by trained GIS personnel

Mozambique Disaster Area Feb 2000

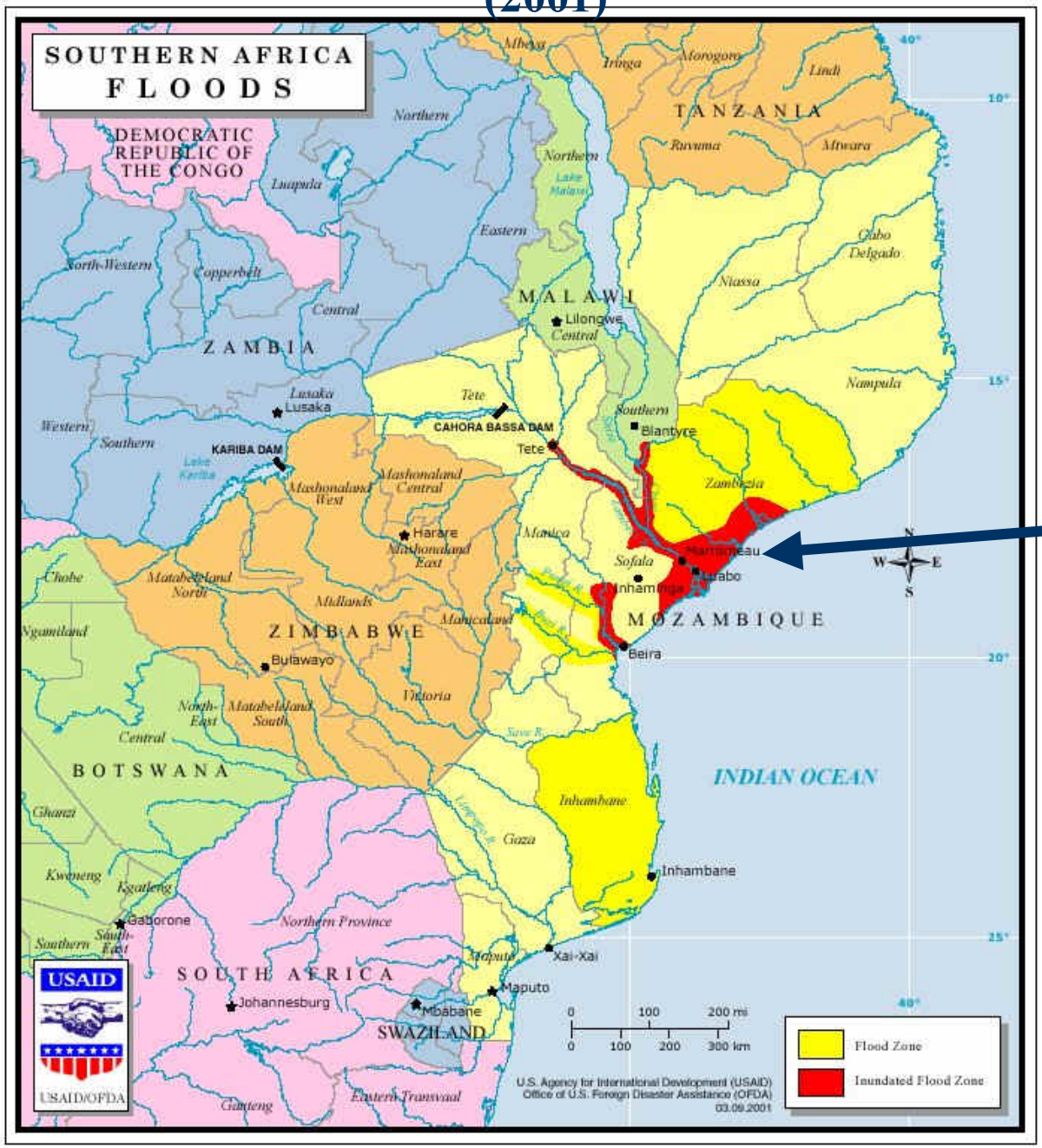


Potential Sources of Flooding




United Nations
POTENTIAL FLOODING AREAS IN MOZAMBIQUE
N
W
E
S
CABO DELGADO
Pemba
Lichinga
Nacalha-Velha
NAMPULA
TETE
Tete
ZAMBEZIA
Quelimane
MANICA
Chimoio
Beira
INHAMBANE
GAZA
Inhambane
XAI-XAI
MAPUTO
Maputo
0
150
300
kilometres
NOTE: This map was drafted based on hydrologycal considerations and hystorical 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
UN/RCO - 11.02.2001

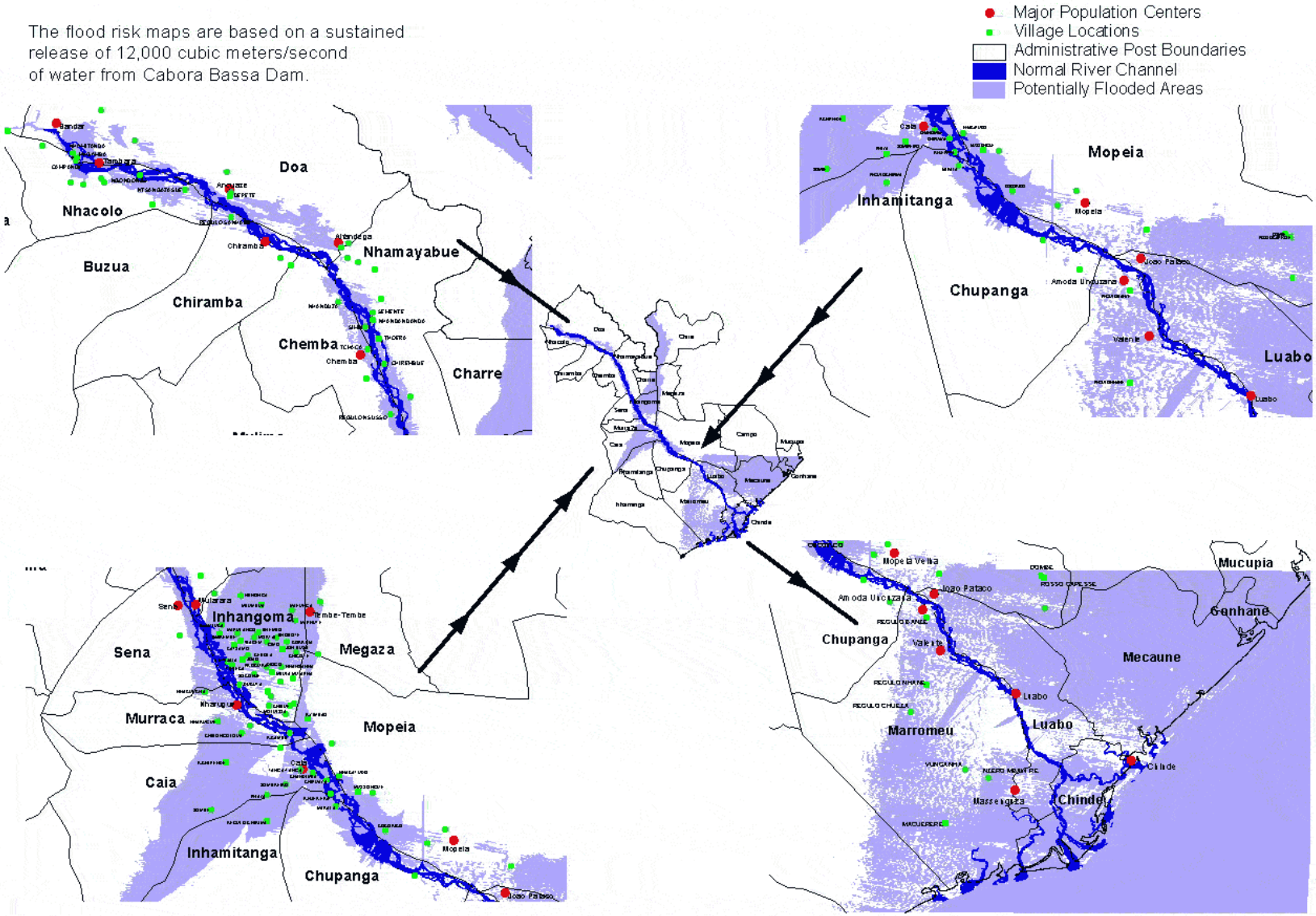
(2001)



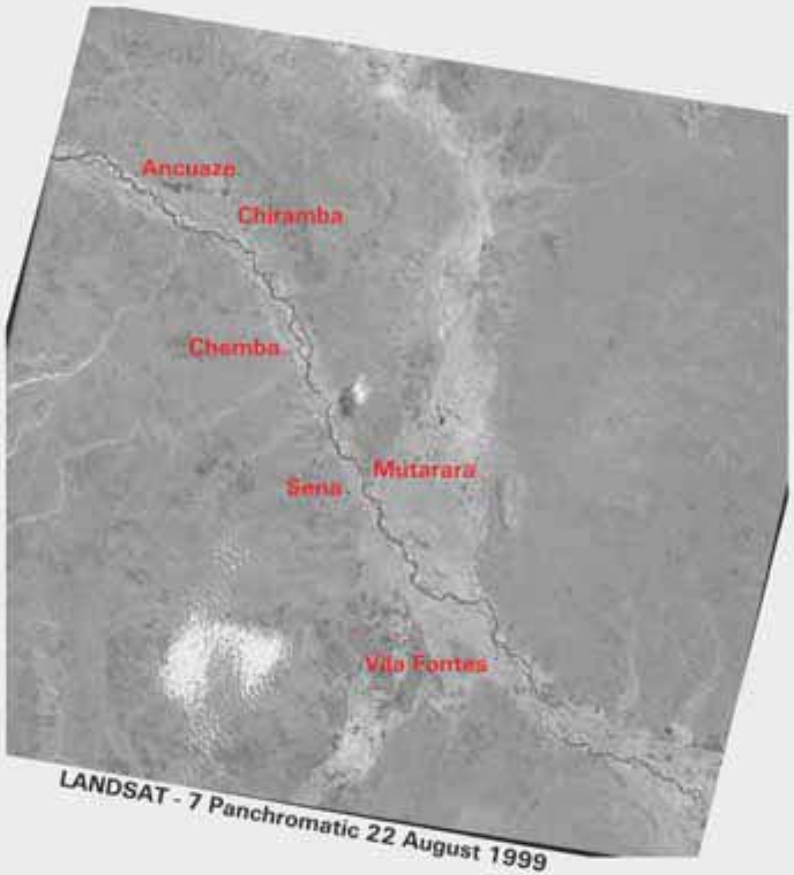
Look here:
Lower Zambez

Zambese Basin Flood Risk Map

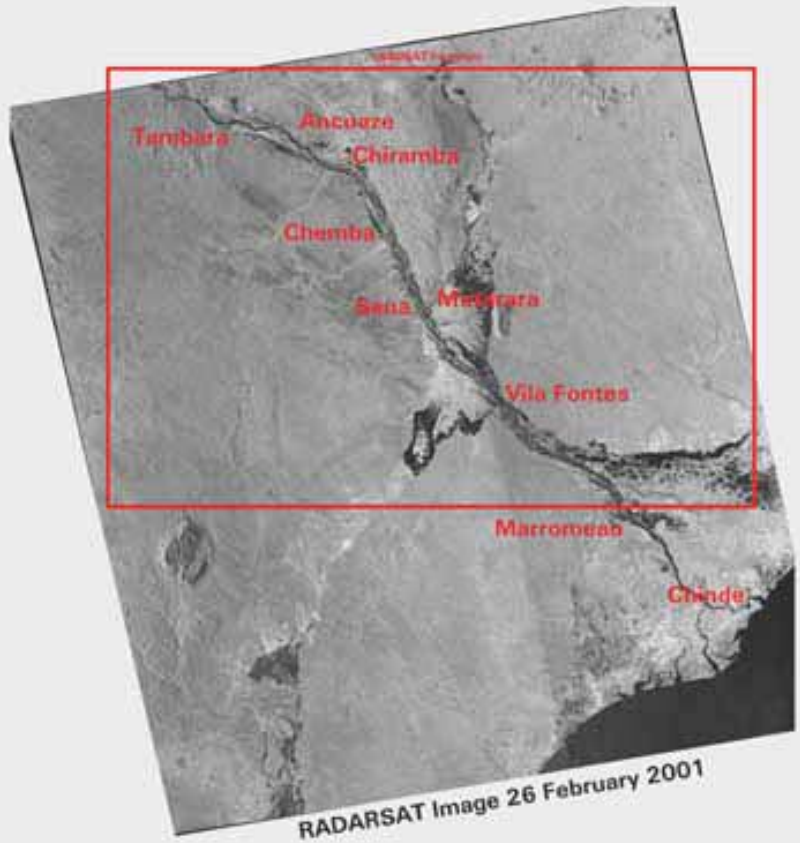
The flood risk maps are based on a sustained release of 12,000 cubic meters/second of water from Cabora Bassa Dam.



Mozambique: Zambezi River Valley Seasonal Comparison

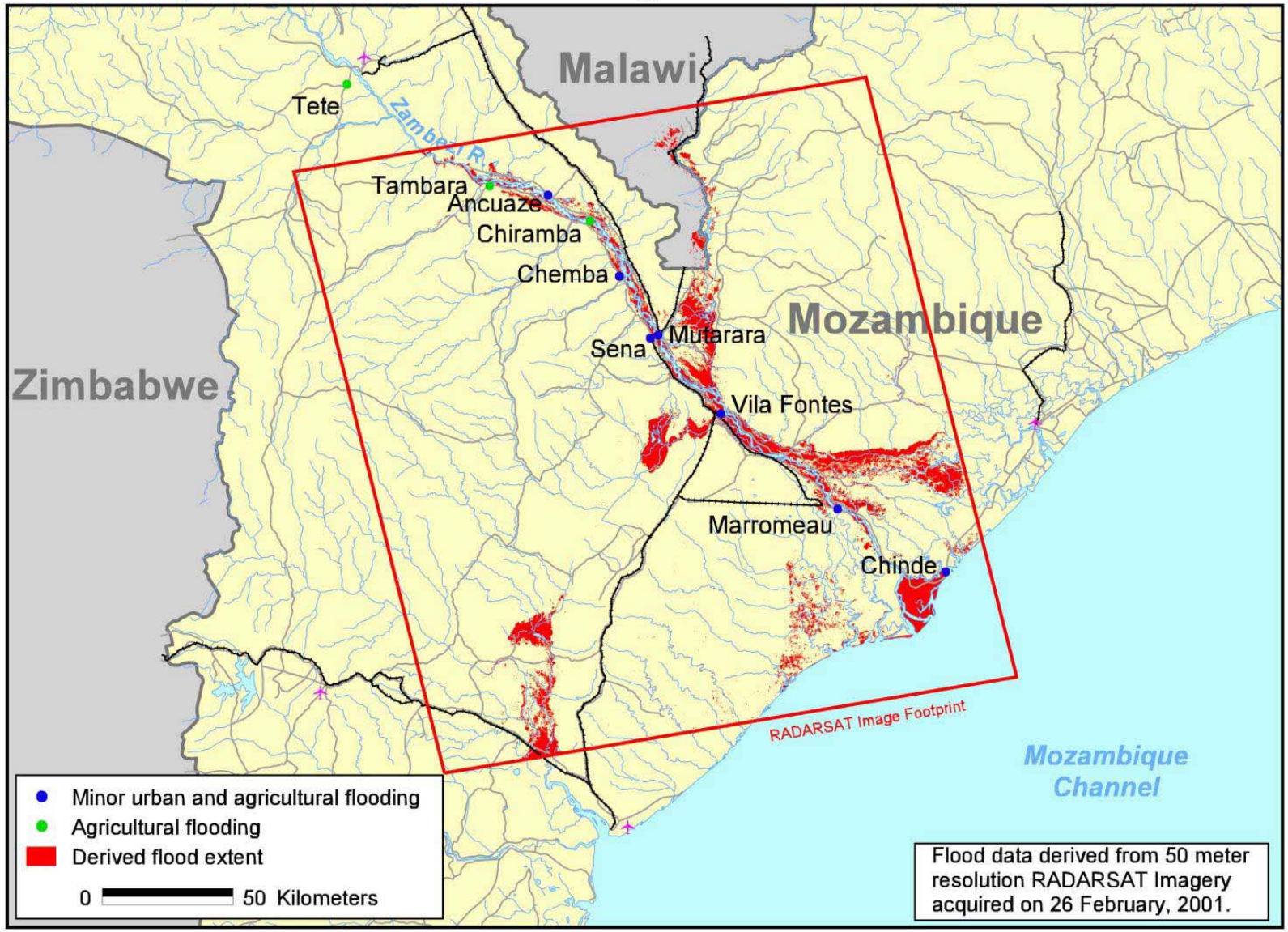


LANDSAT - 7 Panchromatic 22 August 1999

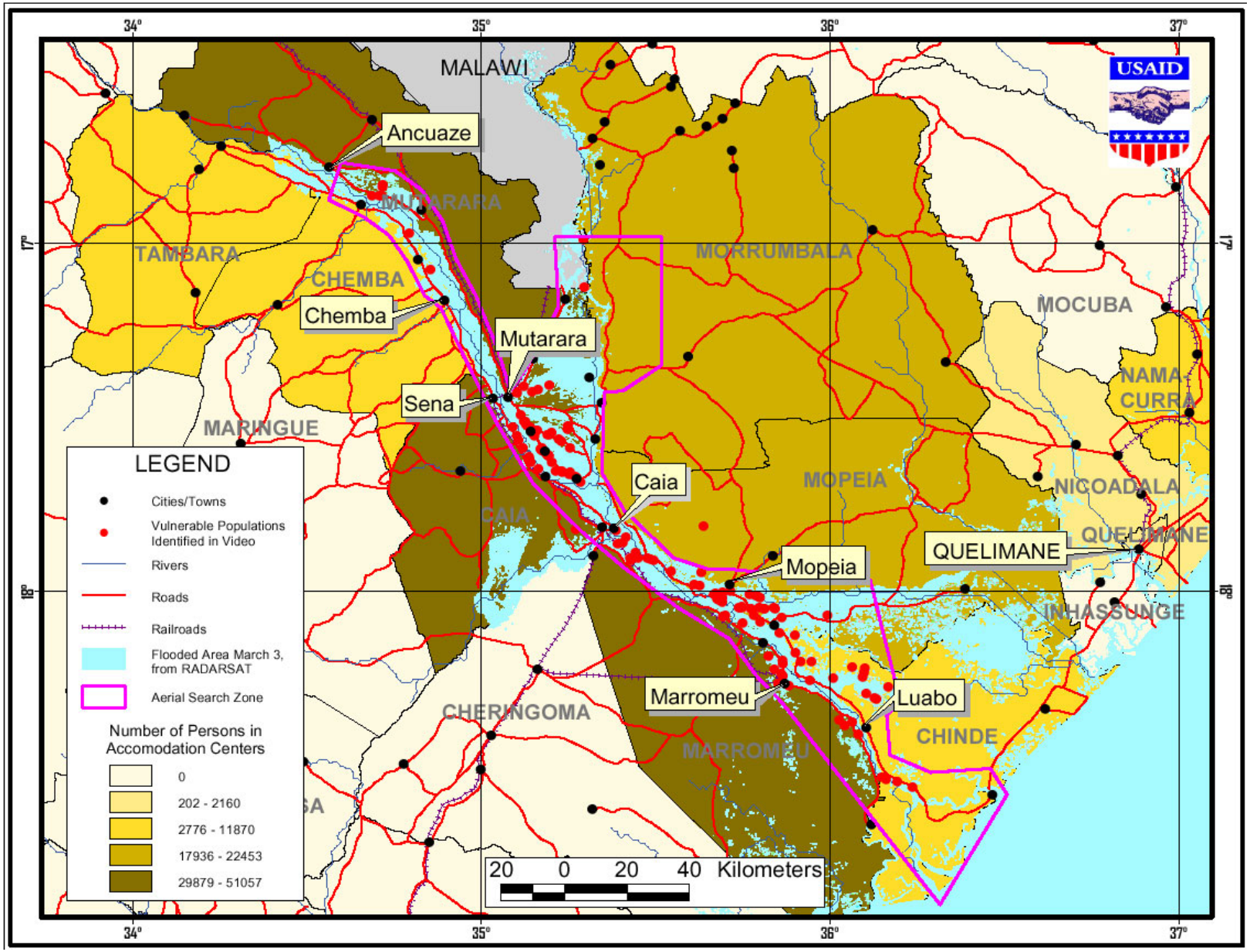


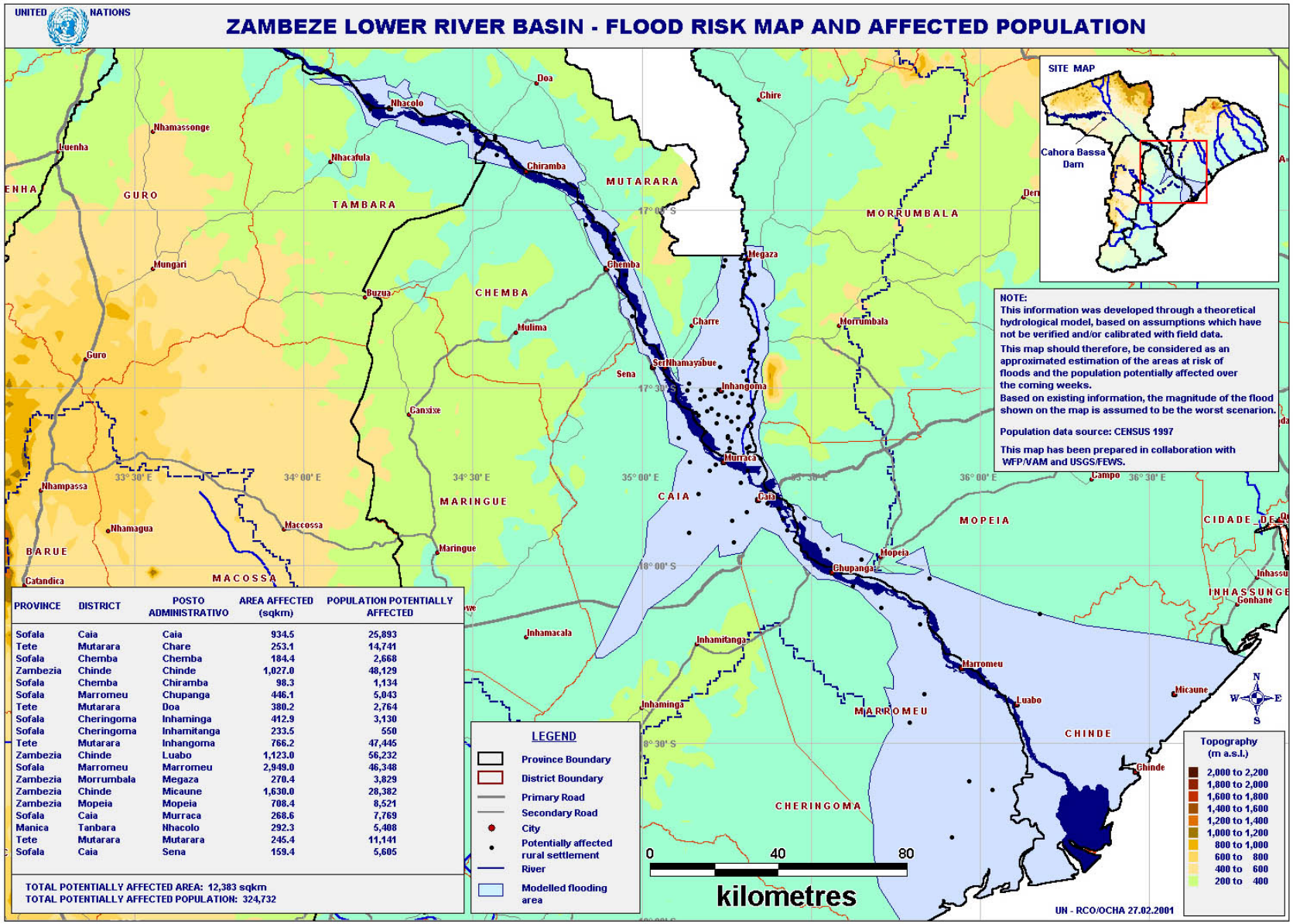
RADARSAT Image 26 February 2001

Mozambique: Zambezi River Flooding



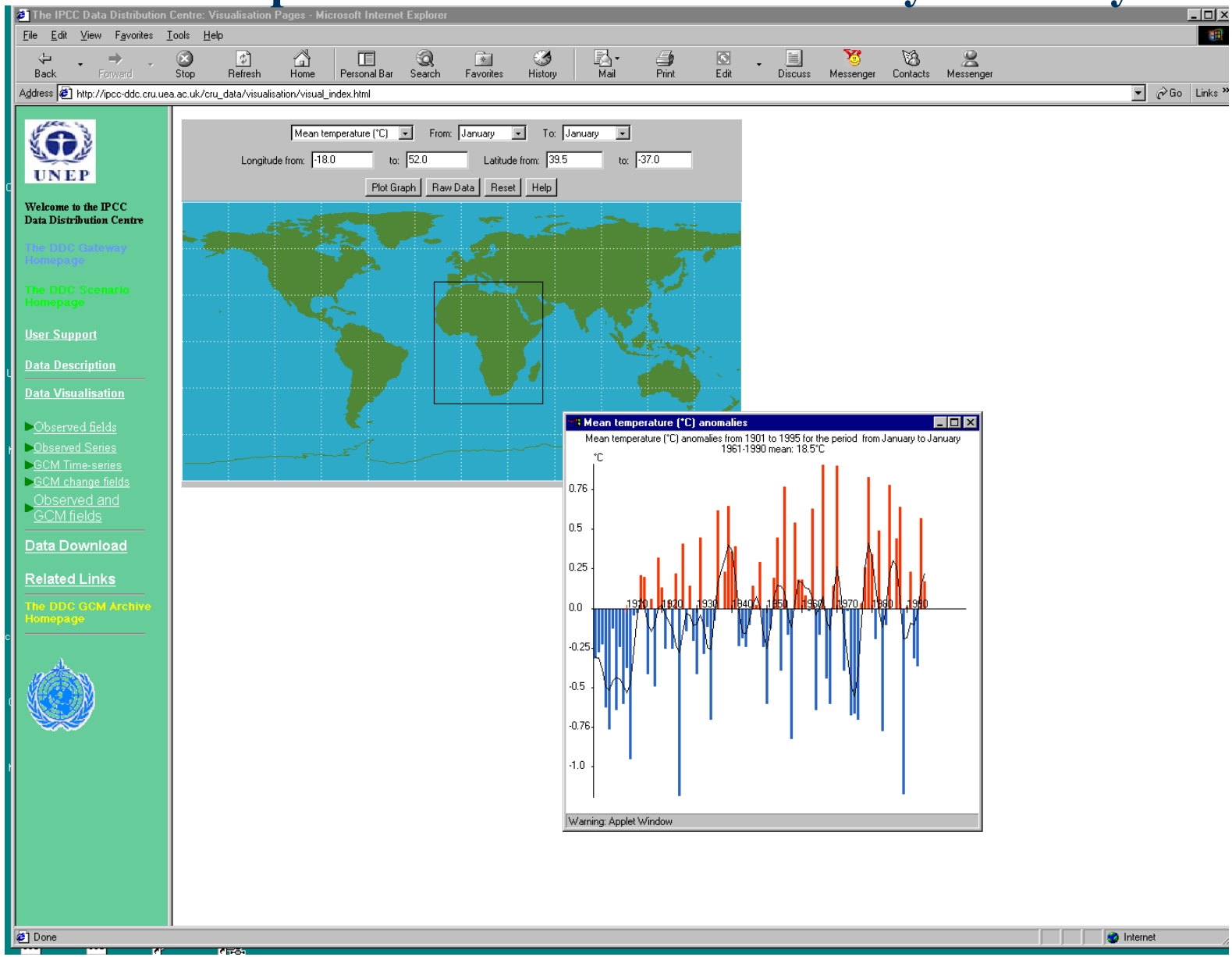
Aerial Search Results: Mozambique 2001




UNITED NATIONS
ZAMBEZE LOWER RIVER BASIN - FLOOD RISK MAP AND AFFECTED POPULATION
SITE MAP
Cahora Bassa Dam
NOTE:
This information was developed through a theoretical hydrological model, based on assumptions which have not be 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 scenarion.
Population data source: CENSUS 1997
This map has been prepared in collaboration with WFP/VAM and USGS/FEWS.
LEGEND
Province Boundary
District Boundary
Primary Road
Secondary Road
City
Potentially affected rural settlement
River
Modelled flooding area
0 40 80
kilometres
Topography (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
UN - RCO/OCHA 27.02.2001
Nhacolo
Doa
Chire
Nhamassonge
Luenha
Nhacafula
Chiramba
MUTARARA
GURO
TAMBARA
MORRUMBALA
Mungari
Megaza
Chemba
Buzua
CHEMBA
Charre
Morrumbala
Mulima
Guro
Sena
Inhangoma
Canxixe
Murraca
Nhampassa
Campo
MARINGUE
CAIA
Caia
MOPEIA
Nhamagua
Maccossa
Maringue
BARUE
Mopeia
Catandica
MACOSSA
Chupanga
Inhassu
INHASSUNGE
Gonhane
Inhamacala
Inhamitanga
Marromeu
Micaune
Luabo
Inhaminga
MARROMEU
CHINDE
Ghinde
CHERINGOMA
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 | Inhaminga | 412.9 | 3,130
Sofala | Cheringoma | Inhamitanga | 233.5 | 550
Tete | Mutarara | Inhangoma | 766.2 | 47,445
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

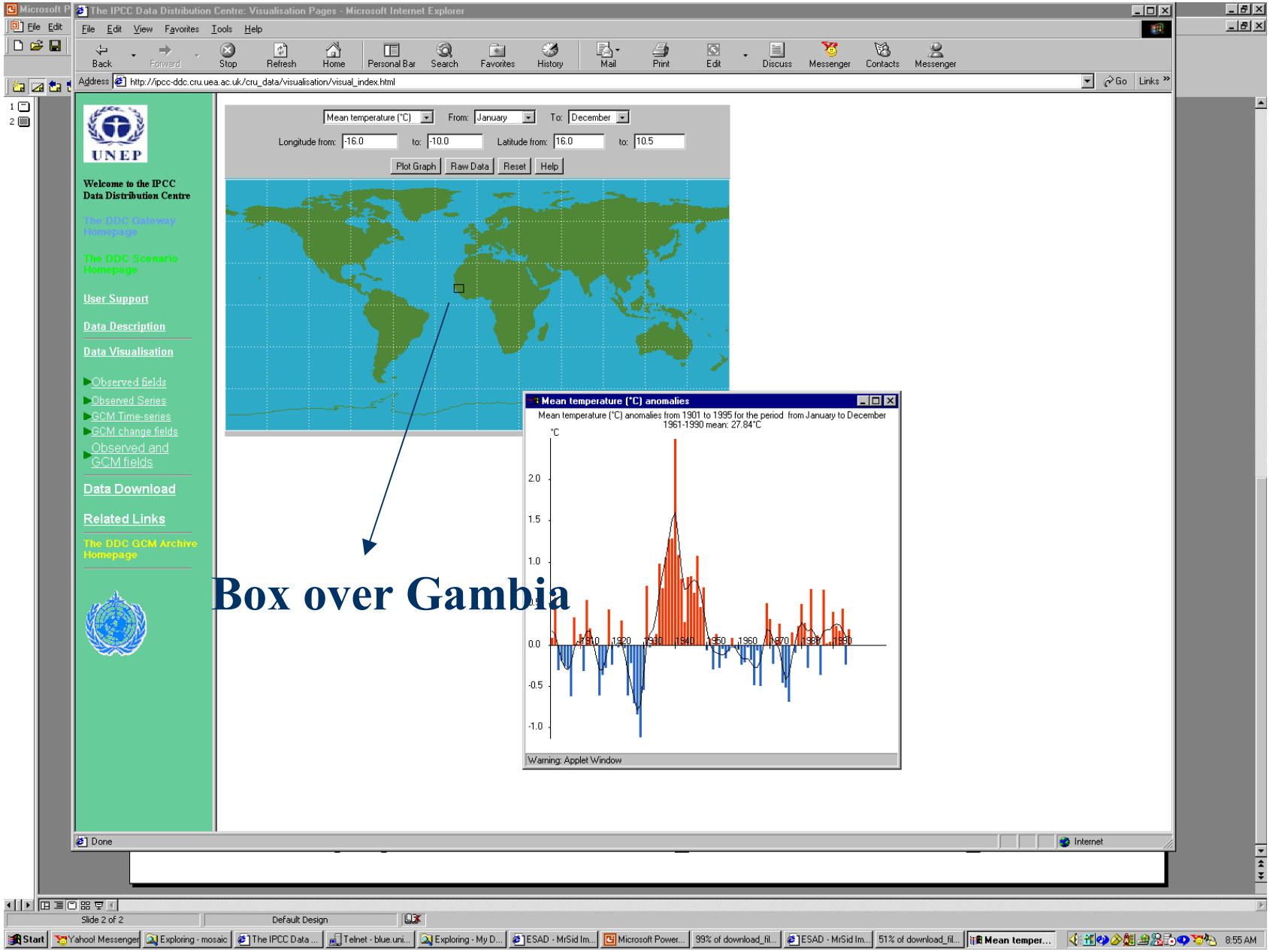
What are data sources?

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

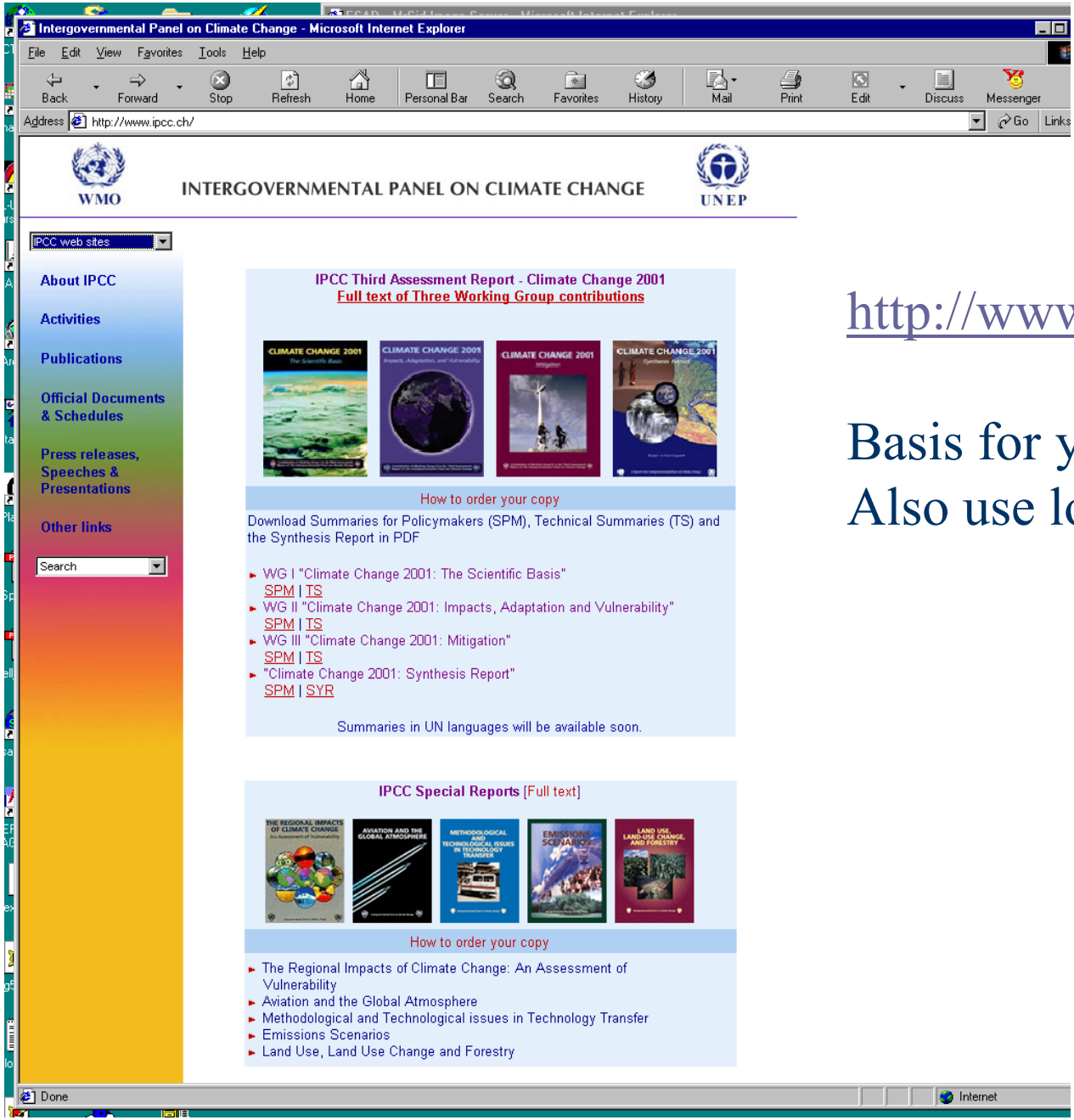


Source: http://ipcc-ddc.cru.uea.ac.uk/cru_data/visualisation/visual_index.html

Can show January to December temperature (also rain etc)



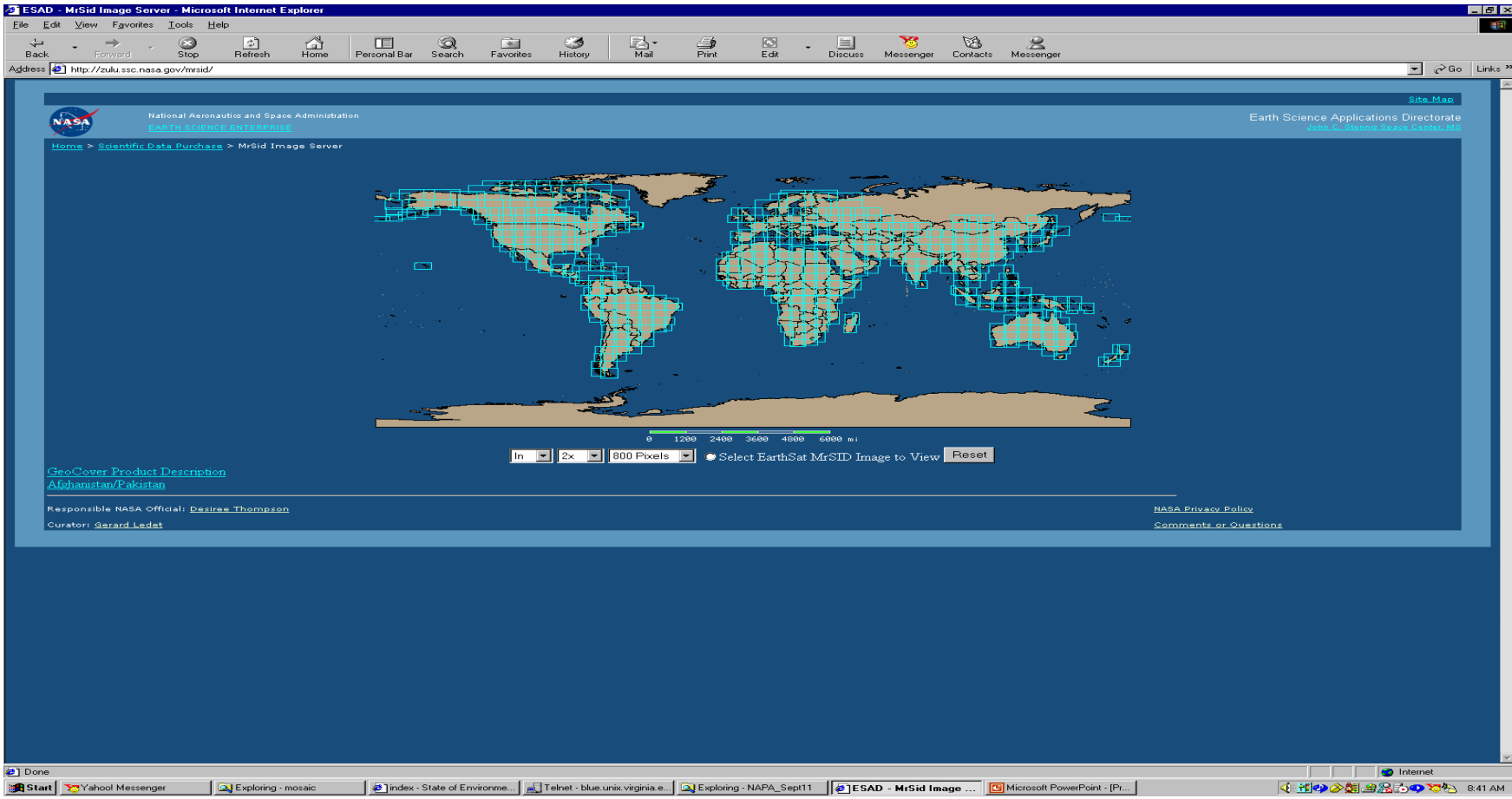
IPCC Web sites for all reports online (see NAPA CD Tool later)



http://www.ipcc.ch

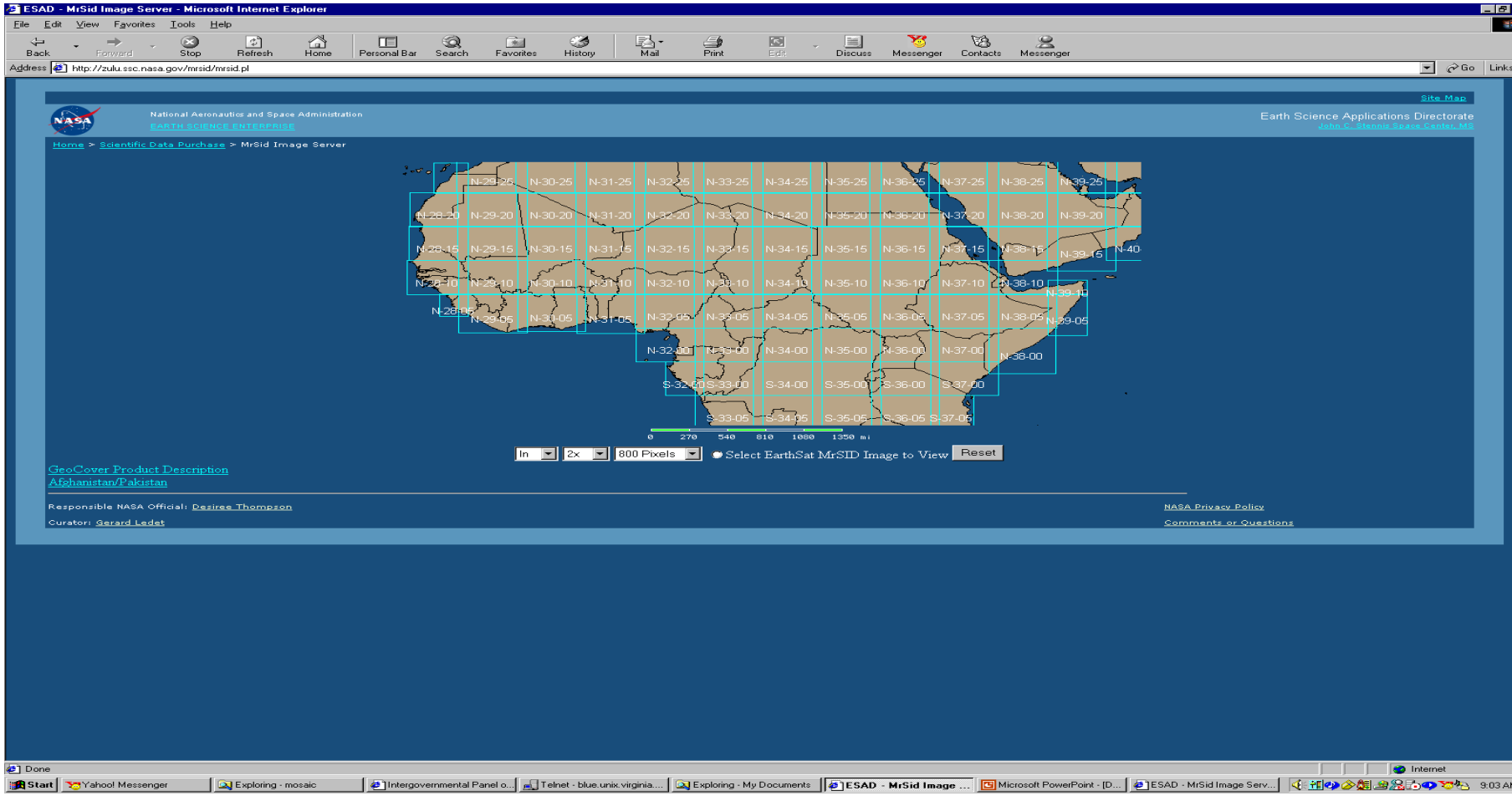
Basis for your science,
Also use local studies

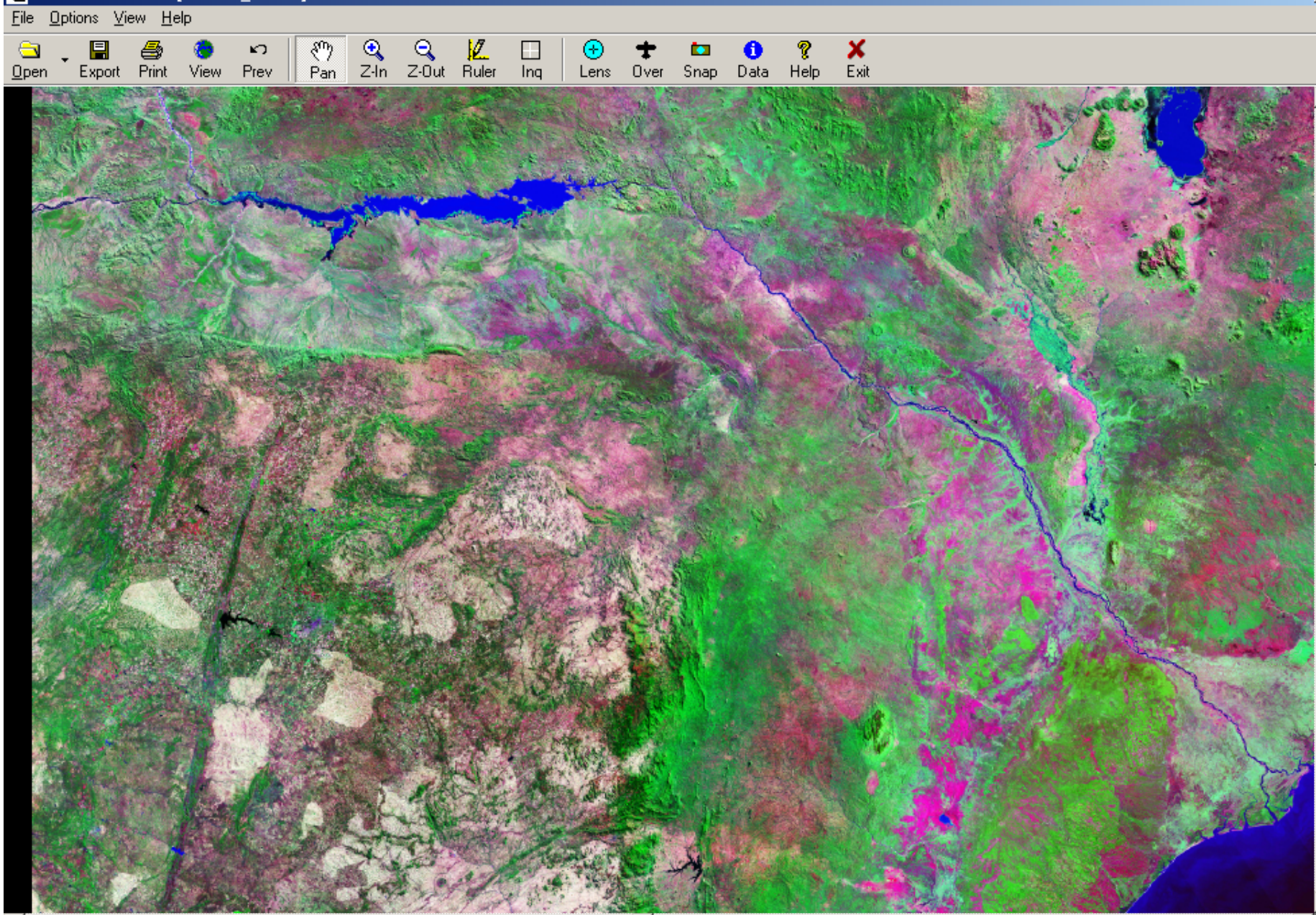
Remote Sensing Data Available from Landsat (for 1990, 2000 comi
Showing Land Surface at 30 meters, available for download!)
Useful for visual displays and mapping …



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

Example of product over Zimbabwe/Lower Malawi/Mozambiqu
Next showing the Shire River, Lake Kariba, Lower Zambezi Riv




File Options View Help
Open Export Print View Prev Pan Z-In Z-Out Ruler Inq Lens Over Snap Data Help Exit
X=396879, Y=-1834635 M
PCS_WGS84_UTM_zone_36N
Scale 1:3074586 (1 cm=30745.9 meters)
Start
S3615
NAPA Rapid Assessment ...
MrSID GeoViewer

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