Distribution and Use of Available LANDSAT Data Sets for Sustainable Development in Africa

Sharafat Gadimova
Office for Outer Space Affairs
United Nations

United Nations/Morocco/European Space Agency International Workshop on the Use of Space Technology for Sustainable Development
25 – 27 April 2007, Rabat, Morocco

- UNEP and USGS have initiated an initial distribution to three regional centres in Africa (RCMRD, AGRHYMET, SADC/RRSU).
- FAO has contributed to the dissemination of the data through its Africover programme.
- UN OOSA through its programme on Space Applications is providing part of these data sets to African Institutions upon request.
- UN-Affiliated Regional Centre in Rabat, Morocco and Ile-Ife, Nigeria are focal points to facilitate the distribution of the available data sets to African Institutions.
DATA ARCHIVE – 32 Years and Counting

Over 1.6 million Landsat scenes

Over 630 terabytes of data

Grows by over 320 gigabytes/day

Fire Scars: Mesa Verde National Park, Colorado
POSSIBLE LANDSAT ALTERNATIVES

Landsat
ASTER, SPOT
EO-1 ALI
QuickBird
IKONOS
OrbView-3
Monitoring Drought on Lake Chad

1963
Declassified satellite image shows Lake Chad, once the sixth-largest lake in the world

1987
Landsat MSS illustrates decline of the Lake Chad

1999
Landsat ETM+ image shows Lake Chad, now 1/10 its size in the 1960s
PROJECT: Distribution and Use of Available Global Landsat Data Sets for Sustainable Development in Africa

- **November 2003, Dakar, Senegal, Expert Meeting for the Western African and Regional African Institutions**
  - Review current obstacles and opportunities to accelerate the distribution of the available global LANDSAT data sets to support natural resources management, environmental monitoring, disaster management and sustainable development in Africa

  - Discuss possible partnerships and projects that can be developed jointly taking advantage of the available LANDSAT imagery

- **July 2005, Rabat, Morocco, Workshop for the Northern African Institutions**
  - Train users in the use of the data sets involving the students of the nine-month post-graduate course

- **November 2005, Pretoria, South Africa, Seminar during Africa GIS Conference**
  - Review the progress made in the distribution of imagery and evaluate the impact made with the availability of the Landsat data sets
LANDSAT IMAGERY

- Global Landsat Data currently available at UN-OOSA, CRASTE-LF and ARCSSTE-E
  - LANDSAT Multi-Spectral Scanner (LANDSAT MSS)
  - LANDSAT Thematic Mapper (LANDSAT TM)
  - LANDSAT Enhanced Thematic Mapper Plus (LANDSAT ETM+)
World Reference System (WRS1 for MSS & WRS2 for TM and ETM+)

- The WRS indexes orbits (paths) and scene centres (rows) into a global grid system comprising 233 paths by 248 rows

- Each Path and Row combination describes a unique rectangular “scene” of satellite data/imagery
LANDSAT IMAGERY (continued)

- red dots represent Landsat scene center points
LANDSAT IMAGERY (continued)

- LANDSAT path/row schematic view

  NOMINAL SCENE CENTRE

  PATH
  Orbit path are numbered westward

  ROW
  Image rows are numbered southward

  UNIQUE SCENE AREA
DATA FORMAT PROPERTIES

- Each LANDSAT scene is available with bands as separate files.
- Most files are compressed using .gzip., so that files have a “.gz” extension.
- The first step is to .unzip. the file.
- This opens the LANDSAT image band in its native GeoTIFF file format.
LANDSAT IMAGERY (continued)

- **Data Format Properties**

  - A GeoTIFF file can be used as a TIFF file in any graphical software or if there is software the GeoTIFF header will provide geo-reference information.

  - The geo-reference formats include a UTM projection and WGS84 datum and ellipsoid;

  - All these characteristics are listed in the metadata file accompanying the scene;
LANDSAT IMAGERY (continued)

TM
WRS-2, Path 199, Row 036
1988-03-16
Ortho, GeoCover
Morocco, Algeria
DATA ACCESS

- Michigan State University’s Tropical Rain Forest Information:
  http://www.landsat.org

- University of Maryland’s Global Landcover Facility GLCF:
  http://glcfapp.umiacs.umd.edu:8080/esdi/index.jsp

- Federation of Earth Science Information Partners:
  http://www.esipfed.org
For further information on LANDSAT data sets please contact:

UN Office for Outer Space Affairs
P.O. Box 500, A-1400 Vienna, Austria

Fax: +43 1 260 60 5830
Email: oosa@unvienna.org