Food and Agriculture Organization
of the United Nations

LAND COVER MAPPING OF LIBYAN ARAB JAMAHIRIYA

The land cover mapping of Libya was conducted as one of the activities of the "Mapping of Natural Resources for Agricultural Use and Planning in Libya" (LIB/00/004) project.

PROJECT BACKGROUND

The project was initiated by the Government of Libya, FAO and the United Nations Development Programme (UNDP) to strengthen the capacity of the General People's Committee for Agriculture, Animal and Marine Wealth (GAAAMW) to manage land resources at national and sub-national levels through the establishment of a strategy, and a spatially based operational decision support system - the Land Resources Information Management System (LRIMS).

LAND COVER MAPPING

The land cover of Libya was developed as component of the broader LRIMS database. The photo-interpretation work has been performed on 88 Landsat ETM images (180x180 km), 18 covering the Northern area (Phase I) and the remaining 70 covering the Southern area (Phase II). The acquisition date of the images ranges between 2001 and 2002. The images used on the 1st phase of the Project have 15 meters resolution since the panchromatic band was previously added to the 432 RGB composites. The mapping scales were 1:50,000 for agricultural areas and other areas characterized by a mean annual rainfall equal or above 200 mm, and 1:100,000 for areas characterized by a mean annual rainfall lower than 200 mm, mainly in the southern part of the country. The legend adopted for the land cover product of Libya reflects the requirements of the different regions of the country. For example, the characteristics of Southern Libya led to the introduction of new classes to allow the detailed description of bare areas, the oasis environment, and its surrounding natural vegetation. The final legend consists of 108 LCCS-based classes. The use of LCCS in the development of this product ensures the compatibility with other similar datasets and a broader use by the community. Following is the summary of the final land cover data set:

- 33,551 polygons covering an interpreted area of 166,560,000 hectares;
- 108 single classes used for the interpretation;
- 755 mixed units deriving from the combination of the single classes;
- 149.6 MB sized file for the full resolution product.

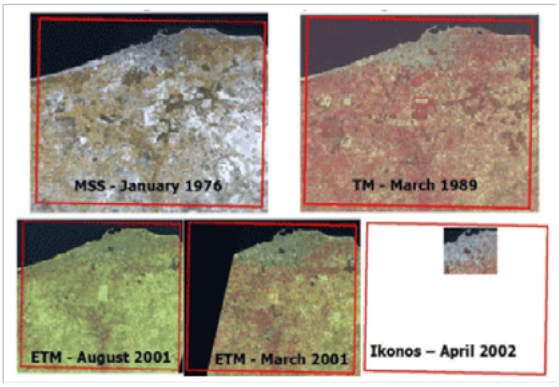
The Libyan full resolution dataset is the most important output of the project activities. Using this data set, a number of aggregated products have also been developed to meet the needs of the different users. For example, one aggregated land cover data set of 10 classes (see below) was realized:

CLASS	DESCRIPTION
AGRICULTURE	
AI	Irrigated Agriculture
AR	Rainfed Agriculture
NATURAL VEGETATION	
NF	Natural Forest and Reforestation
NV	Rangeland
BARE AREAS	
BC	Bare Soil Consolidated
BU	Bare Soil Unconsolidated
BSN	Loose and Shifting Sand
BW	Bare Soil in Wadi Environment
SABKHAS	
SK	Terrestrial and Acquatic Sabkha Environment and Waterbodies
URBAN AREAS	
UB	Urban Areas, Quarries and Dump Sites

MAPPING ACCURACY ASSESSMENT

The land cover database developed for Libya was validated through an accuracy assessment analysis which consisted of undertaking field surveys across the whole country. This was fundamental to ensure the accuracy of the photo-interpretation process. Five field work campaigns were undertaken to carry out in situ validation of 253 randomly selected polygons representing all the LC features. Each point was reached using GPS technology. The survey consisted of:

- a general observation of the area around the field point
- a description of the point itself by completing a specifically modified Field Form already adopted by the FAO Africover Project, which allows to verification that the basic interpretation of the point is correct. The field "Site Description/Observations" was also compiled, when needed, either to better explain the situation observed or to write down additional information gathered on the point
- the collection of at least four pictures of the area surrounding the point surveyed from different directions, in order to provide a visual description.



The sum of points collected during the different field trips for the verification, the accuracy assessment and the change assessment, generated a database consisting on 5,288 points. The results of the field surveys confirmed the quality of the land cover database developed.

LAND COVER CHANGE ASSESSMENT

A comparative change detection analysis with 1970's, 1980's and 1990-2000's satellite data (Landsat Thematic Mapper) of four sample areas was also performed. [Details in Lybia Land Cover Change]