

# Quarterly Report for July to September 1998

## Malawi Environmental Monitoring Programme Prototype Environmental Information System (EIS) Middle Shire Analysis

*Contribution of the Arizona Remote Sensing Center (ARSC), University of Arizona, Tucson*

### Transition: PLUS to the Prototype EIS

This is now complete for all spatial data. A version of the PLUS socioeconomic and ecological SPSS statistical data that have been structured in SPSS to correspond to guidelines set up for spatial data will be delivered to key research institutes in Malawi in November 1998.

### Image processing activities for south central Malawi

All of Malawi is covered by 11 Landsat Thematic Images. The south-central region, including the Middle Shire, is captured by the four images covering territory physically north of Ngabu ADD. Using Landsat imagery nomenclature, these are named by satellite path/row as follows:

P168/R070    P167/R070  
P168/R071    P167/R071

While these images were delivered to Malawi in June 1998, ARSC collaborated with several agencies in order to assist in projects not directly related to the Middle Shire Analysis. These are detailed in the table below.

### Middle Shire Analysis

The efforts of ARSC, the Department of Surveys, LRCD, and Forestry for the prototype EIS objective of erosion hazard modeling are almost complete. Most of the key data have been captured and quality checked. Obstacles concerning misregistration of the Satellitbild 1991 land cover and the LREP edge-matching problems on soils data remain, but are being addressed through methods agreed between the collaborating agencies. In addition, the boundary of the Rivi-Rivi portion of the study area recently was expanded again, require addition digitizing. In terms of land area, the importance of Middle Shire to Malawi's total land (9.4 million hectares) is noted in the table below:

Middle Shire Region	Land Area Percent of Malawi's	
	(ha)	Total Land
Blantyre ADD	1,021,852	11%
Machinga ADD	1,464,644	16%
Rivi-Rivi	923,774	10%
Total	3,410,270	36%

The status of each base data layer and corresponding analysis efforts is noted in the table below:

## Summary of Prototype EIS Spatial Data Development

Data Layer	<u>Blantyre ADD</u>			<u>Machinga ADD</u>			<u>Rivi-Rivi</u>		
	Capture	QA/QC	Metadata	Capture	QA/QC	Metadata	Capture	QA/QC	Metadata
<i>Base Data</i>									
<i>Survey Sheets (1:250,000)</i>									
Contours (100m)	√	√	√	√	√	√	√	√	√
Streams	√	√	√	√	√	√	√	√	√
Roads	√	√	√	√	√	√	√	√	√
Boundary	√	√	√	√	√	√	**		
<i>LREP (1:250,000)</i>									
Agroclimate	√	√	√	√	√	√	√	√	√
Soils	√	√	√	√	√	√	√		
<i>Satellitbild (1:250,000)</i>									
1991 Land Cover	√	*	*	*	*	*	*	*	*
<i>Analysis</i>									
DEM	√			√					
Shaded Relief	√			√					
Erosion Hazard	*			*					

\*The completion of QA/QC of these data layers with the assistance of Malawian participants in the May-June training revealed fundamental problems in the original data. In the case of LREP soils, the soil categories along with edges of separate map sheets do not consistently match (and in many cases are dramatically different). In the case of Satellitbild's 1991 Land Cover map, there appears to be a registration or projection error that has resulted in a 1-3 km shift in where the land cover classes fall relative to the original images the classes were derived from. Experts from key Malawian EIS agencies are discussing options for addressing these problems.

\*\*The boundary for what we are calling Rivi-Rivi has actually expanded several times in the past nine months as requests for a broader definition of the "Middle Shire" watershed have come in. In addition, ARSC has attempted to include all areas proposed by other USAID intervention efforts (i.e. agroforestry and small agricultural business) as having high potential that are near the Middle Shire.

A strategy for addressing the Satellitbild 1991 land cover misregistration was designed in September 1998. It will involve "rubber-sheeting," part automated and part manual to shift the land cover boundaries to match the original imagery, with focus on high elevation classes (which are much easier to differentiate on the false color composite images).

### Participant Training – Continued Communication and Collaboration

Four individuals central to EIS development efforts in Malawi participated in a Spatial and Temporal Modeling of Land Cover Conditions Course conducted in Tucson between 25 May and 30 June 1998. The participants included:

Patrick S. Jambo, Department of Forestry  
 Geoffrey C. Mzembe, Department of Surveys  
 Mesheck L.M. Kapila, Department of Land Resources Conservation  
 Vincent A.L. Mkandawire, Department of Land Resources Conservation

ARSC has been able to establish *semi*-regular (when phone lines permit) e-mail and fax communication with these individuals and others from their respective departments interested in EIS development. This improved communication has resulted in multi-sector efforts to address common problems and a sharing or dividing of tasks.

The table below depicts collaborative efforts with four Malawians (and their respective agencies) and their efforts to use the EIS as a tool to address environmental issues. In each case, the respective agency made a request for specific information, some of which was already available in the prototype EIS database, and some which had to be captured/processed. ARSC teamed up with each agency and assisted in addressing each issue individually. The results of the collaborative efforts were delivered to Malawi in August 1998.

<b>Researcher &amp; Department</b>	<b>Study Area &amp; Project</b>	<b>Supplied in June (all as .lan files)</b>	<b>Recently Processed Data (all as .lan files)</b>
Jeffrey Mzembe Department of Surveys	Kasungu National Park New Independent Project	1994 'raw' image (p123, r345) 1994 atm-rad corrected  1984 'raw' image	1984 atm-rad corrected
Meshek L. Kapila Land Husbandry Training Center	Zomba Forest Reserve PLUS	1994 'raw' image 1994 atm-rad corrected 1994 georectify  1984 'raw' image 1984 atm-rad corrected 1984 georectify	
	Musisi Forest Reserve (Karonga) New Independent Project	1994 'raw' image 1994 atm-rad corrected  1984 'raw' image	1984 atm-rad corrected
Patrick S. Jambo Forestry Department Headquarters	Namizimu Forest Reserve PLUS	1994 'raw' image 1994 atm-rad corrected 1994 georectify  1984 'raw' image 1984 atm-rad corrected	1984 georectify (PLUS)
	Nyika National Park New Independent Project	1994 'raw' image 1994 atm-rad corrected  1984 'raw' image	1984 atm-rad corrected
Vincent Mkandawire LRCD	Lilongwe Area New Independent Project	1994 'raw' image 1994 atm-rad corrected  1984 'raw' image	1984 atm-rad corrected