

# MALAWI ENVIRONMENTAL MONITORING PROGRAM

## QUARTERLY REPORT FOR THE PERIOD OCTOBER – DECEMBER 1997

### Program I: Expand Environmental Monitoring Technologies

#### Component One: Catchment Monitoring

During this quarter a modified catchment monitoring methodology was presented which focused on a shift from attempts to monitor a single impact of market liberalization to a more encompassing monitoring methodology focusing on soil erosion as highlighted in the NEAP. Change. A critical review of monitoring across catchments was completed and a report produced as part of the activities for the Environmental Science Advisor and the MEMP Technical Advisor. The report noted that testing the impact of the burley tobacco liberalization policy on the environment is complex and may only be determined if the experiment was conducted as research not as an integrated research/monitoring activity. These conclusions support an earlier report on catchment monitoring by MEMP watershed consultant, Dr. Don Slack, in 1996.

Efforts to summarize what has been learned regarding the monitoring of impacts of land use change indicate that although there are some data quality problems, it seems that the collection activities have been continuously improving. It appears that data analysis, interpretation and reporting activities have not been successfully implemented. Training for technical officers to address this shortcoming is scheduled for the first quarter of 1998.

Recommendations were developed for a methodology to evaluate soil erosion in other catchments based on the experiences from the MEMP catchments and relate to sampling procedures currently being adopted by the Ministry of Agriculture and Irrigation.

With a clear distinction between research and monitoring in small catchments, the research component will focus more on quantitative data collection and the monitoring on qualitative. Using a research focus, accuracy and reliability of the data can be improved and the data can be used for policy impact assessment and decision making purposes.

It was recommended that many research questions relating to soil and water degradation be addressed through the continuation of the small grants research program.

#### Indicators and achievement of results

##### *Develop a monitoring strategy for MEMP catchments*

A revised monitoring strategy was proposed and adopted as part of a research activity for the upcoming monitoring season. Training in analysis of data was scheduled for the first quarter of 1998.

##### *Develop a synthesis-reporting format for integration of sectoral data and reports*

A workshop was held to produce a synthesis reporting format and report. Unfortunately, attendance was poor and many of the required sectoral reports were not ready.

## Component Two: Develop Prototype EIS (Environmental Information System)

(This Component includes by Clark University)

The MEMP technical advisor worked with the proposed members of the analysis team to develop a strategy for completing activities using institutional sub-contracts. Provision of funds to the analysis team from the Environmental Management Project was erratic and many of the analysis activities were accomplished using MEMP agency funds.

Following the workshop in Harare on State of the Environment Reporting, the MEMP Technical Advisor assisted the Senior Environmental Officer in the preparation of a workplan and budget for completion of a Malawi's first *National State of the Environment Report*. The proposed workplan was favorably reviewed by DANIDA and support was provided for a consultancy team to assist in the preparation of the report which included a design component for developing district state of the environment reporting.

### Indicators and achievement of results

*Provision of technical support for data collection, archiving, and GIS/Remote Sensing to the Task Force Analysis Team (Clark University may wish to add to this section)*

MEMP Team provided technical support to GOM for strategy development.

MEMP Team assisted GOM in workplan development and budgeting for *National State of the Environment Report*.

## Component Three: Public Lands Utilization Study (PLUS)

The highlight of this quarter was the PLUS final presentation, a two day seminar that took place at the Malawi Institute of Management, 17-18 November 1997. The PLUS presenters included coordinator Barron Orr, remote sensing specialist Barbara Eiswerth, anthropologist Tim Finan, and field coordinator Luke Malembo (from the Forestry Institute of Malawi). Attended by 85 representatives of over 50 organizations, the seminar culminated in a lively debate of critical land use and land reform issues surrounding Malawi's protected areas. A draft report (80 pages) documenting the information was issued to all participants and 15 additional Lands Steering Committee members who were not able to attend.

The PLUS presenters followed the seminar with a series of smaller presentations and meetings (including two formal data presentations to key technical experts on the spatial and socio-economic sides) designed to show the high potential for synergy between PLUS and the prototype Environmental Information System. Feedback from the seminar and all the meetings that followed will be included in the PLUS Final Report that will be issued in the following quarter.

The memo detailing the PLUS Closing Seminar Proceedings will be comprehensive and available in January 1998. The table which follows provides a summary of PLUS activities completed to date.

## Indicators and achievement of results

### PLUS Status Summary Table

<b>Activity</b>	<b>Expected</b>
Spatial Data Collection	<i>completed</i>
Base Digital Mapping (Level 2	<i>completed May</i>
Base Digital Mapping (PL	<i>completed May</i>
Land Cover Classification	<i>completed</i>
Change Detection (Level 2	<i>completed</i>
Summary Data Extraction	<i>completed</i>
Building the “digital atlas”	<i>completed</i>
Creation Rationale	<i>completed</i>
Secondary Data Collection	<i>completed May</i>
Rapid Appraisal	<i>completed</i>
Participatory Mapping	<i>completed</i>
Key Respondent Interviews	<i>completed</i>
Formal Household Survey	<i>completed</i>
Resource Assessment	<i>completed</i>
Res. Assess. Data Entry	<i>completed June</i>
Res. Assess. Analysis	<i>completed</i>
Socio-economic Data Entry	<i>completed</i>
Socio-economic Data Cleaning	<i>completed</i>
Socio-economic Analysis	<i>completed</i>
Framework for Decision	<i>completed</i>
Final Draft Report &	<i>completed</i>
Final Report	expected

## Component Four: NDVI Time Series Analysis and Interpretation

Assess the potential of using multi-date 3 km AVHRR imagery. (CU)

Assess the value of time series analysis of 7.5 km NDVI imagery (CU)

Assess use of different resolutions of NDVI data for monitoring vegetation change in large watersheds with the DoF. (CU)

## Indicators and achievement of results

*(Clark University may wish to add to this section)*

## Component Five: Area Sample Frame (ASF) in Machinga ADD

The final phase of the subcontract to implement pilot Area Sample Frame for Machinga ADD was completed which presented the statistical analysis of data, a review of results, and evaluation of the ASF. Although initial analysis of the crop production data provides a contrasting value to results

obtained from the current sampling methodology, a third sample or follow-up is probably required to verify which value is closer to the true estimate.

The original purpose of the sub-contract was to demonstrate the use of the area sample frame for quantifying environmental variables at the national level. The results from the pilot provided little information on these variables largely due to inadequate supervision during the data collection exercise. Regardless of this shortcoming, the ASF methodology is viewed from a technical standpoint to have sufficient advantages over the current system to merit continuation with proposals to develop national coverage. Recommendations to overcome the shortcomings of the pilot were proposed which included reducing the sample unit size, the total number of samples and developing the capacity of three regionally based field crews to improve field collection procedures.

It was envisioned that the ASF would provide robust estimates of total land area and land cover. Results from the pilot indicated that further modifications to the frame were required which raised questions to the value of pursuing follow-on sub-sampling activities using the current frame for estimating woodland cover and soil erosion parameters. In discussions with the Department of Forestry it was decided to forego continuing with the follow-on activities as prepared in the USFS consultancy. The Department indicated that they currently are facing resource constraints and most likely will not be able to participate in a national sampling activity. They anticipate having to respond to 'hotspot' assessments or focus on completing inventories of their plantations in anticipation of assessing their value for privatization.

As the Land Resources Conservation Department will be involved in the revised frame construction using funding from the World Bank, they saw little value in using the current frame for any sub-sampling activities to estimate erosion parameters.

## Indicators and achievement of results

*Final report presenting both a quantitative and qualitative analysis of data generated and an evaluation of the ASF methodology, procedures, and applicability.*

The consultant gave the ASF methodology a favorable evaluation and prepared a final report. The fact that additional support has been secured for developing national coverage would indicate there has been favorable approval of the methodology.

*Results of assessment summarizing forest information by tenure class, strategy for groundtruthing NDVI for vegetation cover, report demonstrating use of ASF data in one watershed in Machinga ADD.*

Due to GOM resource constraints, these activities are temporarily delayed.

## Program Two: Strengthen Environmental Training and Research

### Component One: Develop an Environmental Science Curriculum (UNIMA)

As an initial stage in the environmental science curriculum development activities, a list of environmental science courses was prepared and submitted to Bunda College of Agriculture for review and approval.

## Indicators and achievement of results

### *Preparation of environmental science curriculum.*

30% of the curriculum development activity has been completed.

## Component Two: Provide Training for MEMP participating agencies

### External training

No external training reported for this period.

### Internal training

Data analysis, interpretation, and reporting have been identified by GOM participating agencies as constraints. These constraints often contribute to delays in publishing results of the MEMP catchments. To resolve these constraints, a 5-day training course on Environmental Data Analysis and Interpretation is planned for February 16-20, 1998, at the Agricultural Policy and Research Unit at Bunda College.

## Indicators and achievement of results

### *Preparation of environmental data analysis and interpretation short course*

Planning has been accomplished for the requested short course.

## Component Three: Strengthen GIS Technical Capacity

*(Clark University may wish to add to this section)*

## Indicators and achievement of results

### *Strengthen GIS Technical Capacity.*

## Component Four: UNIMA Small Grants Research Program

In October, 1997, UNIMA researchers, whose proposals were accepted for funding under the Small Grants Research, revised and resubmitted their final proposals to the UNIMA Research Coordinator. The proposals were further reviewed by the Environmental Science Advisor and Members of UNIMA Research and Publications Committee (RPC).

The implementation phase of the Small Grants Research Program was delayed while awaiting the signing of a Memorandum of Understanding (MOU) between the University of Arizona and University of Malawi. The Memorandum of Understanding between the University of Arizona and

University of Malawi was signed by the University Council on December 19, 1997. Implementation of the Small Grants Research will start on February 1, 1998.

## Indicators and achievement of results

### *Initiate a Small Grants Research Program*

Subcontracts and Memorandum of Understanding (MOU) between University of Arizona and University of Malawi were signed. About 35 percent of this activity has been completed.

## Component Five: Strengthen MEMP Research Component

### Large Catchments

The objective of this work is to develop methodologies for environmental monitoring of large catchments and to demonstrate the importance of available data for environmental monitoring. In order to do so, historical data were collected by MEMP participating agencies (namely Water and Meteorological departments). These data were used to study the impact of land use and vegetation cover changes in the hydrological regimes of selected rivers in Malawi. Preliminary analysis of the historical data show increased runoff and reduced soil moisture storage for rivers where increased land use change occurred.

Sediment sampling sites were established in December, 1997, at Rivi-Rivi and Lisungwe rivers which are tributaries of the middle Shire River. Both rivers are known to carry heavy sediment loads that greatly contribute to the siltation of reservoirs downstream and the overall reduction of the hydroelectric power generation capacity in Malawi. Although the social cost of the off-site impacts of soil erosion can be translated into loss of hydroelectric power generation, numerical data of sediment yields and contribution of these rivers to the overall problem of siltation in the Middle Shire River is not known. This study will provide not only a baseline data on sediment loads but also information on the land use/management practices that lead to the current levels of sediment loads.

## Indicators and achievement of results

### *Strengthen Large Catchment Research Component*

The large catchment research is progressing as scheduled. Final data analysis once analysis of satellite images and sediment data is accomplished. About 50 percent of this task has been completed.

### Small Catchments

A methodology is being developed for monitoring off-site impacts of soil erosion and water resources degradation. The methodology can also be used for evaluating the effectiveness of soil erosion control practices and the mitigation impacts. The methodology is now being tested at Kamundi and Chilindamji catchments.

## Indicators and achievement of results

### *Develop and test a monitoring methodology:*

A monitoring methodology developed for small catchments is now under testing at Kamundi and Chilindamji. About 60 percent of this task has been completed.

## Component Six: Specialized Training on Key Environmental Issues

Two students from the Department of Agricultural Engineering at Bunda College of Agriculture have completed a one-month field data collection activity. The two students are doing their undergraduate research under supervision and will use the data collected from the MEMP catchments for their research project.

The students' research will test and evaluate the suitability of the Soil Erosion Estimator for Southern Africa (SLEMSA) model and Universal Soil Loss Equation (USLE) model for the conditions in Malawi. Soil erosion models such as SLEMSA and USLE are important conservation planning tools. Through applied research, the ESA is working to improve the linkage between line agencies and UNIMA graduates.

## Indicators and achievement of results

### *Provide specialized training*

Specialized training is underway for Malawian students. About 50 percent of this task has been completed

Program Three: Strengthen Environmental Policy, Legislation  
Development, and Institutional Capacity

General remarks

This quarter saw the first action by the MoF to provide financial support to NATURE's policy program since April 1996. It was clear by the end of 1997 that the GoM would have to make a very clear demonstration of commitment to NRM to avoid a major restructuring of NATURE in 1998.

## **2. Substantive work program**

### ***Financing for the Composite Action Plan for review and reform of policies, institutional roles and legislation for E/NRM.***

The first release of funds by MoF for more than 20 months gave a great boost to morale, and could be said to have brought the NATURE policy program back to life. The USAID Mission was kept apprised of developments, and continued to hold regular NPA strategy meetings. The concept of a Special Account for isolating NPA funding from the revenue pool was first discussed with the MoF and the Reserve Bank in September 1997, was agreed to in principle in October and was developed further during the remainder of the quarter.

### ***Land policy***

Two major land utilization study presentations were made during the quarter: the MEMP financed and implemented Public Lands Utilisation Study (PLUS) final workshop in November, and the non-MEMP Customary Lands Utilization Study (CLUS II) in early December. The former, which was well publicised and attended, generated feedback which was used to shape the final report. The latter, which was attended only by MoAI and MoLHPS staff, presented the controversial finding that the extent of smallholder cultivation in 1995 was 1.9m ha, not 3.4m ha as reported by CLUS I. The distribution of unused customary land was not clear, however, and the CLUS II team was instructed to continue its work in order to quantify this distribution at least to ADD level.

By the end of 1997 the field program of the Presidential Commission of Inquiry on Land Policy Reform was complete.

### ***Protected areas***

The Protected Areas Working Group met in October to discuss the future of the Model Forest initiative in Malawi. The meeting was briefed by Dr. Ron Ayling of the International Model Forest Network Secretariat

in Ottawa, who reaffirmed the Secretariat's commitment to supporting MF development in Malawi.

#### *Model forest*

In order to progress the development of a concept paper for MF start-up the EPA explored the possibility of using USAID/CBNRM funds administered by the SHARED Project but was informed in November that all funding was already committed to other proposals.

#### ***Wildlife policy***

A national wildlife policy conference was held in Lilongwe on November 10th-12th, financed by NATURE/UoA Project funds and opened by the Minister of Tourism, Parks and Wildlife. The EPA made a presentation on policy issues in both protected and customary areas. The draft under discussion included a clear statement devolving wildlife tenure to the rightful users of the land on which it occurs. The successive draft wildlife policy which resulted from the conference made further advances, most notably in the expansion of the private sector's envisaged role in protected area operations. The new draft will be presented to Cabinet following clarification of institutional issues in early 1998.

#### ***Fisheries policy and the development of fisheries legislation***

The Fisheries Conservation and Management Bill was passed by Parliament in October and assented to by the President in November. To a large extent the new Act defines fisheries policy in advance of a draft policy document. To finalize the policy document, a number of consultation meetings were held in December 1997, with artisanal and large-scale commercial sectors of the industry with substantive participation by the Minister of Forestry, Fisheries and Environmental Affairs.

#### ***Sanitation and waste management policy and legislation***

With the allocation from MoF in November, the Department of Local Government commenced a re-planning of its program to review and develop sanitation and waste management policy and legislation as a joint UNEP/NATURE initiative. The EPA attended a meeting of the policy Task Force at DLG headquarters on December 12<sup>th</sup> and prepared draft terms of reference for the consultancy team before the end of the month.

#### ***Donor Co-ordination***

The donors E/NRM Committee met monthly during the quarter. In October, Mr. Gray Munthali of the Meteorology Department made a presentation on the likely impact of the El Nino phenomenon on Malawi,

and on November 13<sup>th</sup> Vitus Mwale (SADC-NRMP) and Daulos Mauambeta (WSM) made a joint presentation on CBNRM initiatives in Malawi. The third meeting, held on December 11<sup>th</sup>, was given over to a general discussion of issues relating to donor coordination.

The EPA participated in two project planning exercises during the quarter: an FAO/FINNIDA fisheries sector identification mission (October) and a DANIDA Coastal Zone Management planning workshop (December). Both investment initiatives lie outside of the (1996 draft) ESP framework, and highlight two fundamental weaknesses of the ESP approach: (a) government's assessment of priorities is in constant flux as both the environment and the information flow alter, and (b) donors will always provide financing according to their own, and not the GoM's, priorities.

Terms of reference for a consultancy to review and update the draft ESP document were drawn up by the EPA in December 1997. ESP development is now expected to proceed as follows:

- the existing ESP document will be updated and finalised by March/April 1998;
- a database of E/NRM initiatives already under development by the COP/MEMP will be completed and updated as Part II of the ESP, also by March/April 1998;
- a round-table meeting of government, donors and other development partners will be held mid-1998 with a focus on improved coordination and better performance in program implementation.

### ***Sustainable financing for E/NRM programs***

Mr. Wiseman Belo, appointed as coordinator to the Endowment Trust Working Group on July 15<sup>th</sup>, sadly died in mid-October having fulfilled only half of his 6-month contract. This event, indecision concerning how to proceed with replacing Mr. Belo, and the absence of funding for Working Group activities (NPA funds were retained by the MoF and UNDP funds were retained by the EAD) resulted in the suspension of activities for the remainder of the quarter.

### ***3. Indicators and achievement of results***

*Assist with interpretation of National Environmental Policy and Environment Management Act* No specific actions required during this quarter.

*Support EAD in the monitoring of sectoral policy and legal reforms to ensure compatibility with the National Environmental Policy and Environment Management Act* Close liaison was maintained with all

agencies actively involved in policy or legal reform, specifically in the fisheries, wildlife, land and local government sectors.

*Assist line agencies, USAID and other donors to identify and make operational a funding mechanism for the GoM action plan for policy, institutional and legal reform in the environmental/natural resource management sectors.* GOM financing for the action plan to the end of March 1998 was secured. By the end of December, MoF had funded approved cashflows to the extent of 97%.

*Assist line agencies in implementing action plans.* Direct technical support was provided to the fisheries, wildlife, land and local government sectors (issues papers, Ministerial briefings, TORs for consultants), while financial and logistical support was provided to the wildlife sector (policy conference).

*Finalize the Environmental Support Programme using the Results Framework methodology.* A program for ESP development were drawn up by the DEA and the EPA, who also prepared TORs for a consultancy to finalize the ESP document, the publication of which is a high priority to the DEA. Use of the RF methodology, which would require a repeat of the ESP planning process undertaken in 1995/96 does not therefore form part of the current program.

*Design and establish a monitoring and coordination mechanism within the Environmental Affairs Department.* The unfilled P7 post to be dedicated to the monitoring and coordination of E/NRM interventions remained unfilled this quarter. Considerable progress was made however in the planning of a process to finalize and operationalize the ESP.

*Support line ministries and departments in formulation of E/NRM programs for consideration for PBBS support.* No action. It is anticipated that the evolving "Special Account" concept could in the future be linked to a performance-based budget support program, and the EPA maintained contact with developments on this front.

*Assist Endowment Trust Working Group to assess legal, financial, organizational dimensions of establishing a national endowment for E/NRM activities.* The death of the working group coordinator and a block in funding procedures halted activities during this quarter.