

# **STRATEGY FOR AN ENVIRONMENTAL INFORMATION SYSTEM IN MALAWI**

EIS Design Team  
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# 1. INTRODUCTION

## 1.1 BACKGROUND

Between February 1996 and August 1996, Ministry of Research and Environmental Affairs (MoREA) staff produced a proposal for developing an Environmental Information System (EIS)<sup>1</sup> for Malawi. The proposal was extensively reviewed by national and international organizations and received comments from an interim EIS Technical Subcommittee representing major government institutions. The Principal Secretary of MoREA then identified a Design Team to draft a more detailed strategy to build such an EIS.

In January 1997, the Design Team prepared the following report outlining this strategy. Appendix A summarizes the major activities carried out over two weeks by the Team. Team members are listed in Appendix B.

The Design Team proposes the following three steps to reach the objective of a functioning EIS for Malawi:

- **Assessment.** Plan, organize, and carry out a situation analysis of the Shire River catchment which will identify the causes for the increased sedimentation of the river and make recommendations for possible solutions.
- **Pilot EIS.** Based on experience gained during the situation analysis, plan and implement a functioning Shire monitoring program that will serve as a pilot EIS.
- **National EIS.** Experience with this pilot EIS will guide the development of a plan to establish a national EIS.

## 1.2 OBJECTIVES

The long-term objective is to develop a national capacity to meet the data needs for effective environmental management and reporting for all of Malawi. The suggested step-by-step approach for developing an EIS satisfies the immediate objectives of gradually building on specific information needs and using existing analytical, institutional, and financial resources in Malawi.

The Shire River assessment is designed to meet two short-term objectives. First, it is intended to produce an analysis of the current environmental situation in the watershed, identifying the major environmental problems and their likely causes, and suggesting actions that might be taken to mitigate them. This assessment will not duplicate the work initiated to identify sources of siltation in the mid Shire (*A Study to Identify Sources of Siltation in the Middle*

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<sup>1</sup> An environmental information system (EIS) is defined as a technical and institutional structure that produces and uses environmental information. The system has a common objective which is the management of the environment. A functioning environmental information system therefore includes information about the environment (data, maps, and publications), institutions (government, private, etc.), defined linkages between institutions (data exchange protocols, defined mandates for custodianship, etc.), a technical set up (computers, software, etc.), and a direct connection to decision and policy making.

*Shire River Catchment Area, Green 1996*) rather it will build on this initial assessment to develop a better understanding of the underlying causes of environmental problems in order to provide appropriate recommendations for mitigation. Second, it is meant to establish a problem-oriented environmental information system that might serve as a prototype for a national EIS.

The Shire River assessment is also conceived to support and further two overriding longer term objectives. The first is to develop analytical capability that can be used to perform environmental impact analyses for various local and regional situations. Together with this capability, the second is to develop an information infrastructure that can be used to prepare national assessments of the state of the environment (SOE).

## **2. STRATEGY FOR DEVELOPING AN EIS IN MALAWI**

### **2.1 APPROACH**

#### *Step-by-Step Approach*

The three proposed steps, Assessment, Prototype EIS, and National EIS, represent a “learning-based” approach for developing an EIS. It is initiated by the specific demand for environmental information to address issues of environmental degradation in the Shire River catchment. The strategy is designed to produce different outputs in a relative short time period, provide answers to questions of national importance, and bring together major information producers, information consumers, and decision makers. It will allow to learn from problems as they arise and develop solutions and institutional arrangements that reflect current capacities and fit within the local context. Figure 1 on the next pages summarizes these three steps. Boxes on the left side outline major actors and tasks. The boxes on the right side represent the expected outputs.

#### *Step One*

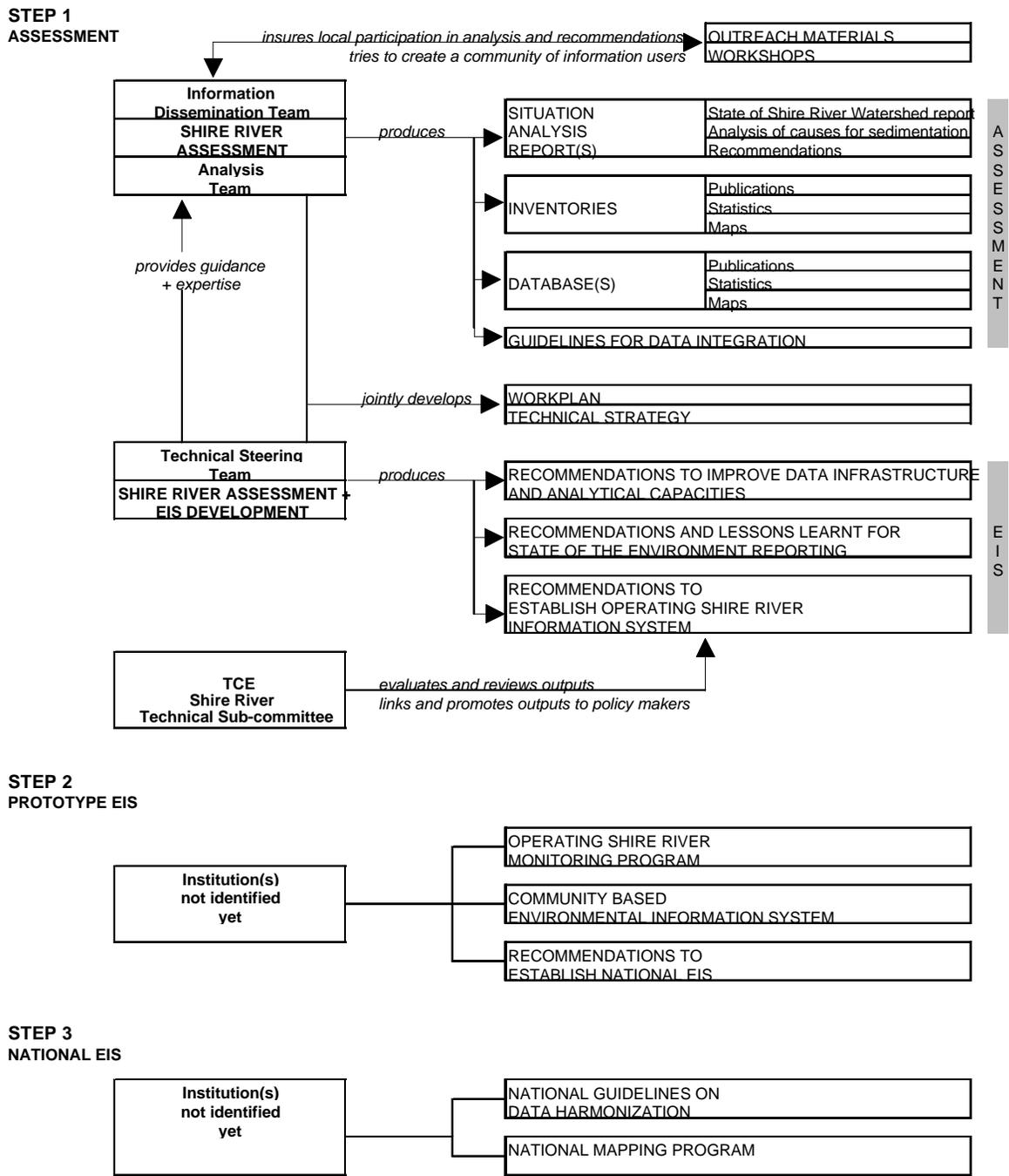
The first step of the proposed strategy tries to accomplish two major tasks (depicted in bold capital letters): completing the Shire River assessment and laying a foundation for a functioning information system. For these tasks, three teams, dealing with information dissemination, analysis, and technical oversight, would be created (depicted in bold lower case letters). They would be assembled for the duration of Step One and be responsible for all expected outputs.

The existing interim EIS Technical Subcommittee will hand over its role in the development of an EIS for Malawi to a larger Shire River Technical Sub-committee of the Technical Committee for the Environment (TCE) who will represent the fourth actor in this first phase. MoREA is interested in linking information generation with appropriate interventions to mitigate against further degradation in the Shire River catchment basin. This link will be formalized through the Shire River Technical Sub-committee that will oversee both the

development of the EIS and targeted intervention programs funded by the Environmental Micro-projects Programme.

**Analysis Team.** An analysis team would be constituted to collect and collate data, and to perform the analysis. It should be small, with representatives from the major resource management agencies (e.g., Agriculture, Forestry, Water, Fisheries) and additional technical support provided by the Department of Surveys and perhaps other organizations with special critical expertise (e.g., an energy economist from ESCOM).

**Information Dissemination Team.** This team would be responsible for organizing workshops and producing intermittent outreach materials (fact sheets, brochures, etc.). Their purpose is to solicit local input for the design of specific outputs and to ensure local participation in analysis and the development of recommendations. The efforts of this team would help creating a community of information users in the Shire catchment.



**Figure 1: Strategy for an Environmental Information System for Malawi**

Both the Analysis Team and the Information Dissemination Team would work closely together in producing the outputs for the Shire River assessment. They would be led by a Principal Investigator selected from one of the represented agencies or perhaps a unit within the University of Malawi system. It is recommended that all members of these two teams and the principal investigator be Malawian nationals.

**Technical Steering Team.** A team of experts would be designated to provide technical backstopping to the Analysis Team. In addition, this team would guide the work of the Analysis Team to ensure that issues important for the development of an information system (e.g., data integration, archiving, and dissemination) are considered by the Analysis Team. At the completion of this first phase, members of the Technical Steering Team would produce specific recommendations that will help to establish a functioning information system. Team members would be selected from senior technical staff of the ministries, and external consultants, as required.

**Shire River Technical Subcommittee of the TCE.** Members of an interim group to the subcommittee have been involved in the review of the original proposal to develop an EIS for Malawi and participated in a workshop organized by the Design Team. In its initial composition it includes the following members: Communications Officer from CURE, Environmental Focal Points (EFP) Coordinator at MoREA, MEMP Technical Advisor at MoREA, Surveyor General at Surveys Department, Research Coordinator at UNIMA, Chief Hydrologist at Ministry of Irrigation and Water, Assistant Director of Forestry at Ministry of Natural Resources, and representatives of the principal funding agencies. The Shire River Technical Subcommittee would be responsible for evaluating and reviewing final outputs and promoting them to policy makers. In addition, they will insure that information produced by the EIS is made available to organizations involved in mitigation activities targeted to reduce sedimentation in the Shire River catchment basin.

### *Step Two and Three*

No specific institutions responsible for these activities have been identified yet. Two different paths to move from a project activity to a functioning information system can be envisioned. The first one would try to create a information system for the Shire River catchment which would operate as a pilot EIS and then move to a national EIS. Possible components of this pilot EIS include an operating Shire River monitoring program or a community based environmental information system that could help in guiding project interventions or local and district planning. The second path would move directly to a national EIS. This requires that the outputs of the Shire River assessment will create enough interest to catalyze new resources and institutional commitments to move to a national EIS, for example with the design and implementation of a national mapping program.

## **2.2 STEP ONE - ORGANIZATIONAL AND INSTITUTIONAL ISSUES**

The Shire River study will be coordinated and initiated by MoREA. Technical work will be performed by an interdisciplinary team drawn from line agencies. Technical oversight will be provided by a technical steering team.

Topical guidance and feedback will be provided to the effort through a series of workshops in which participation will be sought from all “stakeholders” in the region. This will include (1) the resource agencies responsible, (2) international groups (donors and NGOs such as IUCN), (3) the private sector (e.g., ESCOM, SUCOMA), and (4) projects or other organizations with active interests in the area (e.g., Blantyre Fuelwood Project, CURE, Actionaid, Christian Service Committee, Concern Universal, World Vision, Society of Malawi).

There are at least four reasons to encourage broad and active participation in the situation analysis. First, the effort should be highly visible, so that it receives priority among participating agencies and thus enhances the likelihood that actions might be taken on results. Second, it ensures that the outcome will address the issues that are judged to be most pressing by those most concerned. Third, it will likely provide access to local restricted-circulation data from individual groups for specific activities that would otherwise be unavailable (e.g., limited studies of specific communities performed by NGOs). Fourth, it will enhance the probability that the recommendations made may be acted upon by any one or all of the involved groups. Inaugural and summary workshops would be held in addition to one intervening progress workshops.

The Shire River Technical Subcommittee will be responsible for promoting outputs to a wider policy audience and will be instrumental in establishing the Technical Steering Team. It will probably meet three times over the next 12 months. The first meeting would review the proposed EIS strategy and formalize the role of the EIS Technical Subcommittee. The next meeting would be required to identify members of the Technical Steering Team. A mid-term briefing dealing with preliminary outputs and results from the Shire River Assessment would help to keep EIS Advisory members informed. No major funds are required for this group but a small budget should be allocated to cover expenses for meetings and the production of a brochure. If the Shire River Assessment is successful, the role and responsibilities of the EIS Technical Subcommittee could easily expand, for example to establish a national EIS.

The Technical Steering Team will be responsible for identifying and selecting the Principal Investigator for the Shire River Assessment. The Technical Steering Team would review the work of the Analysis and Information Dissemination Teams almost on a monthly basis. Additional meetings, for example to prepare a workplan and develop the technical strategy should be scheduled as needed. The Technical Steering Team would guide analytical efforts, make recommendations for the technical strategy, and react to specific technical requests from the Analysis Team. Team members will share their experiences on building a database and map infrastructure, integrating databases, and formulating mapping and digitizing standards. They will provide technical advice on the acquisition and analysis of satellite imagery and suggest data formats for archiving and dissemination. Selected members of the Technical Steering Committee would be contracted to prepare short reports summarizing lessons learnt and recommendations to establish a functioning information system. Funds need to be allocated to cover allowances for meetings and three short-term contracts to produce recommendations.

The specific details of the technical strategy for the analysis and the final workplan will be developed jointly by the Shire River assessment teams and the Technical Steering Team. However, a number of general requirements guiding the analysis can be specified already. The purpose of the assessment is to quickly produce a series of outputs, use readily available data and expertise, and work with major data providers within and outside government. The analysis will try to emphasize spatial relationships incorporating digital maps and other geo-

referenced information, for example national censuses and surveys. Investments in new data collection and training of staff at collaborating agencies should be kept at a minimum during Step One. The experience gained during this initial phase, however, will help to prepare recommendations to improve the data and map infrastructure and strengthen analytical skills, which then can be addressed with other broad training and data collection programs. The workplan in Section Three of this report provides a rough outline of different analytical steps.

The Analysis and Information Dissemination Teams would work full time on their tasks and are expected to produce their outputs within ten months. Institutional and financial arrangements have to be made to ensure that team members can concentrate their efforts exclusively on the Shire River assessment and produce all envisioned outputs within this deadline. At the termination of the first phase, team members would return to their agencies. The team would be reunited periodically to perform subsequent analyses with MoREA.

The Analysis Team would consist of a core team which has at a minimum three persons: one senior analyst and two junior analysts. The senior analyst would have a background in statistical data analysis and presentation, considerable experience with GIS packages and remote sensing, and a track record of carrying out studies. The junior analysts would have a similar background, but less experience. Members of the Analysis Team should complement each other in their technical backgrounds and cover areas such as land cover analysis, time series analysis, environmental monitoring, forestry, surveying, water resources, and social sciences. For selected tasks the Analysis Team may expand its membership and receive short term assistance from technical staff of other government agencies. The Analysis Team will work closely with the members of the Information Dissemination Team to produce their reports, presentations, and materials for workshops. The core members of the Analysis Team will be working on the assessment full time over a ten month period.

The Information Dissemination Team would consist of at least of three persons: writer/editor, report production specialist, and outreach specialist. The responsibilities of the writer/editor would be primarily drafting and editing of reports and other outreach materials. This person should have a strong background in writing and editing and work well with others. The report production specialist will work closely with all staff to prepare reports for publication and requires expertise in word processing, desk top publishing, and general knowledge about printing and distributing documents. The outreach specialist would have experience in organizing workshops, facilitating multi-stakeholder meetings, and contacting and reaching press and media. The members of the Information Dissemination Team will be assigned to the assessment over a ten month period. However, their work load would probably not exceed six months.

The Principal Investigator should be a dynamic individual with demonstrated experience in integrated environmental research and the institutional flexibility to take on such a short-term project. The person should have strong communication skills, a collaborative outlook, efficient management skills, and work well with all levels of government. The position of the Principal Investigator is a full-time commitment for ten months.

### **2.3 STEP ONE - FINANCIAL AND LOGISTICAL ISSUES**

Institutional and financial arrangements for staff working full and part time on Shire River assessment are provisionally outlined below. In-country costs to support the implementation on the first step of the programme are as outlined using Project Implementation funds from the World Bank. Finalized logistic details will be completed after discussion of this draft.

Budget for EIS Technical Subcommittee allowances	\$700
Budget for Technical Steering Team allowances	\$700
Budget for “Awareness Workshop”.	\$13,000
Budget for “Workshop on Preliminary Findings”.	\$13,000
Budget for “Summary Workshop”	\$13,000
Budget for Analysis Team.	\$70,000
Budget for Information Dissemination Team.	With above
Budget for Principal Investigator.	\$18,000
Budget for Report Production.	\$2,500
Budget for Electronic Output.	\$1,000

### Logistical issues

Description	Requirements	Options
Office space for Principal Investigator, Analyst and Dissemination Teams (Administrative support)	2 or 3 rooms	MoREA?
Office furniture	2 desks, 4 tables, 8 chairs, 2 office chairs, filing cabinet, map cabinet	PIP
Computer Hardware	2- Office Computers (PFP) 2- GIS Computers (MEMP) 1- Colour printer (MEMP) 1- Laser printer (PFP) 1- Photocopier (PFP)	
Computer Software	Virus protection Office package Image processing Raster GIS Desktop publishing Desktop mapping Communication GPS differential correction	PIP and AID (MEMP) funding
Vehicle (Driver)	1- Twin cab pickup	PIP or PFP funding
GPSs	Capable of differential correction	Provided through MEMP

## 2.4 THE PROCESS - FROM PROJECT ACTIVITY TO A FUNCTIONING SYSTEM

The greatest challenge for the proposed strategy is how to move from a project to a functioning system. The Design Team is proposing a number of mechanisms and outputs that can help such a transition. They include creating a community of information users, producing technical papers, and promoting outputs to senior policy makers.

**Creating a community of information users.** The Analysis Team will work hand-in-hand with the Information Dissemination Team and attempt to produce a stream of preliminary outputs that are targeted to different information users, for example district planners, utility company executives, general public, and line agencies. Two workshops, “Awareness Workshop” and “Workshop on Preliminary Findings”, will seek the active participation and input of information users and local stakeholders in the Shire River catchment. It is envisioned that such tailored outputs will create interest in a continued supply of data and information, either to follow overall environmental trends or to monitor the impacts of interventions.

**Producing technical papers.** The Technical Steering Team will guide the Analysis Team to incorporate issues of relevance to a functioning information system in its database set up, data integration, and analysis. Based on this interaction, selected members of the Technical Steering Team will be able to summarize the lessons learnt from the Shire River assessment and make recommendations how to set up a functioning information system.

**Promoting outputs to senior policy makers.** It is the role of the Shire River Technical Subcommittee to promote the outputs from the Shire River assessment to senior policy makers. The outputs from the assessment (maps, reports, workshops, databases, etc.), the technical papers, and the findings from the assessment itself are expected to create sufficient interest among senior policy makers so that they will provide continued political and financial support to further a Malawi or Shire River EIS.

### 3. PROPOSED WORKPLAN FOR IMPLEMENTING AN EIS IN MALAWI

#### 3.1 EIS PREPARATION

A number of activities need to be completed before the EIS strategy can be implemented. It will be MoREA’s responsibility to coordinate and motivate most of the activities during this preparatory phase. An especially important step is strengthening the Shire River Technical Subcommittee which needs to formalize its role by selecting a chairperson, deciding on its mission, and outlining its major functions. The role of the existing interim EIS Advisory Group will be assumed by the Shire River Technical Subcommittee. It is hoped that the technical subcommittee will solicit participation of additional organizations with a vested interest in the development of an EIS to provide information to reduce degradation in the Shire River catchment. Funding needs to be secure to complete the project within its ten months period. Table 1 summarizes all the proposed major activities.

**Table 1 Workplan - EIS Preparation**

ACTIVITY	MONTH	DAYS	RESPONSIBLE
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<b>EIS Preparation</b>		<b>2 - 5</b>		
1. Design of EIS		2 - 4		
	a. EIS Staff committed by MoREA	2	3	MoREA
	b. Draft EIS strategy prepared	2	5	Design Team
	c. EIS budget reviewed and funding secured	2	10	MoREA, The World Bank
	d. Draft reviewed by Design Team	2	5	Design Team
	e. Finalize EIS Strategy Report	2	1	Design Team
	f. Send Strategy Report to EIS Technical Subcommittee	2		MoREA
	g. Strategy Report reviewed by EIS Technical Subcommittee	3	11	EIS Technical Subcommittee
	i. Meeting of EIS Technical Subcommittee	3	1	MoREA
	j. Formalize role of EIS Technical Subcommittee	3		MoREA, EIS Technical Subcommittee
	k. Produce brochure about EIS Technical Subcommittee	3		EIS Technical Subcommittee
	l. Submit Strategy Report to NCE	3		EIS Technical Subcommittee
	m. Review of Strategy Report by NCE	3		NCE
	n. Approval of Strategy Report by NCE	4		NCE
2. Identify members of Technical Steering Team (TST)		4		MoREA, EIS Technical Subcommittee
3. Establish and formalize role of TST		4		MoREA, EIS Technical Subcommittee
4. Identify Principal Investigator (PI)		4		TST
5. Select Analysis Team (AT)		4		TST, PI
6. Select Information Dissemination Team (IDT)		4		TST, PI
7. Review + modify initial workplan for Step One		5	10	TST, PI, AT, IDT
8. Modify + finalize technical strategy for Step One		5	10	TST, PI, AT, IDT

### 3.2 STEP ONE

Once Senior MoREA management has decided to initiate and fully support the strategy, funding is in place, and staff has been assigned for the ten months of the assessment, then Step One of the strategy can be carried out. Step One puts great emphasis on producing outputs and letting representatives from different institutions work together on solving specific problems to take advantage of the strategy's learning-by-doing approach.

Table 2 on the next two pages outlines the workplan with proposed activities for Step One. Table 3, on the following page, provides a month-by-month break down of time allocation for the Shire River assessment teams. This information is then summarized in Table 4.

**Table 2 Workplan - Shire River Assessment**

ACTIVITY	MONTH	DAYS	RESPONSIBLE
<b>Step One - Shire River Assessment</b>	<b>4 - 14</b>		
9. Create awareness for Shire River Assessment	6		
a. Prepare outreach materials	6	5	PI, IDT, AT
b. Radio broadcast	6	1	IDT - EFP, NDC, M&M
c. Press releases	6	1	IDT - EFP, NDC, M&M
d. Prepare workshop materials	6	4	PI, IDT, AT
e. Conduct "Awareness Workshop"	6	1	PI, IDT, AT
f. Minister announces activities	6	1	MoREA
10. Inventory existing data with PPF funds	4 - 5		NDC, EFP, M&M
a. Prepare questionnaire	4	5	NDC, EFP, M&M
b. Distribute questionnaire	4	2	NDC, EFP, M&M
c. Receive responses	4	1	NDC, EFP, M&M
d. Response follow-up	5	5	NDC, EFP, M&M
e. Initiate trial SDI literature search service for Shire River catchment	5	3	NDC, EFP, M&M
f. Compile directory of environmental resources in Shire River catchment	5	5	NDC, EFP, M&M
11. Situation analysis - data integration	6	10	PI, AT
a. Data design analysis procedure	6		
b. Request and purchase data and images	6		
c. Collect data and images from primary sources	6		
d. Compile information and data	6		
e. Produce data catalogue	6		
12. Situation analysis - GIS/ remote sensing/ preliminary analysis	7 - 9	30	PI, AT
a. Guidelines for data integration	6 - 9		PI, AT, TST
b. Create multirate landcover maps of Shire River catchment	7 - 9		
c. Produce landcover change map	7 - 9		
d. Produce landcover change maps with NDVI data	7 - 9		
e. Create watershed boundaries map for Shire River	7 - 9		
f. Create rainfall intensity map for Shire River catchment (AFHRR Cold Cloud Data)	7 - 9		
g. Create slope map for Shire River catchment	7 - 9		
h. Create soil erosion model	7 - 9		
i. Integrate demographic data (Census, etc.) and create maps (population density and change)	7 - 9		
j. Integrate economic data and create maps	7 - 9		
k. Integrate point data (schools, hospitals, boreholes, estates, dambos, markets, etc.) and create maps	7 - 9		
l. Integrate agricultural production data and create maps (production systems, tenure, etc.)	7 - 9		
m. Integrate energy use data and create maps (demand and supply)	7 - 9		
13. Outreach, reviews, and presentations during data integration and preliminary analysis	6 - 9		
a. TST Review - data integration	6	5	PI, AT
b. TST Review - month 1 analysis	7	5	PI, AT
c. TST briefing month 1 and outreach	7	5	IDT
d. TST Review - month 2 analysis	8	5	PI, AT
e. TST briefing month 2 and outreach	8	5	IDT
f. TST Review - month 3 analysis	9	5	PI, AT
g. TST briefing month 3 and outreach	9	5	IDT
h. EIS Technical Subcommittee Review - month 1-3	9	5	PI, AT
i. EIS Technical Subcommittee presentation, press release, and other materials	9	5	IDT
14. Situation analysis - integrated analysis	10		PI, AT

ACTIVITY		MONTH	DAYS	RESPONSIBLE
	a. Integrated analysis of all data sets	10	10	PI, AT
	b. TST Review - integrated analysis	10	5	PI, AT
	c. TST briefing integrated analysis and outreach	10	5	IDT
15. Situation analysis - "Workshop on Preliminary Findings" to prioritize areas for further study or interventions		10	5	PI, AT, IDT
	a. Prepare workshop materials	10		PI, AT, IDT
	b. Conduct workshop on preliminary findings	10		PI, AT, IDT
	c. Press release for workshop on preliminary findings + other materials	10		PI, AT, IDT
16. Situation analysis - socio-economic studies using PRA in priority areas		11		
	a. Conduct studies	11	10	PI, AT, Clark University
	b. Prepare reports of studies in priority areas	11	5	PI, AT, Clark University
	c. TST Review - socio-economic studies	11	5	PI, AT
	d. TST briefing socio-economic studies and outreach	11	5	IDT
17. Prepare Situation Analysis Report		12 - 13		
	a. Write Situation Analysis Report	12	20	IDT, PI, AT
	b. Review Situation Analysis Report by TST	13	5	TST
	c. Finalize Situation Analysis Report	13	5	PI, AT, IDT
	d. Desktop publish Situation Analysis Report	13	5	IDT
	e. Proof Situation Analysis Report	13	5	IDT, PI
	f. Correct and amend	13	3	IDT
	g. Produce Situation Analysis Reports	13	2	IDT
18. Produce electronic product of situation analysis		13		
	a. Prepare data diskette or CD-ROM	13	5	PI, AT
	b. Prepare data catalogue	13	5	PI, AT
19. Recommendations		10 - 12		
	a. Improve data infrastructure		5	TST
	b. Lessons learnt for State of the Environment reporting		5	TST
	c. Shire River Information System		5	TST
20. Promotion of results		14	10	PI, AT, IDT
	a. Prepare "Summary Workshop" materials	14		
	b. Conduct "Summary Workshop"	14		
	c. Press release, official launch of Shire River Report, and distribution of products	14		

ACTIVITY		Week 1	Week 2	Week 3	Week 4
Month 5	Develop and finalize workplan [7.]	PI			
		AT			
		IDT			
	Develop technical strategy [8.]	PI			
		AT			
		IDT			
Month 6	Prepare outreach materials [9a-c, 9f]	PI			
		AT			
		IDT			
	Prepare materials for "Awareness Workshop" and conduct workshop [9d-e]	PI			
		AT			
		IDT			
Situation Analysis - Data integration and data catalogue [11.]	PI				
	AT				
	IDT				
Prepare TST presentation - data integration and press release [13a]	PI				
	AT				
	IDT				
Month 7	Situation Analysis - GIS/remote sensing/preliminary analysis [12.]	PI			
		AT			
		IDT			
Prepare TST presentation - month 1 preliminary analysis and press release [13b-c]	PI				
	AT				
	IDT				
Month 8	Situation Analysis - GIS/remote sensing/preliminary analysis [12.]	PI			
		AT			
		IDT			
Prepare TST presentation - month 2 preliminary analysis and press release [13d-e]	PI				
	AT				
	IDT				
Month 9	Situation Analysis - GIS/remote sensing/preliminary analysis [12.]	PI			
		AT			
		IDT			
Prepare TST presentation - month 3 preliminary analysis and press release [13f-g]	PI				
	AT				
	IDT				
Prepare EIS Advisory Group Presentation + and outreach [13h-i]	PI				
	AT				
	IDT				
Month 10	Situation Analysis - integrated analysis of all data [14a]	PI			
		AT			
		IDT			
Prepare TST presentation - integrated analysis of all data and outreach [14b-c]	PI				
	AT				
	IDT				
Situation Analysis - "Workshop on Preliminary Findings" plus outreach activities [15.]	PD				
	AT				
	IDT				
Month 11	Situation Analysis - socio-economic studies of priority areas [16a-b]	PI			
		AT			
		IDT			
Prepare TST presentation - socio-economic studies and outreach [16c-d]	PI				
	AT				
	IDT				
Month 12	Write Situation Analysis Report [17a]	PI			
Month 13	Produce Situation Analysis Report [17b-g]	PI			
		AT			
		IDT			
Produce electronic product from Situation Analysis [18.]	PI				
	AT				
	IDT				
Month 14	Prepare "Summary Workshop" materials [20a]	PI			
		AT			
		IDT			
Conduct "Summary Workshop", press release, and distribution [20b-c]	PI				
	AT				
	IDT				

**Table 3 Time Allocation for Shire River Assessment Teams**

**Table 4 Summary - Time Allocation for Shire River Assessment Teams**

	<b>Principal Investigator (PI)</b>	<b>Analysis Team (AT)</b>	<b>Information Dissemination Team (IDT)</b>
Month 5	2	2	2
Month 6	4	4	2
Month 7	4	4	1
Month 8	4	4	1
Month 9	4	4	2
Month 10	4	4	2
Month 11	4	4	1
Month 12	4	4	4
Month 13	4	3	4
Month 14	2	2	2
<b>TOTAL (weeks)</b>	<b>36</b>	<b>35</b>	<b>21</b>

## **APPENDIX A      Design Team - Schedule of Activities from January 22 - February 1, 1997**

### **Wednesday, 22 January**

1. Meeting to plan activities of Design Team.
2. Review background materials.

### **Thursday, 23 January**

1. First Meeting of Design Team - Presentation of objectives and development of workplan.
2. Compile questions and problems related to the development of an EIS.

### **Friday, 24 January**

1. Second meeting of Design Team - Discussion of problems and approaches for an EIS.
2. Prepare draft outline for report.

### **Saturday, 25 January**

1. Prepare first outline of a strategy for an EIS.
2. Write hand-out summarizing strategy and describing purpose, approach, and outputs.
3. Prepare questions for meetings with local institutions in Shire catchment.

### **Sunday, 26 January**

1. Finalize hand-out and questions.
2. Design Team leaves for Shire River.

### **Monday, 27 January**

1. Blantyre - Meeting with Blantyre ADD
2. Blantyre - Meeting with Regional Forest Office
3. Blantyre - Meeting with ESCOM
4. Blantyre - Meeting with Survey Department
5. Zomba - Meeting with Southern Region Water Board

### **Tuesday, 28 January**

1. Third meeting of Design Team - Review of materials and findings from field trip.
2. Prepare agenda for EIS Technical Subcommittee meeting.

### **Wednesday, 29 January**

1. Fourth meeting of Design Team - Finalize agenda, identify facilitators and chair persons, and decide on materials for EIS Technical Subcommittee Meeting.
2. Prepare hand-outs and presentations for EIS Technical Subcommittee Meeting.

### **Thursday, 30 January**

1. EIS Technical Subcommittee Meeting.

### **Friday, 31 January**

1. Prepare report.

### **Saturday, 1 February**

1. Prepare report.

**APPENDIX B****EIS Design Team**

Alex Bunda	MoREA
Kent Burger	MoREA
James Chuma	MoREA
Ron Eastman	Clark University
Norbert Henninger	World Resources Institute
Barbara Hutchinson	University of Arizona
Chuck Hutchinson	University of Arizona
Joseph Kazombo	Water Department
Tawonga Mbale	MoREA
Vincent Mkandawire	LR & CB
Yusuf Mohammoud	Bunda College
Gray Nyali	Bunda College
Wongani Phiri	MoREA

## **Appendix C Shire River Technical Subcommittee of the TCE - Terms of Reference**

### **Objective**

The objective is to ensure participation of senior technical staff and decision makers in the process of developing an EIS. Prospective members will have a vested interest in the development and the products of an EIS, but have little time to get involved in the day-to-day activities and the technical details of the EIS strategy. The purpose of this group is to evaluate and review the overall strategy for an environmental information system in Malawi. It will initiate the Shire River assessment by selecting a Technical Steering Team. The group will promote outputs from the Shire River Assessment to policy makers and try to ensure continued political and financial support to further a Malawi or Shire River EIS. Once the Shire River assessment is successfully completed, the role and responsibilities of the EIS Technical Subcommittee could easily expand, for example it could become the nucleus of a planning committee to establish a national EIS.

### **Duration**

This group will be in operation for both the EIS preparation and duration of Step One. It will probably continue its role during Step Two and Three.

### **Scope of Work**

The Shire River Technical Subcommittee will be responsible for getting the EIS strategy off the ground and promoting outputs to a wider policy audience. It will be instrumental in establishing the Technical Steering Team. The group will probably meet three times over the next 12 months. The first meeting would review the proposed EIS strategy and formalize the role of the Shire River Technical Subcommittee. The next meeting would be required to identify members of the Technical Steering Team. A mid-term briefing dealing with preliminary outputs and results from the Shire River Assessment would help to keep the subcommittee members informed and allow them to promote findings to senior policy makers and parties responsible for mitigation activities.

### **Expected Outputs**

1. EIS Strategy Report reviewed.
2. Role of EIS Technical Subcommittee formalized (chair person selected, mission defined, and major functions outlined).
3. Shire River Technical Subcommittee brochure produced.
4. Develop means to include a broader group of interested members.
5. EIS Strategy Report submitted and promoted to NCE.
6. Members of Technical Steering Committee selected.
7. Preliminary analysis (Month 1-3) of assessment teams reviewed.
8. At completion of Step One, short report or statement produced that reviews and evaluates the work and outputs of Step One.

### **Qualifications and Team Composition**

Members of this group are senior decision makers and technical staff who are currently members of the Technical Committee for the Environment. Members of this groups predecessor were involved in the review of the original proposal to develop an EIS for Malawi and participated in a workshop organized by the Design Team. In its initial composition it

included the following members: Communications Officer from CURE, Environmental Focal Points (EFP) Coordinator at MoREA, MEMP Technical Advisor at MoREA, Surveyor General at Surveys Department, Research Coordinator at UNIMA, Chief Hydrologist at Ministry of Irrigation and Water, Assistant Director of Forestry at Ministry of Natural Resources, and representatives of the principal funding agencies. The current committee needs to develop a means to include other organizations that are interested in developing an EIS or using the outputs from the Shire River Assessment.

**Funding**

No major funds are required for this group. A small budget should be allocated to cover allowances and rents for meetings and the production of a brochure.

## **Appendix D Technical Steering Team - Terms of Reference**

### **Objective**

The objective is to provide a pool of technical expertise to the Analysis Team, establish a regular review process, and guide the technical and analytical approaches of the Shire River Assessment toward a functioning EIS. This team will be responsible for identifying and selecting the Principal Investigator for the Shire River Assessment. It will write up recommendations on how to move to Step Two and Three in the EIS Strategy.

### **Duration**

The Technical Steering Team will be assembled for the duration of Step One. It will review the work of the Analysis and Information Dissemination Teams, almost on a monthly basis. Additional meetings, for example to prepare a workplan and develop the technical strategy, will be scheduled as needed.

### **Scope of Work**

This team of experts will be designated by the EIS Technical Subcommittee to provide technical backstopping to the Shire River Assessment. In addition, this team will guide the work of the Analysis Team to ensure that issues important for the development of an information system (e.g., data integration, archiving, and dissemination) are taken into consideration. The Technical Steering Team will help in analytical efforts, make recommendations for the technical strategy, and react to specific technical requests from the Analysis Team. Team members will share their experiences on building a database and map infrastructure, integrating databases, and formulating mapping and digitizing standards. They will provide technical advice on the acquisition and analysis of satellite imagery and suggest data formats for archiving and dissemination. Selected members of the Technical Steering Committee will be contracted to prepare short reports summarizing lessons learnt and recommendations to establish a functioning information system.

### **Expected Outputs**

1. Completed Workplan and technical strategy for Shire River assessment (together with Analysis Team and Information Dissemination Team).
2. Guidance and technical advice at regular review meetings (a total of five meetings have been planned).
3. Guidance and technical advice at requests from Analysis Team.
4. Short paper with recommendations to improve data infrastructure and analytical capacities.
5. Short paper with recommendations and lessons learnt for state of the environment reporting.
6. Short paper with recommendations to establish operating Shire River information system.

### **Qualifications and Team Composition**

Team members will include senior technical staff from government agencies, private sector, and external consultants. The team needs to have expertise in analysis (statistical and spatial), GIS and remote sensing (acquisition and analysis of satellite imagery, etc.), EIS (building a database and map infrastructure, integrating databases, formulating mapping and digitizing standards, data formats for archiving and dissemination, etc.), and specific technical fields (ecology, hydrology, geomorphology, forestry, social sciences, etc.).

**Funding**

Funds need to be allocated to cover allowances for meetings and three short-term contracts to produce recommendations.

## **Appendix E Analysis Team - Terms of Reference**

### **Objective**

Establish a small, well motivated group of analysts that can carry out the analytical components of the Shire River assessment without too many distractions.

### **Duration**

The Analysis Team, working closely with the Information Dissemination Team and under the guidance of the Principal Investigator, will work full time on its tasks and are expected to produce their outputs within ten months. At the termination of the first phase, team members will return to their agencies. The team would be reunited periodically to perform subsequent analyses with MoREA.

### **Scope of Work**

Collect and assemble data. Perform analysis and produce outputs (maps, reports, etc.). Prepare briefing materials and conduct briefings. Prepare workshop materials and conduct workshops in close collaboration with Information Dissemination Team.

### **Expected Outputs**

1. Workplan and technical strategy for Shire River Assessment (together with Technical Steering Team and Information Dissemination Team).
2. Materials for “Awareness Workshop” (together with Information Dissemination Team).
3. Completed “Awareness Workshop” (together with Information Dissemination Team).
4. Guidelines for data integration (together with Technical Steering Team).
5. Month 1 briefing materials for review meeting with Technical Steering Team (together with Information Dissemination Team).
6. Month 2 briefing materials for review meeting with Technical Steering Team (together with Information Dissemination Team).
7. Month 3 briefing materials for review meeting with Technical Steering Team (together with Information Dissemination Team).
8. Month 1-3 briefing materials for review meeting with EIS Technical Subcommittee (together with Information Dissemination Team).
9. Briefing materials of integrated analysis for review meeting with Technical Steering Team (together with Information Dissemination Team).
10. Materials for “Workshop on Preliminary Findings” (together with Information Dissemination Team).
11. Completed “Workshop on Preliminary Findings” (together with Information Dissemination Team).
12. Completed socio-economic studies using PRA in priority areas (together with Information Dissemination Team).
13. Report on socio-economic studies (together with Information Dissemination Team).
14. Briefing materials on socio-economic studies for Technical Steering Team (together with Information Dissemination Team).
15. Situation Analysis Report(s) (together with Information Dissemination Team).
16. Inventories (together with Information Dissemination Team).
17. Databases (together with Information Dissemination Team).
18. Materials for “Summary Workshop” (together with Information Dissemination Team).
19. Completed “Summary Workshop” (together with Information Dissemination Team).

### **Qualifications and Team Composition**

The Analysis Team would consist of a core team which has at a minimum three persons: one senior analyst and two junior analysts. The senior analyst will have a background in statistical data analysis and presentation, considerable experience with GIS packages and remote sensing, and a track record of carrying out studies. The junior analysts will have a similar background, but less experience.

The team should include representatives from the major resource management agencies (e.g. Agriculture, Forestry, Water, Fisheries). Members should complement each other in their technical backgrounds and cover areas such as land cover analysis, time series analysis, environmental monitoring, forestry, surveying, water resources, and social sciences. For selected tasks, the Analysis Team may expand its membership and receive short-term assistance from technical staff of other government agencies. For example, additional technical support could come from the Department of Surveys and perhaps other organizations with special critical expertise (e.g., an energy economist from ESCOM). All members of the team need to be Malawian nationals. The Analysis Team will work closely with the members of the Information Dissemination Team to produce their reports, presentations, and materials for workshops.

### **Funding**

Institutional and financial arrangements have to be made to ensure that team members can concentrate their efforts exclusively on the Shire River assessment and produce all envisioned outputs within the envisioned deadlines.

## **Appendix F Information Dissemination Team - Terms of Reference**

### **Objective**

The objective is to link analysis and information dissemination throughout the Shire River assessment and produce a continuous stream of outputs. The Analysis Team will be paired with a group of experts that know how to write, produce reports, conduct workshops, and disseminate information. The Information Dissemination Team will solicit local input for the design of specific outputs and insures local participation in analysis and the development of recommendations. The efforts of this team will help creating a community of information users in the Shire River catchment.

### **Duration**

The members of the Information Dissemination Team will be assigned to the assessment for the duration of Step One, a ten month period. However, their work load will probably not exceed six months. At the termination of the first phase, team members will return to their agencies. The team would be reunited periodically to perform subsequent analyses.

### **Scope of Work**

Responsible for organizing workshops, preparing intermittent outreach materials (fact sheets, brochures, press releases, etc.), and producing final outputs.

### **Expected Outputs**

1. Workplan and technical strategy for Shire River Assessment (together with Technical Steering Team and Analysis Team).
2. Materials and Outreach for “Awareness Workshop” (together with Analysis Team).
3. Completed “Awareness Workshop” (together with Analysis Team).
4. Outreach and Month 1 briefing materials for review meeting with Technical Steering Team (together with Analysis Team).
5. Outreach and Month 2 briefing materials for review meeting with Technical Steering Team (together with Analysis Team).
6. Outreach and Month 3 briefing materials for review meeting with Technical Steering Team (together with Analysis Team).
7. Outreach and Month 1-3 briefing materials for review meeting with EIS Technical Subcommittee (together with Analysis Team).
8. Outreach and briefing materials of integrated analysis for review meeting with Technical Steering Team (together with Analysis Team).
9. Outreach and materials for “Workshop on Preliminary Findings” (together with Analysis Team).
10. Completed “Workshop on Preliminary Findings” (together with Analysis Team).
11. Report on socio-economic studies (together with Analysis Team).
12. Briefing materials on socio-economic studies for Technical Steering Team (together with Analysis Team).
13. Situation Analysis Report(s) (together with Analysis Team).
14. Inventories (together with Analysis Team).
15. Databases (together with Analysis Team).
16. Outreach and materials for “Summary Workshop” (together with Analysis Team).
17. Completed “Summary Workshop” (together with Analysis Team).

### **Qualifications and Team Composition**

The Information Dissemination Team will consist of at least three persons: writer/editor, report production specialist, and outreach specialist. The responsibilities of the writer/editor will be primarily drafting and editing of reports and other outreach materials. This person should have a strong background in writing and editing and work well with others. The report production specialist will work closely with all staff to prepare reports for publication and requires expertise in word processing, desk top publishing, and general knowledge about printing and distributing documents. The outreach specialist will have experience in organizing workshops, facilitating multi-stakeholder meetings, and contacting and reaching press and media. All members of the team need to be Malawian nationals.

### **Funding**

Institutional and financial arrangements have to be made to ensure that team members can concentrate their efforts exclusively on the Shire River assessment and produce all envisioned outputs within this deadline.

## **Appendix G Principal Investigator - Terms of Reference**

### **Objective**

Provide guidance, initiative, management, and research experience to the Shire River Assessment.

### **Duration**

The Principal Investigator will work full time over a period of ten months. At the termination of the first phase, the Principal Investigator will return to her/his original position.

### **Scope of Work**

Responsible for overall project management, financial management, and contractual arrangements. The Principal Investigators will help to set priorities for analysis and information dissemination. She(he) will motivate and guide members of the Analytical and Information Dissemination Teams. She(he) will help to identify analytical gaps and request and secure assistance from Technical Steering Team or government agencies. The Principal Investigator will promote all activities and outputs of the Shire River Assessment to officials in government, line agencies, and the private sector.

### **Expected Outputs**

Successful completion of Shire River Assessment with all planned outputs, within budget and deadlines.

### **Qualifications**

The Principal Investigator will be selected from one of the represented agencies or perhaps a unit within the University of Malawi system. The Principal Investigator should be a dynamic individual with demonstrated experience in integrated environmental research and the institutional flexibility to take on such a short-term project. The person should have strong communication skills, a collaborative outlook, efficient management skills, and work well with all levels of government. The person needs to be a Malawian national.

### **Assistance**

The Principal Investigator may be assisted by an administrative assistant who will handle all financial, contractual, logistical, and other administrative issues for the Analysis and Information Dissemination Teams.

### **Funding**

Institutional and financial arrangements have to be made to ensure that the Principal Investigator can concentrate exclusively on the tasks of the Shire River assessment and produce all envisioned outputs within envisioned deadlines. A research budget needs to be in place that covers the costs for all three workshops, outreach activities, travel, staffing and contracts for Analysis and Information Dissemination Teams, production of reports and electronic outputs, and other miscellaneous expenditures.