PD-AAR-816 41373

COOPERATIVE AGREEMENT ON HUMAN SETTLEMENTS AND NATURAL RESOURCE SYSTEMS ANALYSIS

A PROPOSAL
TO DETERMINE THE CAUSES OF ENVIRONMENTAL
DEGRADATION AND RESOURCE DEPLETION IN
THE SABI BASIN AND TO PREPARE
EFFECTIVE RESOURCE MANAGEMENT GUIDELINES FOR
CHIPINGA DISTRICT AND THE UPPER AND MIDDLE
SABI VALLEY, ZIMBABWE

by

The Agricultural and Rural Development Authority
Harare, Zimbabwe

and

Clark University/Institute for Development Anthropology
Cooperative Agreement (USAID)

Clark University
International Development Program
950 Main Street
Worcester, MA 01610

Institute for Development Anthropology
Suite 302, P.O. Box 818
99 Collier Street
Binghamton, NY 13902

A PROPOSAL TO DETERMINE THE CAUSES OF ENVIRONMENTAL DEGRADATION AND RESOURCE DEPLETION IN THE SABI BASIN AND TO PREPARE EFFECTIVE RESOURCE MANAGEMENT GUIDELINES FOR CHIPINGA DISTRICT AND THE UPPER AND MIDDLE SABI VALLEY, ZIMBABWE

September 1982

Submitted to:

The United States Agency for International Development

Jointly by

The Agricultural and Rural Development Authority

Box 8439

Harare, Zimbabwe

and

Clark University/IDA

Cooperative Agreement

USAID Contract No. DAN-1135-A-00-1078-00

September 2, 1982

TABLE OF CONTENTS

Summary 1

A. Background Description of the Project and Project Area 3

B. Project Description 9

C. Tasks and Output 11

D. Work Plan 13

E. Training 18

F. Staff 21

G. Timetable 23

H. Budget 24

I. Vitae 30

SUMMARY

The Problem

It is reported by Agritex (Agritex Report, 1982) that millions of tons of soil are washed from the catchment area of the Sabi river every year resulting in a loss of valuable agricultural land and a lowering of productivity on commercial farms, communal lands, and irrigation schemes. A continuous need for expensive maintenance work on canals and lateral channels as well as the need for desilting works at pump intakes on irrigation schemes is also a direct consequence of soil erosion and siltation. The question is, to what extent are the natural processes of soil erosion and downstream siltation exacerbated by the land and water management practices of resource users in the basin?

The Proposal

This proposal is directed towards determining the causes and extent of soil erosion and siltation in the Sabi Valley with the purpose of helping to devise resource management guidelines which will include soil conservation and better management of land and water. The aim is to maintain and improve the productivity of the Sabi Valley lands and to obtain better coordination among the various resource users to further this aim. The focus will be on Chipinga District with particular reference to the problems of the Middle Sabi Irrigation Scheme and conservation and resource management plans for Mutema communal lands, and a proposed extension onto an adjacent area. Close liaison with local people and local authorities will be maintained throughout the project and all recommendations will be developed in consultation with them. The primary institutions concerned will be the Sabi-Limpopo Basin Development Authority, ARDA, the Ministry of Lands, Resettlement and Rural Development, the Ministry of Agriculture, the Ministry of Water, the Ministry of Tourism and Natural Resources, and the University of Zimbabwe, together with the Rural Development Council, the District Council,

and the District Conservation Committee in Chipinga District.

The Output

There will be three specific outputs from these research activities. They are:

1. Estimation of the future flow of sediment to the area of the Middle Sabi Irrigation Scheme, given as a range of possibilities, to enable planning to proceed (30-50 page report and simulation model; 4 color maps at 1:250,000 with 30-50 page explanatory guide).

2. A set of land use guidelines for the whole of Chipinga District, and provisional plans for monitoring needs (4-7 resource/land use system maps; 1:100,000 plus reports and plans).

3. A set of specific land management recommendations for the Middle Sabi Irrigation Scheme and for the Mutema region which lies upstream of it and therefore impinges directly onto the Scheme (50 page report with black and white maps and charts).

The Inputs

The proposed activity calls for forty-one professional months of work with appropriate support, giving a total cost of $514,902. Local substantive and in-kind contributions will total an additional $130,600.

THE PROPOSAL

A. Background Description of the Project and Project Area

The Sabi Valley lies in the southeastern part of the country and the river drains to the Indian Ocean after traversing Mozambique.
The Sabi basin (in Zimbabwe) covers an area of approximately 15,000 sq.miles (38,649 sq. Km) and reaches from high ground south of Harare in the north to the Mozambique border, and roughly from the towns of Enkledoorn and Nyanda on the western side to Mutare, Melsetter and Mount Silinda on the eastern side.

The main tributary of the Sabi is the Odzi, draining the eastern highland areas and, like the Sabi's middle course, flowing from north to south, parallel with the main trend of the mountains at the base of the highland. To the west and north, the land rises gently to the high veldt (4,000 ft or 1200 m. near Harare). To the east the rise to the highlands is steep and abrupt. In the lower reaches of the river the valley bottom is flat and in places it is as much as 12 miles wide.

Rainfall is lower in the valley than in the highlands because the land is partly in the rainshadow of the eastern highlands and protected from the air masses moving in from the Indian Ocean. Annual totals of rainfall are 18 in. (450 mm.) in the valley (average) compared with averages of 48 in (1200mm.) for the eastern highlands and 25-30 in.(650 to 800mm) at stations on the high veldt in the west.
Temperatures are also higher in the valley than on the uplands. Monthly averages range from 60° - 80° F (15° - 25°c) with occasional highs of over 100°F (38° c). Frost is unknown and year round growth of plants and crops can be assured wherever water is available.

The problem is that rainfall generally is insufficient for crop growth and below average rainfall in the valley areas means crop failure. December to March is the main rainy season and during that period rainfall tends to occur in intensive downpours, leading to excessive run-off in flash floods. The river regime reflects the pronounced seasonality of the rainfall with floods in the wet season and periods of low and intermittent flow in dry months.

The Sabi itself is a braided stream , flowing in a bed of shifting sand for most of it's course. The main western tributaries, the Devure and the Turgwe, cease flowing periodically in most years, but the eastern tributary, the Odzi, is perennial. The waters of the Sabi, Odzi, Devure and Turgwe carry large loads of silt in the high water season which means that desilting works are needed at pump intakes on irrigation schemes and that there is a continuous need for expensive maintenance work on canals and lateral channels. The Tanganda river also appears to bring in a large sediment load just north of the Middle Sabi irrigation scheme.

Without water from surface drainage, the lowland areas are only suitable for extensive ranching, but the perennial streams draining the highlands make water available in the valley and so create the potential for irrigation and crop production. Soils are generally considered to be good, many having a sandy texture which is important for drainage in the irrigated areas. Sandy soils, however, are also a disadvantage in that they are subject to high erodability and add to the dangers of sheetwash in periods of heavy rainfall.

The agricultural potential of the area can be assessed by a major subdivision according to elevation, temperature and rainfall, and a secondary classification based on soil characteristics. There is a strong correlation between elevation, climate, and vegetation;two major agro-ecological zones can be recognized.

There is the high veldt of tall grasses and woody shrubs (3,000 - 4,000 ft. or 900m - 1200m) and the low veldt of sparse grass cover, Baobab, Mopane and Acacia trees (below 3,000 ft. or 900m). In general, farming potential decreases with descending elevation, the uplands being the most productive areas. In the lowlands the best soils are derived from recent alluvium.

The indigenous inhabitants of the study area are loosely joined groups of Shona speakers whose territories once encompassed both the upland and lowland regions and whose members traded with each other, making the most of the produce from different ecological zones. Traditionally these people did not practice irrigation but instead used the bottom lands for dry season cropping to give them a harvest before the upland rainfed crops were ready. Their traditional economies were based on a mixture of cultivation, animal herding, game, fish from the rivers, and wild fruits and tree crops. It is said that the long fallow periods which they practiced in the form of shiftin agriculture helped to retain soil fertility while their methods of planting thick leafy crops among the grain stems and their practice of leaving tree stumps in the cleared fields helped to reduce soil erosion.

White occupation of the uplands began in 1893 with the coming of the Moodie trekkers to the Melsetter area and the pegging out of large farms (9.4 sq. miles or 23 sq km.). The apportionment of land between European and African farmers was essentially completed by 1902 when the Shona-speakers were moved to the lower and drier lands where they had to rely mostly on their livestock.

In the Sabi basin today, most of the African farmers are found on the drier, lower veldt lands which have more potential for ranching than for cultivation. Exceptions include some small patches of African cultivation on the steep slopes of the eastern valley side and some areas of alluvial flats on the east bank of the river.

These African communal farming lands, in which indigenous forms of communal tenure are the rule and the occupance of cultivated areas depends on user rights, are in a sense sandwiched in between the higher farms of the Europeans and the irrigation schemes of the valley bottoms, most of which are found in a line from north to south along the foot of the eastern highlands. The government has some investment in commercial estates, mostly for sugar growing by irrigation, in the warmer lower reaches of the valley. Since the downstream effects of the use of land and water impinge sequentially on the different users, the disposition of the various forms of land use is an important aspect of the present situation.

The irrigation schemes have a long history. The first attempts were made in 1912 by the Mutambara Mission in a year of severe famine. By 1934, irrigation was practiced on about 150 acres, with the land being used in the same way as the indigenous use of bottom land, to supplement the rainfed harvests. Government interest dates from 1928 and was prompted by famine concern. This concern continued and was reinforced by a policy which aimed at settling as many Africans as possible on the designated African farming areas by moving them on to more intensively worked irrigated land under close supervision. Public investment was thus put into African farming but with limited goals. In physical terms this meant some expansion of existing projects on to steeper slopes and sandier soils.

There were eventually nine irrigation projects with roughly 4,500 acres(1875 ha.) set up in the middle Sabi Valley, including Nyanyadzi(772 acres) which is regarded by the government as a model scheme. The others are: Nyachowa (112 acres), Marande (785 acres), Mutambara (300 acres), Umvumvumvu (238 acres), Devuli (531 acres), Tawona (326 acres), Mutema (380 acres) and Chibuwe (928 acres). Ultimately it was planned to develop 600,000 acres (250,000 ha.) on a project by project basis under the Sabi-Limpopo Authority, involving the two major river basins.

Together the nine irrigation projects represent an important fund of experience as the question of the development of the Sabi valley now comes to be considered in post-independent Zimbabwe. There have been some obvious benefits to the settlers on the schemes despite worries about the lack of security of tenure, regimentation of farming practices, problems in keeping animals, and finding enough firewood. Public benefits have accrued as the projects provided the incentive for new infrastructure and integration in the regional economy.

Previous governments saw the subsidization of the irrigation schemes as part of the price for keeping Africans out of European areas and as a means of improving African farmer productivity. Present problems focus on the cost of maintenance and the relative value of further investment in irrigation compared to investment in more favorable areas of better agricultural potential, as land in the former European areas becomes available. There is a considerable resettlement potential as there are presently some 4 million acres(1.6 million ha.) of unused land in the area designated "European". The immediate concern, however, is for the maintenance of productivity in the valley lands in the face of problems of soil erosion and heavy silting of the irrigation works.

At present it is estimated that some 96.3 million tons of soil are being washed from the catchment area of the Sabi every year, mostly from the communal lands, and a further 4.2 million tons are lost from the commercial farms in the region (Agritex Report, 1982). This soil loss was calculated by using the Soil Loss Estimation Technique for Southern Africa developed by the soil and water research section of the Institute of Agricultural Engineering, Zimbabwe. The magnitude of the problem is a cause of grave concern because it affects the yields of crops, amounts to a loss of valuable agricultural land, leads to a loss of productivity on

irrigation schemes and an increase in maintenance costs, and directly affects the livelihood of the poorer farmers in the communal lands whose ability to produce even subsistence level yields is threatened. Pressures on the grazing and woodland resources which are an essential part of the subsistence economies also contribute to the soil loss problems.

Government concern relates to all of these issues, but is especially directed towards the threats posed to the irrigation projects by the silting of the rivers. It is said that the newly proposed Condo Dam on the river west of Mutare will be useless if the siltation problem is not solved. Erosion prevention techniques are being studied and there are proposed research efforts aimed at reaching farmers through the extension services, but there is a need for a comprehensive and thorough examination of the nature of the problems, to determine the extent of the natural processes of soil erosion and downstream siltation and in what ways these are exacerbated by the land and water management practices of farmers and other resource users in the basin.

B. Project Description

The aim of this pilot study is to identify the particular nature of resource degradation problems in the upper portions of the Sabi basin with special attention to problems in Chipinga area. While the study will focus primarily on this sub-region, it will be set in the context of the hydrological and other resource use conditions in the basin as a whole. A project team consisting of three full-time and six to eight part-time staff will perform the work in collaboration with Zimbabwean colleagues over a period of sixteen months (October,1982 to January, 1984).

This approach to an investigation of the soil erosion and siltation problems, though focusing on the physical problems, would include economic interests and social practices of the resource users as an integral part of the physical problems and their solutions. Unless the role of the resource users is considered, including the bases of their livelihoods and land and water management practices, technological interventions will prove short term and inadequate to solving the problems.

Because the area covered by the African communal farmlands amounts to well over half of the area of the total Sabi catchment (38,649 sq. Km), there is a tendency to attribute many physical problems such as sheetwash, gullying, silting and reduced water flow in the rivers to mismanagement of the communal agricultural land under wasteful methods of extensive farming. The question is to determine to what extent and how the land and water management practices of the communal farmers as well as all other resource users contribute to the physical problems of soil erosion in the basin. To understand these processes will require evaluation of the entire hydrological unit in the context of its problem sites. Measures can then be recommended to deal with site specific problems.

It is clear that the maintenance and improvement of land productivity in the Sabi Valley lie in a better program of soil conservation and enhanced co-ordination of resource use. Zimbabwe is not alone in this dilemma. In Africa generally there has been a long history of misunderstanding about soil conservation measures. Traditionally, chiefs and other local authorities controlled resources through local measures.

The advent of colonial administration brought colonial coercion to assure that bench terraces, cut-off drains, and check dams were built and grazing control was practiced. Independence eliminated colonial coercion but did not restore the traditional authority of the chiefs. The land suffered.

As awareness of land degradation increased, newly independent governments issued edicts to restore the soil; but many of these pronouncements have come without taking into account the needs and capabilities of farm families. Further, little attention has been paid to economic and social benefits which would accrue to individual farm families for engaging in soil control practices. Because these socio-economic factors play such a large role in farmer behavior, an understanding of what lies behind farming practices is a necessary step to working out a successful program for conservation.

With these factors in mind, the ARDA/Clark/IDA team has set three major objectives for this project:

1. to provide an overview assessment of the physical problems including sources of sediment, nature of soil loss, amount of siltation, and areas affected for the Upper and Middle Sabi Basin. The overview will include preparation of a comprehensive map and analysis of the resource management situation in terms of all resource users and percieved problems:

2. to carry out a detailed study of the Chipinga District in order to identify site specific problems and causes of resource degradation. The study will also determine the varying degrees of problem intensity in the context of different land and water management systems (communal farmers, freehold farmers, commercial farmers, irrigation schemes, and other resource users). The district analysis will identify critical areas for remedial action and make recommendations for short and longer term remedial measures including reclamation activities, a set of resource management guidelines, and a monitoring program.
3. to develop a co-ordinated plan of resettlement and resource conservation with the Mutema people. An area of 2,500 ha. adjacent to the Mutema's present communal lands is under consideration for possible resettlement. The ARDA/Clark/IDA team would work with local leaders in assessing resource management needs as well as devising a plan to implement the program.

C. Tasks and Output

1. Overview: Upper and Middle Sabi Basin

Output for the overview will consist of a simulation model of sediment flow through the basin with an identification of the main sources and orders of magnitude of soil erosion and a forecast of future trends (30 to 50 page report).

Accompanying the trends forecast will be a map of the resource (land, water and woodlands) management systems. The purpose of the map will be to demonstrate spatial linkages between problems of soil erosion and types of management system (4 color map at a scale of 1:250,000 with a 30 to 50 page explanatory guide).

To carry out the overview, the research team will use Landsat imagery, 1:250,000 and 1:50,000 topographic maps, thematic maps, air photos, and documents from relevant ministries to assess the situation in terms of natural processes and the patterns of resource use. The contributions of the Ministry of Agriculture, the Ministry of Lands, Resettlement, and Rural Development, the Ministry of Tourism and Natural Resources, the Department of Statistics and ARDA (Agriculture and Rural Development Administration) will be especially important.

These data will enable the research team to define the problem more precisely through an investigation into sources of sediment, nature of soil loss, amounts of siltation, areas affected, periodicity and intensity of rainfall, erosivity of the soils, amount of run-off, and soil permeability. A combination of the existing data including work by the Institute of Agriculture Engineering and the Natural Resources Board, with field data from rivers, canals, dam sites, water storage works and pumping stations would be used.

The team will also investigate the land use and water use systems, particularly those in the communal lands with a view to understanding the constraints on local farming economies and problems with conservation. Important consideration in relation to African semi-subsistence farming systems will be:

a. physical perception of resources
b. organization of work,
c. loss of labor to urban areas,
d. allocation of land to different uses,
e. economic costs (time and cash)
f. percent of income derived from land,
g. cash inputs into farming systems,
h. question of security of tenure.

Finally, the team will review the agricultural history of the region, and also outline the administrative pattern of organization in the region to assess how administrative and institutional structures affect resource management through such things as extension work, water storage works, dams and road maintenance.

2. Resource Management Guidelines for Chipinga District

Output will include a report suggesting short term remedial action and longer term resource management guidelines for use by the Chipinga District Council, and the District Conservation Committee, the District Rural Development Council, and other local planning authorities. The guidelines will be prepared by the ARDA/Clark/IDA team in close consultation with local planning authorities and district and regional officials. The purpose of the guidelines will be to help in developing a flexible set of goals and plans for the council to use in planning short term reclamation work as well as longer term development activity.

A second output will be a series of between four and seven Resource Use/ Land Use System Maps. Drawn at a scale of 1:100,000 for Chipinga District and printed in four colors, they will be designed with the District Planning Committees in mind as primary users. The maps will identify present economic and land use systems as well as land use suitabilities. Specific titles and themes for the maps will be agreed upon by the project team and district authorities once the data collection is well underway.

Social-economic study will review livelihood systems, farming systems, marketing patterns, farmer attitudes toward soil conservation measures, attitudes toward the older chief-oriented governance as well as the newer district council polity, and problems related to food production and wage employment

Physical analysis will deal with the current methods of land management and soil conservation; the nature of soils, vegetation and land forms; the quantity, shape, and source of sediments in the waterways; the effectiveness of present soil conservation structures; and the extent of change in land use practice over the last few years Special efforts will be made to determine trends in resource degradation with an eye toward developing guidelines to arrest the most severe trends.

The socio-economic and physical data will be combined to produce both the District Resource Management Guidelines and the Resource Use Systems Maps.

3. Resettlement and Resource Management Plan for Mutema

Output for the third component will consist of a land use plan for resettlement and rehabilitation of the Mutema people who presently reside in one ward of Chipinga District. The plan will be developed jointly by the ARDA/Clark/IDA team in cooperation with local authorities and leaders of the Mutema with the approval of the Chipinga District Council. The plan will be approximately fifty pages in length with appropriate black and white maps and charts as needed.

It will provide a land use management plan for a new area of 2,500 ha. about to be resettled, adjacent to the Mutema's present area. The plan will also include a scheme for the rehabilitation and subsequent management of the present overstressed communal area where the Mutema now reside; the plan will include a system for the monitoring and enforcement of land use practices, including the following:

a. grazing management
b. rainfed agriculture
c. soil conservation
d. energy management including tree planting and harvesting
e. development of small-scale, pump powered irrigation, drawing on the experience of the irrigation schemes at Mutema (160 ha.) and Chibuwe (385 ha.).

The task to prepare the rehabilitation and resettlement plan will involve physical assessments of the current rate of degradation in the present area; an analysis of land use suitabilities in the 2500 ha. to be resettled; a transition plan to move portions of the present livestock to the new area for 12 to 18 months while rehabilitation is underway; interviews with farmers and other local residents to gain their perspectives on a land management plan; and development of the actual land/resource use plan including a system of monitoring and regulation.

D. Work Plan

Work will be carried out in three parts with the overview to begin as soon as possible after the agreement is signed and the two field exercises as soon as a team can be put in the field. The three parts are:

1. Overview

2. Chipinga District Resource Management Guideline

3. Resettlement and Resource Management Plan for Mutema

The plan of work for each of these three will include:

1. Overview of Upper and Middle Sabi

The first section will draw on existing information including present work underway such as the Italian team working on resource pressures in the Upper Sabi. The Middle and Upper Sabi will be viewed as an hydrological unit with information drawn from government, donor, consultant, and local sources of information.

The purpose of this part of the work is to coordinate all available data and to provide a basin-wide review of the problems of soil erosion and siltation. As the entire basin is almost forty thousand square kilometers in area, the task must rely primarily on secondary sources though some field visits and spot checks will be made. The analysis will include both the probable causes and effects of natural processes and of land and water management practices. The aim is to model the basin's system so as to obtain a measure of the movement of sediment through the basin. The simulation model to be developed will provide the context for more detailed study, to lead to specific actions at the local level. The overview level of investigation is necessary because of the importance of seeing all local site problems in terms of the entire hydrological unit.

The work will include an identification of the main areas of soil loss and tracing the movement of the sediment through the basin network. In particular, an estimate will be made to verify existing data on the relative quantities of sediment from different sources reaching the Middle Sabi irrigation scheme and to forecast future sediment flows.

The work itself will consist of four parts, each prepared under the guidelines of the project's hydrologist and river basin planner with the assistance of the soil erosion specialist and other members of the team based at Clark University. The four parts to the overview will be:

a. Data Collection

Data collection from existing reports especially of rainfall, (spatial, seasonal, frequency, distribution, intensity), runoff, evapotranspiration, streamflow data, and land variables (slope, soils, landuse). Field data collection to develop flow/sediment rating curves on the Sabi at two sites and on the Devure and Tanganda.

b. Data Analysis

Following a brief field reconnaissance early in the work period,

data will be assembled, reviewed, and verified against comparable data in similar hydrological and ecological settings.

c. Model Development

After data review and testing, an appropriate simple simulation model of sediment flow will be constructed and tested in Zimbabwe conditions.

d. Factor and Trend Analysis

This work will include field investigation of sediments and trend analysis of sediment origin and movement. Using the outputs of the other tasks in the study, an estimation will be made of future trends under different scenarios.

2. Chipinga District Resource Management Guidelines

The work plan for the district guidelines will provide ample opportunity for the project team and district officials to work jointly on preparing suitable guidelines. The urgent problems of soil erosion and sedimentation are of highest priority to the Middle Sabi irrigation scheme as well as to farmers and pastoralists in Chipinga as a whole.

The purpose of this portion of the work is to determine the specific causes of soil erosion and siltation within the Chipinga District with a view to working out a program for sounder management of land and water as well as developing particular guidelines to prevent further soil erosion. The overall aim is to improve and maintain productivity on the Middle Sabi irrigation scheme and on existing and newly opened communal farmlands and grazing lands, as well as to set out resource management guidelines for the whole of the district.

Initial hypotheses suggest that much of the district's erosion originates from overstressed communal areas. Although overgrazing certainly contributes to land degradation, there are other sources including natural erosion, runoff from abandoned or unused agricultural areas, newly cleared fields, deforestation resulting from use of fuel wood, and improperly built or maintained roads.

The district resource management guideline will develop information on two sets of phenomenon: type and location of current resource use/land use systems and nature of and distribution of major sources of resource degradation with special attention to soil loss. The two sets of information will be collected and analyzed by the field research team, discussed by virtually all parties in the project, and then combined into a series of land suitability maps with accompanying guidelines for the best means of implementing and managing the land. The guidelines will identify sites where immediate

reclamation efforts may be proposed to district authorities, to the Natural Resources Board, or to the Ministry of Lands, Resettlement, and Rural Development. ARDA will also be able to use the information to improve production levels in the Middle Sabi irrigation scheme.

The report and maps would not only identify needed technical solutions but would also consider constraints to implementation at both the local and national levels. It is recognized that technical solutions must be implemented within a specific social and economic context which needs to be identified in a practical sense. This means recognizing the capabilities of farmers to implement particular measures and to be aware of possible needs for outside assistance. The team intends to look at all available methods of soil conservation and not restrict interest to terracing and contouring only. Mulching in connection with contouring, leaving some weed cover to help with soil stabilization, using leafy plants interplanted with maize, planting trees as windbreaks in suitable locations, mobilizing local labor for community works, developing new mixes of crops, and many other approaches must all be considered. The more careful siting of water points and dip tanks for cattle is another matter to be reviewed in terms of developing an overall district strategy which fosters development and economic growth without degrading resources.

3. Mutema Resettlement and Rehabilitation

One communal farming area will be selected for close and detailed field study. The Mutema area has been tentatively identified as representative as it is:

a. currently over stressed, especially in grazing and rain-fed agriculture;
b. under consideration for resettlement;
c. contributing in undetermined ways to soil erosion;
d. provided with receptive leadership to develop and implement recommendations for action which the proposed analysis will produce.

Primary topics for investigation at the village level will include farming systems, cultivation methods, physical conditions, irrigation potentials, grazing practices, and any conservation techniques which may be in place. In order to understand the rationale for these systems it will be necessary to investigate the needs and production goals of African farm families and how the farm side of their livelihoods might be influenced by other factors such as loss of labor to wage employment on nearby estates or in towns. The effects

on farming methods of cash incomes to buy labor or farming inputs such as fertilizer or plows is another important consideration. The high proportion of women farmers recorded in the area would suggest that labor shortage is a critical factor and this may also be a major factor in implementing labor intensive soil conservation techniques. In this case the question of cooperation among farm families at the village level will be examined.

The purpose of these surveys would be to identify the local physical problems, to investigate the soil loss areas, and to identify local and exogenous sources of sediment in areas of deposition. The importance of local soil types and slope factors in contributing to the problems would be examined. The local surveys will also provide more in-depth information on existing land use practices among the Mutema. An attempt will be made to distinguish which farmers, or groups of farmers use which methods, and on which lands. Previous attempts to introduce conservation methods will be investigated and an attempt will be made to understand reasons for failure or success. Any significant variations in practices or in attitudes will be documented. In particular the attitudes and influence of local chiefs will be taken into account. The capabilities of farm familes to provide sufficient labor and to carry out soil conservation techniques will be particularly noted, and the specific constraints on adopting new land and water management practices will be identified. Attitudes to conservation will be examined in this light, that is in relation to such constraints. This information will then be collated and used to work out with the Rural Development Council, the District Conservation Committee, and the District Council an effective resettlement, rehabilitation, and conservation program for Mutema.

E. Training

A major investment in resource analysis and planning creates a setting in which local training can flourish. Although training is not included as a primary activity in this proposal, it is mentioned briefly to suggest two potential modes:

1. Specific Training Needs

In-service training or local workshops for which little or no funds are required other than support already contained in the basic budget;

2. Specialized Training Components

Training which will enhance the effectiveness of the project with the investment of additional funds designated specifically for training.

The objectives of the training component are:

. . . to enable Zimbabweans to continue planning and managing the use of resources;

. . . to assist individuals in improving specific job skills;

. . . to improve the resource management capabilities of both individuals and institutions;

1. Specific Training Needs

a. On-the-job training of a small number of University graduate students in research survey techniques, data gathering and data analysis. Such training would include a preparatory workshop to instruct these research assistants in data gathering techniques as well as close field supervision of their efforts. It would involve them in some forms of data analysis and would provide them with a set of field research capabilities transferable to other projects. (Funds included in present budget.)

b. Community and local leadership workshops to generate public awareness of environmental and resource issues at the community level, particularly in Chipinga District. Such seminars or workshops would enhance community understanding of the work being carried out under the area studies project and

provide increased knowledge and understanding of the problems of resource use and the options available to the community for dealing with them.

Under the AID contract for environmental training and resource management in Kenya, Clark University has had considerable experience in conducting community seminars at the district level. These two or three day seminars have been directed toward local officials and leaders in the community and have been highly successful in generating open discussion of resource needs and problems as well as forward planning concerning their use.

Seminars such as these could be conducted by ARDA, Clark, and other Zimbabwean staff working in conjunction with organizations and institutions in Chipinga District. The Conservation Committee of the District Council, for example, would be an appropriate group to co-sponsor a seminar. Funds are included in the budget for two or three such workshops at the local level. The project leader will be responsible for building a supportive relationship with local officials and informal leaders. This is vital to achieving community understanding and participation in the long-term objectives of resource management. (Funds included in present budget.)

2. Additional training opportunities

a. Medium-term training of three to six months duration to provide individuals with specific skills relevant to resource management.

Such training will focus on the acquisition of specific skills needed by individuals to perform their responsibilities more adequately in relation to the overall objectives of the project. Individuals appropriate for medium-term training might be officers working at the local level in Chipinga District or in other parts of the Middle Sabi Valley. They also might be affiliated with ARDA or with ARDA estates. Training opportunities are numerous. They could include a wide range of skills from accounting or office procedures to acquisition of specific techniques in agro-forestry. Training can take place within

Zimbabwe, at institutions in other African countries, or in the United States. ($10,000 per person year for five people equals $50,000).

b. Long-term degree training in the United States or in an African institution. If, in the course of implementing the project, ARDA and Clark University identify specific needs for highly trained manpower, relevant to resource management, it would be appropriate to provide long-term training to one or more individuals to meet such needs. Even though the impact of such training might not be visible during the life of the project, it could be a critical part of the long-term implementation and follow through efforts. ($20,000 per year for two years for two people equals $80,000).

c. Workshops for institution-building within ARDA or in one or more of its subsidiary organizations. Clark University, under the cooperative agreement, can offer one or more in-house workshops of one to three weeks duration focusing on priorities and needs identified by ARDA. Such seminars can be offered directly by the International Development Program at Clark University, perhaps drawing on the wider resources of the University, such as those of the School of Management. They can focus on levels of expertise and professional needs deemed most suitable by ARDA in the course of implementation of the area studies project or aspects related to it. For example, a workshop can be directed toward new estate supervisors or farm managers. It also might be desirable to incorporate personnel of other institutions, such as AGRITEX, into such workshops, insofar as their work relates to the objectives of improved resource management in the designated area. (two workshops of two weeks duration at $50,000 each equals $100,000).

F. Staff

1. Full Time:

Three full time personnel, supported by the AID budget, would work in the Chipinga District. These would be:

a. A Field Manager to oversee all the field work and to liase with ARDA, the Rural Development Councils, District Council, Conservation Committees, and Ministry personnel and any other interested parties. This would be a senior academic appointment. The manager would be directly responsible for the Chipinga Resource Management Guideline and the field work for Mutema resettlement planning.

b. A physical geographer or land management specialist, working under direction from senior research specialists at Clark and the field manager.

c. A socio-economic analyst, working under direction from a senior research specialist at Clark. This would be a senior graduate student or post-doctoral level appointment.

The main tasks of the last two staff persons would be the field data collection in the Upper and Middle Sabi; Chipinga District and Mutema Ward. At least one is likely to be Zimbabwean

2. Part-time

Six to eight specialists would cover technical and managerial needs, part-time as listed below:

a. A project coordinator to be responsible for the final report.

b. An agricultural systems analyst to direct the mapping and identification of farming systems.

c. A hydrologist and river basin planner to organize the work and produce the simulation model of the Sabi Basin hydrological unit.

d. A land capability and soil erosion specialist to direct the work on identification of soil erosion problems and the recommendations for conservation.

e. A rural development specialist with particular interest in rural energy use as it relates to destruction of woodlands and accompanying problems of land degradation.

f. A cartographer and remote sensing analyst to interpret Landsat data and images, and to prepare maps and diagrams.

g. A village livelihood specialist with experience in agricultural economies, village level studies, or socio-economic surveys.

We would hope for a Zimbabwean counterpart for the field manager and for counterpart involvement in the agricultural systems, soil erosion, and socio-economic studies as well as substantial assistance from Zimbabwe experts and students at several levels of the study. (See previous section on training.)

G. TIMETABLE

Project Commencement	1 October 1982
Initial Field Visit Project Leaders	November 1982
Field Team in Place Chipinga (Full time Staff 1, 2 &3)	December 1982
Agricultural Systems Survey Team	January - February 1983
Sabi Basin Reconnaisance Field Visits	February - March 1983
Land Planning Team Mutema	March - April 1983
Draft Report Sabi Valley	June 1983
Field Study Completion	June 1983
Draft Report Mutema Land Planning	October 1983
Draft Report Chipinga Resource Management	November 1983
Final Reports All Sections	January 1984

H. BUDGET
(all figures in U.S. Dollars)

I. Initial Visit Oct/Nov. 1982

A. Staff		
2 Senior faculty 1 mo. x 4,500	$9,000	
1 Associate faculty 1 mo. x 2,400	2,400	$11,400
B. Transportation		
3 airfare x 2,400	7,200	7,200
Per Diem		
28 days x 78 x 3	6,552	
28 days x 40 x 2	2,240*	8,792
C. Local Costs		
Local travel	1,000	
Secretarial		
Reproduction/communications	2,000	3,000
TOTAL - Initial Visit-		$30,392

II. Field Study: Dec. '82 - July, '83

A. Staff		
Senior faculty 7 mo x 4,500 (field mgr.)	$31,500	
2 Research associates 7 mos. x 1,500 x 2	21,000	$52,500
B. Transportation		
3 airfare x 2,400	7,200	
Per Diem		
210 days x 78 x 2	32,760	
210 days x 40 x 2*	16,800	56,760
C. Local Costs		
Local travel	6,000	
Secretarial/Postage	2,000	8,000
TOTAL - Field Study, Dec '82-Jul '83-		$117,260

*Includes two local Zimbabwean specialists.

III. Field Visits: February - July, 1983

A. Staff		
3 Senior faculty 1 mo. x 4,500 x 3	$13,500	
3 Associate faculty 1 mo. x 2,400 x 3	7,200	$20,700
B. Transportation		
6 airfare x 2,400	14,400	
Per Diem		
6 x 30 days x 78	14,040	28,440
C. Local Costs		
Local travel	4,000	
Secretarial, Postage, Reproduction	1,500	5,500
TOTAL - Field Visits Feb- Jul '83-		$54,640

IV. Data Analysis & Work at Clark

A. Staff		
1 Research associate (1,000 x 8)	$8,000	
Faculty-Project Coordination(2 mos. also in field visits) 8 mos. over 15 mo. 3,000 x 8	24,000	
Support staff	10,000	
1.5 Research Assistance:		
Academic year (4,300 x 1.5)	6,450	
Summer 3 mos. x 1,250 x 1.5	5,625	54,075
B. Domestic Travel		
5 Trips x 300	1,500	
Per diem 75 x 5	375	1,875
C. Local Costs		
Reference materials	4,000	
Cartography	10,000	
Remote sensed imagery	5,000	
Computer time	3,000	
Supplies, Communications	5,000	27,000
TOTAL - Data Analysis & Work-		$82,950

V. Final Visits and Follow-up

A. Staff		
Senior faculty 3 mos. x 4,500		$13,500
B. Transportation		
3 airfare x 2,400	7,200	
Per Diem		
30 x 3 x 78	7,020	14,220
TOTAL - Final Visits & Follow-up-		$27,720

VI. Final Reports

Maps and Final Documents		8,000
TOTAL - Final Reports-		$8,000

VII. Training and Counterpart Involvement

A. Staff		
4 Zimbabwean Research Fellows		
2 ARDA Funds	------	
2 Research Fellows x 12,000	24,000	
Fringe (10%)	2,400	
B. 2 Workshops at 7,500	15,000	
TOTAL - Training & Counterpart Involvement-		$ 41,400

VIII. Equipment

Landrover (est.) to Harare	13,000
Copier (est)	5,000
TOTAL - Equipment-	$18,000

Summary Totals (Direct Costs)

I.	$30,392
II.	117,260
III.	54,640
IV.	82,950
V.	27,720
VI.	8,000
VII.	41,400
VIII.	18,000
TOTAL Direct	$380,362

Total Clark/IDA Salaries

I.	$11,400***
II.	52,500***
III.	20,700***
IV.	54,075**
V.	13,500***
TOTAL	$152,175

Fringe $152,175 x 25.8% = 39,261

Overhead:

** On-Campus IV	54,075 x 97.1%	=	52,507
***Off-Campus I, II, III, V	98,100 x 43.6%	=	42,772
Total Overhead			95,279

***Approximately ¼ of these salaries will be on campus for preparation and field visit follow-up. However we have used the off-campus rate on 100% of these salaries.

GRAND TOTALS

A. Total Direct Costs	$380,362
B. Fringe Benefits	39,261
C. Overhead Costs	95,279
Total Direct/Indirect	514,902

ARDA Contributions

Office Space - Sabi		
6 people x 150 = 900/mo		
12 mos. x 900	10,800	
Office Space - Harare		
2 Offices x 400 = 800/mo.		
3 mos. x 800	2,400	13,200
Planning Assistance		
1 Senior Project Manager 5,000 x 2 mos.	10,000	
Fringe (10%)	1,000	11,000
Second Vehicle		
$100 per day x 20 days per month x 7 mos.		14,000
Research Fellows		
15 mos.		
2 x 12,000	24,000	
Fringe (10%)	2,400	26,400
Three Counterparts		
Physical; Socio-economic		
Field Manager 15,000 x 3	45,000	
Fringe (10%)	4,500	49,500
Clerical, Technical, Adm. Services		
$1,000 x 15 mos.	15,000	
Fringe	1,500	16,500
TOTAL ARDA CONTRIBUTION		130,600

Copies of vitae for the following people have been included with the original proposal to Liberty Mhlanga of ARDA and Mark Winter of AID:

Eileen Berry

Leonard Berry

David W. Brokensha

J. Ronald Eastman

Richard B. Ford

David K. Munasirei

Wolf Roder

Harry E. Schwarz

Robert A. Simko

Henry James Steward

Barbara P. Thomas

Billie Lee Turner II