PDACD-535

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COMMUNITY BASED MANAGEMENT OF CHIA LAGOON WATERSHED:

ANNUAL WORKPLAN FOR 2004/05

BACKGROUND AND PROGRAM PERSPECTIVES

This project is being implemented under USAID's Global Development Alliance initiative through a partnership alliance with the Nkhotakota District Assembly (NDA), local communities, five NGOs and a private firm. Funding for the current workplan period includes $ 786,000 from USAID and $ from the partner alliance.

The partner alliance involves Washington State University (WSU) as the lead institution with the Nkhotakota District Assembly (NDA) as the focal point for coordinating field programs with other alliance partners. These include Total LandCare (TLC), Cooperation for the Development of Emerging Countries (COSPE), Business Consult Africa (BCA), AgriCane Malawi, and the Wildlife and Environmental Society of Malawi (WESM) Dwangwa Branch. The alliance team reflects a diverse blend of experiences and skills to develop opportunities for accelerating decentralization, community-based natural resource management (CBNRM), and market-driven enterprises for agricultural and natural resource products. The adoption of a truly integrated approach, which involves collaboration with other institutions, NGOs, private sector businesses and donor-funded projects such as NASFAM and COMPASS II, is designed to enhance, expand and maximize targeted results and impacts on rural livelihoods in the Chia Lagoon Watershed.

Chia Lagoon Watershed covers a total area of 989 km^2, of which 611 km^2 forms the project area. It falls between latitudes 13°0' and 13°30'S, and longitudes 33°50' and 42°20'E, encompassing parts of Nkhotakota and Ntchisi Districts in Central Malawi. The watershed is endowed with vast natural resources vital to the livelihoods of its 55,000 human inhabitants. Over the past 20 years, the watershed has experienced escalating rates of environmental degradation due mainly to the following factors: deforestation; soil erosion; siltation in rivers and lakes; harmful bush fires; declining fish populations in the lakes, rivers and lagoons from over fishing; poaching and encroachment in Dwambazi Forest and Nkhotakota Game Reserves. Priority concerns identified by the local inhabitants to address the above inter-related problems include:

- Reduced fish resources in the lagoon resulting from little control of fishing by communities, invasion of water hyacinth and decline in water quality and quantity;
- Declining crop yields from over-cultivation, poor farming practices and loss of top soil from surface run-off and erosion;
- Decreasing quality and abundance of surface and ground water from soil and forest degradation; one impact has been increased outbreaks of water borne diseases from use of unsafe water;
- Increasing shortages of wood for fuel and construction due to degradation in the cover and composition of natural vegetation from uncontrolled tree cutting, bush fires and opening of land for agricultural purposes;
- Rising scarcity of certain indigenous plant and animal species, including premium hardwoods, fruit trees, medicinal plants and animals.
- Escalating health risks from the increasing incidence of malaria, HIV/AIDS, respiratory ailments, schistosomiasis, trachoma, trypanosomiasis, cholera and dysentery.

PROJECT GOAL AND OBJECTIVES

The goal of the project is to improve the livelihoods of rural communities within the Chia Lagoon Watershed through an integrated community-based approach that involves sustained economic use of the watershed's natural resources of land, water, flora and fauna. This goal is consistent with the economic growth results framework of the USAID's Malawi Mission under *Strategic Objective No. 6*: Sustainable Increases in Rural Incomes.

The goal of the project will be achieved through the following objectives:

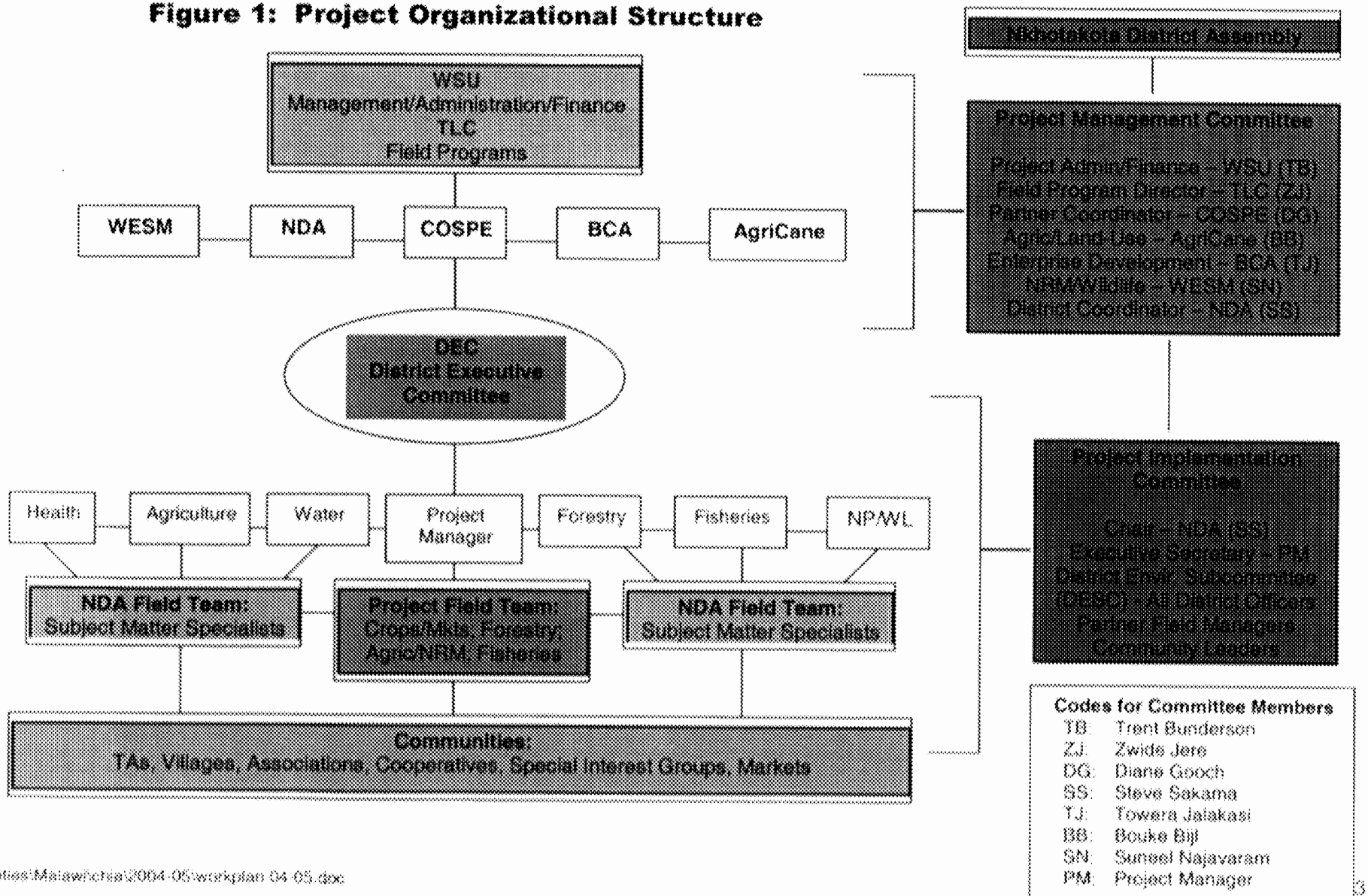
1. **Decentralization:** Assistance will be provided to the district decentralization process through support services and resources in policy, technical and business/marketing skills, extension and training materials, environmental monitoring, and overall human development with a focus on organization, leadership, and communications.
2. **Improved Community-Based Natural Resource Management:** The key focus here is on community empowerment through the transfer of knowledge, skills and resources to sustainably use and manage forests, soils, water, fisheries, and wildlife.
3. **Sustainable Agricultural Practices:** Improved agronomic and land-use practices will be promoted through crop rotations, intercropping, crop diversification, agroforestry, increased tree planting and soil conservation.
4. **Enterprise Development** will involve identifying and developing enterprises that provide rural people with practical and profitable opportunities to produce agricultural and natural resource-based products in response to demand-driven markets. This will include options to add value through basic processing and packaging of products involving the organization of special interest groups/economic units to increase efficiency and competitiveness. It will also leverage opportunities to become more vertically integrated into the market chain through linkages with other producer groups and commercial firms including small medium entrepreneurs (SMEs) engaged in marketing and processing.
5. **Improved Health Services** will be strengthened to reduce the incidence and debilitating effects of malaria, HIV/AIDS, respiratory ailments, schistoeomiasis, trachoma, trypanosomiasis, dysentery and cholera through basic preventive and treatment measures. Although funding for the health component will be sourced from a separate donor, its integration is important due to the incapacitating effects of diseases on household productivity, education, family support systems and social values.
6. **Monitoring and Evaluating Impacts and Ecosystem Change:** Increased capacity will be developed to monitor and evaluate impacts of targeted interventions on communities within the watershed, including the ecosystem dynamics of its natural resources in relation to changes in land and water use.

PROJECT MANAGEMENT STRUCTURE

Organizational Structure

The organizational management of the project - from the alliance partnership to the communities in the watershed - is shown in **Figure 1**. As the lead institution, WSU and it's Project Director will have overall responsibility for managing and administering the project with the alliance team of partners. All technical, logistical and financial matters will be handled through this unit, including the production of technical and financial reports with contributions from each alliance partner. Field programs will be coordinated at the partner level by the Director of Total LandCare. Communications support will be provided by the COSPE Country Representative as the point person for planning activities in the field. Line management at the field level will be coordinated through the District Environmental Officer at the NDA Headquarters, with the Project Manager as the executive secretary.

Figure 1: Project Organizational Structure



Three representative bodies have been set up to support the administration of this management structure:

1. Project Management Committee
2. Project Implementation Committee, and
3. Community Committees

Project Management Committee (PMC)

The PMC comprises representatives from each alliance partner to lead initiatives in their areas of specialization (see member composition, **Figure 1**). The Project Director, WT Bunderson (WSU) will serve as chair, with Z Jere (TLC) in charge of Field Programs, and D Gooch (COSPE) as the Communications Coordinator. The committee will meet monthly and will be responsible for:

- Overall coordination of the individual partner activities across their given areas of expertise.
- Carrying out sector-specific activities as agreed upon in the annual workplan.
- Overseeing the execution of the proposed activities in a timely and effective manner.
- Resolving any issues of communication or conflict among the partners.
- Timely and proper disbursement of funds to each partner as per the stated individual funding needs.
- Coordinating timely contributions from each partner regarding project financial and technical reports, workplans, budgets, workshops and field days.
- Communication between the partners, the Project Implementation Committee, the District Executive Committee, the full District Assembly and the community leaders.
- Initiating and/or maintaining contact with other stakeholders and organizations that could provide potential support to any component of the project.
- Disseminating and sharing experiences, information and results with all partners.

Project Implementation Committee (PIC)

The PIC will operate at the field level. Its members will be the District Environmental Sub-Committee (DESC), the Project Manager, partner field representatives and the government and project field coordinators. The District Environmental Officer (S Sakama) will chair the PIC, with the Project Manager as executive secretary. All meetings will be held at sites within the watershed to enhance the exchange of information and understanding among all parties about the diverse range of interventions and the implementing partners involved.

The PIC will meet on monthly, and will coordinate all project activities at the field level as follows:

- Identifying priority sites, "hotspots" and actions in consultation with the PMC.
- Reviewing previous month's activities and planning for the following month.
- Conducting joint supervisory visits/spot checks to project sites.
- Verifying the effective implementation of the proposed activities.
- Reporting to the PMC on activities and progress within the project areas.
- Exchange of information with the communities and the community leaders.
- Overseeing information sharing of events and activities between the communities, community leaders, the District authorities and the field staff;
- Clarifying issues and resolving conflicts among the project and district field staff.
- Guiding awareness and sensitization campaigns for communities in the watershed.

Community Committees (CCs)

CCs will be formed to provide designated focal groups at the community level to carry out and administer specific activities as indicated in the project workplan. Targeted communities will elect respected and active members to represent the community's concerns and issues and to assist the project staff in the implementation, management and support for community participation of any proposed action. Already existing in the project area are Community Based Natural Resource Management Committees and Beach Village Community Committees.

The committees will have responsibility for the following:

- Overseeing the development and enforcement of regulations to better manage the resources utilized by the community.
- Assisting in the dissemination of information and the introduction of sustainable and improved resource management technologies.
- Coordinating activities and trainings of the community with the district and project field coordinators.
- Developing by-laws to control the utilization of the natural resources in a sustainable fashion.
- Representing the needs and interests of community members to the government and project field staff.

In addition, community committees will be used or formed to support economic initiatives for producing and processing agricultural and natural resource based products.

The project will support the strengthening of these committees to become fully functioning organizational bodies that are legally registered and recognized as **Community Associations** and/or **Cooperatives** that promote micro-enterprise development. These Community-based entities will have elected leaders fulfilling organizational/managerial roles and will be responsible to their members for:

- Financial management of the members' monies with full transparency to members on all monetary transactions.
- Accurate and up-to-date bookkeeping and regular reports on accounts.
- Dissemination of technical information to the members.
- Coordination of activities and trainings with members and project/partner field staff.
- Sharing information with other interested parties or communities.
- Management of market linkages and sales for both inputs and outputs.
- Over-all business administration in a transparent and conscientious manner.

IMPLEMENTATION PLAN

Strategic Approach

A participatory approach involving all stakeholders is fundamental for engendering a true sense of ownership and responsibility among all parties to ensure successful and long-lasting impacts. From the inception of the project 18 months ago, this approach has been pivotal in identifying priority needs and actions to address them. Shortly after the project proposal was approved by USAID, partner workshops and meetings were held in the district to develop this action-oriented workplan with clearly articulated partner responsibilities under the direction of a well-structured management framework.

Targeted Results

Targeted results for the 2004/05 annual workplan are shown in Table 1, which gives a breakdown for each component and intervention.

TABLE 1: CHIA LAGOON WATERSHED TARGETS 2004/05

Indicator	Targets
Decentralization and Effective Devolution of NDA	
Villages/Fishing Communities (#)	30
Participating Households (#)	1,200
Total Beneficiaries (including family members) (#)	6,000
Community-based Committees (#)	50
Farmer Associations (#)	3
Individuals Trained in Sector Interventions (#)	15,000
Awareness/Sensitization Campaigns/Environmental rallies on all Subject Areas (#)	30
Hotspots located and community profiles completed (#)	30
Community Action Plans (#)	30
Watershed Environmental Action Plan (#)	1
Environmental Micro-projects Implemented (#)	2
State of the Environment Reports Completed (#)	1
Extension Leaflets on each Intervention for Households (#)	15,000
Inter-Community Debate/Dialogue (#)	3
Policy/By-law Formulation (#)	1
Exchange Visits (#)	30
Improved Community-Based NRM	
Land/Forest Resources	
Tree Nurseries (#)	30
Tree Seedlings Raised (#)	200,000
Homestead & Boundary Tree Planting (#)	170,000
Roadside Tree Planting (#)	20,000
Streambank Planting (#)	10,000
Households Planting Bamboo (#)	250
Village Forest Areas Demarcated and Managed (#)	30
Households Using Improved Wood Stoves (#)	500
River Restoration for Eco-Tourism	2
Water and Sanitation	
Households Using of Ecological Sanitation Latrines (#)	250
Installation of Shallow Wells (#)	15
Lagoon Fishery Resources	
Control of Water Hyacinth (# Communities/Villages)	10
Beetle tanks (# Communities/Villages)	10
Sustainable Agricultural Practices	
Soil & Water Conservation	
Vetiver Nurseries (ha)	3
Contour & Box Ridging (ha)	50
Contour Vetiver Hedgerows (ha)	20
Gully Reclamation (No.)	10
Stream Bank Protection (km)	10

TABLE 1: CHIA LAGOON WATERSHED TARGETS 2004/05 (Continued)

Improved Agronomic & Land-use Practices	
Conservation farming/reduced tillage (# HH)	50
Crop diversification (# HH)	300
Rotations/Intercropping (# HH)	300
Multiplication of Improved seed/planting material (# HH)	300
Soil fertility improvements - compost, agroforestry, manure etc (# HH)	300
Small-scale Irrigation	
Treadle Pumps/Accessories (# HH)	500
Extension/Input Packs (# HH)	500
Enterprise Development	
Agro-Based Products/Enterprises	
High Value cash Crops (# HH)	300
Agro-Processing Plants	
Cassava and Sweet Potato (# processing plants)	2
Groundnuts (# processing plants)	5
Sugar cane Outgrower Assessment (#)	1
Fish Nursery Ponds/Fingerlings (# Clubs)	10
Fish Production ponds (# Clubs)	10
Cotton Marketing (# associations)	1
NRM Products/Enterprises	
Bamboo Assessment (#)	1
Assessment of Potential of Woodlots for Timber/Fuel/Building Needs (#)	1
Bee Keeping/Honey Production (# Clubs)	10
Mushroom Production (# Clubs)	3
Assessment of Potential of Grasses for Thatching/Fencing (#)	1
Guinea Fowl Farming (# Clubs)	30
Cane Rat Farming (# Clubs)	5
Eco-Tourism	
Construction of Hides (#)	2
Construction of Boats (#)	2

Plan of Action

A detailed description of the targeted interventions is provided below with a plan of action for 2004/05 in Annex 1.

1. Decentralization and Effective Devolution of NDA

The project will support the process of decentralization and effective transfer of power to local communities by the following actions:

- Strengthen of existing community-based structures and provide support in forming new ones. In order to facilitate smooth implementation of the sectoral plans of the project, the structures to be strengthened/formed during the current workplan are: Village Natural Resources management Committees, Beach Village Committees, Bee Keeping Clubs, Irrigation Clubs, Small Wild Animal Clubs, Fish Farming Clubs, Wildlife/Environmental Clubs, Tour Guide Clubs/Associations.
- Strengthen of existing and formation of new associations as economic entities for community development.
- Train communities in the project sectoral interventions including business and marketing skills and provision of extension and training materials.

- Facilitate exchange visits and dialogue between communities. In particular, the project plans to set in motion a dialogue between communities in upland areas and those in the lowlands to a) identify factors/practices that have led to the current state of affairs, and b) to agree on a joint plan of action to address the identified problems through a judicial system.
- Support awareness campaigns and environmental rallies through meetings, theatre for development, radio and other media channels to speed up the understanding of the emerging issues of the watershed.
- Strengthen linkages and communication between ward councilors, traditional authorities and members of Parliament in matters relating to development.
- Support policy and by-law formulation/reform with the objective of regulating the use and management of natural resources within the watershed. Although the idea is to make by-laws for the watershed, efforts will be made to influence the district assembly to enact these laws so that they apply to the entire district.
- Facilitate the establishment of village level / community revolving funds/credit schemes. Provision of certain services will either be on a cost-sharing arrangement or full cost recovery. In this regard, communities will be supported to establish revolving funds with the Malawi Rural Financing Company or will be linked to existing micro-financing institutions to access credit for financing some of the business ventures to be initiated through the project.

2. Improved Community-Based Natural Resource Management

The project will support communities to improve their capacity in managing and using natural resources within the project area through the following:

- Facilitate participatory resource assessment and problem analysis.
- Develop community-based action plans that cut across all the sectors of the project.
- Develop an environmental action plan for the watershed area.
- Evaluate potential, and facilitate where appropriate, the transfer of rights and access for NRM from Govt to local communities through co-management agreements.
- Facilitate the development of environmental micro-projects for the area that will implement the targeted CBNRM interventions described below. Communities will be supported through training and provision of inputs/material. Support will be provided through project funds or other sources.

Targeted CBNRM Practices

The following CBNRM interventions are targeted for the current workplan:

i) Multi-Purpose Tree Planting:

- ***Homestead/Boundary/Woodlot Planting*** of multi-purpose trees for fuel, building material, shade, fruit, cash and medicine. This is the most popular technology and communities will be encouraged to plant as many trees and species as possible based on their interests and land availability.
- ***Roadside Tree Planting:*** This is a program to plant avenues of trees along village roads. This is an initiative that is highly attractive among communities because of the limited space available for trees, especially where land available for tree planting is dwindling. Roadside planting will also improve the aesthetics of the village environment, while offering shade and shelter to foot and animal traffic, windbreaks to bordering farms, protection of road verges from erosion, and wood products for use by the community.

- ***Streambank Protection/Planting:*** This will be achieved through natural regeneration/protection of existing vegetation and tree/vetiver grass planting on strips of land along banks to stabilize stream flow and to reduce the risk of flooding, siltation, land slides and loss of arable land. Community leaders will be encouraged to formulate by-laws against cultivation and cutting down of trees along the designated strips of land. The project will facilitate identification of hot spots along the rivers and prioritize these for intervention.

- ***Natural Tree Regeneration/Protection:*** Apart from encouraging the community to plant new trees, the project will also emphasize the need to preserve natural woodlands and to protect other land areas and farms from indiscriminant tree cutting. In addition, those with existing woodlands will be urged to enrich such areas by planting both indigenous and exotic trees. The principle aim is to encourage natural regeneration of trees in a manner that is sustainable and compatible with other forms of land use, such as cultivation. Communities in the project site will be supported in forest resource assessment and demarcation, management and utilization of the village forest areas.

ii) Safe Water and Ecological Sanitation

Many rural villages in the project area have no access to clean water, which presents a huge health risk to the villagers, especially children. The distance to water points at streams and hand-dug wells also increases labor and time by girls and women to collect water for household use. These factors have tremendous impacts on the productivity and wellbeing of households. As a result, simple covered shallow wells will be introduced in the most desperate villages, each equipped with a hand-operated pump that is easy to install and maintain by the villagers themselves. The cost of the pump and its installation is approximately $400.

Ecological sanitation is a new initiative aimed at improving sanitation in addition to providing manure from decomposed fecal matter and reducing deforestation. This program is being implemented with support from Water Aid, a UK based international NGO. The technology involves digging a pit 1 m wide by 1 m deep which is covered with a dome-shaped concrete slab. The cost of the slab is $4. A temporary structure is erected around the latrine for privacy. Each time the pit latrine is used, a handful of wood ash mixed with soil is dropped into the pit from a bucket inside the latrine. This speeds up fecal decomposition and reduces odor and flies. The pit has a retention time of about 6 months. Thereafter, the slab is moved to another pit, along with the structure around it. Once decomposed, the waste can be used as manure for fruit trees or vegetables. The practice also helps reduce use of wood for covering pits.

iii) Planting of Local Bamboo Species

Local bamboo (*Oxytenanthera abyssinica*) is a type of bamboo that produces more solid stems relative to the exotic bamboos which are hollow. Although small in diameter, the stems of this species are relatively strong, making it valuable in constructing the roofs of houses and farm sheds. It is also used for making tobacco ties, granaries, fences, mats, baskets, and furniture. Local markets for these products are huge and growing, and some are even being exported to Europe. However, growing demands for local bamboo are depleting available supplies.

This situation offers a lucrative opportunity for rural communities to grow bamboo as a commercial enterprise, while simultaneously meeting local construction needs. The options available include supplying raw materials to traders and craftsmen, or to encourage the development of these enterprises at the village or household level. As such, the propagation of local bamboo is targeted as an important component of the project, not only to increase income among targeted communities, but to sustain the supplies and to reduce the felling of trees for wood, hence reducing negative impacts on forest resources.

The project will support communities through training and provision of planting materials.

iv) Improved Wood Stoves

The use of woodfuel in rural areas is by far the largest form of wood consumption in Malawi. In 2003, it involved 5.4 million m^3 which is 56% of the total wood consumption in the country. Consequently, a strategy is needed to reduce destructive forms of wood consumption through more efficient methods of using it, or by providing alternative sources of energy. The latter at present is not a plausible option in rural areas due to cost and supply implications for alternative fuels. Given the realities of the rural situation, our proposed strategy involves introducing simple fuel-efficient stoves into the targeted communities using models made from local materials. The kitchen mud stove recommended has a fuel saving efficiency of 35-70%, and can be made by one adult in half a day. Demonstrations will be staged to increase public awareness and interest in the wood stove. The savings in wood used as well as in the time for its collection, are expected to dramatically increase the demands and social acceptance of the wood stove. Savings in labor will allow women to engage in other more productive chores, and to increase school attendance by girls. This will allow for rapid expansion of its use in subsequent years. In addition to the kitchen mud stove, selected local tinsmiths will be trained to construct and market the portable ceramic stove, another opportunity for income generation for rural households.

v) Improved Management of the Lagoon's Fishery Resources

The project will support communities around the Lagoon in improved use and management of the fishery resources in terms of training in sustainable fishing methods, fish processing and marketing. The project will also support communities in the following:

- Formation of a Lagoon Fishing Association that will coordinate the activities and business interests of the Village Beach Committees.
- Strengthen the operational capacity of Beach Village Committees and their ability to enforce the defined community by-laws for fishery resources.
- Designate selected lagoon sanctuaries to protect breeding/nursery grounds as part of the water catchment area management. Protecting these areas will potentially open them up for eco-tourism with bird and hippo watching.

vi) Removal of Water Hyacinth

During the current workplan, the Fisheries Department at NDA will mobilize the communities around Chia Lagoon in controlling the water hyacinth (*Eichhornia crassipes*). Water hyacinth has become an invasive species in the area and its extensive and vigorous growth in the lagoon is having a severe impact on access to water, navigation, irrigation, fish breeding and water quality in general. The project will support communities to control this weed through both physical and biological means. Physical operations will involve simple harvesting tools. Biological control will involve a specific type of beetle reared in tanks located within the lagoon area.

The project will further investigate the use of the harvested material as medium in the production of mushrooms, for compost making and as feed for livestock.

vii) River Restoration

In Chia watershed, Likoa and Bambara rivers are plagued by the presence of reeds and water hyacinth. These reeds and water hyacinth restrict the flow of water in rainy season, thus contributing to the flooding of Mpamantha irrigation scheme. The river restoration is a two fold solution both for clearing the reeds and hyacinth and prevention of soil erosion. It is believed

that clearing of hyacinth compliments soil conservation measures to be implemented by agriculture department. Northern Chia section is a habitat for a lot of birds, clearing the reeds and hyacinth will facilitate the movement of boats along the rivers and facilitate bird watching. WESM, Dwangwa will involve tourism clubs in clearing these reeds and hyacinth. This activity provides labor income to the local communities. Tourism clubs will be provided with boats and selected members will be trained as guides for bird watching. Clearing of rivers, construction of hides for bird watching, provision of boats and training of guides will contribute to the development of eco-tourism in Chia area.

3. Sustainable Agricultural Practices

The project will facilitate the development of sustainable agricultural production systems in the Chia Lagoon Watershed. This will be achieved through research investigations, training inputs/materials and technical supervision in the implementation of improved agricultural crop production practices. These will include small-scale irrigation, improved crop husbandry practices, crop diversification, soil and water conservation, conservation farming and soil fertility improvement.

Targeted Practices

The following sustainable agricultural practices have been targeted for the current workplan:

i) Crop diversification

The project will provide support in sustainable rapid multiplication of planting materials in primary multiplication and distribution centres which will supply to smallholder commercial multipliers. Priority crops for this include beans, cassava, sweet potatoes and bananas. Use of irrigation technology will allow this to happen. Agricane in collaboration will local agriculture staff, the Southern Africa Roots and Tubers Network (SARNET) and the International Centre for Tropical Agriculture (CIAT) will assess potential for growing of these and other crops in the area, conduct demonstrations of best agronomic practices and provide training to communities which will include production of user-friendly extension materials.

ii) Small-scale Irrigation

Over the last 5 years, government has placed irrigation as a high priority on its development agenda. This has resulted in a shift in modality from large-scale, government controlled, single crop schemes to small-scale highly diversified farmer managed systems.

This workplan specifically aims at building the capacity of rural communities to use treadle pumps, water harvesting techniques, stream diversion, and harvesting runoff into storage ponds for irrigation. These are all simple low cost methods that depend largely on gravity for the supply of water to crops. Their attractiveness to realize the untapped potential of irrigation in Malawi lies in the fact that they possess features ideally suited to smallholders, namely:

- technology appropriateness and affordability, even among the rural poor
- firm control and ownership by communities and individual households
- simple to use and maintain
- require no costly external sources of energy
- socially acceptable among all groups
- potential to increase productivity, food security, income and wealth
- potential to meet market demands and growth
- potential for adding value from products/services derived through irrigation
- better market linkages and access to other interventions
- potential to generate employment
- high interest by government, NGOs and the donor community

There are 5 core aspects to the developing smallholder irrigation within this project:

- Selection and introduction specific technologies (including field testing) linked to the crop farming systems appropriate for each target site.
- Creation, development, support and monitoring of the supply chain.
- Training and extension in setting up and using irrigation systems.
- Outreach support and promotion to others–government, private sector, NGOs etc.

Properly managed, these systems of irrigation can greatly improve household food security, incomes, nutrition and health on a sustainable basis without detrimental effects to the environment.

Treadle Pump Irrigation

TLC has taken a lead role in developing practical application of the treadle pump in Malawi, which includes the production of training and extension materials that are being widely used by government agencies, NGOs and donor funded projects. The system operates on the principle of pumping water manually from a low to a high point from which it flows by gravity through a system of channels to irrigate crops. It is especially suited to upland areas on plateaus, or in bottomlands where ready supplies of surface water can be pumped manually to irrigate nearby areas of crops.

The model developed and used successfully by TLC, and which is now being promoted widely with many NGOs and donor projects, involves the following key elements:

- Villages form irrigation clubs based on interest, commitment and available resources.
- Clubs establish and manage a revolving fund in an interest-bearing bank account.
- A limited injection of irrigation equipment and inputs are provided with intensive to each club to kick-start irrigation activities and operation of the revolving fund. This enables the clubs to expand and sustain irrigation activities on their own.
- Club members receive loans from the revolving fund for an irrigation package after making a deposit with agreement to pay off the loan within 12 months into the village revolving fund.

TLC will provide support to communities to acquire treadle pumps using the approach explained above. It is planned that a total of 800 treadle pumps will be bought during the current workplan, 500 of which will be contributed by the alliance. Support will also include intensive training and farmer to farmer extension.

Stream Diversion, Water Harvesting and Storage

The basic premise of this system is to divert water from rivers or streams when in full flow during the rains or 'high water' period to capture "surplus" water that would otherwise end up in lakes or swamps. The key principle is to store water derived from streams during the rainy season. Given the enormous quantity of water that passes through the watershed's rivers and streams, this system has great potential to provide water to irrigate large areas through low-cost, gravity-based systems. When combined with some basic measures of tree planting and soil conservation (e.g., streambank protection, reduced tillage, contour ridging and vetiver hedges), this system also provides a mechanism to keep water in the uplands as a means to re-charge ground water supplies and to reduce downstream problems of flash floods, erosion and siltation.

Agricane with the support from TLC, will evaluate the potential of stream diversion and water harvesting in the project area with the aim of mobilizing the community to harness this potential. Agricane will also evaluate the potential for rehabilitating Mpamantha irrigation scheme for use by smallholder farmers.

Drip Irrigation

Under drip irrigation water is filtered through a pipe running parallel with planted crops, from a larger mainline pipe, and is emitted in minute, precise amounts at pre-calculated intervals. Several forms of drip irrigation exist and trials will define the most appropriate configuration for each crop to be supported. The most recent version of this system, developed by IDE in India and called Easydrip or KB Drip, has lowered costs dramatically (estimated at approximately $12 per 100 m^2 of area irrigated for the system itself) and made growing with drip irrigation a lucrative option for most smallholder products.

Results so far in Zambia and Zimbabwe have shown that use of drip irrigation reduces amount of water needed, reduces labour requirement, allows precise application of relevant chemicals, reduces disease incidence and has a substantial impact on productivity. While standard plot sizes in India are around 1,000 m^2, the technology can be used down to garden sizes as small as 20 m^2. This makes drip irrigation ideal for household gardening and particularly for those families that are vulnerable, need improved nutrition, have limited labour or are affected by HIV/AIDS.

TLC in partnership with Actionaid, Malawi and International Development Enterprises (IDE) is evaluating the water use efficiency, labour costs and crop yields of the 100 m^2 drip irrigation system in comparison with the treadle pump. Under the same partnership, other drip systems will be demonstrated. These include the easy drip, family nutrition kit and the 500 m^2 systems. Depending on the outcome of these experiments, TLC plans to promote drip systems in the project area as an alternative to the other forms of irrigation.

iii) Soil Improving Agroforestry Practices

- ***Undersowing of Tephrosia species*** (fish bean) with maize will target selected households as a means to demonstrate visible results and proper management before promoting it on a wider scale in the project area.
- ***Improved fallows of Tephrosia.*** Based on past experiences and results, this practice will be promoted on a more aggressive scale to restore soil fertility at a faster rate, with a focus on land that is no longer productive to farm. In the first year, farmers will intercrop *Tephrosia* with crops on land that will be left idle or fallow in the following year.
- ***Dispersed Systematic Interplanting of soil improving trees.*** Greater efforts will be made to promote this technology in all sites with emphasis on *Faidherbia albida, Acacia polyacantha, Acacia galpinii* and species of *Albizia*. Those who have these trees growing naturally in their fields will be encouraged to protect them. In addition, community leaders will be asked to establish or re-enforce by-laws against felling *Faidherbia albida*.

iv) Soil and Water Conservation

Soil and water conservation will focus on 4 practices to reduce water runoff and loss of topsoil:

- ***Contour ridging*** through pegging and construction of marker ridges using a line level, followed by re-alignment of planting ridges.
- ***Vetiver nurseries*** will be established on communal and individual land for planting on contour lines in subsequent seasons.

- ***Contour vetiver hedges*** will be established on a limited scale until more material is available from community/individual nurseries.
- ***Gully control*** with check dams of brushwood/stones and vetiver hedges.

All will be augmented with tied/box ridges and raised footpaths on field boundaries.

v) **Conservation Farming/Minimum Tillage**

Conservation agriculture (CA) aims to conserve, improve and make more efficient use of natural resources through integrated management of soil, water and biological resources combined with external inputs. Soil compaction, erosion and run-off are significant problems of tilling the soil. Conservation farming offers a unique opportunity among rural households by providing more stable yields, particularly in dry years, increasing profits and reducing demand for labor, time and farm power and cost of production. Globally, conservation farming helps in carbon sequestration, reducing erosion, minimizing leaching of nutrients and recharging aquifers through better infiltration.

During the current workplan, TLC will collaborate with the Conservation Agriculture Project being coordinated by the International Maize and Wheat Improvement Centre (CIMMYT), Zimbabwe and Chitedze Research Station to demonstrate best practices for conservation agriculture. These will include:

- Farm planning and crop rotations
- Management of crop residues and cover crops
- Zero tillage and direct planting
- Pest, weed and soil fertility management

4. Enterprise Development

During the current workplan, the project plans to investigate and develop both agricultural and natural resource based enterprises with the aim of increasing incomes of the communities within the watershed. The following activities will be carried out to investigate/develop enterprises in the project area:

- The project will use the sub-sector analysis approach (SSA) to ensure that communities select the best enterprises for investment of their time and meagre resources. The approach will also identify the most appropriate market and production opportunity to take forward as well as the constraints that may exist. The assessment will help to identify a particular sub-sector, market players within sub-sectors and their roles and interrelationships and determine key issues/constraints hindering the growth and development of the sub-sector. This will also help determine which business service can best address the constraints of the sub-sector.
- Conduct input/output market research to establish demand for specific products and develop market growth strategies for communities to penetrate the market. This will include the ability to add value through basic processing and packaging of products involving the organization of special interest groups/economic units for increased efficiency and competitiveness. It will also leverage opportunities to become more vertically integrated into the market chain through linkages with other producer groups and private sector firms, including small medium entrepreneurs (SMEs) engaged in marketing and processing.
- Facilitate market linkages by providing information such as market trends, prices, names & addresses of buyers. Facilitate meetings between the producers and large production chains, intermediaries and other players for market access.

- Design and develop promotion as well as communication strategies and support communities to come up with activities for implementation through different channels such as press, radio, print, trade shows for publicity and promotion of the finished products.
- Support formation of business associations/ co-operatives to enable them, through business counseling, development of self-management and business knowledge/ skills, increase their (member) income.
- Support the development of market information system for both communities and buyers.
- Provide technical support in finance and business administration through one-on-one business counseling, business health checks and business and marketing skills development.

Potential Enterprises to be Investigated/Developed

i) Agro-Based Enterprises/Products

- **Production of high value crops** under irrigation which will include growing of winter beans, vegetables, green maize, paprika, bird's eye chilies and rice.
- **Agro-processing** of the following products:

  i) **Sweet potatoes:** The importance of sweet potatoes as a food crop has increased with declining maize production levels due to high cost of production. The crop yields well even in soil with marginal fertility levels. Sweet potatoes mature within a period of 3 to 4 months. Women and children especially like the crop and it matures during the food lean period. Opportunities now exist for value adding through processing into flour and grated chips. The flour can also be mixed with wheat flour and used to bake biscuits in confectionary industries.

  ii) **Cassava:** Cassava is an important food crop in Malawi, but the national demand for cassava is yet to be met. Although it is extensively grown in the project area, its integration varies from area to area depending on the level of adoption of the crop as a staple or a cash crop. Key factors to consider include the following:

  - Cassava production is constrained by lack of available and sustainable disease and pest free planting materials.
  - To expand production, sustainable systems to rapidly multiply and distribute planting materials are required by commercial smallholder growers, aided by access to irrigation.
  - Commercial and sub-regional demand is rapidly increasing mostly from the timber industry, bakeries, supermarkets and export market in south Africa.
  - There is an expanding national and regional market for cassava starch for manufacturing glue and cassava silage for livestock feed.
  - New technology to support commercialization is now available. Locally made graters are estimated to cost about US$100 per machine and can be used to produce chipped cassava and cassava flour to cost about US$8 per 25 kg bag. The need to diversify cassava recipes for urban consumption has created demand for new technology. Promotion of technology use and access will also enhance food security at household and national level. Private entrepreneurs will be identified to stock processing equipment in response to demand and provide spare part supply. The project will cooperate with the Southern Africa Roots and Tubers Network (SARNET) in technology transfer which is currently working with communities in the project area. This also applies to sweet potatoes.

iii) **Groundnuts:** Groundnut production and supply has increased in recent years with the bulk of the crop being sold raw within the country and for export. Groundnuts have traditionally been used in local diets by being pounded into a paste for cooking with various dishes. Industrial processing has been restricted in urban centres, but there are strong local and external markets for processed groundnut oil and paste. There are proven low cost technologies to process groundnuts into paste developed by ITDG in Zimbabwe at an investment cost of about US$45. Market prices for raw groundnuts range from 50-80 cents per kg. Processing will usually double these returns. A farmer with 1,000 m^2 is likely to produce up to 200 kg. This is an ideal project initiative to implement through farmer associations into the export market and to link with small scale entrepreneurs in the private sector. The project will work with International Centre for Research in the Semi-Arid Tropics (ICRISAT) to demonstrate best practices, including processing of the product.

iv) **Sugar cane:** The project will evaluate potential for an outgrower scheme with ILLOVO and other potential growers/producers to grow and process sugar cane under smallholder conditions within the project site.

v) **Selling of fingerlings and fish in production ponds:** This will involve breeding fingerlings of desired fish species in nursery and breeding ponds with support to communities in establishing the fish ponds through training in pond construction, management and provision of stock and inputs/materials.

vi) **Marketing of cotton:** There is potential to form farmer associations to sell cotton direct to the principal buyers in the district, which require strong bargaining skills by farmers. The project will work through local agriculture staff to strengthen the existing Cotton Growers' Association located in Mwansambo. This will be done in partnership with the National Smallholder Farmers' Association of Malawi (NASFAM) which is starting new operations in the area.

ii) **NRM-Based Enterprises/Products**

- **Timber/fuel production:** During the current workplan, the project will assess potential for timber production from premium hard woods in managed woodlots and from woodlots to meet local demands for fuel and building materials.
- **Local bamboo for construction and craft making:** Use of bamboo in construction and craft making is becoming increasingly popular among communities. The potential for this enterprise will be explored and interested groups and individuals will receive training.
- **Grass thatching:** There is great potential for use of grass species in the building sector, in particular for roofing of lodges, houses and other structures. This will be explored and interested communities / individuals will be trained in the business.
- **Bee keeping, honey processing and marketing:** WESM in collaboration with the Parks and Wildlife Department, will support formation and strengthening of bee-keeping clubs. The project area is an ideal location for bee keeping because of the presence of a wide range of tree species and plants with flowers attractive to bees. The project will provide input and training support in apiary site selection, material for hives, hanging of hives, and in the collection, processing and marketing of honey. Institutional aspects like management of a club and basic book keeping will also be addressed in training programs. Local markets for selling the product will be explored and promoted.
- **Cane Rat farming:** Domestication of the cane rat (*Thryonomys swinderianus*) will be explored and demonstrated in the project sites with the aim of maximizing meat production and incomes from the marketing of the animal. The project will evaluate its acceptability within the local cultural set-up and will provide support in terms of inputs, breeding stock and training in cage construction, rat rearing and marketing. Lessons will be drawn from

the Saopampeni Cane Rat Farming Organization in Traditional Authority Khombeza, Salima District which was supported under COMPASS I.

- **Guinea fowl farming:** To reduce the over fishing in the lake and poaching of forest resources, guinea fowl rearing is an appropriate activity in the target area. It provides an alternative income and nutritious food to the community. It is also an easy and convenient activity. During the current workplan, the project will form guinea fowl rearing clubs in the target area which will be supported with inputs and training in collection of eggs, procurement of birds, breeding of birds, establishment of "Kholas"(bird house) for birds, feeding of birds and marketing of birds.
- **Mushroom production:** Mushroom production is a highly lucrative business but limited in scale due to lack of technical knowledge and business skills. During the current workplan, the project will provide support to establish 3 demonstration units in the project area, including use of the water hyacinth as medium for growing of the crop. Targeted communities/individuals will be supported with materials and trained in construction of mushroom houses, substrate formation, substrate processing and spawning, incubation, fruiting, harvesting, packaging and marketing.
- **Eco-tourism** will be undertaken in partnership with local businesses specializing in the hospitality industry (Njovu Safari Lodge, Sani Lodge, Nkhotakota Pottery).
  - i) The Northern area of Chia Lagoon is regarded as an excellent area for bird watching and viewing hippos. The project will restore the river habitat by clearing some of the reeds on the Likoa and Bambara Rivers. This will increase water flow, allowing boats to cruise up and down the rivers.
  - ii) Hides will be constructed at strategic locations around the many pools and reeds along these rivers for use by bird watchers.
  - iii) Wooden boats will be built for use by bird watchers and fishermen visiting the area.
  - iv) Discussions will be held with the Chia Beach Committees to issue fishing licenses for visitors to the area at an agreed fee for specified seasons. Only line rods will be permitted, and limits will be set for the number of fish caught per day by species. Young fish and protected species will be released. The set up will be adapted from the system used on the Bua river in Nkhotakota Game Reserve.
  - v) Local people will be trained as guides and given flat bottom plank boats where tourist can be dropped off and given a tour by the local people. For facilitating this process tourism clubs will be formed in the communities.

MONITORING AND EVALUATION PLAN

WSU will prepare and submit three copies of a draft Monitoring and Evaluation (M&E) plan to the USAID CTO 60 days after the effective date of this Award. WSU will consult with the USAID CTO in developing the M&E plan, which will cover the full period of the project and will include, but not necessarily be limited to, the following:

- the results and targets to be achieved in line with the targets specified in this workplan and the project document;
- the indicators and benchmarks to be used to measure achievement of the results;
- the method of data collection to be used to obtain the indicator data including the frequency/timeframe involved.

USAID will review the draft M&E plan and provide comments/suggestions within 30 days of receipt. WSU will then submit three (3) copies of the final M&E plan to the USAID CTO not later than 15 days from receipt of USAID's comments/suggestions.

Annex 1: Chia Project Plan of Action, October 2004 - September 2005

	ACTIVITY	TIMEFRAME 2004 Oct	Nov	Dec	2005 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Responsible Party
1.0	**Project Start-up Activities**													
1.1	Develop 2004-05 AWP & Budget													WSU
1.2	Brief Nkhotakota District Assembly members													NDA
1.3	Recruit staff													TLC
1.4	Set up Offices at NDA													NDA
1.5	Establish project management & implementation committees													COSPE & NDA
1.6	Conduct sensitization meetings with communities													NDA/WESM
1.7	Conduct stakeholders' briefing workshop & project launching													COSPE
2.0	**Decentralization and Effective Devolution of NDA**													
2.1	Form/strengthen community-based structures													
	Village Natural Resource Mngt Committees (VNRMC)													NDA-Forestry
	Village Beach Committees (VBC)													NDA-Fisheries
	Bee Keeping Clubs													NDA - NPWL
	Irrigation Clubs													NDA-Agric
	Fish Farming Clubs													NDA-Fisheries
	Small Wild Animal Clubs													NDA-NPWL
	Mushroom Production Clubs													BCA
	Environmental/Wildlife Clubs													WESM
	Tour Guide Clubs/Associations													WESM
	Community Associations/Cooperatives													BCA
2.2	Facilitate exchange visits/dialogue between communities													NDA
2.3	Organize & manage awareness campaigns and environmental rallies													WESM
2.4	Strengthen linkages/communication between ward councillors, TAs, MPs, & communities													COSPE
2.5	Support policy & bye-law formulation/reform to regulate use and management of natural resources													NDA/TLC
2.6	Support establishment of community-based revolving funds/credit schemes													NDA/TLC
3.0	**Improved Capacity for Community-Based NRM**													
3.1	Facilitate participatory resource & problem analysis													NDA/WESM
3.2	Facilitate development of community action plans													NDA/WESM
3.3	Develop an environmental action plan for the area													NDA/WESM
3.4	Facilitate development of environmental micro-projects													WSEM
3.5	Improved CB Management of Chia Land/Forest Resources													
	Evaluate potential, and facilitate where appropriate, the transfer of rights and access for NRM from Govt to local communities through co-management agreements													NDA-NPWL
	Support establishment of community tree nurseries													NDA-Forestry
	Provide technical support in tree outplanting & mangt; bamboo planting; regeneration/protection of natural woodlands & streambanks; improved wood stoves													NDA-Forestry
3.6	Improved CB Management of Chia Water Resources													
	Identify and prioritize river hot spots													WSEM
	Support communities in river / streambank restoration activities													NDA-Forestry
	Construction of shallow wells													NDA-Water
3.7	Improved CB Management of Chia Fisheries Resources													
	Support communities to control water hyacinth through physical & biological methods													NDA-Fisheries/WESM
	Designate sanctuaries to protect important fish breeding/nursery grounds													NDA-Fisheries
	Support building of CB nurseries & production ponds for aquaculture													NDA-Fisheries

Annex 1: Chia Project Plan of Action, October 2004 - September 2005

	ACTIVITY	TIMEFRAME												Responsible Party
		2004			2005									
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
4.0	**Sustainable Agricultural Practices**													
4.1	Crop Diverification													
	Assess alternative/viable crops													AgriCane
	Supply planting materials for multiplication/crop diverification													TLC
4.2	Small-scale Irrigation													
	Evaluate irrigation potential in the area and design appropriate interventions													AgriCane
	Provide extension support with irrigation equipment and inputs to club members													TLC
	Stream diversion - support, tools													TLC
	Water harvesting/storage ponds (mechanical)													TLC
4.3	Soil & Water Conservation/Conservation Farming													
	Planting material / transport establishment of community vetiver nurseries													NDA-Agric/TLC
	Provide technical support in contour farming, conservation farming & gully control													NDA-Agric/TLC
4.4	Agroforestry Practices													
	Provide technical support in soil fertility interventions, compost making & rotations													NDA-Agriculture
	Support communities in promotion of ecological sanitation													TLC
5.0	**Enterprise Development**													
5.1	Evaluate / develop enterprises													
	NRM-based products:													
	Timber/fuel production													BCA
	Local bamboo for construction and craft making													BCA
	Grasses for thatching													BCA
	Mushroom production													BCA
	Bee keeping & honey processing and marketing													WSEM
	Cane rat farming													BCA
	Guinea fowl farming													BCA
	Eco-tourism (e.g., bird/game viewing, hiking/camping, fishing, boats, hides etc)													WSEM
	Agro-based Products													
	Support development of micro-irrigation of high value crops													BCA
	Agro-processing of cassava, sweet potato, g/nuts, horticultural crops, fruits, rice etc													BCA/AgriCane
	Sugarcane outgrower scheme with Dwangwa Cane Growers Limited													BCA/AgriCane
	Selling of fingerlings and fish produced in community ponds													BCA-NDA-Fisheries
5.2	Conduct market research													BCA
5.3	Facilitate market linkages													BCA
5.4	Promotion of finished products													BCA
5.5	Support formation of business associations/cooperatives													BCA/COSPE
5.6	Support development of a market information system													BCA
5.6	Provide technical support in financial and business administration													BCA

Annex 1: Chia Project Plan of Action, October 2004 - September 2005

	ACTIVITY	TIMEFRAME												Responsible Party
		2004			2005									
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
6	**Training**													
6.1	Conduct a hands-on orientation training for project field workers				■									TLC
6.2	Train community leaders and staff in NRM related Acts/Policies							■	■					NDA
6.3	Train community leaders in by-law/constitution formulation and enforcement							■	■					NDA
6.4	Train staff in sustainable use, co-management of natural resources and GPS, conservation farming							■	■					NDA
6.5	Train communities in specific sector interventions													
	Agroforestry, soil conservation/conservation farming			■								■	■	TLC
	Nursery management, tree & bamboo outplanting, improved wood stoves, solar cookers			■								■	■	TLC
	Small-scale irrigation systems					■	■	■	■	■	■	■	■	TLC/AgriCane/NDA
	Shallow well operation & maintenance					■	■	■	■	■	■	■	■	NDA Water
	Management of revolving funds					■	■	■	■	■	■	■	■	BCA
	Ecological sanitation							■						WESM
	Sustainable agronomic practices			■	■	■	■	■	■	■	■	■	■	NDA-Agric/AgriCane
	Bee keeping						■	■						NDA-NP/WESM
	Mushroom production						■	■						BCA
	Guinea fowl and cane rat farming						■	■						NDA-NP/WESM
	Eco-tourism/tour guiding								■					NDA-NP/WESM
	Fish farming					■	■							NDA-Fisheries
	Sustainable fishing methods and fish processing					■	■							NDA-Fisheries
6.6	Training in basic business and marketing skills					■	■							BCA
6.7	Development of Extension Materials across all the above areas				■	■	■	■	■	■	■	■	■	Alliance
7.0	**Monitoring & Evaluating Project Activities & Impacts**													
7.1	Produce base maps of the area using GIS				■	■								TLC
7.2	Conduct land use/cover change analysis using satellite data and API				■	■	■	■	■					TLC-AgriCane
7.3	Identify "hot spots" in the watershed to prioritize interventions				■	■	■	■	■					TLC-AgriCane
7.4	Conduct hydrographic survey of the Lagoon			■						■				NDA-Water
7.5	Carry out water quality analysis of the Lagoon			■	■			■				■	■	NDA-Water
7.6	Establish new water level gauging stations								■	■				NDA-Water
7.7	Monitor water flow/level in designated rivers and the lagoon			■	■	■	■	■	■	■	■	■	■	NDA-Water
7.8	Conduct framework for fishing gear and boats			■										NDA-Fisheries
7.9	Collect data on fish catches and fish marketing/prices			■	■	■	■	■	■	■	■	■	■	NDA-Fisheries
7.10	Support communities in enforcing by-laws in CBNRM			■	■	■	■	■	■	■	■	■	■	NDA
7.11	Facilitate CBM&E surveys to evaluate progress/results				■	■								TLC
7.12	Design and produce database on adoption of interventions/NRM pactices by village/area				■	■	■	■						TLC
7.13	Project Management Committee Meetings		■	■	■	■	■	■	■	■	■	■	■	COSPE
7.14	Project Implementation Committee Meetings with DESC		■	■	■	■	■	■	■	■	■	■	■	NDA
7.15	Produce monthly financial reports			■	■	■	■	■	■	■	■	■	■	WSU
7.16	Produce quarterly progress reports				■			■			■			WSU
7.17	Conducting surveys + producting State of Environment report										■	■	■	NDA
7.18	Annual Review and Planning Meeting										■	■		COSPE
7.19	Produce annual report											■		WSU
7.20	Produce 2005-06 annual workplan												■	WSU