GLOBAL ENVIRONMENT FACILITY

PROJECT BRIEF RAF/95/G47

Desert Margins Initiative: Carbon fixation and measures against desertification in the fragile desert margins

DRAFT PROJECT BRIEF FOR THE

UNDP GLOBAL ENVIRONMENT FACILITY

REGIONAL BUREAU FOR AFRICA

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Project Title	:	Desert Margins Initiative: Carbon fixation and measures against desertification in the fragile desert margins.
GEF Focal Area	:	Climate Change, Bio-diversity

Country Eligibility (Ratification of Convention as at 31 July 1995) :

Country	Climate change	Bio-diversity
Botswana	✓	✗
Burkina Faso	✓	✓
Kenya	✓	✓
Mali	✓	✓
Namibia	✓	✗
Niger	✓	✓
Senegal	✓	✓
South Africa	✗	✗
Zimbabwe	✓	✓

Total Project cost	:	US $25,000,000
GEF Financing	:	US $12,500,000
Counterpart Financing (national governments)	:	To be determined
Co-financing	:	US $12,500,000 (CGIAR donors contribution)
Associated Projects	:	None
GEF Implementing Agency	:	UNDP
Executing Agency	:	UNOPS with ICRISAT Sahelian Centre
Local Counterpart Agencies	:	Sub-regional organisations ASARECA, IGADD, SACCAR, INSAH NARS/NGOs INERA, Association Six-S (Burkina Faso); ARDTL (Botswana); CHF (Canada); KARI & ELCI (Kenya); IER (Mali); INRAN (Niger); MoAWRDRT (Namibia); ISRA & PRP du CILSS (Senegal); DRSS (Zimbabwe)
Estimated Starting Date	:	October 1996
Project Duration	:	5 years
GEF Preparation Costs	:	US $ 25,000

1. COUNTRY/SECTOR BACKGROUND/CONTEXT

The Desert Margins Initiative (DMI) brings together a multi-disciplinary consortium of key national and international partners to combat desertification, climate change and loss of bio-diversity by focusing on improved land use and carbon sequestration in degraded lands in sub-Saharan Africa. Desertification is now recognised as a major worldwide problem following the international Convention to Combat Desertification (CCD). The CCD established that desertification is a form of progressive soil and vegetation degradation in arid lands, not just outright conversion to desert, to which both human and climatic factors may be contributing. There is a strong link between climate and land use practices which affect surface energy balance (e.g. albedo), soil moisture and atmospheric dust composition. The dramatic decline in Sahelian rainfall, by up to 50% since the 1950s, constitutes some of the strongest evidence for this link between land degradation and climate change. Poor land use practices can also affect the global carbon balance, e.g. via decreased carbon sequestration associated with reduced vegetation cover and soil erosion and grassland and fuel wood burning. Biomass burning in drylands has been estimated to contribute 10 to 15% of the total greenhouse gas emissions from all sources.

Desertification also decreases bio-diversity through the loss of dryland habitats, crops, animals and genetic diversity in dryland plants and micro-organisms. Many of humanity's most important food crops, such as barley and sorghum, originated in drylands. In the US today one third of all plant derived drugs comes from drylands. Land management practices which degrade vegetation and lead to soil erosion will also increase sedimentation of rivers and lakes, thereby contributing to the degradation of international waters. According to the Worldwatch Institute, 24 billion tonnes of soil are lost each year.

The scale of desertification, also referred to as dryland degradation, is immense. The total area of arid, semi-arid and dry sub-humid drylands (5.2 billion hectares) cover 40% of the Earth's land surface. Vast areas of these drylands, somewhere between 1 and 3.6 billion hectares are thought to be suffering some degree of degradation. The areas affected encompass over one hundred countries and some 900 million people, who are suffering from the adverse social and economic impacts of dryland degradation. The majority of these people depend on rainfed agriculture which is particularly vulnerable to climate change. The extent of land degradation is most severe in the arid and semi-arid areas in sub-Saharan Africa, where one third of the entire global area of dryland soil degradation is to be found, Figure 1. These arid and semi-arid zones have very low rainfall (100 - 600 mm rainfall per year), are prone to frequent drought and have high average temperatures and evaporation rates. In consequence annual rainfall is only a small fraction of annual potential evaporation (0.05 - 0.65), so water is almost always in short supply.

In the nine countries participating in the DMI (Niger, Burkina Faso, Mali, Senegal, Botswana, Namibia, Zimbabwe, South Africa and Kenya), there are 120 million people, most of whom are very poor, with per capita GNPs below 1000 $ and life expectancy of only 40 - 45 years. These countries have some of the highest population growth rates in the world (2.4 - 3.6% per annum), yet at the same time, cereal production per unit area of land in the driest countries is very low (typically ~ 500 kg per hectare). There is therefore an escalating pressure to increase food production at the expense of depleting and degrading natural resources. The need to find sustainable solutions is most acute in sub-Saharan Africa, in areas of high land degradation bordering the Sahara and Kalahari deserts.

The four main proximate causes of dryland degradation, all of which can lead to a loss of vegetation cover and soil erosion, are (1) overgrazing, (2) over-cultivation and use of marginal land, (3) deforestation and (4) mismanagement of irrigated land. Overgrazing is largely the result of increasing livestock numbers in combination with a steady decline in rangeland area. As the demand for food increases with population, over-cultivation occurs in traditionally good arable land where the fallow period is reduced or even abandoned. More marginal land supporting natural vegetation, which is often not suitable for sustained cropping, is also cleared. Deforestation, or in general the destruction of perennial woody species, occurs because too much wood is removed for use as fuel and in building. Irrigated lands have a long history of mismanagement which has led

to a loss of productivity due mainly to salinization of the soil. The root causes of desertification are therefore embedded in poverty and population pressure, so in addition to looking at the technical issues it is also necessary to examine farmer and community incentives to adopt improved resource management practices. To evolve effective and sustainable solutions to desertification there is therefore a need to understand the root causes, the extent and rates of expansion of land degradation and the physical mechanisms involved in order to avoid any further detrimental climate change and loss of bio-diversity.

The proposals set out in the DMI are consistent with the National Development, Strategic, Conservation and Resource Management Plans of the participating countries. For example, the National Conservation Strategy of Botswana, adopted by the National Assembly in 1990, identified degradation of rangeland pasture resources, depletion of wood resources and over exploitation of dryland products as three of the five main environmental problems in the country. The Senegal National Strategic Plan for Resource Management calls for an evaluation of traditional and improved land use practices, the role of livestock in pasture degradation and fertility and soil water management and improvement techniques. In Kenya there is a National Secretariat for the Environment, a National Environmental Action Plan (NEAP) and an inter-ministerial committee on desertification in the Presidency. All the technical ministries/departments dealing with environmental resources are brought together under a Council for Science and Technology. The institutional framework for the DMI is thus well developed, but there is still a need for capacity building in the form of infrastructure, equipment, training and human resources.

DMI countries all give high priority to combating land degradation and welcome any initiative that enhances national effort; besides national initiatives like National Conservation Strategies, National Environmental Action Plans and National Action Plans to Combat Desertification, DMI countries also participate in sub-regional programmes run by *e.g.* INSAH in West Africa, IGADD in East Africa and the SADC Plan of Action for the Kalahari-Namib region in southern Africa. Many countries also participated in negotiating the Convention to Combat Desertification (CCD) and see the DMI as providing a very suitable framework for implementing the CCD and FCCC.

An extensive planning and consultation process for the DMI has extended over a two year period from September 1993 - September 1995. This has involved consultations at the global level, preparation of a background document, organization of an initial International Planning Workshop, followed by three sub-Regional Workshops in West, Southern and East Africa. A total of nearly 200 practitioners, experts and interested parties have been involved so far. The consortium of partners evolving through this consultation process is unique as it pools resources and expertise of nine NARS and NGOs, three sub-Regional Organizations (CILSS/INSAH for West Africa, SADC/SACCAR for Southern Africa and IGADD/ASARECA for East Africa), seven International Agricultural Research Centers (ICRISAT, ICRAF, ILRI, IFPRI, IPGRI, ICARDA and IFDC) and four Advanced Research Organisations (IH, ORSTOM, ITE and CIRAD). The proposed management and implementation structure for the DMI is described in Section 10. The next stage in preparing the DMI involves the detailed planning of specific activities and to ensure that these are truly 'country driven' they are to be defined at as series of national workshops in the participating countries.

2. PROJECT OBJECTIVES

The integrated research programme proposed in the DMI is aimed at increasing our understanding of the physical, biological and socio-economic processes associated with desertification so that we can distinguish between the different causes of degradation and produce effective solutions through improved natural resource management. A better understanding of the underlying mechanisms will allow us to recognise and distinguish between changes resulting from natural climate variability (e.g. drought), human activity (e.g. over-cultivation, over-grazing) and climatic change. As these processes become better understood a better definition of quantitative indicators of degradation will emerge, which can be used to assess the extent and rate of change of degradation in dryland areas more accurately. Integrated studies of the options for ameliorating land degradation

will give the necessary technologies required to halt and reverse land degradation in the areas where it is found to be most necessary and cost effective to do so. Halting or reversing dryland degradation will enhance the food security of poor, rural populations and contribute to poverty alleviation. This defines the key overriding goal of the DMI. The seven specific objectives of the DMI are:-

1. Understanding the physical mechanisms of land degradation.

To develop a better understanding of the causes, extent, severity and physical processes of land degradation in traditional crop, tree and livestock production systems in the desert margins, and the impact, relative importance and relationship between natural and human factors.

2. Assessing Dryland Management Practices

To evaluate, with the participation of farmers, NGOs and NARS, current indigenous soil, water, nutrient and vegetation practices for arresting land degradation and to identify socio-economic constraints to the adoption of improved management practices.

3. Improving Natural Resource Management

To develop and foster improved and integrated soil, water, nutrient, vegetation and livestock management technologies and policies to achieve greater productivity of crops, trees and animals to enhance food security, income generation and ecosystem resilience in the desert margins.

4. Designing Policies, Programs and Institutional Options

To evaluate the impact and assist in designing policies, programs and institutional options that influence the incentives for farmers and communities to adopt improved resource management practices.

5. Formulating Drought Management Strategies

To promote more efficient drought management polices and strategies.

6. Enhancing Institutional Capacities

To enhance the institutional capacity of countries participating in the DMI to undertake land degradation research and the extension of improved technologies, with particular regard to multi-disciplinary and participative socio-economic research.

7. Exchanging Technologies and Information

To facilitate the exchange of technologies and information among farmers, communities, scientists, development practitioners, and policy makers.

The strategy proposed for choosing locations within the DMI is to focus most of the effort on a small number of well monitored sites where the work of the soil, plant and animal scientists can be integrated with the studies performed by the socio-economists, policy and institutional analysts. These sites will also act as sub-regional 'field laboratories' where the necessary interactions can be established between researchers, development workers and farmers. It is the partnerships formed by this integration of disciplines and mix of research and development which is the strength of the DMI. The strategy of focusing on a few sites of this kind will also avoid duplication of effort and will give a critical mass of work which can really achieve the progress necessary to tackle the complex problem of land degradation.

3. PROJECT DESCRIPTION

The DMI is a multi-disciplinary applied and strategic research project involving collaboration among NARS, IARCs, AROs, NGOs, farmers, communities, policy makers at local, national, sub-regional and regional levels. Specification of detailed activities is 'bottom up' from national committees, through sub-regional organisations to regional coordination by a steering committee chaired by ICRISAT. Mechanisms are included for exchange of information, networking and capacity building. Activity programmes will be defined in detail at a national level with all actors participating within the framework of the seven DMI specific objectives (Section 2) and associated expected outputs. The following are the primary outputs of the DMI as defined at the sub-regional Workshops in West, Southern and East Africa.

Primary outputs associated with Specific Objective (1):

1.1 Improved understanding of the relative contributions of climatic and human factors to dryland degradation.

1.2 A better understanding of the temporal and spatial variability of dryland climates and implementation of improved methods for weather monitoring and forecasting of seasonal rainfall.

1.3 A set of consistent and objective criteria to evaluate and monitor the present status and severity of land degradation in dryland areas.

Primary outputs associated with Specific Objective (2):

2.1 Inventory of soil and water conservation and nutrient management practices in traditional systems including integration of trees and livestock with crops.

2.2 Information on traditional and modern practices for natural resource management and their effectiveness in arresting land degradation, as well as their impact on the resilience of dryland ecosystems.

2.3 An understanding and inventory of the constraints to adoption of existing technologies.

Primary outputs associated with Specific Objective (3):

3.1 Understanding of the role of livestock in the rangeland/arable land continuum.

3.2 Improved methods for restoring and sustaining the long-term fertility in the dryland areas, to effectively combat land degradation.

3.3 Improved soil and water management techniques for increasing plant water-use efficiency and arresting land degradation.

3.4 Sustainable crop production technologies that conserve the environment, are socially and economically acceptable, and meet the food and fodder needs of local populations in the dryland areas.

3.5 Availability of tree species and agroforestry systems that use limited water more efficiently and sequester carbon below ground.

3.6 Strategies for enhancing ecosystem resilience through optimization of bio-diversity

Primary outputs associated with Specific Objective (4):

4.1 Improved understanding of the social, economic and policy factors which affect land degradation

4.2 Guidelines for policy and institutional changes to improve incentives for the adoption of sustainable technologies and farming practices, and investments in improving and conserving resources.

4.3 Methodologies and models to assess the impact of policies on natural resource management.

4.4 Improved market opportunities for the products of drylands.

Primary outputs associated with Specific Objective (5):

5.1 Knowledge of historical response to agricultural drought and policies to plan and prepare for future droughts.

5.2 Availability of crop and tree varieties tolerant of drought with acceptable functional and food properties.

5.3 Availability of modern and traditional early-warning systems and bio-physical models relevant to climate in the areas susceptible to drought.

Primary outputs associated with Specific Objective (6):

6.1 Availability of opportunities for institutional and human resource capacity building.

6.2 Availability of training opportunities and training manuals on improved land management practices for farmers, technicians, and scientists.

6.3 Effective partnership of national, regional and international institutions to create a continuum from strategic, applied, and adaptive research to extension and adoption of technologies for arresting land degradation.

6.4 Harmonization and rationalization of the land degradation programs of relevant national, regional and international institutions to ensure complementary and optimal use of the available capacity.

Primary outputs associated with Specific Objective (7):

7.1 Community-based groups involving local farmers, pastoralists, and extension officers focused on improving land management practices.

7.2 Availability of information including training manuals, the conduct of workshops, conferences, and symposia aimed at various audiences (policy-makers, scientists, development practitioners, farmers, NGOs) which contribute to a better understanding of the processes of land degradation and of ways and means of arresting it.

7.3 Natural resources councils at national and regional levels involving representatives from ministries and other relevant government agencies, and officials from implementing agencies including the private sector, to create an enabling policy environment for the generation, exchange, and adoption of technologies for arresting land degradation.

Further details of the DMI outputs and associated activities are given in the DMI proposal (attached). The DMI is organised and managed via a four level structure (national, sub-regional, regional and global) which draws on the existing structures which are already available, Figure 2. Details of how this structure was evolved and how it will operate are given in Section 10.

4. RATIONALE FOR GEF FINANCING

The DMI will help developing countries fulfil their commitments to the Framework Convention on Climate Change (FCCC), particularly under Article 4 where there is a call to '*Promote sustainable management, and promote and cooperate in the conservation and enhancement, as appropriate, of sinks and reservoirs of all greenhouse gases...*'[4.1 (d)] and '*...develop and elaborate integrated plans for ...water resources and agriculture, and for the protection and rehabilitation of areas, particularly in Africa, affected by drought and desertification...*'[4.1 (e)]. The DMI is also eligible for funding under the Instrument for the Establishment of the Restructured GEF where Article 3 states '*The agreed incremental costs of activities concerning land degradation, primarily desertification and deforestation, as they relate to the four focal areas shall be eligible for funding*'.

Combating land degradation interfaces with climate change through impacts on soil carbon storage capacity, surface albedo effects, effects on carbon sequestration by vegetation, and effects due to reduction of dust loads in the atmosphere; in this regard this project largely addresses Operational Program #6 - carbon sequestration, in the GEF Operational Strategy for the Climate Change Focal Area.

The DMI has also been evolved in response the Convention to Combat Desertification (CCD) call for scientific and technical cooperation required to make better progress in tackling desertification as expressed via Article 16 - *Information collection, analysis and exchange*, Article 17 - *Research and development* and Article 18 - *Transfer, acquisition, adaption and development of technology*. The paramount importance of *Capacity building, education and public awareness* in the countries affected by desertification is highlighted in Article 19 of the CCD, and is a major theme within the DMI.

The global benefits of the DMI are in its potential to enhance the regional capacity to combat desertification, mitigate global warming, conserve bio-diversity, protect international waters and provide increased food security. The initiative has a specific objective on understanding the relative contributions of climatic and human factors to dryland degradation. This knowledge will be used to develop technologies (e.g. remote sensing) and models to extrapolate local results to national, regional and global scales. Studies of soil erosion and technologies for soil conservation and amelioration should increase below ground carbon sequestration.

Bio-diversity conservation is also a major theme in the DMI. There are plans for compiling inventories of dryland species and other relevant natural resources. Tree and crop improvement and diversification will conserve and enhance above and below ground bio-diversity. There are also plans to conserve the genetic resources of trees and crops. International waters will benefit from the knowledge and techniques developed in the studies of soil erosion.

A key innovative feature of the DMI is the integration of the natural scientific studies within a policy and institutional option framework. The additional involvement of NGOs and local farmers will ensure that the results obtained will lead to guidelines and models for institutional changes for the adoption of sustainable natural resource management techniques which also conserve the environment. By being multi-disciplinary, the DMI provides an opportunity for (1) exploiting linkages between economic, social, agronomic, ecological and environmental functions and values of desert margins, and (2) identifying crucial trade-offs and synergies between sectors, resources and ecological functions.

The project will be country driven by the programme management structure which has been set up for the DMI

(Figure 2). This ensures that the national partners are at the heart of the initiative and that country perspectives are given top priority. The DMI meets national priorities for addressing land degradation, poverty alleviation, capacity building and for responding to the Conventions on Climate Change and Combatting Desertification.

As the DMI is based largely on activities of national agricultural research organisations, NGOs and the international agricultural research centres, GEF funding will leverage funds from national governments, traditional NGO sources and CGIAR donors. The DMI proposal (attached) has already been presented at a CGIAR donors meeting, where it received a favourable response.

The DMI is likely to establish demonstration areas where techniques for monitoring desertification, methods for rehabilitating degraded areas and options for improved resource management can be seen in action. There is therefore scope for replication or expansion of the techniques and results from the project to be applied in other drylands in Africa and globally. The regional nature of the DMI provides the opportunity for making regional comparisons as a basis for cross-fertilization of research efforts and for reaching more generally valid conclusions; it helps to establish sizes and scales of climate change interactions, *e.g.* sources and sinks of greenhouse gases that are meaningful for global scale calculations, and it concentrates the effort of the limited population of researchers in the region and enhances cost-effectiveness through sharing of facilities, *e.g.* data bases.

The DMI has several attractive 'added value' features. Firstly, while addressing land degradation and global concerns of climate change, the DMI also addresses the critical problems of poverty alleviation and improving livelihoods in the participating countries; direct benefits will be gained by the rural population through improved land productivity. Further added value is gained since the DMI structure provides the opportunity for deriving international and global scale results from the same study data that contribute to local decision-making and national policy on sustainable development.

5. SUSTAINABILITY AND PARTICIPATION

The DMI is country driven and involves institutional strengthening of participating national and sub-regional organisations and development of human resources. The build up of infra-structural capacity and individual skills in NARS, NGOs and rural communities should mean that the project should have lasting impact well beyond its initial 5 year lifetime. Benefits from improved land productivity should also be a strong incentive to continue with practices developed from the project. Governments of the participating countries are committed to the objectives of DMI as shown by their ratification of FCCC and the CCD and have set up institutions for the implementation of these Conventions that will remain in place beyond the DMI project lifetime. Government recurrent expenditure on these institutions and on NARS should sustain their contributions to the implementation and maintenance of DMI designed natural resource management programmes.

Co-financing from a number of sources is being sought by the participants in the DMI. At a national level commitments will be made in terms of infrastructure and staff time of the organisations participating in the DMI. International organisations will bring up to 50% ($12,500,000) of the core funding during the project lifetime and it is expected that this will attract other international funds where the DMI infrastructure offers efficiency and added value. In subsequent phases of the DMI, when the project moves from its initial research orientated mode into a largely developmental mode, it is envisioned that national governments and donor agencies will fund the implementation of DMI results as national or bilateral projects.

The DMI contains a large and explicit element of its budget (15% or $3,750,000) devoted to developing innovative incentive schemes to encourage farmers to adopt improved natural resource management methods. These incentives include micro-and macro-economic policies, legal rules of access to resources, direct public investment, institutional mechanisms and access to technical information. The main aim is to establish conditions which will encourage large scale transition to more intensive and environmentally sustainable resource

management and production systems. This incentive scheme approach will be reinforced by the additional funds in the project (20% or $5,000,000) for national capacity enhancement and information and technology transfer. The participatory approach of the project should empower local organisations and individuals involved to continue with the practices developed.

6. LESSONS LEARNED AND TECHNICAL REVIEW

The DMI had not yet been subject to formal review by GEF processes such as the Scientific and Technical Advisory Panel (STAP). However, there has already been a wide ranging consultation process involving nearly 200 practitioners, experts and interested parties at national, sub-regional and global levels via the preparation of a background document, organization of an initial International Planning Workshop, followed by three sub-Regional Workshops in West, Southern and East Africa. This process has been monitored by two UNDP/GEF consultants whose report (attached) made the following key recommendations:-

- As a result of extensive planning and discussion the DMI has evolved into a carefully thought out proposal which is unique in attempting to bring together a multi-disciplinary consortium of the key national and international partners necessary to make significant progress into the wide scale problem of land degradation in sub-Saharan Africa.

- Land degradation and desertification are very relevant to three focal areas of the GEF; climate change, bio-diversity and international waters, and the DMI therefore has all the essential elements to become the 'flagship' initiative addressing land degradation and climate change in sub-Saharan Africa.

- There is clearly sufficient merit in the DMI proposal for it to be highly recommended for funding from the GEF and other donors.

The UNDP/GEF consultants also recommended that further development of the DMI is required in three key areas. (i) Development of structures and decision making and monitoring mechanisms that are efficient and operational. These structures and mechanisms should be simple, non-duplicatory, and linked with the existing coordination structures within the sub-regions. (ii) The DMI Interim Steering Committee (InSc) needs to provide policy guidance and direction to the sub-regional and national committees to facilitate further discussion among the national, regional and international partners on the activities and work plans for inclusion in the final project. (iii) The InSc also need to set up procedures to review and approve the activities and budgets evolved at the national meetings and to use these to prepare the final DMI project proposal for submission to appropriate donor agencies.

7. PROJECT FINANCING AND BUDGET

Considering the need for a long term perspective in combatting land degradation, the DMI consortium partners propose a 10 year project, with two phases of 5 years each. Funding for the first 5 year phase, estimated at $5,000,000 per annum, is requested from the CGIAR donors and the GEF on a cost sharing basis. A preliminary breakdown of how this annual budget will be shared between the national, sub-regional and international and advanced research organisations who proposed activities at the sub-regional Workshops is shown in Table 1a. The detailed composition of these budgets will be discussed at the national workshops. However, an initial assessment of the activities proposed shows that a total of 21 organisations are involved in activities in nine different countries. It also indicates that 41% of the total research budget (total - coordination costs) will go to national and sub-regional organisations. International institutes account for 38% of the research budget, with advanced research organisations receiving 15% of the budget (Table 1 a).

Table 1 a. **Preliminary DMI annual budget (US$, thousands) proposed at the sub-regional workshops by national, sub-Regional, International Agricultural Research Centers and Advanced Research Organisations.**

Institutional groups	West Africa	Southern Africa	East Africa	Global	Total
National organisations	710	710	180		1600
Sub-regional organisations	100	100	20		220
International Agricultural Research Centers	970	350	380		1700
Advanced Research Organisations	490	70	120		680
Regional Information Networks	100	100	100		300
Coordination				500	
Total	2370	1330	800	500	5000

Table 1 b shows the provisional allocation of the total research budget by specific objective and the phasing of the funding during the first 5 years of the project. Some activities, such as the assessment of current dryland management practices (specific objective 2) and understanding the mechanisms of land degradation (specific objective 1), require more funds in their initial years than in later phases. Follow up work on improving natural resource management (specific objective 3) and formulation of drought management strategies (specific objective 5) starts at lower level of funding in the initial stages, but builds up during the project as the information required to achieve these objectives comes on line. Some 65% of the total research budget is to be spent on research and development and 35% on policy, enhancing national institutional capacity and exchanging technologies and information.

Table 1 b. **Percentage allocation of total research budget (total - coordination costs) by specific objective and phasing of the funding during the 5 years of the project.**

Specific objective	1996 (%)	1997 (%)	1998 (%)	1999 (%)	2000 (%)	Total (%)
1	6	6	4.5	2	1.5	20
2	4	4	3	2	2	15
3	1.5	3	4.5	8	8	25
4	3	3	3	3	3	15
5	0.5	0.5	1	1.5	1.5	5
6	4	2	2	1	1	10
7	1	1.5	2	2.5	3	10
Total	20	20	20	20	20	100

Further co-financing by the partner institutions will be discussed at the national workshops. The commitments sought from each institution will be mainly in terms of staff costs of scientists actively participating in the DMI. It is expected that the personnel costs from national and sub-regional organisations will form a substantial contribution to the DMI. In order to enable NARS, NGOs and sub-regional organisations to achieve the DMI objectives of global significance, funding is requested from the GEF to cover the additional costs arising.

8. INCREMENTAL COSTS AND COST EFFECTIVENESS

8.1 Incremental costs

Baseline: Research and development to improve land use management, conservation and productivity is a baseline activity for the participating countries in the DMI. This work has a strong national focus and the participating countries are unlikely to commit resources beyond those required for direct national benefit. Additional funds are required to support extensions of the research and collaborative efforts to conform with sub-regional or regional plans set by the DMI consortium, by which global benefits (described in Section 4) are gained. This additional fund represents the incremental cost of the DMI. Details of the baseline costs can only be made with some knowledge of national budgets for the natural resources and agricultural sectors. Details of how the different country incremental costs are made up will also have to await the specific budgets for each countries activities within the DMI. Both of these sets of information will only be readily available after the national committee meetings planned for the next stage of the DMI.

GEF alternative: The activities described in the DMI constitute the GEF alternative, which is a targeted research project to build on the national efforts in natural resource management in order to enhance their utility in arresting land degradation, mitigating climate change, increasing carbon sequestration and preserving bio-diversity. The approach of tackling these problems from the root causes and ensuring the involvement of local people is one of the major strengths and guarantees of success of the DMI.

8.2 Cost effectiveness

The cost-effectiveness of the project will be enhanced in a number of ways. Firstly, by the DMI strategy of focusing efforts on a small number of well monitored sites where there is already a significant amount of underpinning work and infrastructure. At these sites the activities of the soil, plant and animal scientists can be integrated with the studies performed by the socio-economists, policy and institutional analysts and the necessary interactions between researchers, development workers and farmers can be established. These 'partnership' sites will also act as sub-regional 'field laboratories' where standardised monitoring of land degradation can be carried out in parallel with the establishment of rehabilitation areas. The unique and major strengths of the DMI are the partnerships that are created by integrating research disciplines with development work. The strategy of focusing on a few partnership sites will avoid duplication of effort and provide a critical mass needed to achieve the progress necessary to tackle the complex problem of land degradation. Cost effectiveness will also be achieved by the sharing of equipment and facilities, by information networking at regional scale. Participation of local communities, NGOs and individual farmers should enhance their level of responsibility in utilizing resources, thus minimizing waste.

The long term investment value of the DMI is in its contribution to the goal of sustainable development, the economic exploitation of natural resources in an environmentally acceptable way.

9. ISSUES, ACTIONS AND RISKS

Efforts need to be taken to ensure the collection of reliable and 'standardised' natural resource data, so that information on land degradation collected in different countries is compatible. This will require strong direction from the central management and could be achieved by holding appropriate workshops and/or having small groups of expert advisors in relevant fields to consult with national activity leaders on measurement techniques and data analysis methods.

The implementation of such a complex project involving nine countries and over 20 organisations is a difficult task. An effective coordination and communication structure is needed and should be given a high priority at the outset of the project. The DMI management structure (Figure 2) and the appointment of a global coordinator

should help ensure that this takes place.

The achievement of the regional and global goals of the project needs to be encouraged and monitored from the central management. Guidelines need to be given to national committees and proposals and progress needs to be monitored.

Collaboration and partnership relationships between government agencies, NGOs and individual farmers might be an issue because of traditional government attitudes to impose their views in many African countries. Careful presentation of the DMI and its goals and the involvement and liaison with appropriate departments is required to help overcome this problem.

Travel and general communication between countries is constrained by poor facilities and calls for long lead times in planning activities.

10. INSTITUTIONAL FRAMEWORK AND PROJECT IMPLEMENTATION

Organization and Management of the DMI

At the International Planning Workshop and in the three Regional Workshops, a governance mechanism for the DMI was agreed which used simple and efficient structures and mechanisms which were linked with the existing coordination structures. These were organized according to four distinct and complementary levels within the DMI; i.e. national; sub-regional (Eastern, Southern, and Western Africa); regional level (Africa) and global (e.g., UNEP, CCD). A schematic diagram showing the organization and management structure for the DMI is shown in Figure 2.

National level

A National Coordination Committee (NCC), established during the national workshops for the DMI, will identify and prioritize country specific research problems in collaboration with all interested partners in the DMI, including research and extension institutions, local NGOs and universities. A convenor will be designated by each NCC in the DMI consortium to overview the national contributions to the DMI, allocate research tasks and share information and resources across the national institutions.

Sub-Regional level

At the sub-regional level, coordination of the activities will be carried out by INSAH/CILSS (West Africa), SACCAR (Southern Africa) and IGADD and ASARECA (Eastern Africa). Among the principal activities envisaged at this level are the organization of sub-regional training workshops and establishment of natural resources information centers.

Regional level

A steering committee comprised of representatives from the participating national, regional and international institutions, NGOs, and UNEP and chaired by ICRISAT, provides the overall policy guidance for the DMI. The steering committee will meet at least twice a year to finalize work plans and budgets for the coming year to review progress, publications and reports and approve workshop and training activities.

Global Coordination

The overall coordination and responsibility for the project will be carried out by a Global Coordinator, to ensure linkages among the participating NARS, international and regional institutions, donor organizations and other

stakeholders. The Coordinator will plan and manage the work of the Coordination Unit, located at the ICRISAT Sahelian Center in Niger, and will be responsible to the steering committee and acts as its ex-officio member-secretary. The Coordinator will organize meetings, interact with the National Coordination Committees and regional organizations to ensure that the research results are effectively synthesized and reported, review the research, report to the steering committee and assist them in their work.

This level of coordination is also designed to establish links with other global initiatives. For example, there are systemwide initiatives of the CGIAR that have been designed to address specific issues affecting natural resource management within the eco-region covered by the DMI. The Systemwide Livestock Initiative (SLI) and the Soil, Water and Nutrient Management Initiative (SWNMI) are two such global programmes. The DMI will provide the framework within which the these initiatives will operate to ensure that the necessary coordination and collaboration between programs is established and duplication of activities is avoided.

The DMI is well connected with other global programmes initiated by the World Climate Research Programme (WCRP) and the International Geosphere Biosphere Programme (IGBP) as DMI members are active in both these initiatives. WCRP has established a programme of research to examining the ways in which large scale changes on the land surface can influence climate. This programme, called GEWEX (the Global Energy and Water balance EXperiments), has promoted a number of large scale land surface-atmosphere experiments in a range of different global biomes. One of the biggest of these experiments was HAPEX-Sahel, the Hydrological Atmospheric Pilot EXperiment in the Sahel, which was carried out in Niger in 1992. This experiment generated a large amount of data which is currently being used to characterise dryland vegetation and to develop a better means of representing it in General Circulation Models which can be used to study the links between land degradation and climate. IGBP has established a core project on Global Change in Terrestrial Ecosystems (GCTE) which initiated the establishment of transects for global change research. Each transect is comprised of a coherent set of research sites along a gradient of a major global change (e.g. precipitation, land use intensity, etc.). One of these transects, called SALT (Savannas in the Long Term), is in West Africa and is one of the most advanced of the GCTE transects. It is 1000 km long and spans from Niger to the Ivory Coast.

10.1 Monitoring and Evaluation

The research outputs of the project will be monitored annually through the individual reports presented by the collaborating institutions at the Annual Technical Meetings and by the combined Annual Project Reports.

At each Annual Meeting, the participating institutions will also present their work plans and budgets for the following year. The Steering Committee will evaluate the reports and work plans for their consistency with the agreed goals and objectives of the DMI and will approve the annual budgets. The entire Initiative will be subject to external, mid-term Review to obtain an independent assessment of progress and recommendations for completion of the Initiative.

Further details of the monitoring and evaluation process need to be added when specific project milestones are identified at the national planning workshops. The GEF Monitoring and Evaluation guidelines also need to be taken into account once they have been fully defined.

10.2 Schedule/Duration

The broad phasing of the seven specific objectives has already been described in Section 7, where it is recognised that different aspects of the project, such as inventories, process studies and ameliorative work will need to be brought in at different stages of the project. Details of the individual activity schedules and durations will emerge from the national workshops.

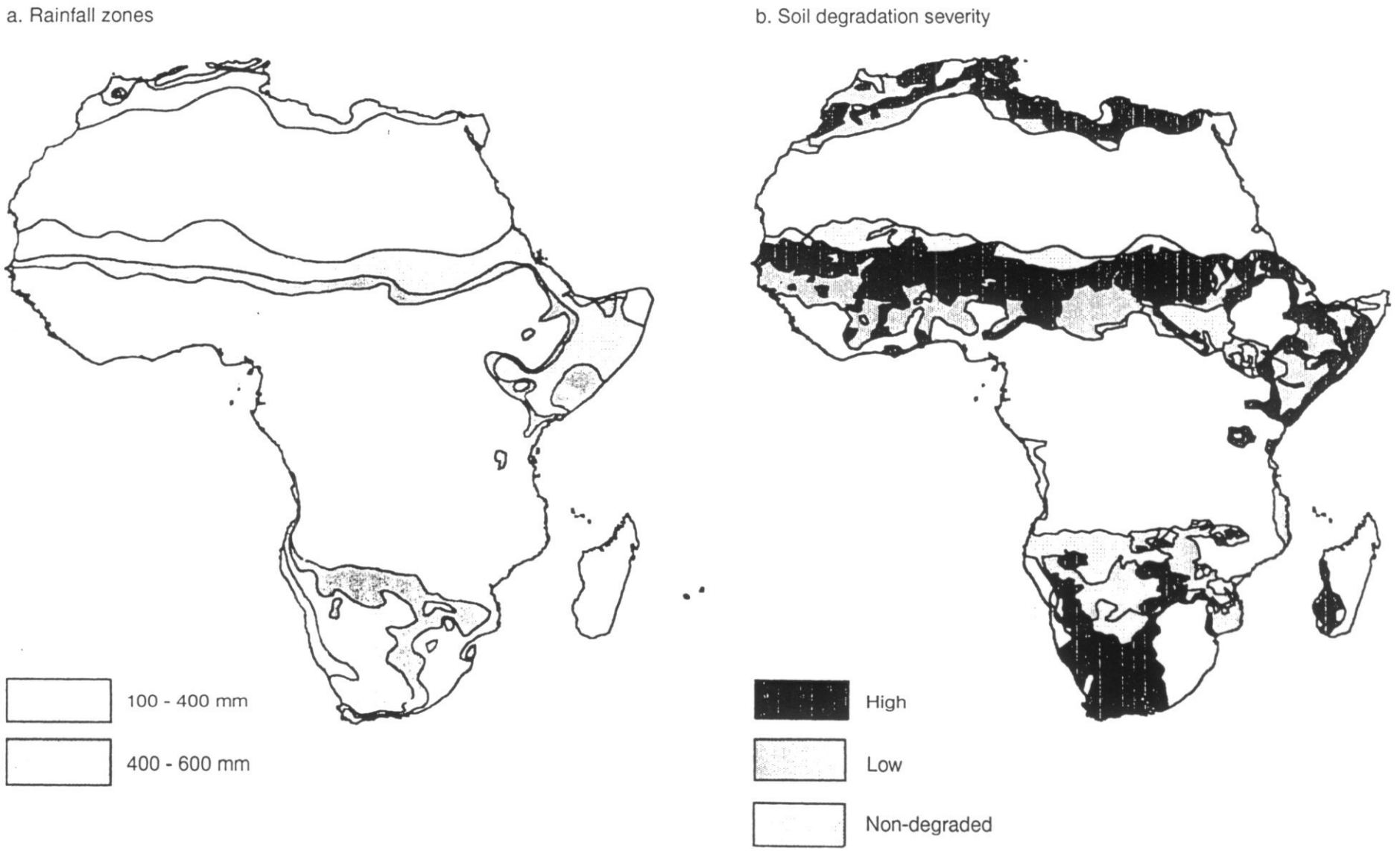
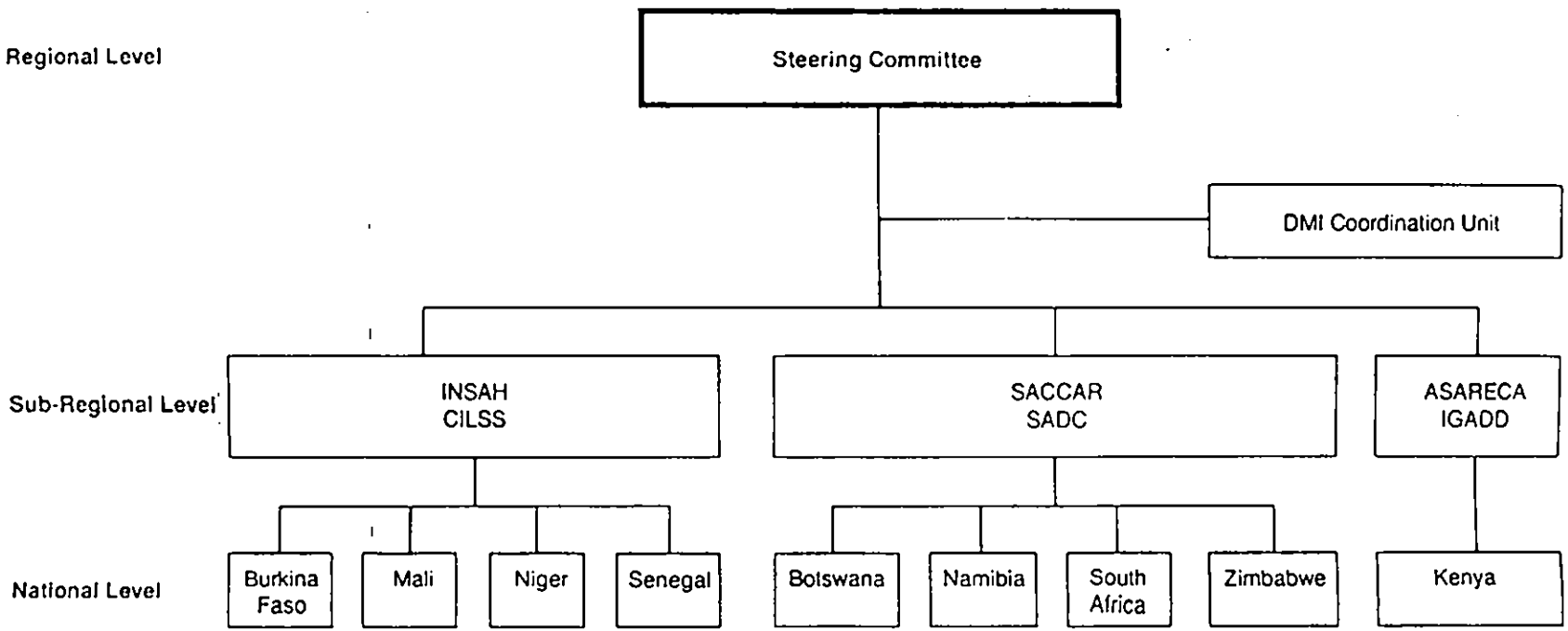


Figure 1 (a) Arid (100 - 400 mm) and semi-arid (400 - 600 mm) rainfall zones and (b) Soil degradation severity in sub-Saharan Africa.



Each National Level Committee will include representatives from

- NARS
- Universities
- NGOs
- Extension Services
- National Environment Departments
- International Institutes
- Advanced Research Organizations (AROs)

Figure 2. The proposed management structure of the Desert Margins Initiative.

11.2 Acronyms

ARDTL	Agricultural Research Department Thusano Lefatsheng
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
CGIAR	Consultative Group on International Agricultural Research
CHF	Canadian Hunger Foundation
CILSS	Comité permanent inter-états de lutte contre la sécheresse dans le Sahel
CIRAD	Centre de Coopération Internationale en Recherche Agronomique pour le Développement
CNRST	Centre national de la recherche scientific et technologique
CSIR	Council for Scientific and Industrial Research
DEAPs	District Environment Action Plans
DMI	Desert Margins Initiative
DRSS	Department of Research and Special Services
DUUO	Prof David Okali
ELCI	Environmental Liaison Centre International
ENDA	Environment and Development Activities
FAO	Food and Agriculture Organization
FL	Dr F Lompo
GEF	Global Environment Facility
HAPEX-Sahel	Hydrological Atmospheric Pilot EXperiment in the Sahel
IARCs	International Agricultural Research Centres
ICRAF	International Center for Research in Agroforestry
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IER	Institut d'écomonie rurale
IFDC	International Fertilizer Development Center
IFPRI	International Food Policy Research Institute
IGADD	Inter-Governmental Authority on Drought and Development
IGBP	International Global Biosphere Programme (??? Jim is this right?)
IH	Institute of Hydrology
ILRI	International Livestock Research Institute
INCD	Inter-governmental Negotiating Committee on Desertification
INERA	Institut National des Etudes Recherches Agricoles
INRAN	Insitut National de Recherche Agronomique du Niger
INSAH	Institut du Sahel
InSc	Interim Steering Committee
ISC	ICRISAT Sahelian Center
ISRA	Institut sénégalais de recherche agricole
IUCN	International Union for the Conservation of Nature
ITE	Institute of Terrestrial Ecology
JSW	Dr J S Wallace
KARI	Kenya Agricultural Research Institute
MoAWRDRT	Ministry of Agriculture, Water and Rural Development, Research and Training
MPTs	Multi-Purpose Trees
MVKS	Dr M V K Sivakumar
NARs	National Agricultural Research stations
NEAP	National Environmental Action Plan
NGOs	Non-Governmental Organisations
ORSTOM	Institut Français de recherche scientifique pour le développement en coopération
PRP	Plateforme rurale des paysans des états membres du CILSS
SACCAR	South African Centre for Cooperation in Agricultural Research
SADC	Southern African Development Community

SALWA	Semi-Arid Lowlands of West Africa
SAT	Semi-Arid Tropics
Six S	Association se servir de la saison séche en savane et au Sahel
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNOPS	United Nations Office for Project Services
WCRP	World Climate Research Programme
WWF	World Wide Fund for nature