



INTEGRATED DROUGHT MANAGEMENT PROGRAMME
A Joint WMO-GWP Programme

Concept Note



November 2011

INTEGRATED DROUGHT MANAGEMENT

A Joint WMO-GWP Programme

SUMMARY OF THE PROGRAMME

- Project Title:** Integrated Drought Management Programme (IDMP)
- Thematic coverage:** Climate Change Adaptation in Water and Agriculture and other sectors
- Driver (s):** World Meteorological Organization (WMO) and Global Water Partnership (GWP)
- Partners:** Intergovernmental, governmental and non-governmental organizations involved in drought monitoring, prediction, drought risk reduction and management¹,
- Beneficiaries:** Primary beneficiaries of the Programme would be the government institutions and agencies responsible for developing drought management policies and/or implementing systems for drought risk mitigation, drought monitoring, prediction, preparedness and response at various spatial scales such as regional, national, provincial, municipal and village. Secondary beneficiaries would be the decision-makers and managers whose task is to implement these policies including mitigation, adaptation; non-governmental agencies involved in global, regional and national drought advocacy, awareness and response efforts; stakeholders vulnerable to drought; and population in general.
- Spatial coverage:** Global, but directed towards and integrated with regional and national development programmes.
- Principal approach:** The IDMP will promote an approach that moves drought management practices from reactive, representing the crisis management to more proactive drought management based on risk management principles. It will provide global co-ordination for efforts towards integration of science, policy and implementation by strengthening drought monitoring, drought risk assessment, development of drought prediction; drought early warning services and sharing best practices at the local, national and regional levels. The IDMP will advocate and facilitate integration of responses by various agencies from various sectors such as water, land, agriculture, ecosystems, and energy on one hand and drought-affected sectors on the other. At the same time it will strive for parallel and interactive vertical integration of science, policy and society through drought monitoring, risk assessment prediction and management through mitigation, community preparedness and response; and regional, national, provincial and municipal (village) level strategies.

¹ These other “organizations involved in drought management” will be defined during the first phase of the project. They may include, for example, other UN agencies, governmental and non-governmental organizations, regional centres and centres/institutions of excellence.

Services provided:

1. Support for regional coordination of drought monitoring, prediction and early warning activities, serving as interface between the climate service providers and various stakeholders involved in drought management;
2. Collection and dissemination of information and knowledge on good practices in drought mitigation, preparedness and response;
3. Guidelines, methodologies, tools and supporting documentation for policy development and management practices and procedures;
4. Inception of pilot projects and coordination of regional projects to showcase best practices through scientific inputs into policy, planning for drought risk reduction and drought management;
5. Support regional and national efforts in drought risk awareness and management;
6. Capacity building and advice on Integrated Drought Management.

1. BACKGROUND

1.1 Problem Statement

Drought is widely recognized as a creeping natural hazard that occurs due to the natural climatic variability. Droughts occur with varying frequency in all climatic regimes. In recent years, concern has grown world-wide that droughts may be increasing in frequency, intensity, and duration as a result of climate change. Likewise, the impacts associated with droughts are increasing because of changing societal vulnerabilities.

Traditionally, response to drought throughout the world has been through a reactive, crisis management approach. This approach to drought management responds to the impacts of drought once they occur in an attempt to speed the recovery process. This crisis management approach has been noted to be costly, largely untimely, poorly coordinated, and often results in resources or assistance being misdirected. Drought impacts illustrate the vulnerability of societies to drought and programs that provide assistance to those affected by drought are essentially treating the symptoms of vulnerability rather than the causes. Many assistance programs, in fact, result in increased vulnerability to future drought events by making individuals and societies more reliant on government programs or assistance from donor organizations. As a consequence of an increased frequency of drought and societal vulnerability to extended period of water shortages, the economic, social and environmental impacts of droughts have increased significantly worldwide. Because of their long-term socio-economic and environmental impacts, droughts are by far the most damaging of all natural disasters.

The Intergovernmental Panel on Climate Change Fourth Assessment Report (IPCC, 2007) states that the world indeed has become more drought-prone during the past 25 years, and that climate projections for the 21st century indicate increased frequency of severe droughts in many parts of the world. Whether due to natural climate variability or climate change, there is an urgent need to improve drought management strategies that will lead to improved coping capacity. These strategies must be science based and directed at managing the risks and mitigate the effects of drought.

1.2 General socio-economic aspects

Drought is an insidious natural hazard and there is no clear understanding of the onset of drought, its termination, and common techniques to measure its severity and spatial extent. Drought rarely draws public sentiment and the response is generally lacking as compared to the dramatic, more visual natural hazards such as floods and earthquakes that result in significant structural damage to infrastructure. Indeed drought characteristics differ for different climate regimes and the impacts are directly proportional to societal vulnerability. The impact of drought in a region depends on the adaptive capacity of communities or the ecosystems to cope.

Coping with drought using exclusively traditionally accepted measures are clearly not enough to avoid increasingly severe drought impacts that negatively impact livelihoods and set back national development targets. Some reasons for this are, for instance, the changing livelihoods patterns and the consequences of migration, lack of clear property rights (different for men and women); these often mean a loss of important traditions at the community level in an scenario where drought cycles are shorter.

Indeed the impacts of droughts spread well beyond agriculture. As greater demand for water increases with increasing population and development, periods of water shortages resulting from extended periods of deficient precipitation and high temperatures often result in serious impacts on

sectors such as energy, tourism and recreation, transportation, health, and ecosystem services. The socio-economic effects of drought occur at the local level but ripple through the economy to the regional and national levels. In many countries, one of the most significant effects of drought is the irreversible migration of the affected rural population, usually to urban areas.

The UNDP Drylands Development Centre estimates that dry lands are inhabited by over 2 billion people worldwide. Empirical evidence shows that incidences of poverty are particularly high in the dry lands, and most countries affected by desertification and drought are among the poorest and most marginalized in the world. Strategies for drought management can be easily extended to water scarce areas with the aim of countering desertification.

The assessment of long-term socio-economic effects of drought is complicated by the scarcity of reliable statistics. The impacts of drought are seldom documented. In addition, methodologies to document these impacts are not standardized so those statistics that are available are not comparable. Given that the impacts of drought are a key indicator of vulnerability, there is an urgent need to document these impacts in order to identify those sectors most affected and to devise and implement mitigation measures in a systematic manner that are directed at reducing those impacts.

By the year 2025, the population projected to be living in water-scarce countries will rise to between 1.1 and 2.4 billion, representing roughly 13% to 20% of the projected global population (ref). Many of these countries are also experiencing high population growth rates. In addition, other non-climatic aspects continue to amplify the severity and impacts of drought. In Africa, the Sahel drought is aggravated by over cropping, as well as by socio-political problems and conflict.

Semi-arid and arid regions generally display strong climate variability, both temporally and spatially, and they frequently face extremely dry situations. As pointed out above, socio-economic changes such as population growth, urbanization, increasing demand for water per capita, land use changes, or loss of traditional knowledge and practices to adapt to drought, can exacerbate the vulnerability of particular populations to drought. For instance, pastoralists are among the most vulnerable groups whose needs are rarely reflected in national development policy.

Drylands are found on every continent, most extensively in Africa and Asia. They embrace a range of climatic conditions, including the hottest tropical deserts, high-altitude regimes and temperate plains that experience extreme cold during the winter. However, all have limited water resources because precipitation is characteristically scarce and unreliable and evaporation is typically high. On average, drylands exhibit a gradient of increasing primary productivity from hyper-arid, arid, and semi-arid to dry subhumid areas. But averages mask considerable variability. Rainfall totals often vary greatly from year to year and over short geographical distances. The result is a group of physical environments characterized by dynamism.

Dryland populations' proven resilience can be increased with an improved understanding of how such ecosystems operate especially under severe water-scarce scenarios that cause disequilibrium in the systems.

1.3 Need for Intervention

The impacts of drought on the community are due both to the physical nature of the hazard as well as to the community's ability to manage the associated risks. Droughts have often been dealt with in a reactive manner through drought relief programmes rather than by applying a pre-emptive management approach that reduces vulnerability making the effective use of scientific knowledge and

all available relevant information. Policies related to national and regional management of drought are generally unsatisfactory and even lacking in most countries. Likewise, drought early warning, consisting of monitoring, prediction and well-developed information delivery systems, is inadequate in most regions. Even when available, the scientific information is not fully incorporated into decision-making processes because of the lack of sufficient capacity in many drought-prone countries to use drought forecasts and related tools effectively in management practices.

There is need for a better understanding of the scientific basis of droughts: their definition, monitoring, impacts, prediction and to bring this knowledge to sectoral experts involved in various aspects of drought management. Understanding the historical frequency, duration, and spatial extent of drought assists planners in determining the likelihood and potential severity of future droughts. The characteristics of past droughts provide benchmarks for projecting similar conditions into the future. At the same time, successful experiences in adopting a comprehensive and active approach across various sectors in dealing with droughts should be widely shared, and the capacity to apply such approaches built and developed where needed.

The mitigation actions against drought risks are generally taken through sectoral perspectives and ad-hoc interventions. The fragmentation of responsibilities for actions taken in various aspects of drought management in most countries suffer from insufficient coordination among various organizations and stakeholders concerned. Inadequate institutional arrangements impede stakeholder participation in planning and implementation of drought management and mitigation actions. The development of drought mitigation plans encompasses effective drought early warning and delivery systems, vulnerability assessments, and mitigation and response actions. The development of these plans must be accomplished with the full engagement of stakeholders from the multiple sectors affected by drought.

The present proposal addresses these issues on one hand and, once implemented, sets the stage for a possible demand-driven support mechanism for the communities, countries and regions affected by drought. The programme proposes to bring together the UN and other inter-governmental organizations dealing with the climate, water, land, agricultural and ecosystem aspects of droughts.

2. UNDERSTANDING DROUGHT

Drought² is an extreme climatic condition that results from a deficiency of precipitation from expected or "normal" that, when extended over a season or longer period of time, is insufficient to meet the demands of human activities and the environment. Drought is a relative, rather than absolute, condition and is a normal part of climate. It is a temporary aberration, in contrast to aridity, which is a permanent feature of climate.

As drought and its impacts are not apparently visible in a dramatic fashion, given the nature of their slow onset, in the initial phases they are generally ignored by the media and the public at large and hence get late attention from the politicians. One factor that distinguishes drought from other natural hazards is the absence of a precise and universally accepted recognition of drought conditions. Definitions and perceptions of drought differ region by region and are application- or impact- specific. The spatial extent and severity of drought will vary on seasonal and annual timescales and the epicenter for drought will change temporally as drought persists over an extended period of time.

² According to the United Nations Convention to Combat Desertification and Mitigate the Impacts from Drought (UNCCD), "drought" is defined as the naturally occurring phenomenon that exists when precipitation has been significantly below normal recorded levels, causing serious hydrological imbalances that adversely affect land resource production systems.

Droughts that occur in the North American Great Plains differ from those that occur in Northeast Brazil, southern Africa, western Europe, eastern Australia, or the North China Plain. The amount, seasonality, and form of precipitation received are specific to each of these locations.

Drought means different things to a water manager, agricultural producer, hydroelectric power plant operator, and wildlife biologist. Even within sectors, there are many different perspectives of drought because impacts may differ markedly. Droughts can be classified as meteorological, agricultural, or hydrological droughts and differ from one another in three essential characteristics: intensity, duration, and spatial coverage.

There are numerous natural indicators of drought that should be monitored routinely to determine its onset, duration, severity and spatial characteristics. Although all types of droughts originate from a deficiency of precipitation, it is insufficient to rely solely on this climate element to assess severity and resultant impacts because of factors identified previously. Effective drought early warning systems must integrate precipitation and other climatic parameters with water information such as stream flow, snow pack, ground water levels, reservoir and lake levels, and soil moisture into a comprehensive assessment of current and future drought and water supply conditions.

A change in the variability of climate, or a trend in any one of its components, may lead to latitudinal and altitudinal shifts in the distribution of terrestrial ecosystems (e.g. rainforests, savannas, steppes). In a given watershed (catchment or basin), these changes might have tangible effects on the water budget and thus on the availability of water resources. Freshwater ecosystems (such as ponds, lakes, wetlands and river channels) are essential components of the environment. They provide support for the existence of aquatic and terrestrial wildlife, environmental goods (e.g. water, foods) and services.

There are both traditional (indigenous) and technological approaches to reducing the risk of drought, and building resilience to its effects. Any technological management of drought requires medium (seasonal) to long-term (annual to decadal) climate prediction and information, to be translated into early warning and response. The response needs to take into account all available water resources including surface water, groundwater, soil moisture, and precipitation. For instance, rainwater harvesting is either a traditional or a highly innovative approach in different contexts. In many countries and regions, such as in Australia and the Mediterranean region, severe droughts have triggered water sector reforms in order to build greater water security, manage water demand, and safeguard livelihoods. An integrated approach to water resources management, involving stakeholders from the communities and sectors affected by drought, is essential and offers a sound basis for longer-term adaptation to climate change.

A common understanding of droughts is essential for its comprehensive management in an integrated approach, addressing the over-all development goals and well-being of the people living in drought-prone areas, and involving the different sectors and stakeholders affected. There is need to mainstream this understanding into development policy and planning processes.

3. NEED FOR THE INTEGRATED DROUGHT MANAGEMENT PROGRAMME

3.1 Current Context and Status

In the past, drought management has been reactive, resulting in inefficient allocation of water and avoidable economic losses. Within the water sector, planning for short-term response to drought had largely been confined to the water authorities placing ad hoc restrictions on water use. Efficient planning necessitates establishing in advance both short and long-term responses across sectors to meteorological, agricultural and hydrological droughts. Improvements in weather and climate

forecasting capabilities and derived drought monitoring and prediction provide the information base for such practices.

A comprehensive drought monitoring and early warning system needs to provide a complete understanding of the drought risks, early warning of a drought's onset and end, determine its severity, and deliver that information to a broad group of stakeholders in many climate- and water-sensitive sectors in a timely manner. With such information and services, the impacts of droughts can be reduced in many cases. With the threat of climate change and the likely amplification of the frequency, severity and duration of droughts, the latest knowledge and capacities in climate science need to be translated into operational products and services to stakeholders. This will enable countries to enhance their capacities in climate-related risk management. In this context, integrated drought management can also be part of the tools for an adaptation strategy to climate change through improved management of climate variability.

3.2 Example of a Successful Application of an Integrated Management Programme

The successful model of the existing WMO/GWP Associated Programme on Flood Management has served to illustrate the integrated approach to flood management, albeit tackling a problem of the opposite extreme, by comprehensively addressing the scientific, engineering, environmental, social, institutional and legal aspects of the flood issue. Over ten years the programme has established well-recognized flood management guidelines as well as a demand-driven mechanism, the HelpDesk, to work with countries and stakeholders in reducing flood risks and mitigating negative flood impacts. It is envisaged that the lessons learned and the experiences of this joint programme will inform the development of the proposed new programme on integrated drought management.

3.3 Strategic Elements of an Integrated Drought Management Programme

Due to its frequency of occurrence and the profound impacts associated with drought, countries need to devote more attention to the development of national strategies to reduce its economic, social, and environmental consequences. Critical components of such strategies are:

- Comprehensive policy framework at both national and regional levels to take preventive action against droughts;
- Scientific and evidence-informed basis to proposed interventions;
- Multi-disciplinary and scientific inputs to developing policies and strategies whereby water, land, agriculture and ecosystem issues are tackled jointly;
- Legal and institutional framework defining responsibilities and facilitating cross-institutional collaboration and coordination;
- National and regional framework for drought monitoring, early warning and information delivery;
- Risk based approaches to drought management;
- Stakeholder participation in policy development and its implementation through advocacy, public awareness, and education.

3.4 Beneficiaries

The proposed activities under the IDMP aim to increase the resilience of societies to droughts. Consequently, populations in drought prone areas, which in many cases belong to the poorer strata of society, are the ultimate target groups for the Programme. On the planning and implementation level of the proposed Programme, distinct groups of beneficiaries are addressed:

- (a) Government organizations and agencies including financial institutions with improved capacities in the development and implementation of national drought policies;
- (b) Institutions responsible for the development and management of land, water and agriculture;
- (c) Institutions responsible for developing preparedness plans and taking preventive actions;
- (d) Regional and national organizations, agencies and institutions engaged in monitoring, prediction, and providing early warning of drought ;
- (e) Government and non-governmental organizations and agencies responsible for the implementation of drought response (crisis management) activities at various levels; and
- (f) Local, national and regional institutions involved in awareness building, research and education.

4. DESCRIPTION OF THE PROPOSED PROGRAMME

4.1 Vision

To improve societal resilience to drought through integrated risk management.

4.2 Objective of the Programme

The wider scope of the Programme is to contribute to national efforts for poverty alleviation in drought-affected regions of the world through an integrated approach to drought management cutting across sectoral, disciplinary, and institutional jurisdictions. As a response to the perception of the drought problem and its complex cross-sectoral impacts on local and national economies, particularly on water, land, agriculture, ecosystems, and energy sectors, the objective of the IDMP is:

To support stakeholders at all levels by providing them with policy and management guidance through globally coordinated generation of scientific information and sharing best practices and knowledge for integrated drought management.

The proposed Programme will contribute to the global coordination of drought-related efforts of existing organizations and agencies with regard to:

- Better scientific understanding of, and inputs for, drought management;
- Improved knowledge base, with better access to information and products;
- Drought risk assessment, monitoring, prediction and early warning;
- Policy and planning for drought preparedness and mitigation across sectors; and
- Drought risk reduction and response.

While the spatial scope is global, the results are expected to be policy relevant and tailored to specific regional and national needs and requirements. The intent is to facilitate actors and partners in various sectors, disciplines, and institutions to provide better drought monitoring and prediction on a global and regional basis, and to use it effectively in the development of short-term and long-term drought management plans and actions. The overarching approach proposed for the Programme centers around four key principles:

1. To shift the focus from reactive (crisis management) to proactive and programmatic measures through mitigation, vulnerability reduction and preparedness;
2. To integrate the vertical planning and decision making processes at regional, national and community levels into a framework of horizontally integrated sectors and disciplines (such as water, land, agriculture, ecosystems, and energy);

3. To promote evolution of a knowledge base and establishing mechanisms for sharing it with stakeholders across sectors at all levels;
4. To build capacity of various stakeholders at different levels.

Drought planning and management within the scope of the Programme will incorporate a three-stage approach involving development of comprehensive drought response plans, short-term planning, and long-term drought planning guidelines. The proposed integrated approach places emphasis on governments working with a range of stakeholders to improve drought risk management practices, reduce vulnerability and build resilience, for example, of water users in various sectors (farmers, water supply operators, urban areas etc.) to cope with drought situations. The approach will involve vulnerability analysis for prioritization and effective targeting of efforts, and will also integrate farm productivity, soil and water protection, and financial management aspects. Sub-programmes may need to be introduced to improve drought monitoring, identify knowledge gaps and areas for further research on drought-related subjects, and support drought extension services.

5. ACTIVITIES IN THE PROGRAMME PHASES

The Programme will be undertaken in two phases: an **Inception Phase** of nine months, followed by an **Implementation Phase**, initially extending over four years. The detailed programme strategy, work plans and budget for the Implementation Phase will be developed during the Inception Phase. Continuation of the Programme beyond the initial four years of the Implementation Phase will be reviewed based on its evaluation by the appropriate bodies and partners one year before the period ends.

5.1 Inception Phase

The following activities are planned for the Inception Phase of the Programme:

- (a) Close consultations with relevant intergovernmental and non-governmental organizations active in the field of drought early warning, policy development and management (land, water and agriculture) through an inception workshop.
- (b) Identification of potential partners working in drought management issues so as to identify and build on their strengths, seeking ways to serve their needs, obtain their commitment, and agree on their roles in the Programme in order to cover the necessary scientific, policy, socio-economic, advocacy and the institutional aspects.
- (c) An extensive enquiry will be commenced to assemble comparable information on past droughts and drought-related disasters, both as regards their physical characteristics and their impact on the local economy and society.
- (d) Review and assessment of services provided, including operational as well as technical aspects, by the drought monitoring and prediction centres.
- (e) Regional dialogues will be held in order to build upon existing regional initiatives in drought management, preparedness and mitigation, and to create buy-in by regional stakeholders into the Programme.
- (f) Development of concept of demonstration projects in consultation with regional partners or the regional nodes.
- (g) The information will be used to prepare an inception report including a detailed programme strategy, work plans and budget for the Implementation Phase of the Programme.
- (h) The inception report will also describe the current status of the regional programme nodes and the linkages between the global, regional and national levels.

5.2 Implementation Phase

Activities in the implementation phase would be taken up under following categories:

- (a) The relevant activities commenced under (a) to (f) of the Inception Phase will be continued and completed during this Phase.
- (b) A broadly comprehensive and integrated approach to drought management will be developed and discussed at national and international forums to address global changes and challenges.
- (c) A catalytic role will be played in facilitating the development of regional activities under the programme and in coordinating existing and new regional projects.
- (d) Pilot demonstration projects will be undertaken, in cooperation with relevant regional groups, to apply the new approach to drought management, provided the funds are available.
- (e) Efforts will be made to obtain funding to implement the plans developed for each of the locations; some may require substantial capital investment, while others may focus more on facilitating legislative and regulative actions.
- (f) Experience with drought planning and management in each region will be collected, and made available in the form of guidelines, methodologies and tools for use in other regions.
- (g) A resource centre will be established, with an interface called a HelpDesk.
- (h) An operational link will be maintained with the IWRM information community and the GWP ToolBox, so that, on one hand, maximum use can be made of existing practices and techniques and, on the other hand, lessons learnt and new techniques developed are fed back into the community for wider dissemination.
- (i) The resource centre could be designed to act as a focus for international coordination and assist drought prone communities and donors to work together.
- (j) One year before the end of this phase, programme evaluation would be undertaken to ascertain the desirability and feasibility of extending the Programme.

6. OUTPUTS AND IMPACTS OF THE PROGRAMME

The major output from this Programme will be a coordinated framework for drought management, prediction and monitoring by networking and integrating new and existing programmes and activities worldwide, identifying the gaps and bridging them. The framework will be accompanied by a set of guidelines and tools, including a HelpDesk for the development of sound and appropriate drought policies and management plans for use by countries and regions, as well as the improved use of drought prediction services. Capacity building will be an important aspect of the Programme.

Outputs

The drought management guidelines will include tools for action as well as case studies demonstrating the value of the integrated process. In particular, the following outputs are envisaged:

- i. Compilation of information and knowledge on past droughts, their impacts and practices in drought planning and management;
- ii. Inception of pilot projects and coordination of regional and national projects for improved drought early warning services including monitoring and prediction to showcase best practices in scientific inputs, policy and planning for drought management and drought risk reduction and drought management;
- iii. Development of an appropriate mechanisms for stakeholder buy-in and for the establishment of regional drought management and preparedness networks;
- iv. Creation of protocols for standards for data, data products and decision-support tools including the use of GIS mapping methods in support of drought early warning, information delivery and risk management systems;
- v. Provision of technical as well as managerial and institutional guidance in the use of the above products and tools in partnership with appropriate institutions;
- vi. Support regional and national efforts in drought risk awareness through advocacy and facilitated dialogues with donors;
- vii. Establishment of a Drought HelpDesk to respond to expressed needs for assistance in drought risk assessment, monitoring, prediction, early warning, preparedness and mitigation;
- viii. Development of guidelines for national drought policies.

Impacts

The Programme is expected to have substantial impacts in the long term as well as short term on the following:

- Potential for poverty alleviation by focusing on prevention strategies in the drought-prone areas;
- Increased resilience of economies and societies to the incidents of droughts;
- A multi-disciplinary approach to drought management through land, water, and agriculture perspectives;
- Improved climate, water and agriculture information for drought management and climate change adaptation;
- Improved approach and tools for drought management supporting land, water and agriculture through Integrated Water Resources Management (IWRM) and sustainable land management (SLM);
- Ensured coordination and scientific back-up to regional drought management projects;
- Effective use of information by those responsible for the development of national drought policies and their management in the broadest sense, including those concerned with emergency response, as well as operation of engineering works (such as reservoirs) and water supply systems;

- Cross-fertilization of ideas and experience between regions, so that success achieved in one way be applied in others;
- Enhanced potential for improved coordination of international assistance and response to current drought events;
- Broader Stakeholder participation and buy-in through networks in drought management for policy development and implementation;
- Increased capacities in countries to adapt to the increasing number of droughts due to climate change, and robust mechanisms for dealing with regional and transboundary aspects;
- Coordinated building and development of drought management institutions at global, regional and national level (through the identification of experts and centres of excellence) and sharing of knowledge and common practices.

7. MANAGEMENT OF THE PROGRAMME

The guiding principle in the management of the Programme will be its fully participatory and transparent approach, with active involvement of collaborating organizations, agencies and their activities that contribute to the objectives of the proposed Programme. While the details of the overall oversight and technical guidance will be worked out during the consultation with various partners during the inception phase, it is envisaged that there will be an International Management Committee and an Advisory Committee to steer and guide the overall implementation. Membership of this committee will comprise of representatives of collaborating partners and technical experts, the latter being invited on an ad-hoc basis.

The Programme will seek coordination with other relevant international initiatives with the aim of avoiding duplication of efforts, increase efficiency in the use of resources and building on synergies. Related national, regional and global projects/activities will need to be taken into consideration and will be identified during the Inception Phase. The Global Water Partnership through its Regional Water Partnerships will guide and assist in developing the regional linkages of the Programme along with other partners.

7.1 Technical Support Unit (TSU)

The TSU will assist the inception and technical implementation of the Programme. The World Meteorological Organization (WMO) provides the scientific basis for managing weather, climate and water extremes. Through its long-standing expertise and activities in the field of drought prediction and management and close links with the national agencies and regional centers responsible for drought prediction, national agencies responsible for drought preparedness, including the hydrological and agricultural agencies it has set up an operational network that would be essential for the success of the programme. Furthermore, WMO is a partner in several programme-relevant intergovernmental processes of the United Nations System. It is proposed, therefore, that the TSU be located within the WMO Secretariat in Geneva, thus providing synergies with existing initiatives in climate, water and agriculture.

Given the important role played by the professional associations, it is planned that intergovernmental and non-governmental organizations involved in aspects of drought planning and management act as partners of the Programme through a consortium of institutions of excellence on a voluntary basis. These will be identified during the Inception Phase of the Programme. The involvement and

collaboration of a number of UN and NGO partners will be essential for this Programme to succeed. Involvement of these organizations will be investigated and discussed with them during the inception phase.

A principal tool for global coordination will be an institutionalized dialogue between the Programme partners using various media and communication platforms to ensure up-to-date information about on-going and planned activities and consultations with regard to joint and multilateral activities in drought management. The development and implementation of regional dialogues and demonstration projects focusing on drought management will be of particular interest to the Programme and facilitate multi-lateral and global collaboration.

7.2 Partnerships

The Programme will be implemented through the major international/ regional institutions dealing with land, water, agriculture, ecosystems and energy coordinated through the World Meteorological Organization, working together with the partner organizations within the network of the Global Water Partnership. The active involvement and collaboration of a number of institutions will ensure that a comprehensive approach with the involvement of all concerned sectors in a multi-disciplinary manner for this Integrated Drought Management Programme to succeed in creating a responsive and demand-driven process.

Many international, regional, and national organizations will have a vested interest in the IDMP as proposed. In addition, many NGOs are also committed to the sustainable management of land and water resources and the impacts of drought on these resources. One of the goals of the implementation phase of Programme development would be to engage other organizations in discussions pertaining to their interest in this activity.

The institutions include, but are not restricted to:

- Food and Agriculture Organization (FAO)
- United Nations Convention to Combat Desertification (UNCCD)
- U.S. National Drought Mitigation Center (NDMC) at the University of Nebraska
- International Strategy for Disaster Reduction (ISDR)
- UNDP Drylands Development Centre
- ReliefWeb (UN Office for the Coordination of Human Affairs (OCHA))
- United Nations Educational, Scientific and Cultural Organization (UNESCO)
- United Nations Environment Programme (UNEP)
- United Nations Development Programme (UNDP)
- United Nations Children's Fund (UNICEF)
- World Bank
- International Federation of Red Cross and Red Crescent Societies (IFRC)
- European Joint Research Centre
- International Commission on Irrigation and Drainage (ICID)
- International Union for Conservation of Nature (IUCN)
- Member of the Consultative Group on International Agricultural Research (CGIAR)
- European Environment Agency
- International Institute for Applied Systems Analysis (IIASA)
- The International Research Institute for Climate and Society (IRI)
- Various regional organizations such as SADC, ECOWAS, IGAD, ASEAN
- Regional economic and social commissions of the U.N.
- Regional Drought Monitoring Centres
- other academic institutions working on drought and drought-related issues

8. PROPOSED GOVERNANCE STRUCTURE

During the initial phase of the proposed programme, an Ad-Hoc Steering Committee (AHSC) will be created to help guide the initial phases of the programme. It is proposed that the AHSC would be composed of representatives from the following organizations: WMO/CAgM, GWP, UNCCD, NDMC, FAO, and IUCN. The initial proposal for governance structure for the IDMP will be based on the structure of the Associated Programme on Flood Management (APFM). The APFM governance structure is composed of an advisory committee of interested partner organizations (see section 7.2) and a management committee of about 10 members. The AHSC will further develop a proposed governance structure based on the APFM model.

9. CONCLUSIONS

Drought and poverty are linked in a self-amplifying cycle that can only be halted by strategically shifting from a crisis management approach to a more comprehensive approach of Integrated Drought Management that aims at drought risk management encompassing preventive and mitigative measures appropriately with preparedness and response activities.

As the frequency, severity, and duration of droughts increase as a result of climate change and other factors affecting the vulnerability of societies to drought, the concept of policy planning and management of drought needs to evolve. Science is in a position to be able to predict the onset of such events with decreasing uncertainty, a capacity that needs to be appropriately factored into reducing drought risks and mitigating its impact on the environment as well as on socio-economic activities, as part of broader strategies for adaptation to climate change. Using and sharing scientific knowledge and experiences through multi-disciplinary problem solving, international cooperation and stakeholder participation, the IDMP is expected to facilitate and provide an objective-oriented framework for the monitoring, prediction and management of drought on regional, national and community levels.

The proposed Programme provides a platform and mechanism to enhance drought management capacities in a coordinated, pro-active and responsive manner based upon improved drought prediction and monitoring services, and the collaboration of a multitude of partners representing all relevant sectors in drought management. By collectively working on improving drought management through a risk-based approach, societies can become more resilient to future drought episodes and, subsequently, reduce the economic, social, and environmental impacts associated with this pervasive natural hazard.
