

POLICY-DOCUMENT ON DROUGHT PREPAREDNESS & CRISIS-MANAGEMENT IN THE PROVINCE OF BALOCHISTAN

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ABSTRACT

This document was prepared to understand the framework on drought-preparedness and mitigation, along with crisis-management in the area-wise largest Province of Pakistan. Balochistan has a rich history back to the Stone Age; then, as now, people depended on natural resources of this arid region. The Government is now determined to achieve prosperity and progress for the people of Balochistan. It intends to achieve this through the optimal use of resources, new policy- initiatives, financial discipline, and balanced combination of approaches on inter-sectoral and inter-regional development. The document describes a practical step-by- step process for identifying actions that can be taken to reduce potential drought-related impacts before a drought occurs, viz.

Step 1: begins with making sure that the right people are brought together and supplied with adequate data to make informed and equitable decisions during the process.

Steps 2 and 3: narrow the focus of the study, by identifying high-priority drought-related impacts that are relevant to the user's location or activity.

Step 4: demonstrates that, in order to reduce the potential for the identified impacts to occur in the future, it is necessary to understand the underlying environmental, economic and social causes of the impacts.

Finally, Steps 5 & 6: utilize all of the previous information to identify feasible, cost-effective and equitable actions that can be taken to address the identified causes. In this manner, with a few subsequent steps, true drought-vulnerabilities can be addressed that will subsequently reduce drought-related impacts and risk.

GLOSSARY OF TERMS

Below are definitions for terms that appear within this document. Several of these terms have other definitions that are commonly used elsewhere, depending on the discipline or perspective. In this case, the definitions have been tailored to the natural hazard of drought.

Acceptable Risk: A level of vulnerability that is considered to be "acceptable", balancing factors such as cost, equity, public input, and the probability of drought.

Crisis Management: An approach for dealing with drought, where responses and actions are made during the event, with no prior planning, sometimes leading to ineffective, poorly coordinated, and untimely initiatives by individuals or governments.

Drought: A deficiency of precipitation from the accepted or "normal" that, when extended over a season or longer period of time, is insufficient to meet demands. This may result in economic, social, and environmental impacts. It should be considered a normal, recurrent feature of climate. Drought is a relative, rather than absolute condition that should be defined for each region. Each drought differs in intensity, duration, and spatial extent.

Drought Contingency-Plan: A document that identifies specific actions that can be taken before, during and after a drought, to mitigate some of the impacts and conflicts that result frequently. These actions are triggered by a monitoring system.

Hazard: A threatening event (in this case of drought, a reduction in water-supply, or an increase in water-demand) that would make supplies inadequate to meet the demand.

Drought impact: A specific effect of drought. People also tend to refer to impacts as "consequences" or "outcomes." Impacts are symptoms of vulnerability.

Drought-impact assessment: The process of looking at the magnitude and distribution of the drought's effects.

Mitigation: short-and long-term actions, programs, or policies implemented in advance of drought, or in its early stages, to reduce the degree of risk to people, property, and productive capacity.

Preparedness: Pre-disaster activities designed to increase the level of readiness or improve operational capabilities for responding to a drought-emergency. Preparedness is a mitigation action.

Response: Actions taken immediately before, during, or directly after a drought, to reduce impacts and improve recovery. Response-measures are an important part of drought-preparedness, but should only be one part of a more comprehensive mitigation-strategy.

Risk: The potential adverse effects of drought as a product of both the frequency and severity of the hazard and corresponding vulnerability.

Risk Analysis: The process of identifying and understanding the relevant component associated with drought-risk, as well as the evolution of alternative strategies to manage that risk.

Risk Management: The opposite of crisis-management, where a proactive approach is taken, well in advance of drought, so that mitigation can reduce drought-impacts, and so relief and recovery decisions are made in a timely, coordinated, and effective manner during a drought.

Vulnerability: Characteristics of populations, activities, or the environment that make them susceptible to the effects of drought. The degree of vulnerability depends on the environmental and social characteristics of the region and is measured by the ability to anticipate, cope with, resist, and recover from drought.

Vulnerability Assessment: vulnerability-assessment provides a framework for identifying or predicting the underlying causes of drought-related impacts. Drought may only be one factor, along with other adverse social, economic, and environmental conditions that create vulnerability.

UNDERSTANDING DROUGHT

Unfortunately, we tend to focus on drought when it is upon us. We are then forced to react---to respond to immediate needs, to provide what are often more costly remedies, and to attempt to balance competing interests in a charged atmosphere. That is not good policy; it is not good resource-management; and it certainly adds to the public's perception that government is not doing its job when it simply reacts when crisis strikes. To the contrary, we must take a proactive approach to dealing with drought. We must anticipate the inevitable ---- that drought will come and go--- and take an approach that seeks to minimize the effects of drought when it inevitably occurs”.

(Mr. James R. Lyons, Assistant Secretary of Agriculture for Natural Resources and Environment, May 1994.)

In drought management, making the transition from crisis to risk-management is difficult because little has been done to understand and address the risk associated with drought. To promote the process, this document presents a guide to assist individuals and organizations, through a process of identifying specific actions that can be taken to reduce short and long-term risks. Although based on natural-hazard theory, this is flexible enough to be tailored to any particular region or province, as a straightforward and practical tool for all drought-managers. The approach may be new to some natural-hazard managers since traditional hazard-risk assessment is often limited to comparison of the likelihood of a disaster with currency-value of potential losses or impacts. These comparisons are then used to decide whether it is economically favorable to prepare for certain disasters. This strategy, however, recognizes that impact-assessment and economic analysis only partially accomplish risk-management. To be complete, risk-management must also address issues of vulnerability and the equity of efficiency-cost, and urgency of possible actions.

Therefore, this guide focuses on identifying and ranking the priority of relevant drought-impacts, examining the underlying environmental, economic, and social causes of these impacts; and then choosing actions that will address these underlying causes. In a sense, what make this guide different and more helpful than previous methodologies is that it addresses the “whys” behind drought-impacts, which are the true causes of

vulnerability, rather than specific impacts. Until now, almost all drought-responses have been reactions to the impacts. This guide provides its users the opportunity to identify mitigation-actions that can be taken to lessen vulnerability to future droughts.

STEP-1: GETTING STARTED

For this type of interdisciplinary analysis, it is essential to bring together the right group of people and supply them with adequate data to make fair, efficient, and informed decisions pertaining to drought-risk. This group's knowledge will need to encompass several aspects of environmental, economic, and social topics. Any shortfall in information or perspective could lead to results that fall far short of planning goals.

STEP-2: DROUGHT IMPACT-ASSESSMENT

Impact-assessment examines the consequence of a given event or change. For example, drought is typically associated with a number of outcomes. Drought-Impact Assessments begin by identifying direct consequences of the drought, such as reduced crop-yields, livestock losses,

The assessment would yield a range of impacts related to the severity of drought. In addition, by highlighting past, current, and potential impacts, trends may become evident that will also be useful for planning purposes. These impacts highlight sectors, populations, or activities that are vulnerable to drought, and when evaluated with the probability of drought occurrence, identify varying levels of drought-risk.

STEP-3: RANKING THE IMPACTS

The impacts should then be ranked according to the most important impacts. To be effective and equitable, the ranking should take into consideration concerns, such as cost, area extent, trends over time, public opinion, fairness and the ability of the affected area to recover. The general public, community advisory committees, and group of relevant scientists and policy-makers can be included in the process of ranking. However, it is recommended that, as in all decision-making activities, as many groups as possible be represented for informed and equitable policy-formulation. In choosing the impacts of highest priority, it may be helpful to ask some of the following questions:

Box – 1: Common Types of Drought Impacts

Economic Category

- Agriculture
- Industry
- Tourism and Recreation
- Energy
- Financial
- Transportation

Social Category

- Stress and health
- Nutrition
- Recreation
- Public Safety
- Cultural Values
- Aesthetic Values

Environmental Category

- Animal / Plant
- Wetland
- Water Quality

and reservoir-depletion. These direct outcomes can then be traced to secondary consequences (often social effects), such as the forced sale of household assets or land, dislocation, or physical and emotional stress. This initial assessment identifies drought-impacts, but does not identify the underlying reasons for these impacts, as in Box I.

- Which impacts are important to the affected individual's or group's way of life?
- If impacts are not distributed evenly, should hard-hit groups receive greater attention?
- Is there a trend of particular impacts becoming more of a problem than others?

It may be also useful to develop some kind of matrix, as shown in Table-1 below, to help

options, a lack of local industry for off-farm supplemental income, or government politics

Table – 1: Decision-Matrix for Drought-Impacts

Impacts	Cost	Equally Distributed?	Growing?	Public Priority?	Equitable Recovery?	Impact Rank

organize the information used in the decision-making.

From this list of prioritized impacts, the next need is to decide which impacts should be addressed and which are too small to warrant attention in this forum. No impacts should be ignored, but they may be deferred to another forum for discussion or postponed until the impacts of higher priority have been addressed. Again, the previously mentioned concerns (urgency, equity, etc.) should be taken into account.

The result of this step is the development of a list of the impacts of highest priority that are relevant to your particular region or activity and supported by scientific researchers, policy makers, and the public. These impacts can then be investigated further (see step-4).

STEP-4: VULNERABILITY ASSESSMENT

Vulnerability-Assessment provides a framework for identifying the social, economic, and environmental causes of drought-impacts. It bridges the gap between impact-assessment and formulation of policy by directing attention to underline the causes of Vulnerability, rather than to its result, the negative impacts, which follow triggering events such as drought; for example, the direct impact of a lack of precipitation may be reduced crop-yields. The underlying cause of this vulnerability, however, may be that the farmers did not use drought-resistant seeds, either because they did not believe in their usefulness, or the costs were too high, or because of some commitment to cultural beliefs. Another example of an impact could be a farm foreclosure. The underlying cause of this vulnerability could be many things, such as small farm-size because of historical land-appropriation policies, lack of credit for diversification options, farming on marginal lands, limited knowledge of possible farming-

(state, national, or international).

Therefore, for each of the identified impacts that are relevant to your application, begins asking why have (might) these impacts occurred (occur)? It is important to realize that a combination of factors might produce a given impact (i.e., environmental, economic, and social factors). It might be beneficial to make a diagram of this causal relationship in some form of a tree-diagram. Two examples are shown in Figures-1 and 2. Figure-1 demonstrates a typical agriculture example and Figure-2, a potential urban scenario. Depending on the level of analysis, this process can quickly become somewhat complicated. That is why it is necessary to have the right mix of people working on the project who have knowledge of the relevant topics. Appendix-1 lists many factors that typically make an area vulnerable to drought; these should be considered when forming your tree-diagrams.

The tree-diagrams illustrate the complexity of understanding drought impacts. The two examples provided are neither meant to be comprehensive or represent an actual location. Basically, their main purpose is to demonstrate that impacts must be examined from several perspectives in order to expose their true underlying causes. For this assessment, the lowest causes on the tree diagrams, the items in boldface of the tree diagrams will be referred to as basal causes. These basal causes are the items that have the potential to be acted upon in order to reduce the associated impact. Of course, some of these impact causes should not be or cannot be acted on for a wide variety of reasons (discussed in step-5).

STEP 5: ACTION IDENTIFICATION

Once drought-impact priorities have been set and the corresponding underlying causes of vulnerability have been

exposed, it is time to identify actions that are appropriate for reducing risk of drought. In accordance with the overall goal of drought-mitigation rather than drought-response, we emphasize that mitigative actions should be identified before potential response actions.

Again it may be useful to develop some kind of a matrix (like table-2) in the decision-making. This matrix expands on the impact, of "income loss from crop failure" from the agriculture example in step-4. The matrix lists the impact, as well as the described basal causes, of the impact. From this point, begin to investigate what actions could be taken to address each of these basal causes. The following sequence of questions may be helpful in identifying

potential actions:

- First,* Can the basal cause be mitigated (can it be modified before a drought)? If yes, then how?
- Second,* Can the basal cause be responded to (can it be modified, during or after a drought)? If so, then how?
- Third,* Is there some basal cause, or aspect of the basal cause, that cannot be modified and must be accepted as a drought-related risk for the activity or area.

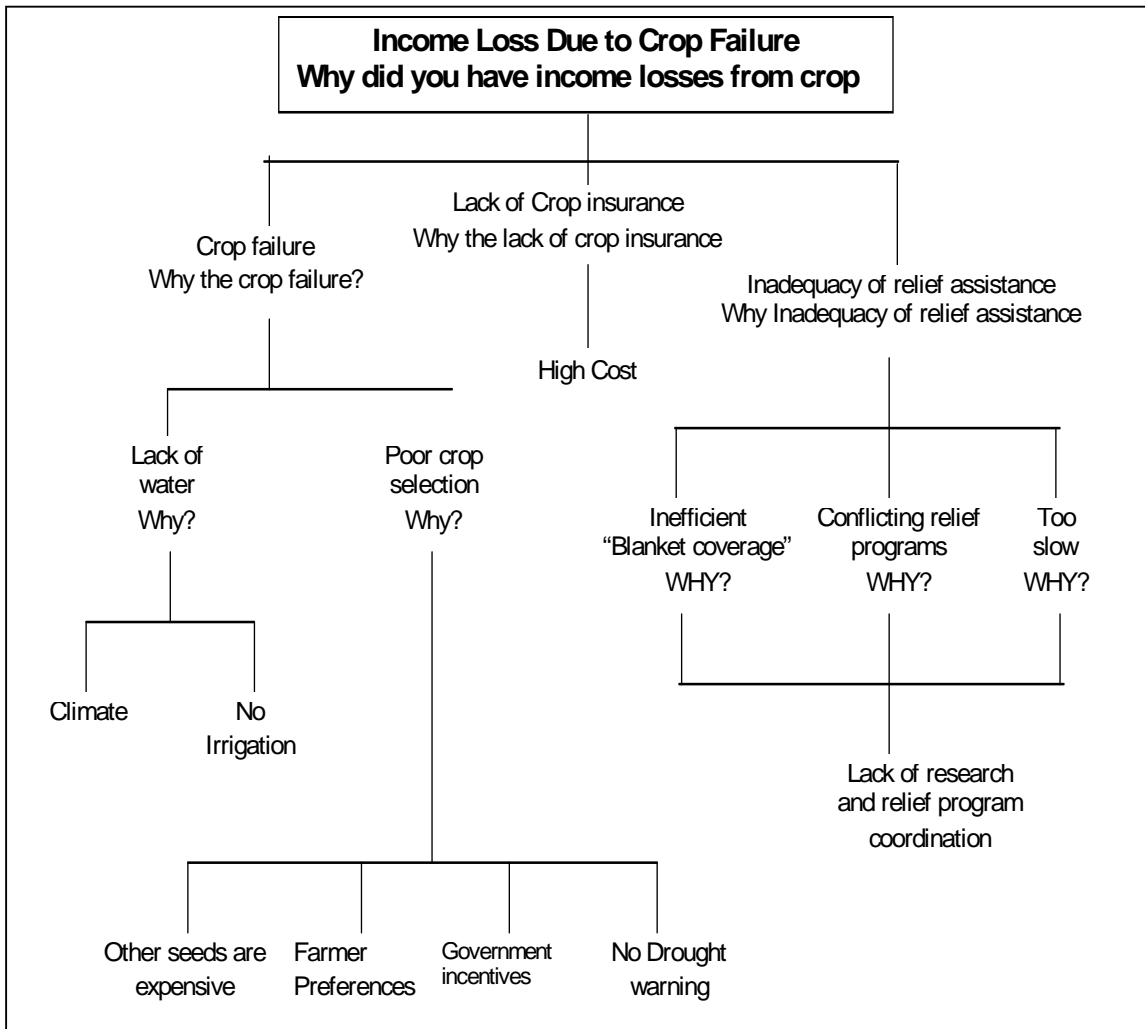


Figure - 1. An example of a simplified agricultural impact tree diagram. Notice that the boldface items represent the basal cause of the listed impact. Although these items may be broken down further, as in Appendix F, this example illustrates the vulnerability-assessment process.

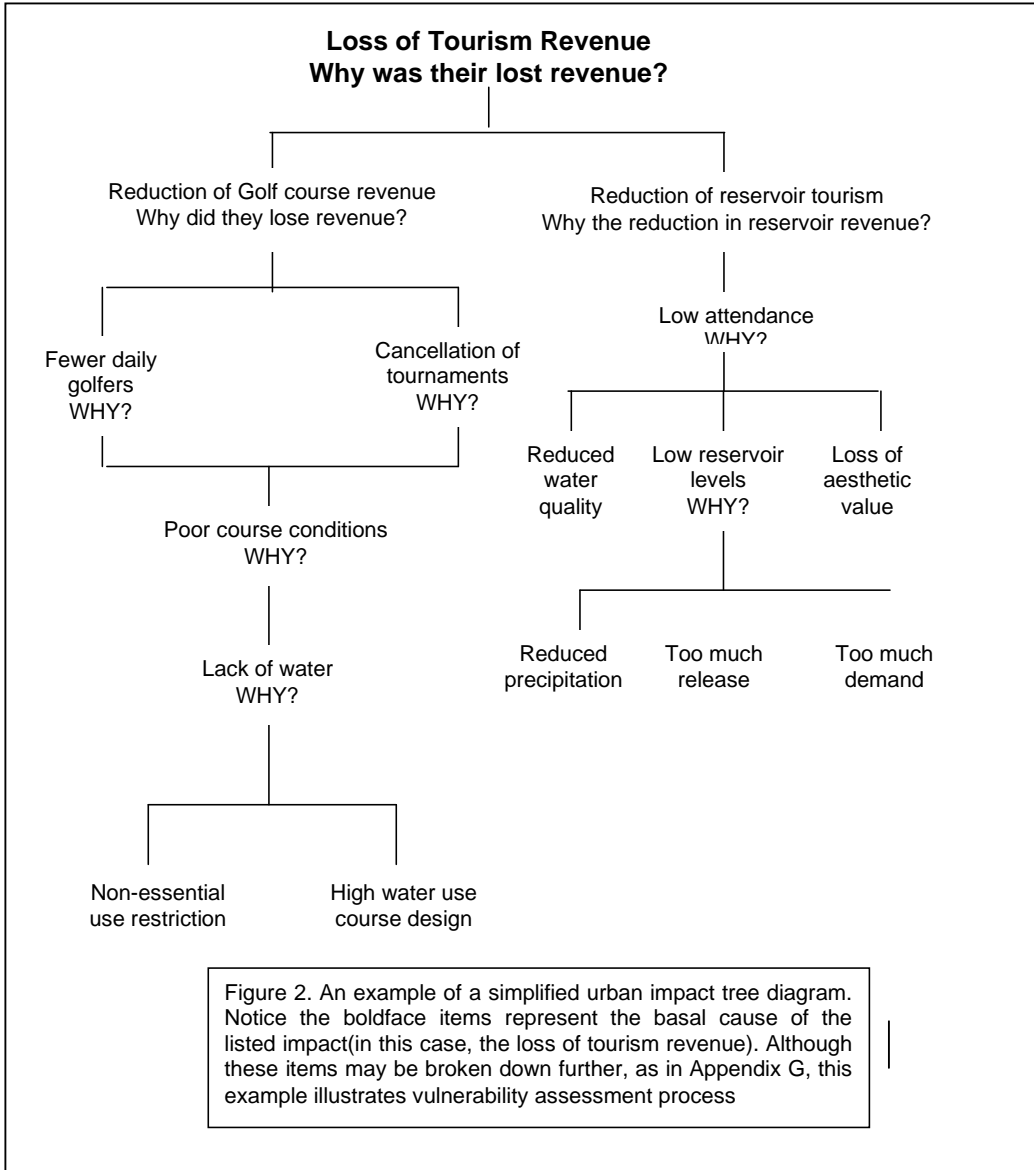


Table – 2: Drought-Risk Action Identification Matrix

Impact of Drought	Underlying causes of Vulnerability (Basal causes of the Why Questions)	Possible Actions	Mitigation (M), Response (R), or Accepted Risk (AR)	Feasible?	Effective for impact reduction?	Benefit / Cost?	Equitable?	To Do?
Income loss from crop-failure	Variable climate	Weather modification	M					
		Weather monitoring	M					
	NO irrigation	Haul water during a drought	R					
		Provide Government-assistance for project	M					
	Expensive seeds	Subsidize seed sales	M					
	Farmer preferences to plant specific seeds	Conduct workshops	M					
		Conduct research	M					
		Enhance communication	M					
	Government incentives to plan specific crops	Lobby for new incentives	M					
	No drought-warning	Provide weather-monitoring	M					
		Identify "triggers"	M					
	High cost of crop-insurance	Government subsidies	R					
	Lack of research as to the efficiency of drought-relief efforts	Identify target-groups and conflicting relief-program criteria and goals	M					
	Lack of drought relief program coordination	Streamline relief application and funding	M					

STEP-6: DEVELOPING THE “TO DO” LIST

Now that the impacts, causes, and relevant potential actions have been identified, the next step is to choose which actions to take in planning your risk-reduction. This selection should be based on such concerns as feasibility, effectiveness, cost, and equity. Additionally, it will be equally important to review the impact tree-diagrams when considering which groups of actions need to be considered together. For example, if it is wanted to reduce crops-losses by promoting the use of a different type of seed, it probably wouldn't be very effective to educate farmers on the benefits of the new variety if it is too expensive for them to use, or there are high government-incentives for planting other crops.

In choosing the appropriate actions, it might be helpful to ask some of the following questions:

- What are the cost/benefit ratios?
- Which actions are deemed feasible and appropriate by the general public?
- Which actions are sensitive to the local environment (i.e., sustainable practices)?
- Are the actions addressing the right combination of causes, to adequately reduce the relevant impact?
- Are the actions addressing short-term and long-term solutions?
- Which actions would fairly represent the need of affected individuals and groups?

Again, a matrix (such as Table-2) may be useful for organizing the concerns regarding relevant actions. Once the appropriate risk-reduction actions have been chosen, they should be compiled in a comprehensive, explanatory form. It is suggested that the “To Do” list be split into actions that are to be taken now, versus those that are to be performed during, or after, a drought. In addition, it may be helpful to clarify the areas of vulnerability that have been identified as falling under the acceptable-risk categories.

This process has the potential to lead to the identification of effective and appropriate drought-risk reduction activities, rather than ad-hoc responses or un-researched mitigation plans that may have little effect on reducing drought-impact in the future.

CONCLUSION

Upon completion of Step 6, the risk consistent is finished. The user has gone through a process to identify drought impacts, vulnerabilities, and the underlying causes of those vulnerabilities. Perhaps most importantly, the user has identified a “to do” list of actions that can lead to long-term mitigation of these impacts. Drought-mitigation actions have always been difficult to identify because of the lack of systematic approaches to do so. This guide stops short of suggesting methods of implementing any of the actions identified.

The development of a drought contingency-plan provides an excellent opportunity to use this guide. In these cases, many of the people needed to complete the guide have already been assembled. In addition, completing this consistent will also provide important information useful in constructing a plan. For example, the mitigation actions identified, by using the guide, can then be included within the plan. It would also be useful for those interested in reviewing and updating any drought-plans. Completion of the analyses as part of a post-drought evaluation would be another valuable opportunity, providing information on how efforts of mitigation, response, and recovery can be improved before the next drought. Finally, because vulnerability is dynamic, it would be beneficial to periodically complete a drought-risk consistent in order to assess how vulnerability is changing and to maintain an appropriate level of preparedness.

THE CHALLENGE

After a major drought, it was important to study the causes and impacts of the event, and let us recognize that has not been met so far.

As a citizenry, we must remember the apparent lessons learned from drought and act on them to prepare for the next drought. May we urge federal governments to decide: How to coordinate drought-related programmes and how to integrate them with ongoing federal – provincial drought-programmes and the efforts of civil society.

Unless and until these basic steps are taken, this country will perhaps continue to rely on taxpayers-funded emergency relief after drought, and probably forget to prepare for the next drought.

Let us develop a National Drought Policy Statement, with preparedness as its foundation, and with a request to Honorable President Islamic Republic of Pakistan to endorse the policy through a National Drought-Preparedness Act, which may ultimately create National Drought Policy Commission.

Second, we should outline a course of action that includes a preparedness initiative, to help reduce the damages and costs of drought.

Third, we envision a federal / provincial partnership to ensure that federal drought-programmes are better coordinated, that they are better integrated with provincial and non-federal programmes, and that their services are more efficient, effective and driven by customer-needs.

It will take commitment and resolve to achieve the goals of national drought-policy. We therefore call on the Chief Executive and the Federal Government to provide sufficient resources to carry out the possible recommendations of the National Commission. Allocation of funds may be based on consideration of the costs and benefits associated with drought-preparedness, proactive mitigation and response-measures.

National Drought Policy may use the resources of the federal government to support, but not supplant nor interfere with, provincial, local tribal and personal efforts to reduce impacts of drought. The guiding principles of National Drought Policy should be:

1. Favour preparedness over relief, and incentives over regulations.
2. Set research priorities, based on the potential of research-results, to reduce drought-impacts.
3. Coordinate the delivery of federal service, through cooperation and collaboration with provincials.

This policy requires a shift from the current emphasis on drought-relief. It means that we must adopt a forward-looking stance, to reduce this nation's vulnerability to the impacts of drought. Preparedness-including drought-planning, plan-implementation, proactive mitigation, risk-management, resource stewardship, consideration of environmental concerns and public education -- must become the corner stones of national drought policy.

We believe that the primary need to prepare for drought is to develop the capability to produce a wealth of basic weather, water, soil-moisture, snow-amount and climate observations. Therefore, we should join and get access to national, regional & global climate-study centers, climatologists, universities and private institutions in order to develop the information needed for effective drought-preparedness along with strengthening or establishing federal-provincial monitoring and prediction-programmes. These programmes should provide data to all concerned weather-services and other enterprises, which may opt to devise detailed predictions, tailored to areas or individual needs. Use of remote-sensing technology may be another option, to show potential area farmers of crop-stress, so that the farmers can make more efficient irrigation-decisions.

We further believe that preparedness, including planning, plan implementation, reflection-planning, proactive mitigation measures, and public education, could well reduce the social, economic and environmental impacts of drought and the need for federal relief- expenditures in drought-stricken areas. Preparedness may lessen conflicts over competition for water during drought.

At provincial level, we are committed to establish Mitigation and Crisis Management Centre (MCMC) at Quetta. One of the biggest challenges for successful drought-planning is getting all the right groups of people to communicate effectively with one another. Three main groups will be involved:

- Climatologists and others, who shall monitor how much water is available now, and in the foreseeable future. (Monitoring Committee).
- Natural-resource managers and others who determine how lack of water is affecting various interests, such as agriculture, recreation, municipal supplies, etc (Risk Assessment Committee).
- High-level decision-makers, elected and appointed officials, who have the authority to act on information they receive about water-availability and effects of drought (Drought Task Force).
- Getting these three groups functioning is the core of a successful drought-plan which is step-5 in a general 10-step process that can be tailored to the needs of an individual district, region (a bunch of districts) or for the province.

THE 10 STEPS ARE

- Appoint a Drought Task-Force.
- Define the Purpose and Objective of the Drought-Plan.
- Seek stakeholder's participation and Resolve Conflict.
- Inventory Resources and Identify Groups at Risk.
- Develop Organizational Structure and prepare Drought-Plan.
- Integrate Science and Policy, close Institutional Gaps.
- Publicize the proposed Plan, Solicit Reactions.
- Implement the Plan.
- Develop Education Programmes.
- Post-Drought Evaluation.

The Basics of Drought Planning: A 10-Step Process

One of the biggest challenges in successful drought-planning is getting all the right groups of people to communicate effectively with one

another.

Three Main Groups Need To Be Involved:

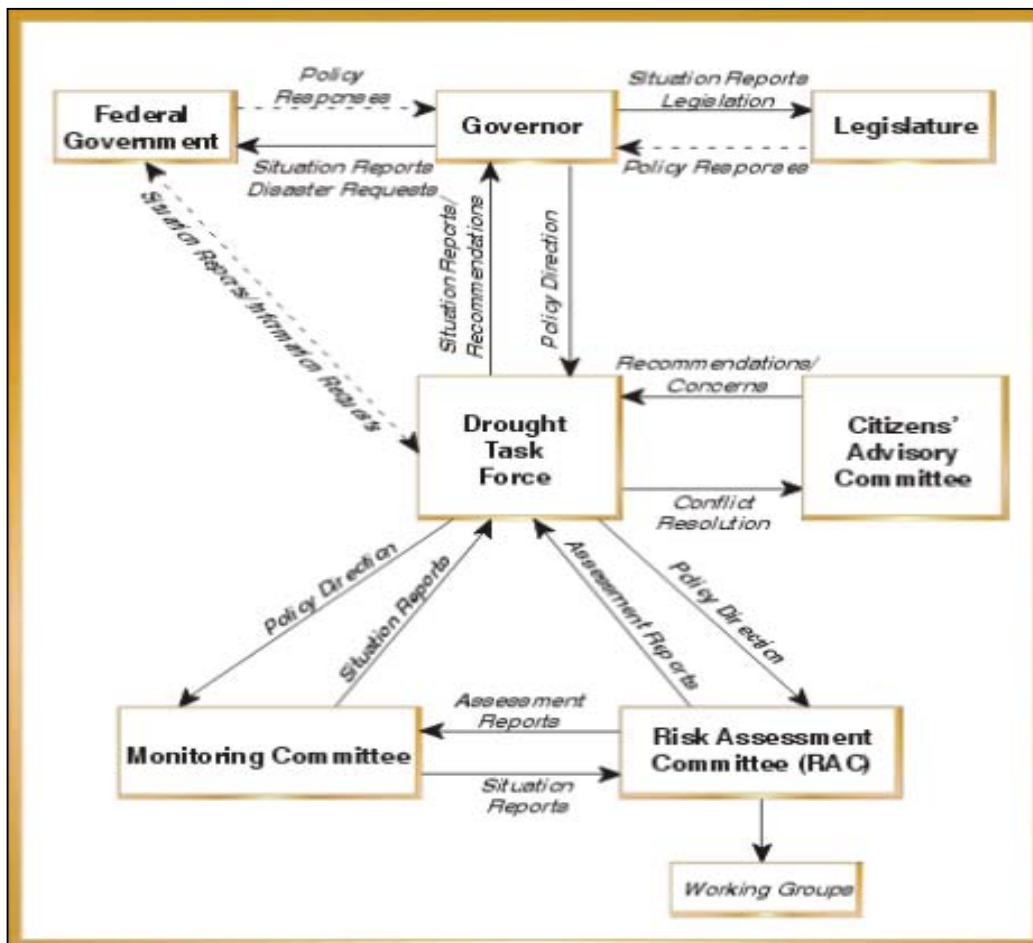
Climatologists and others who monitor how much water is available now, and in the foreseeable future. (Monitoring Committee) *natural resource managers* and others who determine how lack of water is affecting various interests, such as agriculture, recreation, municipal supplies, etc. (Risk Assessment Committee) *high-level decision makers*, often elected and appointed officials, who have the authority to act on information they receive about water-availability and drought's effects. (Drought Task Force)

Getting these three groups functioning is the core of a successful drought plan, which is step-5 in a general 10-step process that can be tailored to the needs of an individual district, province or country:

Step-1: Appoint a Drought Task Force

The drought planning process is initiated

ORGANOGRAM



through appointment of a drought task-force by the governor. The task-force has two purposes. First, it supervises and coordinates development of the plan. Second, after the plan is developed, and during times of drought when the plan is activated, the task force coordinates actions, implements mitigation and response-programs, and makes policy-recommendations to the Governor. The task-force is encouraged to oversee development of a web site that would contain information about the planning process, a copy of the plan, and current climate and water-supply information.

The task force should reflect the multidisciplinary nature of drought and its impacts, and it should include representatives of both state and federal government agencies and universities (e.g., representatives from extension, climatologists, policy specialists, and planners). A representative from the Governor's office should be a member of the task-force. Environmental and public-interest groups and others from the private sector, including industries, can be included on the task-force, and/or on sector-specific working groups of the risk-assessment committee, or an advisory council, or they can be otherwise involved, as appropriate. The actual makeup of this task-force would be highly variable between provinces, reflecting the province's political and economic character.

Depending on the nature of recent experiences with drought, the task force may find itself in the public spotlight from the outset, or it may work in relative obscurity. No matter what the initial level of public attention is, the task force needs to incorporate people who know how to conduct effective two-way communication with the public. Ideally, the task force should include or have access to public-information official who is familiar with local media's needs and preferences and a public-participation practitioner who can help establish processes that accommodate both well-funded and disadvantaged groups.

Step-2: State the Purpose and Objectives of the Drought Plan

As its first official action, the drought task force should state the general purpose for the drought-plan. State officials should consider many questions, as they define the purpose of the plan, such as the:

- Purpose and role of provincial government in drought-mitigation and response efforts;

- Scope of the plan;
- Most drought-prone areas of the province;
- Historical impacts of drought;
- Historical response to drought;
- Most vulnerable economic and social sectors;
- Role of the plan in resolving conflicts between water-users and other vulnerable groups during periods of shortage;
- Current trends (e.g., land and water use, population-growth) that may increase/decrease vulnerability and conflicts in the future;
- Resources (human and financial) that the state is willing to commit to the planning process;
- Legal and social implications of the plan; and
- Principal environmental concerns caused by drought.

A generic statement of purpose for a plan is to reduce the impacts of drought, by identifying principal activities, groups, or regions most at risk and developing mitigation actions and programs that alter these vulnerabilities. The plan is directed towards providing government with an effective and systematic means of assessing drought-conditions, developing mitigation-actions and programs to reduce risk in advance of drought, and developing response-options that minimize economic stress, environmental losses, and social hardships during drought.

The task force should then identify the specific objectives that support the purpose of the plan. Drought-plan objectives will, of course, vary between provinces and should reflect the unique physical, environmental, socioeconomic, and political characteristics of each province. At the state level, plan objectives will place less emphasis on measures for financial assistance (traditionally a role of the federal government) than would the objectives of a national plan. Technical assistance is a common element of National agency missions. Support for educational and research programs is typically a shared responsibility of provinces and federal government. Objectives that states should consider include the following:

- Collect and analyze drought-related information in a timely and systematic manner.
- Establish criteria for declaring drought-emergencies and triggering various mitigation and response activities.

- Provide an organizational structure and delivery-system that assures information-flow between and within levels of government.
- Define the duties and responsibilities of all agencies, with respect to drought.
- Maintain a current inventory of provincial and federal programs used in assessing and responding to drought-emergencies.
- Identify drought-prone areas of the province and vulnerable economic sectors, individuals, or environments.
- Identify mitigation-actions that can be taken to address vulnerabilities and reduce impacts of drought.
- Provide a mechanism to ensure timely and accurate assessment of impacts of drought on agriculture, industry, municipalities, wildlife, tourism and recreation, health, and other areas.
- Keep the public informed of current conditions and response-actions, by providing accurate, timely information to media in print and electronic form (e.g., via TV, radio and the World Wide Web).
- Establish and pursue a strategy to remove obstacles to the equitable allocation of water during shortages, and establish requirements or provide incentives to encourage water-conservation.
- Establish a set of procedures to continually evaluate and exercise the plan, and
- Periodically revise the plan so that it will stay responsive to the needs of the provinces and state.

Step-3: Seek Participation of Stakeholders and Resolve Conflicts

Social, economic, and environmental values often clash, as competition for scarce water-resources intensifies. Therefore, it is essential for task-force members to identify all citizen-groups that have a stake in drought-planning (stakeholders) and their interests. These groups must be involved early and continuously, in order to have fair representation and effective drought management and planning. Discussing concerns, early in the process, gives participants a chance to develop an understanding of one another's varying viewpoints, and to generate collaborative solutions. Although the level of involvement of these groups will vary notably from district to

district, the power of public-interest groups in policy-making is considerable. In fact, these groups are likely to impede progress in the development of plans if they are not included in the process. The task-force should also protect the interests of stakeholders who may lack the financial resources to serve as their own advocates.

Public participation takes many forms. Time and money may constrain how actively the task force can solicit input from stakeholders. One way to facilitate public-participation is to establish a citizen's advisory council, as a permanent feature of the drought plan, to help the task-force keep information flowing and resolve conflicts between stakeholders. Another way is to invite stakeholders to serve on working groups of the risk-assessment committee.

Provinces should also consider whether district or regional advisory councils need to be established. These councils could bring neighbors together, to discuss their water-use issues and problems and seek collaborative solutions. At the provincial level, a representative of each district-council should be included in the membership of the provincial citizens' advisory council, to represent the interests and values of their constituencies. The provincial citizens' advisory council can then make recommendations and express concerns to the task-force, as well as respond to requests for situation-reports and updates.

Step-4: Inventory Resources and Identify Groups at Risk

An inventory of natural, biological, and human resources, including the identification of constraints that may impede the planning process, may need to be initiated by the task force. It is important to determine the vulnerability of these resources to periods of water-shortage that result from drought. The most obvious natural resource of importance is water: where is it located, how accessible is it, of what quality is it? Biological resources refer to the quantity and quality of grasslands/range lands, forests, wildlife, and so forth. Human resources include the labor needed to develop water-resources, lay pipeline, haul water and livestock feed, process complaints of citizen, provide technical assistance, and direct citizens to available services.

It is also imperative to identify constraints to the planning process and to the activation of

the plan in response to a developing drought. These constraints may be physical, financial, legal, or political. The costs associated with the development of a plan must be weighed against the losses that will likely result if no plan is in place. The purpose of a drought-plan is to reduce risk and, consequently, economic, social, and environmental impacts. Generally speaking, the costs associated with the development of a provincial-level plan have been \$50,000-\$100,000, plus in-kind costs to provincial and federal agencies. This price-tag seems inconsequential, in comparison to the impacts associated with drought. Legal constraints can include water rights, existing public-trust laws, requirements for public water-suppliers, liability issues, and so forth.

In drought-planning, making the transition from crisis to risk-management is difficult because, historically, little has been done to understand and address the risks associated with drought. To solve this problem, areas of high risk should be identified, as should actions that can be taken, before a drought occurs, to reduce those risks. Risk is defined by both the exposure of a location to the drought-hazard and the vulnerability of that location to periods of drought-induced water-shortages. Drought is a natural event; it is important to define the exposure (i.e., frequency of drought of various intensities and duration) of various parts of the province to the drought-hazard. Some areas are likely to be more at risk than others. Vulnerability, on the other hand, is defined by social factors, such as land-use patterns, government policies, social behavior, water-use, population, economic development, diversity of economic base, cultural composition, and so forth. The drought task-force should address these issues early in the planning-process, so that they can provide more direction to the committees and working groups that will be developed under Step 5 of the planning process.

Step-5: Develop Organizational Structure and Prepare Drought-Plan

This step describes the process of establishing relevant committees to develop and write the drought-plan and develop the necessary organizational structure to carry out its responsibilities. The drought-plan should have three primary components: monitoring, risk-assessment, and mitigation, and response. It is recommended that committees be established to focus on the first two of these needs. The drought task-force can, in most

instances, carry out the mitigation and response function.

These committees will have their own terms of reference, but well-established communication and information flow between committees and the task force is a necessity, to ensure effective planning.

Task Force (Mitigation and Drought Response)

It is recommended that the task force (see Step 1), working in cooperation with the monitoring and risk-assessment committees, have the knowledge and experience to understand drought-mitigation techniques, risk analysis (economic, environmental, and social aspects), and drought-related decision-making processes at all levels of government. The drought task-force, as originally defined, is composed of senior policy-makers from various state and federal agencies. The group should be in an excellent position to recommend and/or implement mitigation actions, request assistance through various federal programs, or make policy-recommendations to the legislature and governor.

Specific responsibilities of the task force at this point are to:

- i. Determine mitigation and response actions for each of the principal impact-sectors, in close cooperation with the risk-assessment committee. However, the transferability of these technologies to specific situations, in other districts, needs to be evaluated further because they may not be directly transferable in some cases. Working with the risk-assessment committee, the task-force should come up with recommendations addressing drought on two different time-scales:
 - Short-term responses to implement during drought, such as voluntary water-conservation guidelines, a ready-to-roll hay hotline, streamlined administrative procedures for evaluating emergency assistance applications, and pre-produced infomercials, leading agricultural producers and citizens to information on best management practices.
 - Long-term drought mitigation projects, such as education programs to give various audiences the background

they need to interpret drought news-reports or scientific drought-indices; programs to persuade people to adopt measures that enhance organic-content in soil, conserve water, and otherwise boost the resilience of natural and social systems that are vulnerable to drought.

- Assuming there is no ongoing drought, it's a good idea to publicize the recommendations of the task-force and seek public input before the plan is implemented, particularly if anything seems revolutionary or controversial.
- ii. Inventory all forms of assistance available from local, provincial, and federal government during severe drought. The task-force should evaluate these programs for their ability to address short-term emergencies and long-term vulnerability to drought. Assistance should be defined very broadly, to include all forms of technical, mitigation, and relief programs available.
- iii. Work with the monitoring and risk-assessment committees to establish triggers. The monitoring committee can advise the task-force on which drought and water-supply indices are most relevant for the district or region. It is helpful to establish a sequence of descriptive terms for water-supply alert levels, such as "advisory," "alert," "emergency," and "rationing" (as opposed to more generic terms such as "phase 1" and "phase 2," or sensational terms such as "disaster"). The task-force should review the terminology used by other entities (i.e., local councils, states, river-basin commissions) and choose terms that are consistent in areas where authorities may have overlapping regional responsibilities. Federal / Provincial authorities may wish to provide technical assistance or other forms of encouragement to help local water-suppliers establish triggers for different stages of rationing before a drought.
- iv. Establish drought-management areas (i.e., subdivide the province or region into more conveniently sized districts, by political boundaries, shared

hydrological characteristics, climatological characteristics, or other means such as drought-probability or risk). These subdivisions may be useful in drought management, since they may allow drought-stages and mitigation and response-options to be regionalized. Climatic divisions are the most commonly used subdivisions at the Federal level, but they may not be the most appropriate, given topographic features, land-use patterns, or water-use characteristics. The task-force should work closely with the monitoring committee, to understand natural boundaries as well as limitations imposed by existing data-collection systems, and with the risk-assessment committee to understand the timing of drought's effects on different economic sectors and social groups.

- v. The drought task-force should develop a web site for disseminating drought-monitoring information and for letting the public know about the drought plan. Models that could be followed are web pages for the states of Texas, Montana, Pennsylvania, Oklahoma, New Mexico, South Carolina, and Nebraska.

Monitoring Committee

A reliable assessment of water-availability and its outlook for the near- and long-term is valuable information in both dry and wet periods. During drought, the value of this information increases markedly. The monitoring committee should include representatives from agencies with responsibilities for monitoring climate and water-supply. It is recommended that data and information on each of the applicable indicators (e.g., precipitation, temperature, evapotranspiration, long-range weather forecasts, soil moisture, stream flow, ground-water levels, reservoir and lake levels, and snow pack) be considered in the committee's evaluation of the water-situation and outlook for the province. The agencies responsible for collecting, analyzing and disseminating data and information will vary according to the district organizational structure and by geographic region.

The monitoring committee should meet regularly, especially in advance of the peak-demand season. Following each meeting,

reports should be prepared and disseminated to the provincial drought task-force, relevant district and federal agencies, and the media. The chairperson of the monitoring committee should be a permanent member of the drought task-force. This person may be the provincial climatologist. If conditions warrant, the task force should brief the Governor about the contents of the report, including any recommendations for specific actions. It is essential for the public to receive a balanced interpretation of changing conditions. The monitoring committee should work closely with public information specialists, to keep the public well informed.

The primary objectives of the monitoring committee are to:

- i. Help policy-makers adopt a workable definition of drought that could be used to phase in and phase-out levels of district, provincial and federal actions, in response to drought. It may be necessary to adopt more than one definition of drought, in identifying impacts in various economic, social, and environmental sectors. Several indices are available (Hayes, 1998), including the Standardized Precipitation Index (McKee et al., 1993; 1995), which is gaining widespread acceptance (Guttman, 1998; Hayes et al., 1999); The commonly used Palmer Drought Severity Index (Palmer, 1965) is being replaced or supplemented as a monitoring tool in many states. The trend is for USA to rely on multiple drought-indices, as indicators of impacts in various sectors. The current thought is that no single index of drought is adequate to measure the complex interrelationships between the various components of the hydrological cycle and impacts.
- ii. Help the task-force establish drought-management areas (i.e., subdivide the province or region into more conveniently sized districts by political boundaries, shared hydrological characteristics, climatological characteristics, or other means such as drought-probability or risk). The monitoring committee's advice may be particularly helpful in communicating natural watershed-boundaries, as well as the limits and constraints imposed by existing data.
- iii. Develop a drought-monitoring system. In USA, most states already have a good data-collection system for monitoring climate and water-supplies and identifying

potential shortfalls. Responsibility for collecting, analyzing, and disseminating the data is divided between many state and federal agencies and other entities. We in Balochistan need to develop such a monitoring system, applying appropriate tools for extracting the above data. The monitoring committee's challenge is to coordinate and integrate the analysis, so that decision-makers and the public receive early warning of emerging drought-conditions. Same action should be replicated at the National level.

The province should have to develop automated weather-data networks that provide rapid access to climatic data. These networks can be invaluable in monitoring emerging and ongoing drought-conditions. Data from them can be coupled with data available from federal agencies, to provide a comprehensive monitoring of climate and water systems. Data and data-products should be disseminated on a timely basis, in printed form and electronically via the World Wide Web.

- iv. Meteorological data are important but represent only one part of a comprehensive monitoring system. Other physical indicators (soil moisture, stream flow, reservoir and ground-water levels) must be monitored to reflect impacts of drought on agriculture, households, industry, energy production, and other water-users. Helpful technology includes soil-moisture sensors, automated weather-stations, and satellite data, such as digital data obtained from the Advanced Very High Resolution Radiometer (AVHRR), transmitted from a National Oceanic and Atmospheric Administration satellite, which is useful in detecting areas where moisture-deficiencies are affecting growth of vegetation. Much of this data will be integrated under the Unified Climate Access Network (UCAN).
- v. Work closely with the task-force and risk-assessment committees, to determine the data needs of primary users. Developing new or modifying existing data-collection systems is most effective when the people who will be using the data are consulted early and often.

Soliciting input on expected new products, or obtaining feedback on existing products, is critical to ensuring that

products meet the needs of primary users and will be used in decision-making. Training on how to use or apply products in routine decision-making is also essential.

- vi. Develop and/or modify current data and information-delivery systems. People need to be warned of drought as soon as it is detected, but often they are not. Information needs to reach people, in time for them to use it in making decisions. In establishing information-channels, the monitoring committee needs to consider when people need various kinds of information. These decision-points can determine whether the information provided is used or ignored.

Risk Assessment Committee

Drought impacts cut across many sectors and across normal divisions of responsibility of district, provincial, and federal agencies. These impacts have been classified by Wilhite and Vanyarkho (2000) and are chronicled in the "Impacts" section of the NDMC's website. Risk is the result of exposure to the drought-hazard (i.e., probability of occurrence) and societal vulnerability, represented by a combination of economic, environmental, and social factors. Therefore, to reduce vulnerability to drought, it is essential to identify the most significant impacts and assess their underlying causes.

The membership of the risk-assessment committee should represent economic sectors, social groups, and ecosystems most at risk from drought. The committee's chairperson should be a member of the drought task-force. The most effective approach to follow in determining vulnerability to, and impacts of, drought is to create working groups under the aegis of the risk-assessment committee. The responsibility of the committee and working groups is to assess sectors, population groups, and ecosystems most at risk and identify appropriate and reasonable mitigation measures to address these risks. Working groups would be composed of technical specialists and stakeholders representing those areas referred to above. The chair of each working group, as a member of the risk-assessment committee, would report directly to the committee. Following this model, the responsibility of the committee is to direct the activities of each of the working groups and make recommendations to the drought task-force on mitigation actions.

The number of working groups will vary considerably between provinces. For instance, Colorado state in USA has identified eight impact working-groups: municipal water, wildfire protection, agricultural industry, commerce and tourism, wildlife, economic, energy loss, and health. State Idaho's drought plan outlines the responsibilities of five subcommittees: water data, public information, agriculture, municipal supplies and water quality, and recreation and tourism. New Mexico uses four sub-groups: agricultural; drinking water, health, and energy; wildlife and wildfire protection; and tourism and economic impact. Nebraska's drought-plan identifies two working groups: agriculture, natural resources, wildlife, tourism, and recreation; and municipal water supply, health, and energy.

A methodology for assessing and reducing the risks associated with drought has recently been completed as a result of collaboration between the NDMC and the Western Drought Coordination Council's (WDCC) Mitigation and Response Working Group (Knutson et al., 1998) The guide focuses on identifying and assigning priorities to drought-impacts, determining their underlying causes, and choosing actions to address the underlying causes. This methodology can be employed by each of the working groups. This effort requires an interdisciplinary analysis of impacts and management options and is divided into the following six tasks:

- i. Assemble the team. Select stakeholders, government planners, and others with a working knowledge of effects of drought on primary sectors, regions, and people.
- ii. Evaluate the effects of past droughts. Identify how drought has affected the region, group, or ecosystem. Consult climatological records to determine the "drought of record," the worst in recorded history, and project what would happen if a similar drought occurred in the near future, considering changes in land-use, population-growth, and development that have taken place since that drought.
- iii. Rank impacts. Determine which of drought's effects are most urgently in need of attention. Various considerations in assigning priority to these effects include cost, spatial extent, trends over time, public opinion, social equity, and the ability of the affected area to recover.
- iv. Identify underlying causes. Determine those factors that are causing the highest

levels of risk for various sectors, regions, and populations. For example, an unreliable source of water for municipalities in a particular region may explain the impacts that have resulted from recent droughts in that area. To reduce the potential for drought-impacts in the future, it is necessary to understand the underlying environmental, economic, and social causes of these impacts. To do this, drought-impacts must be identified and the reason for their occurrence determined.

- v. Identify ways to reduce risk. Identify actions that can be taken, before drought, that will reduce risk. In the example above, taking steps to identify new or alternative sources of water (e.g., ground water) could increase resiliency to subsequent episodes of drought.
- vi. Write a “to do” list. Work with the task-force to assign priority to options according to what’s likely to be the most feasible, cost-effective, and socially equitable. Implement steps to address these actions, through existing government programs or the legislative process. This process has the potential to lead to the identification of effective and appropriate drought-risk reduction activities that will reduce long-term drought impacts, rather than ad hoc responses or untested mitigation actions that may not effectively reduce the impact of future droughts.

Step-6: Integrate Science and Policy, Close Institutional Gaps

An essential aspect of the planning process is integrating the science and policy of drought-management. The policy maker’s understanding of the scientific issues and technical constraints involved in addressing problems associated with drought is often limited. Likewise, scientists generally have a poor understanding of existing policy-constraints for responding to the impacts of drought. In many cases, communication and understanding between the science and policy communities must be enhanced if the planning process is to be successful. Integration of science and policy during the planning process will also be useful in setting research-priorities and synthesizing current understanding. The drought task-force should consider various alternatives to bring these groups together and maintain a strong working relationship.

As research needs and gaps in institutional responsibility become apparent, during drought planning, the drought task force should compile a list of those deficiencies and make recommendations (on how to remedy these) to the governor and relevant agencies. For example, the monitoring committee may recommend establishing or enhancing a ground-water monitoring program. Another recommendation may be to initiate research on the development of a climate or water-supply index, to help monitor water-supplies and trigger specific actions by provincial government.

Step-7: Publicize the Proposed Plan, Solicit Reaction

If there has been good communication with the public throughout the process of establishing a drought-plan, there may already be better-than-normal awareness of drought and drought-planning by the time the task force recommends various drought mitigation and response options. Themes to emphasize in writing news releases and organizing informational meetings during and after the drought planning process could include:

- How the droughts-plan is expected to relieve impacts of drought. Stories can focus on the human dimensions of drought, such as how it affects a farm-family; on its environmental consequences, such as reduced wildlife habitat; and on its economic effects, such as the costs to a particular industry or to the provincial overall economy.
- What it will cost to implement each option, and how it will be funded.
- What changes people might be asked to make in response to different degrees of drought, such as restricted lawn-watering and car-washing, or not irrigating certain crops at certain times.

In subsequent years, it may be useful to do “drought-plan refresher” news-releases at the beginning of the most drought-sensitive season, letting people know whether there is pressure on water supplies or reason to believe that there will be shortfalls later in the season, and reminding them of the plan’s existence and history and any associated success-stories. It may be useful to refresh people’s memories, ahead of time, on circumstances that would lead to water-use restrictions.

During drought, the task-force should work with public-information professionals to keep the public well informed of the current status of water supplies, whether conditions are approaching “trigger points” that will lead to requests for voluntary or mandatory restrictions on use, and how victims of drought can access assistance. All pertinent information should also be available on the province’s drought web-site, so that the public can get information directly from the task force without having to rely on mass media.

Step-8: Implement the Plan

Once the task force and any external constituencies have agreed on the plan, the task force and/or its designated representatives should oversee implementation of both the short-term operational aspects of the plan and long-term mitigation measures. Periodic testing, evaluation, and updating of the drought-plan will help keep the plan responsive to district or provincial needs. An ongoing or operational evaluation keeps track of how societal changes, such as new technology, new research, new laws, and changes in political leadership, may affect drought-risk and the operational aspects of the drought-plan. Drought-risk may be evaluated quite frequently, while the overall drought plan may be evaluated less often. An evaluation under simulated drought conditions (i.e., drought exercise) is recommended before the drought plan is implemented and, periodically, thereafter. The virtual drought-exercise developed in association with a recent national study conducted by the U.S. Army Corps of Engineers (Werick and Whipple, 1994) is one mechanism that has been used to simulate drought-conditions and related decisions. *It is important to remember that drought planning is a process, not a discrete event.*

Long-term mitigation measures, such as implementing policies that require conjunctive use of ground and surface water, may require drafting new legislation and finding funds to support new monitoring and regulation efforts. In any case, it is essential to recognize that reducing long-term vulnerability to drought will require a sustained effort, although it may be a matter of long-term programs undertaken by a variety of agencies.

Step-9: Develop Education Programs

A broad-based education program to raise awareness of short- and long-term water-

supply issues will help ensure that people know how to respond to drought when it occurs and that drought-planning does not lose ground during non-drought years. It would be useful to tailor information to the needs of specific groups (e.g., elementary and secondary education, small business, industry, homeowners and utilities). The drought task-force or participating agencies should consider developing presentations and educational materials for events, such as a water-awareness of short- and long-term water-supply issues, to help ensure that people know how to respond to drought when it occurs and that drought-planning does not lose ground during non-drought years. It would be useful to tailor information to the needs of specific groups (e.g., elementary and secondary education, small business, industry, homeowners and utilities). The drought task-force or participating agencies should consider developing presentations and educational materials for events such as a water-awareness week, community observations of Earth Day, relevant trade-shows, specialized workshops, and other gatherings that focus on natural-resource stewardship or management.

Step-10: Post-Drought Evaluation

A post-drought evaluation or audit would document and analyze the assessment and response- actions of government, non-governmental organizations, and others, and provide for a mechanism to implement recommendations for improving the system. *Without post-drought evaluations, it is difficult to learn from past successes and mistakes, because institutional memory fades.*

Post-drought evaluations should include an analysis of the climatic and environmental aspects of the drought; its economic and social consequences; the extent to which pre-drought planning was useful in mitigating impacts, in facilitating relief or assistance to stricken areas, and in post-recovery; and any other weaknesses or problems caused or not covered by the plan. *Attention must also be directed to situations in which drought-coping mechanisms worked and where societies exhibited resilience; evaluations should not focus only on those situations in which coping mechanisms failed. Evaluations of previous responses to severe drought are also a good planning aid.*

To ensure an unbiased appraisal, governments may wish to place the responsibility for evaluating drought, and

societal response to it, in the hands of capable non-governmental organizations.

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**APPENDIX-1:
VULNERABILITY CONSIDERATIONS**

Water Shortage Vulnerability Continuum (by Deborah Braver, 11/97)		
	Higher Vulnerability	Lower Vulnerability
Meteorological	Wide Precipitation Variation	Stable Precipitation Pattern
	Lack of Data/Single Source Data	Good Long-Term Data/Multiple Source of Data
	Passive Drought "Acceptance"	Advance Warning
	Longer Duration	Shorter Duration
	Higher Severity Shortage	Lower Severity Shortage
	Sudden Change in Supply	Gradual Changes in Supply
Supply/Demand Balance or "Institutional Drought"	Single Water Source or Low Supply Reliability	Multiple Water Source or High Supply Reliability
	Low Priority Water Rights or Low Contractual Rights	Senior Water Rights or High Contractual Rights
	Water Supply at Risk from Contamination	Protected Water Supply
	Imported Water Supply(ies)	Local Supply(ies) and Locally Controlled
	Subject to Other Natural Disasters	Low Likelihood of Other Natural Disasters
Water Use Patterns	High Growth Area/High Additional Demand	Stable or Decreasing Water Demand
	High Percent Water Use Improvements Requires EARLIER Demand Management Response	Low Percent Water Use / Efficiency Improves "Slack" in System = Requires MORE Demand Management Response
	Landscape /Ag Irrigation Usual Practices OR Landscape / Ag Dependence on Precipitation	"Climate Appropriate" Plants OR Non-irrigated Agriculture / grazing
Preparedness	Wait Until Shortage is "Declared" (or beyond ...)	Early Shortage Response
	Lack of Political Will	Leadership
	Ignoring Situation/Abdication Responsibility	Preparedness/ Actions to Protect Community/ Economy/ Environment
	Non-interconnected Water Supply Systems OR Non-Collaborative Approach with Neighbors	Coordination with Others (i.e., Neighboring Water, Disasters Response and Fire Agencies, Mutual Aid agreements, etc.)
	Revenue/ Rate Instability	Rate Stabilization Fund
	"Knee Jerk" Rationing	Pre-determined and Equitable Allocation Methods
	Little Public Awareness	High Community Involvement (from all social and economic sectors)