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Hamdy A., Trisorio-Liuzzi G.

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Drought planning and drought mitigation measures in the Mediterranean region

A. Hamdy* and G. Trisorio-Liuzzi**
*Mediterranean Agronomic
Institute of Bari (CIHEAM-IAMB), Via Ceglie 9, 70010 Valenzano (Bari), Italy
**Istituto di Sistemazioni Idraulico - Forestali, Faculty of Agriculture, Bari University,
Via Amendola 165/a, 70126 Bari, Italy

SUMMARY – In the Mediterranean, water scarcity – due to drought – needs appropriate approaches. These approaches are to focus on identifying and ranking the priorities of relevant drought impacts, examining the underlying environmental, economic and social causes of these impacts. Carrying this process is fundamental to decide on the specific mitigation actions that can be taken to reduce short and long-terms drought risks. To successfully cope with drought, there is a need for better understanding the characteristics and consequences of those phenomena, which make water scarce due to drought, very different from those caused by aridity. Dealing with drought requires the development and implementation of preparedness and emergency measures.

Key words: Drought, planning, mitigation, management.

RESUME – *"Un instrument pour la gestion de l'eau d'irrigation en conditions de sécheresse". En Méditerranée, le problème de la pénurie d'eau causée par la sécheresse doit être traité par des approches appropriées. Elles doivent porter, notamment, sur l'identification et la classification des priorités afférentes aux impacts de la sécheresse, et l'analyse des causes environnementales, économiques et sociales de ceux-ci. C'est un exercice fondamental pour décider les actions d'atténuation possibles pour réduire le risque sécheresse à court et long terme. Pour mieux lutter contre la sécheresse, il est essentiel de mieux comprendre les caractéristiques et les conséquences de ces phénomènes, où la pénurie d'eau est due à la sécheresse, qui sont très différents de ceux qui sont causés par l'aridité. La lutte contre la sécheresse nécessite le développement et la mise en œuvre de mesures de préparation et d'urgence.*

Mots-clés : *Sécheresse, planification, mitigation, gestion.*

Introduction

Water causes controversial and different problems in various parts of the world. Too much water causes flood and too little causes drought, poor distribution causes famine, poor quality causes health hazard and poor management creates competition and conflicts.

Out of the weather-related disasters, drought is certainly the most complex one and both the causes and multifaceted are not well understood. Persisting over months or years, drought affects extended areas and large populations. Its environmental and socio-economic impacts, however, stems not only from the duration, severity and spatial extent of the precipitation deficit, but also to a large extent from the environmental, social and economic vulnerability of affected regions.

In the last ten years, many countries in the Mediterranean region were subjected to severe and frequent droughts and their impacts resulted in significant economic, social and environmental costs. In the region, despite the increasing awareness of the drought hazard and the presence of several projects and initiatives networking activities, tools and strategies for risk assessment, prediction, monitoring and mitigation of droughts are, however, not well defined. There is no Mediterranean drought policy as such as institutional frameworks to cope with drought. In general, strategies are more reactive than proactive and standardization of methods as well as coordination and cooperation at Mediterranean level are weak.

In the Mediterranean there is a need to develop an appropriate drought planning, effective monitoring tools and mitigation strategies as well as to pursue research on the immediate and long-term impacts of drought events: those are the major issues, beside others, this paper is focusing on.

Drought definitions

Differences in the perception of drought lead to the adoption of different definitions, which do not have general acceptance, nor have worldwide applicability, as reviewed by Wilhite and Glantz (1987) and Tate and Gustard (2000). The controversy over perceptions of drought, and the consequent defining of them and their characteristics, does not help decision and policy makers to plan for droughts. Lack of clearly agreed definitions makes it difficult to implement preparedness measures, to apply timely mitigation measures when a drought occurs, or to adequately evaluate drought impacts.

Drought has been grouped by type as follows: meteorological, agricultural, hydrological and socio-economic (Wilhite and Glantz, 1985) (Fig. 1).

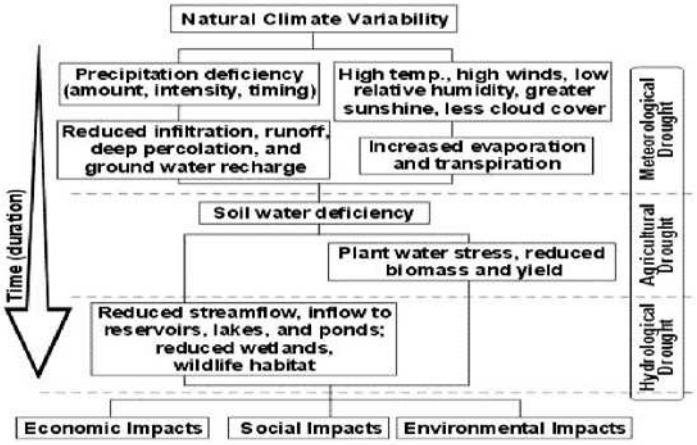

Fig. 1. Definitions of drought categories as meteorological, agricultural, hydrological.

Plan for drought

In the Mediterranean, having a regional plan to mitigate drought is essential, but not sufficient to cope with the sequences opposed by drought from one country to other. It is of paramount importance that each country in the region suffering the drought should have its own plan.

Country planning for drought is the key point for a successful mitigation policy, but it doesn't come naturally due to several obstacles related to the absence of a unified authority for managing natural resources including water and the responsibility is divided among many governmental jurisdictions.

In addition, risk reduction is not always treated as an integral part of water resources management and it is perceived as a technical problem ignoring both social and economical factors.

Furthermore, inadequate policy and institutional capacity and resources as well as the absence of single definition for drought are major constraints most countries are facing in planning for drought.

Drought planning: Major basics

For the Mediterranean countries, the primary step to be carried out is the establishment of a national drought authority including the following major committees:

(i) Climatologists and others who monitor how much water is available now and in the foreseeable future (Monitoring Committee).

(ii) Natural resources managers and others who determine how lack of water is affecting various interests such as agriculture, municipal supplies, industry, etc. (Impact Assessment Committee).

(iii) 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: DTF).

Drought planning and response framework for the mentioned major committees are summarized in (Fig. 2).

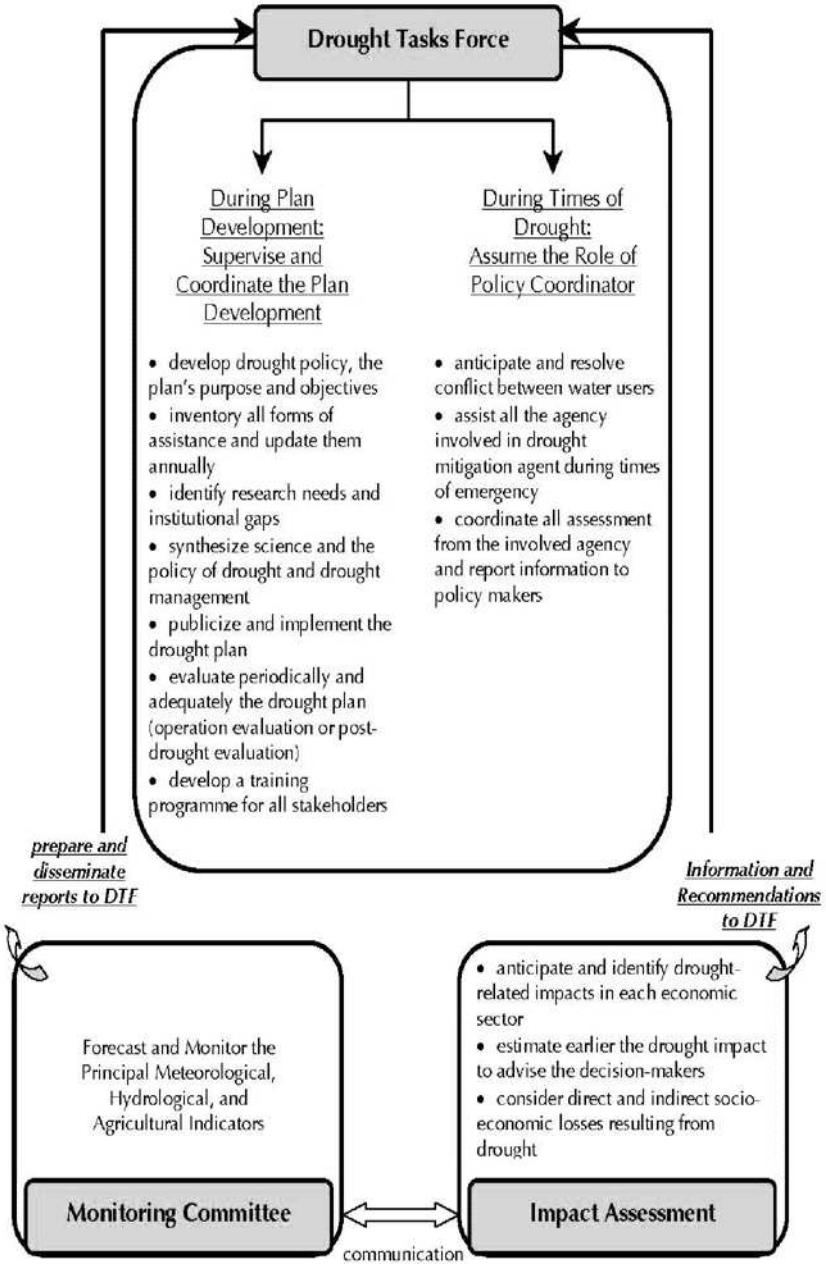

Fig. 2. Drought planning and response framework (Source: Hamdy, 2004).

Bringing and working together, the above-mentioned committees are the core of a successful drought plan. It is also one of the planning's biggest challenges to get these groups to communicate effectively with one another.

Drought mitigation: Long-term and short-term measures

The primary concern of drought is water shortage, most of the planned activities aim at reducing the effect of such shortage, through measures that are taken before, during and after drought.

From the water resources perspective, a proactive approach to drought is equivalent to strategic planning of water resources management for drought preparation and mitigation. Such planning consists of two categories of measures, both planned in advance (Rossi *et al.,* 2003): (i) long-term actions, oriented to reduce the vulnerability of water supply systems to drought, i.e. to improve the reliability of each system to meet future demands under drought conditions by a set of appropriate structural and institutional measures; and (ii) short-term actions, which try to face an incoming particular drought event within the existing framework of infrastructures and management policies.

The measures that can be included in each of the above two categories for drought mitigation and alleviating drought impacts can also be grouped into three main types or sub-categories (Yevjevich *et al.*,1983): (i) water-supply oriented measures; (ii) water-demand oriented measures; and (iii) drought impact minimization measures (Fig. 3).

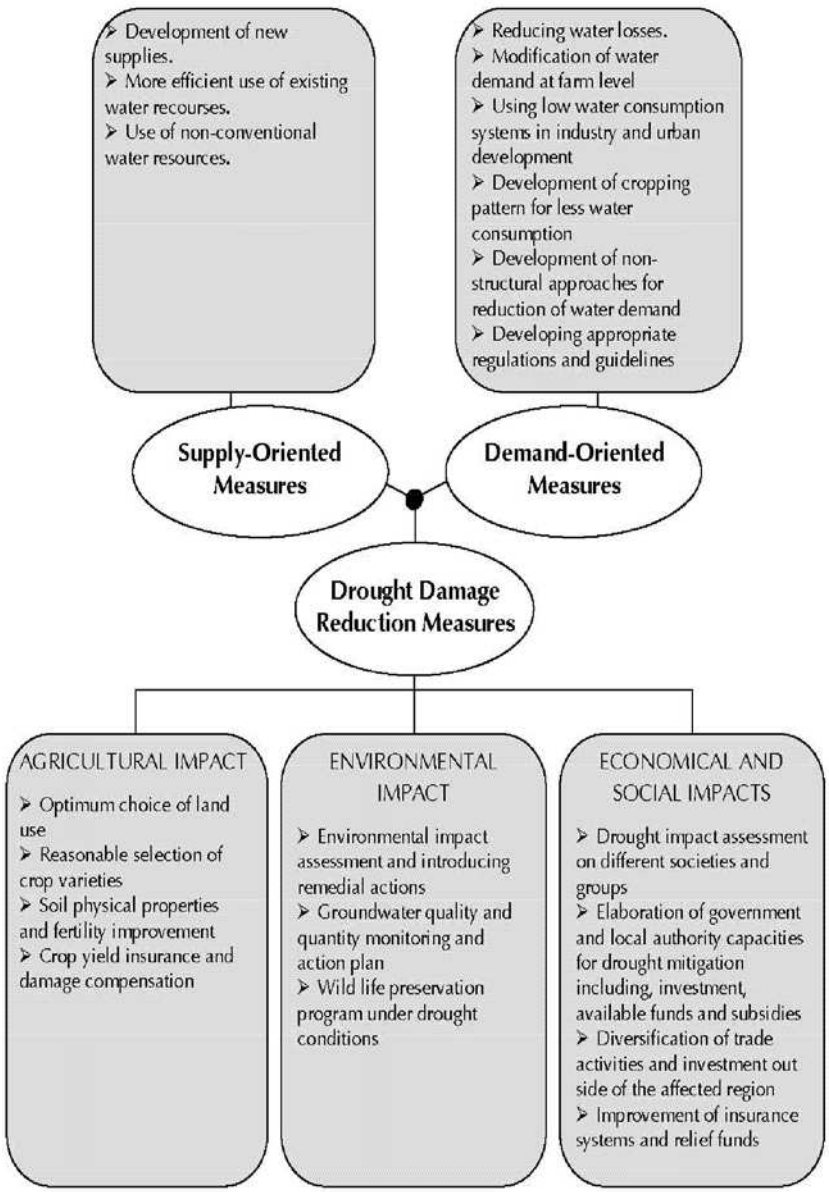

Fig. 3. Measures for drought mitigation and alleviating drought impacts.

The measures related to supply management aim at increasing the available water supplies, whereas those pertaining to demand management aim at improving the efficient use of the available resources. These two categories of measures aim to reduce the risk of water shortage due to a drought event, while the third category is oriented to minimize the environmental, economic and social impacts of drought (Rossi, 2000).

In practice, the measures are actually interrelated and, at times, even overlapping; but such interrelationships are necessary in order for the plan to achieve its goals. In the meantime, beside the technical measures, effective adaptation measures are needed by strengthening the resilience of societies and natural eco-systems. Indeed, this requires an accurate prediction of climate change and scenarios building and greater cooperation and dialogue between water managers and the climate community.

Concluding remarks

(i) In the Mediterranean, evaluation of past experience on water resources management for drought conditions shows that most countries adopt a reactive approach following droughts which has several short comings regarding effectiveness and sustainability of natural resources. The adverse impacts of drought are likely to increase in view of the decreasing per capita water resources and the increase in drought occurrence, however, reducing long-term vulnerability to drought remains possible but it requires a fundamental shift in approach to deal with water resources management.

(ii) The significant diversity existing within each country of the region: each country has to develop national drought plans and appropriate drought mitigation measures. Governments of the Mediterranean countries are called upon to:

- Develop national drought planning and action programmes for combating drought, with particular emphasis on policies, required infrastructures, co-ordination, community participation, political commitment, raising public awareness and provision of finance.

- Give due support to co-ordination mechanisms at country level, that would accommodate cooperative programmes, joint activities and institutional set-ups.

(iii) Drought mitigation plans should be integrative, proactive and incorporate: drought monitoring and early warning system, drought risk and impact assessment; and institutional arrangements including mitigation response actions and programmes. All the above elements must be underpinned by research.

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