



Hellenic Agricultural Organization - DEMETER  
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# Developing drought action plans at farmers' organization level in order to improve their climate change adaptation potential



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## Introduction

Since agriculture is directly exposed to climate variability, the impacts of droughts in agriculture are also direct. Therefore, agriculture constitutes one of the most to drought vulnerable productive sectors and subsequently the necessity for proper response in order to alleviate impacts is very high. Water scarcity and droughts constitutes one of the major water-related concerns of European Commission which was recognized in the Communication "Addressing the challenge of water scarcity and droughts" at 2007 [COM(2007)414]. The necessity for drought management has been also recognized in Directive 2000/60/EC, according to which, when and where needed, a specific "drought management (sub) plan" should be included in the WFD RBMP (art. 13.5).

Considering the above, the compilation of drought action plans is of high importance in order to enhance agricultural sector adaptability to the foreseen climate change, thus alleviating potential impacts. This study aims at presenting how drought action plans can be compiled at farmers' organizations level (F.ORs), which is a common organizational scheme in Mediterranean.

## Materials & Methods

Drought management constitutes a very complex and demanding task, since a wide spectrum of sectors (e.g. agriculture, industry, tourism, environment, socioeconomical aspects) are interacting in a complicated way. Therefore drought management plans are commonly compiled at national and regional levels for which a management procedure can be established on a common basis. Subsequently, compiling a drought action plan only for a specific sector (agriculture) and for a very specific area (area of F.ORs) constitutes a tricky and demanding task that in any case will have to be linked to its spatial and sectoral extensions in order to be efficient and meaningful.

The proposed drought action plan development methodology presented in Figure 1, comprises of two main sections: a) the drought risk assessment section, in which the potential of drought occurrence is assessed and b) the drought risk management section, in which specific actions are proposed in order to enforce the drought preparedness level of the FOR. Drought risk assessment section aims to identify, analyze and evaluate drought risk. Based on drought risk assessment results, specific actions are proposed, according to which the F.OR is getting prepared to deal with droughts.

The above methodological approach was adopted in order to develop drought action plans in two F.ORs (Platanias and Merabello) located in Crete island-southern Greece, for which olives constitutes the main cultivated crop.

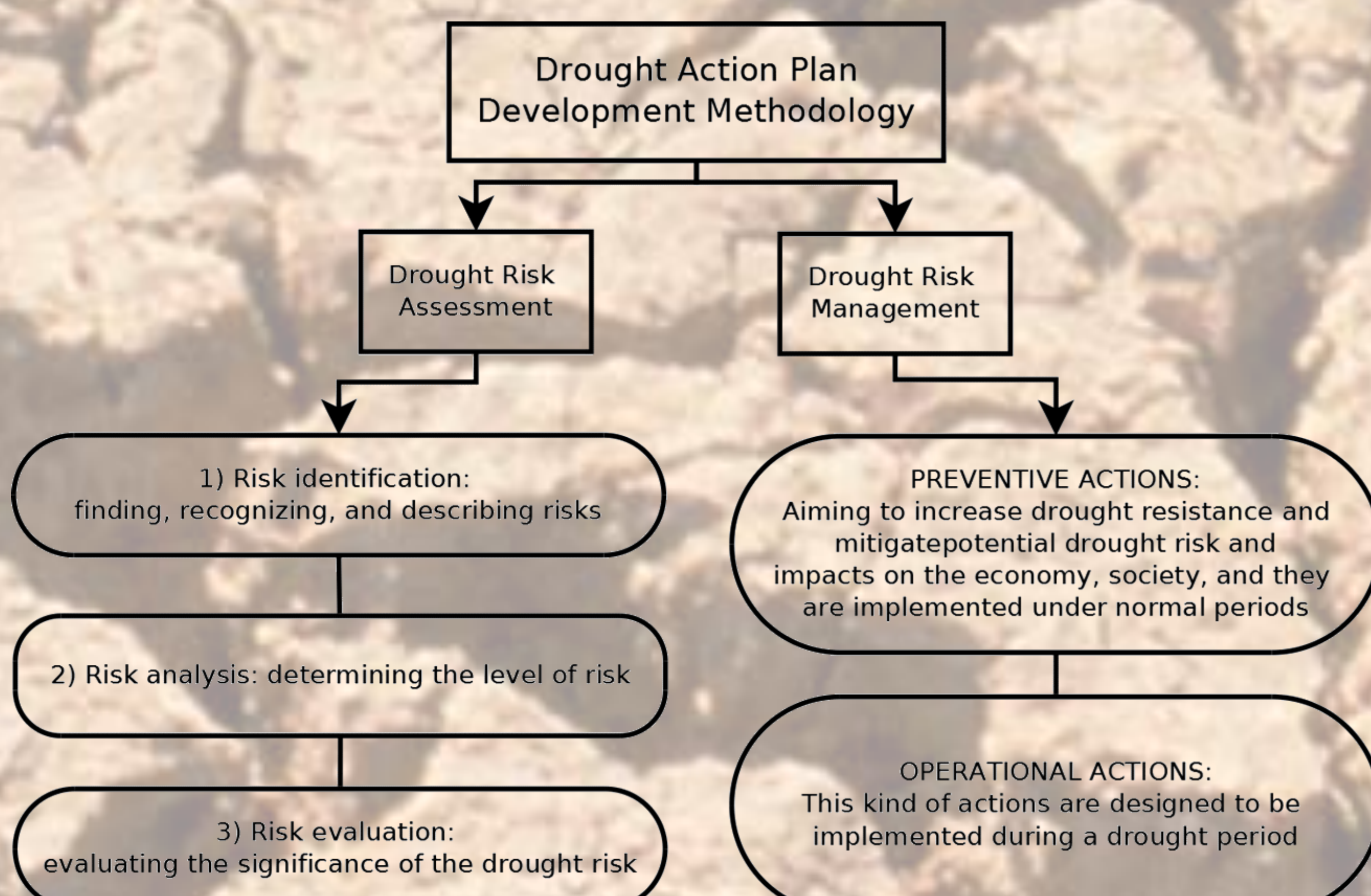


Figure 1. Drought action plan development methodology implemented in the context of the present study.

## Results & Discussion

### Drought risk assessment

According to the Water Resources Management Plan of Crete Water District a drought management plan has not been developed yet. More specifically, the development of a strategic plan for the mitigation of water scarcity and droughts has been included in the list of measures that will be implemented (measure code: GR13SM02-01). Therefore, the necessity for the development of a regional drought management plan has been recognized in the Water Resources Management Plan.

Given the absence of a regional drought management plan, information about drought risk assessment were retrieved from alternative sources. Drought risk assessment results indicated that summer droughts cannot be considered of high risk for the agricultural production of the two F.ORs, since they constitute typical climate conditions during a critical time span of the cultivation period. Prolonged droughts, on the other hand, are the major risk for agricultural production in the two F.ORs, since water resources availability decreases considerably (reduction of reserves and often deterioration of quality). Moreover, based on previous studies, it was identified that prolonged droughts frequency is of major concern for the two F.ORs.

### Drought risk management

With regards to drought management, a wide range of agricultural practices are proposed to serve both as preventive and operational actions. These practices can be categorized as follows:

Practices for reduction of water evaporation losses: Reducing water evaporation losses could significantly contribute to water saving since high air temperatures observed during summer period result in high evaporation potential. Such practices include:

1. Soil mulching.
2. No weed control.
3. Shredding of pruned wood.
4. No soil tillage.

Practices for reduction of water transpiration losses: Specific practices, such as appropriate winter and summer pruning could be applied that aim to reduce water transpiration without affecting crop yield.

Practices for the improvement of soil water holding capacity: The increment of soil organic matter has been found to improve soil water holding capacity. Therefore, locally available organic matter can be applied in the farm during Autumn.

Practices for reduction of surface runoff losses: By reducing surface runoff more water will be available to infiltrate in the soil. Surface runoff can be reduced by introducing physical materials along the contour lines.

Practices for improving irrigation efficiency: Improving irrigation efficiency has been proved to contribute significantly to agricultural water saving. Several practices can be applied in order to improve irrigation efficiency:

1. Calculation of evapotranspiration losses.
2. Deficit irrigation.
3. Avoidance of irrigation during very high temperature and high wind speed.
4. Appropriate modification from micro-sprinkle to drip irrigation applied directly on the soil surface.
5. In cases of high irrigation water salinity consider water blending for different sources.

## Conclusions

### Drought risk assessment

Compilation of F.OR specific drought action plans have to be strongly connected to the regional drought management plans that in turn need to be compiled for drought vulnerable areas, in accordance to Directive 2000/60/EC (art. 13.5). In regional drought management plans, each F.OR can identify specific drought management directions, understand its role as a water user in the basin, and comprehend its interactions with the other water users and sectors.

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