



MASTER PLAN

WATER MANAGEMENT IN THESSALY IN THE WAKE OF STORM DANIEL

How to Address Thessaly's Water-Related Agricultural Challenges

INTRODUCTION

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Background

Storm Daniel, which devastated the Thessaly region on September 4-7, 2023, caused extensive flooding. At least 17 civilian deaths were reported and thousands of people had to be rescued with boats and helicopters. Tens of thousands of homes and industrial buildings suffered damage and several hundred thousand livestock drowned. A quarter of Greece's annual agricultural production was destroyed and the damage was at an early stage estimated to be more than €2.2 billion. The authorities responded by executing emergency repairs, providing fodder to cattle farmers, distributing water and supplies to affected people, and mobilizing financial aid.

This medicane occurred just three years after Storm Ianos, which at the time was considered to have been the most disruptive and adverse weather event to ever have hit the region, causing estimated economic losses of €0.5 - 1.0 billion. The total financial damage incurred by Storm Daniel will likely be several billion euros.

In order to develop sustainable solutions to mitigate future flooding damage in Thessaly, the government of Greece appointed HVA to investigate the causes and impacts of the floodings so as to develop a Master Plan that would make the region more flood resilient. In September and October 2023 fact finding missions were mobilized by HVA where teams examined the damage from a number of angles so as to find the causes as well as the post-disaster state of flood recovery. The fact finding comprised not only flood management issues, but also an outline of a viable flood recovery strategy for the two most important and adversely affected economic sectors of Thessaly, namely its agricultural crop production and livestock sector. A Fact-Finding Report was submitted on October 24th, 2023.

The Master Plan is based on the findings of the Fact-Finding Report and discussions that were held with officials at both central and local levels of government, as well as subsequent investigations and research. It comprises a detailed outline of the recovery and reform strategy in order for the Thessaly Region to *"Build back better"*. The reforms focus to a large extent on the infrastructural interventions that are needed in the agricultural and livestock sectors and for future flood protection as well as a costing plan and what institutional and legal reforms need to be implemented. The thinking behind the Master Plan is for Thessaly to serve as the example for other EU countries and create a precedent for how institutions, businesses, infrastructure and civil protection can quickly and cost-effectively be adapted and made resilient to the perils of climate change. Another element of the plan is how to reform the mindset of farmers so as to make the region more competitive than it was prior to Storm Daniel.

Depending on responses from government officials, supplemental studies may be needed before bankable projects are tendered.

Structure of the Master Plan

This Master Plan focuses on water management and is based on the findings and conclusions of the fact-finding missions. The main findings and conclusions are presented in the INTRODUCTION. The Master Plan is based on a number of principal assumptions with respect to the envisaged socio-economic development of Thessaly as well as national and regional policies. These assumptions are presented in the INTRODUCTION and will serve as the benchmark for the Master Plan and the proposed measures for water management.

The largest portion of investments into water management will be needed for flood defense infrastructure. VOLUME I: FLOOD DEFENSE INFRASTRUCTURES elaborates the main concepts and solutions regarding flood defense infrastructure, including costs and benefits; safety levels; planning and design; and how to organize their implementation.

The proposed flood defenses are based on the fact that Thessaly consists of two vastly different types of landscape: the expansive cultivated valleys and the surrounding undulating, mountainous areas. These two contrasting landscapes require completely different types of flood defense structures and are elaborated in VOLUME I: FLOOD DEFENSE INFRASTRUCTURES.

The Fact-Finding Missions that were conducted identified not only flood defense infrastructure to be lacking but also shortcomings in the region's water governance structures and -practices. VOLUME II: WATER MANAGEMENT ORGANIZATION in this Master Plan therefore addresses how to remedy Thessaly's water governance problem.

Given that extreme weather events are likely to become recurring events, improvements to flood preparedness, such as early warning systems and crisis management, are presented in VOLUME III: EARLY WARNING AND CRISIS MANAGEMENT

The flood recovery strategy for the two most important economic sectors, agriculture and livestock production, is presented in VOLUME IV: AGRICULTURE & LIVESTOCK. This strategy also presents recommendations for interventions and reforms that can make these sectors more competitive and resilient.

Integration in plans and policies

The Master Plan is not a stand-alone plan. The components herein need to be integrated into the existing and future Water Management Plans, Flood Management Plans, EU directives such as the EU Floods Directive (2007/60/EC), and the development plans for the agricultural and livestock sectors.

A revised Flood Management Plan is currently being elaborated by the government of Greece and rather than merely map the risk areas and calculate discharges the plan will become a genuine operational tool in flood management and flood recovery. It is of great importance therefore that the data and models in this Master Plan get incorporated into the new Flood Management Plan.

The responsible authorities for flood management will need to have access to (or at least become familiar with) the tools that are used for the Flood Management Plan, particularly the applied models, as they will be needed for the planning, development and evaluation of flood defense infrastructure, and as operational tool for forecasting and managing floods within a system for early warning and crisis management. Moreover, these models are indispensable when it comes to addressing the existing challenges with respect to water scarcity.

In order to ensure the full integration of the various plans, the Terms of Reference provided to the Consultants working on them need to be reassessed and, if necessary, amended.

Basic assumptions

The following basic assumptions are applicable to each Volume of the Water Management Report:

- **Weather patterns:** The study is based on the most recent weather patterns; nevertheless, the increasing frequency and severity of recent storms underscore the necessity to re-evaluate the reliability of these patterns. This escalating trend emphasizes the imperative for implementing more robust measures.
- **Hydrological conditions:** Due to the limited frequency of hydrological samples taken, aspects such as drainage density and proximity have been examined only to a constrained extent. A comprehensive analysis of the current situation has not been conducted in detail.

- **Topography and geography:** The study concentrated on the Thessaly region, acknowledging its dependence on other regions. Ultimately, the masterplan for each region should seamlessly align with the National Water Plan to ensure overall success.
- **Interrelationship of proposed solutions:** The plan's recommendations integrate solutions for both flood management and irrigation. It is a cohesive and integrated strategy, and omitting specific proposals may likely result in adverse effects on other parts of the plan and water infrastructures.
- **Availability of funding:** The recommendations outlined in the Masterplan for Water Management suggest actions considered necessary, with due attention to financial challenges and possibilities. The allocation of funding, contingent upon the acceptance of (part of) the recommendations, has not been included and requires to be addressed subsequently to the embracement of proposed recommendations.
- **Coordination with stakeholders:** As emphasized in the sociological volume of this masterplan, the plan's success hinges on effective engagement and coordination with numerous stakeholders. Given the diverse incentives and needs of each stakeholder, clear communication, active involvement, and sustained engagement are imperative.
- **Information gathering:** The bulk of information has been derived from carefully curated data provided by key stakeholders, publicly available sources, and extensive interviews with a diverse range of stakeholders.
- **Local ownership:** Ultimately, the success of the proposed recommendations in this Master Plan hinges on the commitment and ownership of dedicated local champions. These champions will play a pivotal role in driving the strategic ambition forward and ensuring its effective execution over the long term.
- **Existing local expertise:** Water management has been a prominent and enduring topic of discussion in Greece for many decades, with substantial efforts already underway. Numerous effective solutions proposed by local champions have been identified and endorsed, poised for wider adoption on a larger scale. The expertise is clearly present, although requires to be supported by an overlaying nation-wide plan.
- **Focussed on new plans:** Aligned with the existing local expertise, numerous well-detailed plans are readily poised for execution. This Masterplan for Water Management focusses on what new and additional plans are required.