

LIFE11 ENV GR 975

FLIRE: Floods and fire Risk assessment and management



Technical Report

Action B7

31/12/2012

Project location	Greece – Attiki region
Project starting date:	01/10/2012
Project ending date:	30/09/2015
Coordinating Beneficiary	National Technical University of Athens
Associated Beneficiary responsible for Action B7	National Technical University of Athens
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Other Associated Beneficiaries involved in Action B7	ICL, IRPI-CNR
Contact Persons	ICL: Cedo Maksimovic, Maria Aivazolglou, Callum Clench IRPI: Tomasso Moramarco, Silvia Barbeta, Luca Brocca

Name of the Action: Planning tool for flood management

Starting date of the Action: 03/02/2014

Ending date of the Action: 31/03/2015

Short description of the Action

Aim

The aim of the implementation Action B.7 is the development of a Planning tool for flood risk management, i.e. a tool that will assist flood risk management in the study area at a planning level.

Objectives

- An integrated understanding of the environmental and human systems and their dynamic interaction in the study area
- The updating of stakeholders and local authorities in the study area regarding possible measures and intervention that could be taken of flood risk management on the long run and assistance in their prioritization
- Development of an innovative flood risk management tool that could potentially be applied to other areas with similar hydromorphological, topographic, hydrometeorological etc characteristics.

Expected outcomes

As foreseen in the submitter proposal, the expected outcomes of Action B.7 are:

- An improved understanding of the possible intervention options for managing floods in the case study area and their cost-benefits.
- A plan of action (set of measures) in collaboration with stakeholders with specific interventions identified and their impact on reducing flood risk assessed.

No constraints, deviations and/or amendment to the submitted proposal have been identified so far for Action B.7.

Tasks

1. Collection of forest fire scenarios developed for the study area (output of Action B.4) and their classification according to their impacts on the area (high, medium, low impact scenarios) (NTUA, IPRI-CNR) [high priority]
2. Setting up and running of an urban development model (NTUA) [high priority]
3. Production of urban development scenarios(NTUA) [high priority]

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4. Development of “an intervention options database”, i.e. a database that will include a super-set of **structural** (dams, flood levies, stream channel modification etc) and **non-structural** (land use planning policies and legislation as well as real time control/early warning), environmentally sustainable, technically and technologically sound and economically feasible measures for flood risk management. (NTUA, ICL, IRPI-CNR) **[high priority]**
5. Assessment of the combined impact of fire and urban development scenarios (Tasks 1 and 3) and measures (considering also their location) (Task 4) on flood evolution, running the integrated catchment and urban models (Actions B.1, B.2 and B.3) (NTUA, ICL, IPRI-CNR) **[high priority]**
6. Definition of the exact criteria/indicators that will be considered by the algorithm described in Task 7 (e.g. environmental footprint of the proposed solution, construction costs, socioeconomic impacts etc). (NTUA) **[high priority]**
7. Development of an advanced multi-objective evolutionary optimization algorithm. As described in detail in the submitted proposal, the tool will analyze each combination of fire and urban development scenarios, consult the list of measures (Task 4) and perform a cost-benefit analysis, considering the combined impact of scenarios and measures on flood evolution. The algorithm will provide, among a long series of outputs, suggestions for a combination of effective interventions, structural and/or non-structural, and their placing in the area, aiming to improve flood management. (NTUA, ICL, IPRI-CNR) **[high priority]**
8. Consultation of stakeholders on their preferences and choices and imposing of the relevant additional constraints to the “feasible solution region” taking into account the political/legislative context. (NTUA) **[high priority]**

Working Team

NTUA

- **Maria Mimikou** – Project Coordinator, who will work on the coordination of the NTUA team.
- **Christos Makropoulos** – Internal Project Coordinator, who will work on:
 - The production of urban development scenarios
 - The development of “an intervention options database”
 - The assessment of the combined impact of fire and urban development scenarios and measures
- **Chrysoula Papathanasiou** – Civil Engineer, Hydrologist, flood modeler, who will work on:

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- The classification of forest fire scenarios according to their impacts on the area
 - The setting up and running of an urban development model
 - The production of urban development scenarios
 - The development of “an intervention options database”
 - The assessment of the combined impact of fire and urban development scenarios and measures
 - The definition of the exact criteria/indicators that will be considered by the optimization algorithm
 - The development of an advanced multi-objective evolutionary optimization algorithm
 - The consultation of stakeholders on their preferences and choices and the imposing of the relevant additional constraints to the “feasible solution region”
- **Nikolaos Mamassis** – Senior Engineer, Hydrologist, expert in Geoinformatics, who will work on:
 - The production of urban development scenarios
 - The development of “an intervention options database”
 - The assessment of the combined impact of fire and urban development scenarios and measures
- **Evangelos Baltas** – Senior Engineer, Hydrologist and flood modeler, who will work on:
 - The assessment of the combined impact of fire and urban development scenarios and measures
 - The definition of the exact criteria/indicators that will be considered by the optimization algorithm
 - The consultation of stakeholders on their preferences and choices and the imposing of the relevant additional constraints to the “feasible solution region”
- **George Zombanakis**, Civil Engineer, expert in Hydroinformatics, who will work on the development of the appropriate similarity metrics
 - The setting up and running of an urban development model
 - The production of urban development scenarios
- **George Karavokiros** – Computer Scientist, expert in network modelling, who will work on:
 - The development of “an intervention options database”
- **George Papoutsoglou** – Tech. Agronomist, responsible for the hydrometeorological stations of NTUA in the study area, who will work on:

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- The collection of forest fire scenarios developed for the study area
- The consultation of stakeholders on their preferences and choices
- **Kimon Hadjibiros** – Senior environmental scientist, who will work on:
 - The development of “an intervention options database”
 - The definition of the exact criteria/indicators that will be considered by the optimization algorithm

ICL

- **Čedo Maksimović** - head of the Urban Water Research Group (UWRG) within the Department of Civil and Environmental Engineering at Imperial College London, project coordinator, senior engineer, advise on flooding/flood protection
- **Maria Aivazoglou** - research and development on urban flood and interactions on forest fires,
- **Callum Clench** - project manager

These members of the ICL team will all cooperate and work on:

- The development of “an intervention options database” (contribution in the definition of measures)
- The assessment of the combined impact of fire and urban development scenarios and measures
- The development of an advanced multi-objective evolutionary optimization algorithm (focusing on consultation for the development of the algorithm)

IRPI-CNR

- **Tommaso Moramarco** – Internal Project Coordinator, who will work on:
 - The assessment of the combined impact of fire and urban development scenarios and measures
 - The development of an advanced multi-objective evolutionary optimization algorithm (focusing on consultation for the development of the algorithm)
- **Luca Brocca** – Environmental Engineer, Hydrologist, flood modeler, who will work on:
 - The development of “an intervention options database” (contribution in the definition of measures)

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- The assessment of the combined impact of fire and urban development scenarios and measures
 - The development of an advanced multi-objective evolutionary optimization algorithm (focusing on consultation for the development of the algorithm)
- **Silvia Barbeta** – Environmental Engineer, Hydrologist, flood modeler, who will work on:
 - The classification of forest fire scenarios according to their impacts on the area
 - The development of “an intervention options database” (contribution in the definition of measures)
 - The assessment of the combined impact of fire and urban development scenarios and measures
 - The development of an advanced multi-objective evolutionary optimization algorithm (focusing on consultation for the development of the algorithm)
- **Temporary Fellow Researcher** – Hydrologist, flood modeler, who will work on:
 - The classification of forest fire scenarios according to their impacts on the area
 - The development of “an intervention options database” (contribution in the definition of measures)
 - The assessment of the combined impact of fire and urban development scenarios and measures
 - The development of an advanced multi-objective evolutionary optimization algorithm (focusing on consultation for the development of the algorithm)

Deliverables

The Implementation Action B.7 has one deliverable, the “***Planning tool for flood intervention planning***” that has to be delivered by **31/03/2015**.

Details on the development of the Planning Tool are presented in the previous fields “Short description of the Action” and “Tasks”.

Milestones

The Implementation Action B.7 has three milestones:

1. ***Completion of the intervention options database*** that has to be ready by **31/10/2014**
2. ***Completion of the optimization algorithm*** that has to be ready by **30/01/2015**

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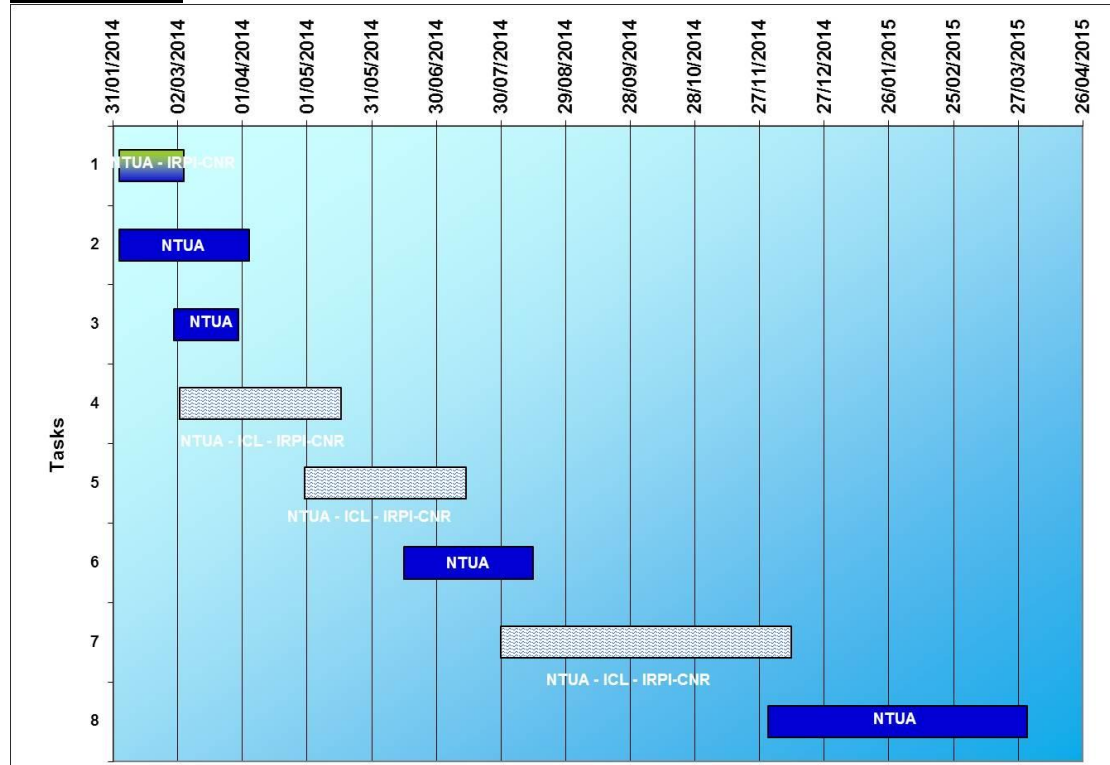
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3. **Successful runs of optimization and model** that has to be ready by **31/03/2015**

Details on the intervention options database and the development of the optimization algorithm are presented in the previous fields “Short description of the Action” and “Tasks”.

Gantt-chart



Key references

- Makropoulos, C. and Butler, D., (2005), A multi-objective evolutionary programming approach to the “object location” spatial analysis and optimisation problem within the urban water management domain. *Civil and Environmental Systems*, 22(2), pp. 85-107.
- United Nations, 2009, Terminology on disaster risk reduction, United Nations International Strategy for Disaster Reduction (UNISDR), Geneva, Switzerland.

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