H.F.R.I.
Hellenic Foundation for Research & Innovation

Description of the funded research project

1st Call for H.F.R.I. Research Projects to Support Faculty Members & Researchers and Procure High-Value Research Equipment

Title of the research project:
Mapping Functional Diversity: Drivers, Impacts and Threats

Principal Investigator: Kallimanis Athanasios

Reader-friendly title: MAPFUN

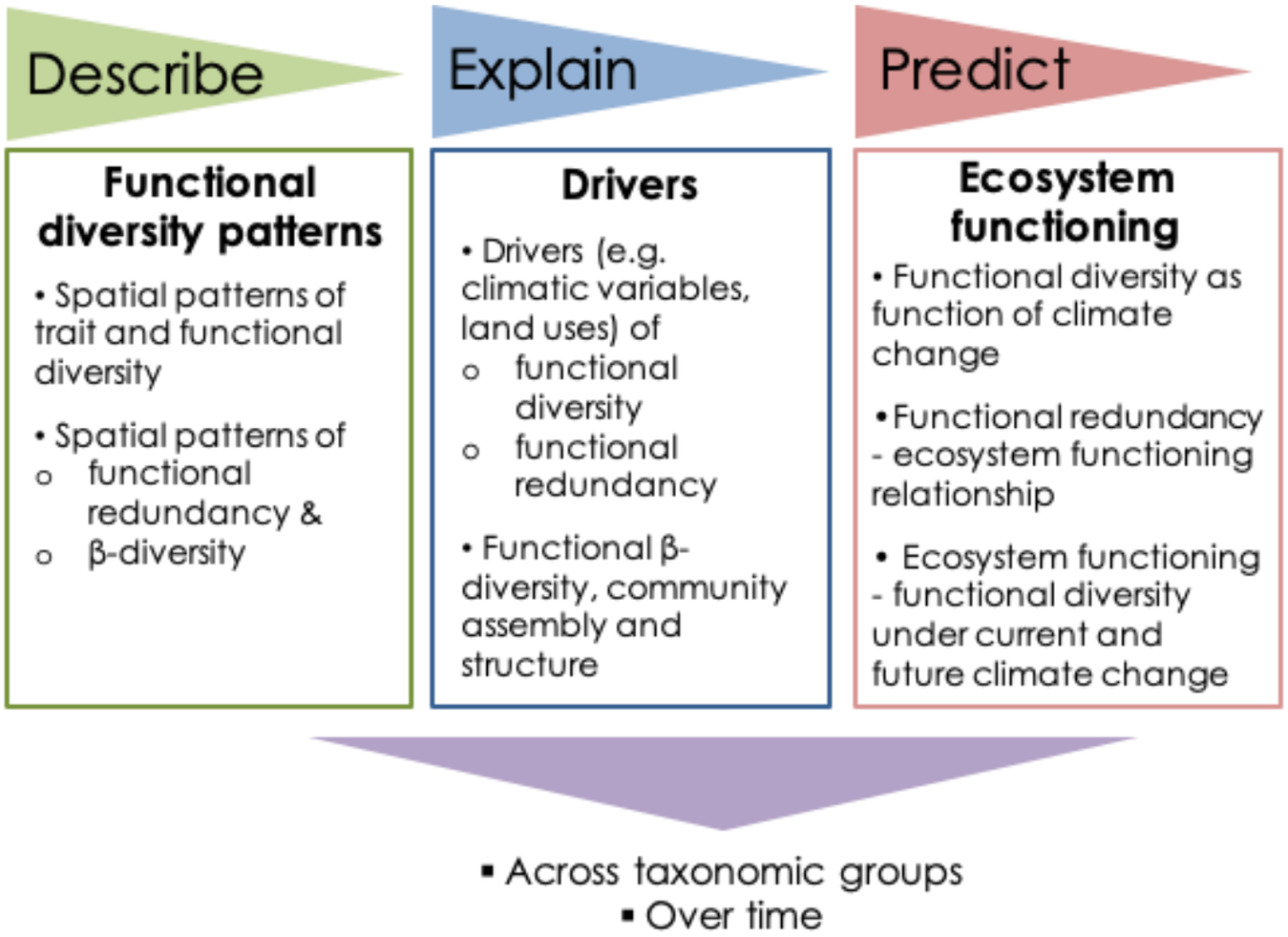
Scientific Area: Environment & energy
(Scientific field: Ecology**)**

Institution and Country: Aristotle University of Thessaloniki, Greece

Host Institution: Aristotle University of Thessaloniki

Budget: 170.000,00 (€)

Duration: 36 months



PI and the Research Team



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Research Project Synopsis

The main goal of the MAPFUN research project is to examine and comprehend the large scale patterns of functional diversity. Functional diversity is the diversity of traits of the species that form a community. In other words, functional diversity reflects the range of things that organisms do in a community or an ecosystem. We focus on understanding the biotic and abiotic factors that drive the spatial patterns of functional diversity, estimating the impact of functional diversity on ecosystem functioning and assessing the threat that environmental change (and more specifically climate change) may pose for functional diversity. In MAPFUN, we will tackle the problem for different taxonomic groups and at different spatial and temporal scales, since different case studies may provide insights to the different research questions.

The main objectives of MAPFUN are:

- To explore the spatial patterns of trait and functional diversity and the factors that affect it
- To investigate functional redundancy and the factors that affect it
- To study the spatial and temporal functional beta diversity
- To identify how functional diversity influences ecosystem functioning
- To examine how climate change affects the spatial patterns of trait and functional diversity

Project originality

The novelty of MAPFUN lies in exploring functional diversity, a less studied facet of diversity, and addressing questions rarely investigated such as functional redundancy, the effects of climate change. Although functional diversity reflects what species do in the ecosystem, thus is indissolubly linked to ecosystem functioning, it has received much less attention than taxonomic diversity. Therefore, factors affecting functional diversity and the threats it faces remain unmapped.

Furthermore, climate change, perhaps the most significant threat to biodiversity, forces species to adapt to survive to this “fragile” world. However, our knowledge on how the functional diversity responds to climate change is limited and regarding specific taxonomic groups and scale. We explore whether functional diversity is more or less vulnerable to climate change than taxonomic diversity and the type of functional diversity’s response.

MAPFUN will contribute towards unravelling the factors that shape functional diversity patterns at regional to continental scales, attempting to shed light also to functional β-diversity a promising but challenging concept that remains virtually unexplored.

Furthermore, we focus on the functional diversity – ecosystem functioning relationship through the lens of functional redundancy. Functional redundancy insures ecosystems against declines in their functioning since if some species fail, other species with similar functions will compensate for their losses, thus functioning will not be affected. Although functional redundancy has been suggested as a possible mechanism underlying biodiversity-ecosystem functioning relationship, researchers debate about its role, quantification method and even if the mechanism exists. In MAPFUN, using empirical data we attempt to quantify functional redundancy, map its spatial and temporal patterns and their underlying driving factors in order to decipher the relationship between functional redundancy, diversity and ecosystem functioning.

Expected results & Research Project Impact

MAPFUN is expected to unravel patterns and drivers of functional, taxonomic, and phylogenetic diversity across spatial scales and taxonomic groups. Applying models to predict diversity as function of climate-, geography- and land cover-related variables will reveal the major environmental and geographical drivers of functional diversity and its components, while the relationship between functional diversity and ecosystem functioning will be explored. In this context, MAPFUN will enhance our understanding of the impacts of climate change and of also other potential threats (e.g. land cover changes) on functional diversity and how this is reflected to ecosystem functioning. Expected key results include proposals for efficient conservation of functional diversity, presentations in scientific conferences and publications in peer-reviewed scientific journals.

Socioeconomic impacts of biodiversity loss are widely recognized and societies throughout the world have adopted policies to deal with it. Greece, adopting a National Strategy and Action Plan for Biodiversity (Government Gazette B 2383/8-9-2014), has set a series of general and specific targets for the biodiversity conservation. The successful implementation of MAPFUN project is expected to contribute towards achieving some of these targets, such as increasing the knowledge about biodiversity status (general target 1), and the prevention and minimization of the impacts of climate change on biodiversity (general target 7). The results of our project will also contribute towards reaching one of the targets adopted in EUs 2020 Biodiversity Strategy to “maintain and restore ecosystems and their services”. The accomplishment of this target will promote a wider no net loss approach to biodiversity and ecosystem services and encourage a better use of nature-based approaches to mitigate climate change effect.

The importance of this funding

Funding for ecological and environmental studies is of critical importance nowadays for advancing the science of ecology and for informing policy decisions about natural resources and environmental issues. H.F.R.I. funding will give us the opportunity to accomplish research of high quality, to investigate research questions of important scientific and socioeconomic impact, to develop new skills and competent experience, to communicate our results through published papers and conference presentations.

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