

PRODUCTIVE REFORESTATION FOR LIVING RURAL LANDSCAPES



Creating jobs and reviving Agroforestry systems for livestock farming, agriculture, beekeeping and biodiversity while tackling desertification, erosion and mitigating the effects of climate change

May 2021

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About this report

This report is an output of the Deforestation and Climate Change project and it compiles best practice examples gathered during the three webinars organised in March 2021 by GEF and the Green Institute Greece focusing on productive reforestations for pasture, bee hiving, recreation and forestry as a means to combat climate change.

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The **Green Institute Greece** (GIG) has as mission to study, analyze and disseminate all the aspects of ecological problematique and of political ecology within and beyond the Green political family.

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Proceedings of the 3 scientific on-line conferences of the Green Institute of Greece (03-18-21/3/2021) with conclusions and recommendations

online conference of the Green European Foundation and the Green Institute Greece



FREDA

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ZUKUNFTS
AKADEMIE



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Elias Gianniris

President of the Green Institute
Former Assistant Professor at the
Technical University of Crete

The mission of the Green Institute of Greece is ‘the study, analysis and dissemination, in every way, of all aspects of ecological reflection and political ecology’. With this “Productive Reforestation Project”, we sought to connect the issues of decreasing biodiversity, tackling climate change and dealing with the threat of desertification and erosion, with the real needs for land use of people living in fertile rural areas of Greece.

We suggested to the Green European Foundation, which approved a small grant for this interdisciplinary project. We are glad that they recognized the value of our proposal. The response to this endeavor from leading academics, pioneering researchers, representatives of the public sector, advisors and others. from various scientific fields and disciplines is touching, and we thank them warmly. We feel that we have caught the pulse of the moment and responded to a personal need of scientists to disseminate their work out of offices and laboratories and contribute to interdisciplinary and cross-university approaches towards a common goal.

We are happy to have provided opportunities for new meetings, discussions and exchange of ideas. We rejoice in the interest shown by the scientific community, students, professionals, producers and politicians, in our attempt to synthesize political proposal under the auspices of the Recovery and Sustainability Plan. This scientific process was expected to yield valuable conclusions and it is a feat and success of the Scientific Committee of the project to formulate a body of coherent applicable policies and feasible proposals and practices, as long as there is the appropriate political will.

Not wasting any time, as a contribution to the consultation of this period, we have sent the recommendations that emerged from the three workshops and seminars we organized to the Ministries of Agriculture and Environment, and we have also communicated them to public services, political parties, the Environment Committee of the Hellenic Parliament and to the European Commission. Being aware of the value and usefulness of scripta manent, with this book we aim to crystallize the cognitive process that took place, not only to honor the scientific community that contributed to it, but also to support and provide a guideline for the formation of appropriate policies.

Introduction

The background image shows a lush, green landscape with several large, ancient trees with thick, gnarled trunks and dense foliage. In the foreground, a flock of sheep is grazing in a grassy field. The scene is bathed in natural light, suggesting a bright day. The overall atmosphere is peaceful and rural.

The carob tree, the wild olive tree, the almond-leaved pear, the chestnut, the walnut, the cherry, the hawthorn, the strawberry tree and so many other 'wild or domesticated' forest tree species that have for centuries been selected, grafted, planted and cared for the earliest inhabitants of the Mediterranean, have created agroforestry **landscapes of unparalleled beauty** throughout the Greek islands and the mainland, being integrated to the special identity and appearance of every corner of our homeland.

The **ancient and unique** agroforestry landscapes found in Greece, which are the accumulated work of countless generations and have supported the local agricultural economy for centuries, are unfortunately collapsing en masse due to economic decline and abandonment, the result of misguided national and European political choices.

However, the time has finally arrived for these **agroforestry landscapes** to be recognized and 'rediscovered' by a number of scientific disciplines as a leading bio-natural (but unrecognized) capital of a bio-cultural national heritage, which it is urgently necessary to be highlighted, protected, restored and re-included in the productive web of the country. In fact, these landscapes are proving to be **the first priority embankment** to preventing the effects of the **two most serious crises** that modern society is facing throughout the world: climate change and global biodiversity loss!

These multi-functional and multi-purpose agroforestry landscapes, with their countless terraces, hold some of the oldest trees in Europe and at the same time constitute places where a huge variety of different local products are produced, accounting for perhaps over 40% of the country's land mass. Moreover, they appear to be a **refuge for biodiversity**, are resilient to **climate change** and **desertification** and most importantly, can generate income by supporting a collapsing rural society and motivating young people to live in their ancestral land.



The **Recovery and Resilience Fund is a unique opportunity** for our country to avoid the mistakes of the past which have led it to well-known impasses and instead to use local traditional and scientific ecological knowledge, the hidden creative forces of innovation and the urgent need to escape a massive collapse of our sensitive agri-food sector, by supporting and providing financial incentives for the **restoration and re-creation** of these complex man-made ecosystems.

For the scientific committee of the Green Institute of Greece **productive reforestation** is the key to **creatively and competently connect** the country's need for **reforestations, aforestations and plantations**, aiming not only to save national and European biodiversity but also to provide income and incentives to restart the agricultural economy by producing unique, high-quality local products, which has been a challenge in Greece, especially after the recent economic crisis.

How can this happen; In the book you are holding in your hands or reading on your screens, we have selected and present the views of reputable and internationally recognized Greek scientists from many distinct scientific fields (foresters, rangeland scientists, agronomists, geologists, etc.) as well as experts from civil society, who provided us with their detailed views by outlining a comprehensive picture of the topic and especially by formulating realistic proposals that can be directly funded and implemented with impressive expected results.

With this new edition we hope to help in the collation of our country's existing scientific knowledge which is needed in order to mobilize forces that could define a solid national agro-forestry policy for the preservation, promotion and utilization of this unique bio-cultural heritage both of Greece and Europe.

On behalf of the Scientific Committee
Dr. Rigas Tsiakiris



Invited speakers are

Name	Profession - specialty	Title of the presentation
Dr. Matzanas Costas	Forester-Rangeland specialist - Greek Agroforestry network (here)- School of Forestry, Aristotle University of Thessaloniki	Agroforestry in Greece: Good examples and approaches
Dr. Panagiotis Sainatoudis	Founder of the non-profit NGO PELITI: "Community of traditional seeds"	Citizens take actions: Saving local traditional seed varieties, greening the table and the cultivations
Dr. Sofia Gounari	Agronomist-Chief researcher of the Beekeeping Laboratory- Instit. Of Med. Forest Ecosystems, Greek Agric. Org. "Demeter"	Beekeeping and Forest Ecosystems: A mutual relationship
Dr. Nikos Nikisianis	Biologist, collaborator of the project «Eco-variety»- «SYSTADA OE»	The value of local traditional varieties of fruit trees - perspectives on their use for agroforestry
Dr. Eleni Maloupa	Agronomist, Director of the Institute of Genetics Improvement and Phylogenetic Resources, Greek Agric. Org. "Demeter"	Small forest fruit trees and shrubs: The role of commercial plant nurseries in ex-situ conservation

The event will be coordinated by the Forest Ecologist Dr. **Rigas Tsiakiris** on behalf of the Scientific Committee of the Green Institute Greece

1st Online event

Reforestation for productive purposes: pasture, beekeeping & recreation in Greece*

Wednesday 3 March 2021

🕒 18:00

*This event is part of the project entitled: "Greece: Climatic change- desertification- erosion and productive reforestations" being part of the wider "Deforestation and Climate Change" (GEF-20-28)

This event is organised by the Green European Foundation with the support of FREDA and Green Institute Greece and with the financial support of the European Parliament to the Green European Foundation





Agroforestry is the science that deals with agroforestry systems that combine trees with agricultural crops or pastures / animals on the same land



Agroforestry in Greece: Good examples and approaches



Agroforestry is the science that deals with agroforestry systems that combine trees with agricultural crops or pastures / animals on the same land. The vegetation of these systems is very rich and consists of various species and functional types. The trees are in dynamic equilibrium with the shrubs and plants on the ground floor. Agroforestry systems constitute a traditional form of land use and have been managed since antiquity in our country. Depending on the type of management practices adopted in each of them, they can be distinguished into traditional and new systems. The trees of the traditional systems are either forest (remnants of older forest areas) and are scattered either on the edge of the field or are fruit trees that were planted many years ago for fruit and firewood production. In the new systems the trees are planted for fruit and technical wood production. These systems have an economic and an environmental benefit. The economic one concerns the production of wood and fruits while the environmental one concerns biodiversity, the preservation of the landscape and the better recycling of nutrients within the system itself. These systems are more stable than any form of conventional agriculture, in terms of soil protection, improving the environment, habitats and wildlife, ensuring the stability and functionality of ecosystems and maintaining or improving the landscapes of our country. The maintenance of agroforestry systems and the establishment of new ones is considered imperative to maintain the good condition of the soils, biodiversity and landscape as well as to provide financial support to the rural population that engages in such activities.





Peliti has been collecting, preserving and spreading traditional seed varieties since 1995



Citizens take actions: Saving local traditional seed varieties, greening the table and the cultivations



It is a great pleasure and honor for me to invite you to participate in the conference "Productive reforestation for pasture, bee hiving and recreation".

Peliti has been collecting, preserving and spreading traditional seed varieties since 1995. As the founder of Peliti I would like to share with you a story that happened twenty years ago. This is the first time I have shared it publicly.

We had visited the Virgin Forest of Fraktos in the Municipality of Paranesti. We stopped at Panorama to enjoy the view of the forest. There on the side of the road I saw wild rye. I was impressed and I picked some cob.

At the first opportunity I took them to the NAGREF at the Genetic Seed Bank. Mr. Stelios Samaras told me that there is no wild rye in Greece and that it is probably from an abandoned settlement. I did a search and found that nearby there is a settlement that was abandoned in 1922. Its distant inhabitants cultivated rye, as in the whole of the Rhodope Mountains. But around the abandoned settlement there are many fruit trees that continue to produce and reproduce without any human care. These trees provide food for bees, bears, other animals, to hikers, increase the biodiversity of the area, etc. The preservation and promotion of these varieties is very important.

In 1999, Peliti started the Peliti Seed Festival, where we distribute free traditional varieties of seeds, vegetables, grains, etc. The 2013 the Peliti Seed Festival was characterized as the Largest Seed Exchange in the World, by the organization www.seedsavers.net of Australia. From 2017 we have also organised the Olympic Seed Festival where people from all over the world gather together. We invite you to participate in the Peliti Seed Festival, which has happened every year since.



Beekeeping must return to the place where it was born



Honeybees and Beekeeping in the Forest, a relationship of both beneficial

The well-being of the Honey Bee and beekeeping, which "serves" it, with the Forest, are inextricably tied. No management, protection or exploitation system of one may not include the other.

In our country in particular, the exploitation by honeybees of the honeydew secretion of honeydew producing insects of forest species, pine, fir, oak, consistently gives about 70% of the annual honey production every year.

While the living of honeybees on the mountain, unlike the plain, offers them a safe environment, clean from pesticides, for their growth and proliferation, while also enhancing.

Similarly, Honeybee-Beekeeping, through pollination, is a regulator of:

- ✿ the conservation of biodiversity of flora and fauna. Bees pollinate 65% of plants in total and especially 86% of forest species
- ✿ the production of fruit, vegetables and seeds improving soil fertility through the survival of plant species (wild leaves),
- ✿ Improving the production of meat, milk and eggs through the production of diary (soy-beans)

At the same time, humanity's relationship with honeybee-keeping helps us:

- ✿ combat poverty and unemployment, giving people income, food, medicine and other products for everyday life such as wax
- ✿ in our development of ecological awareness, our acquaintance and development of a relationship with the environment and the development of capacity for observation
- ✿ improve our psychology and sociability, offering the joy of creation and strengthening our position as a 'piece of a whole' rather than a 'dominant ruler'.

The practice of Beekeeping should take its place in the Management Plans of Forest Ecosystems through:

- ✿ Projects for the exploitation of honeydew secretions, studies of the bee yield of mountain meadows
- ✿ Location of beekeeping areas and especially in mountain areas under great residential or other pressure
- ✿ Cooperation of beekeeping bodies with forest authorities for reforestation, road opening, signaling, fire prevention and/or response
- ✿ Training of beekeepers in the principles and prerequisites for the practice of beekeeping in forest areas





Local varieties can be used for cultivation, restoration of traditional orchards, or reforestation activities



Biologist, collaborator of the project "Ecovariety", "Systada O.E"

The value of local traditional varieties of fruit trees - perspectives on their use for agroforestry



The Ecovariety project is aiming at the collection, identification, evaluation and pilot exploitation of traditional, local varieties and of wild fruit trees and shrubs. As far as fruit trees are concerned, the project focuses on varieties found in the mountain and sub-mountain environment of Northern Greece and of high environmental importance, in an effort (a) to preserve abandoned varieties that are dying out and (b) to highlight the interaction between agricultural and natural diversity. Until now, we have located more than a 1.000 trees belonging to traditional, local varieties, including mainly apple, pear, cherry, quince and pomegranate trees. 200 selected varieties are being genetically identified and evaluated (growing characteristics, fruit quality analysis). Varieties that will be evaluated as having potential commercial value, are leveraged in pilot projects by the cooperating nurseries, while relevant cultivation guides that will be drawn up as well. These varieties may enrich national and European lists of local varieties and be used for cultivation, restoring traditional orchards, or refostration projects. Finally, the project will enhance networking, experience and the exchange of good practices among farmers that cultivate traditional varieties. The project's results are available in a interactive map application (ecovariety.gr).





Local fruit varieties are adapted to the environment of each area and produce fruits with high nutritional value



Native small fruit trees and shrubs: connection and role of commercial nurseries in ex-situ conservation.



Director, Institute of Plant Breeding and Genetic Resources
Ellinikos Georgikos Organismos -DIMITRA (ELGO-DIMITRA)

The Institute of Plant Breeding and Genetic Resources (IPB&GR) under ELGO -DIMITRA, through its targeted research, produces and transfers knowledge about the development of plant production and the resolution of current agricultural problems.

The Greek Gene Bank and the Balkan Botanic Garden of Kroussia are departments of the Institute.

Botanical Gardens are bodies that maintain documented collections of living plants for the purpose of scientific research, conservation, promotion and education.

The Balkan Botanic Garden of Kroussia (BBKK) is located in Kilkis Prefecture, in a deciduous oak forest of the Kroussia mountain range. It covers a total area of 310 acres.

The Laboratory for the Protection and Exploitation of Native and Flowering Species (EPAAAE) is located on the campus of ELGO-»DIMITRA« in Themi, Thessaloniki and its premises include more than 3,000 fully recognized species and sub-species of Greek flora.

Small forested fruit bushes and trees are traditionally consumed in many parts of Greece and can be a lever for the development of mountainous-semi-mountainous areas. In the context of ex-situ conservation, evaluation and sustainable exploitation of Greece's indigenous plant-based resources and with a view to the development of new crops, the implemented research project «Eco-Variety» aims at the collection, documentation, evaluation and pilot exploitation of local traditional varieties of fruit trees and native fruit species of Greece. Native fruit species are evolutionarily adapted to the environment of the country, have natural resistance to enemies and diseases and produce fruits with high nutritional value as well as scientifically documented beneficial properties (such as rose hip, soumac, raspberries, cranberries, etc.) and many of them are collected directly from the natural environment (and/or seasonal local markets) and are traditionally consumed (mainly rose hips, raspberries and cranberries). The results so far with regard to the native fruit plants in Greece have shown that some species, such as *Sambucus nigra*, *Cornus mas* (skulls) and *Rubus idaeus* (raspberry) are easily rooted, quickly, at high rates and respond very positively to the application of appropriate rooting hormones, while at the same time they are easily hardened, exhibit high survival dynamics and have good adaptability to ex situ conservation conditions in commercial nurseries, where they have been delivered through the project and could be used in cultivation.



Invited speakers are

Name	Profession - specialty	Title of the presentation
Dr. Christos Tsadilas	Agronomist, Soil scientist, f. Director of the Soil Mapping & Classification Institute ETHIAGE (now ELGO-DEMETER)	Soil and Desertification The case of Greece
Dr. Dionissios Kalivas	Professor at the Agricultural University of Athens Geospatial technologies in the erosion and desertification research	Geospatial technologies in erosion and desertification research
Dr. Vassilios Papanastasis	Forester-Rangeland Ecologist, F. Director of the Laboratory of Rangeland Ecology, Professor at the School of Forestry & Natural Environment, Aristotelian University of Thessaloniki	Sustainable Rangeland management against desertification: best practice applications
Dr. Yannis Kazoglou	Agronomist- Rangeland Ecologist, Assoc. Professor Univ. of Thessaly & General Secretary of the Association of the Greek Shorthorn Cattle Breed	Autochthonous farm animal breeds and desertification: how can we “re-green” our islands?
Dr. Spiros Karkabounas	Professor of Environmental Physiology, Medical Department, University of Ioannina	The 30 years of experience of the «Kallidendron» method for the successful planting and growth of trees in desert and arid environments
Dr. Theodora Petanidou	Professor of Ecology & Ecogeography, Department of Geography, University of the Aegean	Landscape restoration in the Aegean: the example of Andros through the project LIFE TERRACESCAPE

An honorary introductory greeting will be given by:

Dr. **Nikolaos Giasoglou**, emeritus professor of the Agriculture University of Athens,

A sort introductory speech will be done by

Dr. **Panos Panagos**, scientific/Research Officer, European Commission, Joint Research Centre Directorate D - Sustainable Resources

The event will be coordinated by the Forest Ecologist Dr. **Rigas Tsiakiris** on behalf of the Scientific Committee of the Green Institute Greece

* The speaker was finally impossible to attend, and therefore no presentation is included.





2nd Online event

Desertification - erosion and productive reforestation*

Thursday 18 March 2021

🕒 18:00

*This event is part of the project entitled: "Greece: Climatic change- desertification- erosion and productive reforestations" being part of the wider "Deforestation and Climate Change" (GEF-20-28)

This event is organised by the Green European Foundation with the support of FREDA and Green Institute Greece and with the financial support of the European Parliament to the Green European Foundation



The most effective measure to combat desertification is the appropriate use of the land

Emeritus Professor of the Agricultural University of Athens

Salutation

First of all, I would like to congratulate you on this initiative to make the issue of desertification known to the general Greek public.

Deserts on earth are distinguished as natural or man-made, and the word refers to the extreme degradation of the soil, which is a basic provider of life in the terrestrial ecosystems of the earth and in large part in the marine ones. Natural deserts are found in places and in areas of the earth with special adverse geoclimatic conditions. Anthropogenic desertification is the result of human greed leading to unsustainable overexploitation of natural resources, especially soils and waters. This desertification, due to technological development and its relatively slow course, is not immediately perceived by the public until it reaches an irreversible stage.

In current climatic conditions, desertification in Mediterranean European countries is a man-made phenomenon and not a natural one.

Relevant action plans have been studied and prepared by many international groups. Our country has played a leading role in this effort. Desertification constitutes a special action plan of the United Nations.

The most effective measure to combat desertification is the proper use of land. I have personally found from research that the Greeks from the Mycenaean era applied wise uses of the land. The National Commission has prepared national desertification vulnerability maps and has submitted relevant studies, as well as the Greek Action Plan. But the application of these studies remains unfulfilled. A plan for appropriate land use was also submitted some time ago. The latter is necessary for the development and strengthening of the country.

At this point I would like to thank all those researchers who have studied and compiled these studies as well as the Green Institute of Greece for bringing the issue back to the forefront.





The European Green Deal together with a Green Common Agricultural Policy can help tackle desertification



Scientific/Research Officer, European Commission, Joint Research Centre
Directorate D - Sustainable Resources

The conclusions of the European Court of Auditors on desertification



Desertification describes the anthropogenic and climatic processes that lead to reduced food production, lack of soil fertility, reduced soil resilience and degraded water quality. Climate change is a fact (no longer a prediction), as we already measure at least a 1 degree increase in temperature in many areas compared to 50-100 years ago. Forecasts and climate models are very ominous even for 2050. This means long periods of drought with high temperatures and an increasing tendency for extreme rainfall causing erosion and desertification.

In 2018, the European Court of Auditors (ECA) examined whether the risk of desertification in the EU was being addressed effectively and efficiently. The ECA has looked into the EU's commitment to zero land degradation by 2030 (Land Degradation Neutrality), according to which the quantity and quality of land resources will remain stable or improve.

The ECA has concluded that, although desertification and land degradation pose a current and growing threat to the EU, the Commission does not have a clear picture of these challenges and the measures taken to combat desertification lack coherence.

At the EU level there is no strategy for desertification and land degradation. There are, of course, a number of strategies, action plans and spending programs, such as the Common Agricultural Policy, the EU Forestry Strategy or the EU Climate Change Strategy.

The ECA made recommendations to the Commission with a view to improving the understanding of land degradation and desertification in the EU; assessing the need to improve the EU legal framework for soil; and intensifying efforts to Member States to achieve zero land degradation in the EU by 2030.

The EU is working to propose a methodology for the full assessment of land degradation. Unfortunately, there is no coordination between the Member States. Italy has currently developed a specific methodology and has quantified land degradation for the last 10-15 years.

We believe that the new strong Soil Protection Strategy (2021) under the European Green Deal, as well as a Greener Common Agricultural Policy can help coordinate action effectively to address desertification.



Proper soil management can make a decisive contribution to tackling desertification



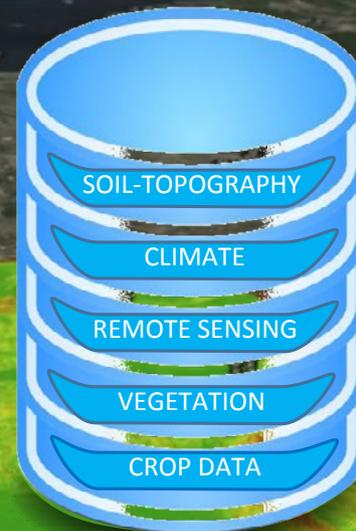
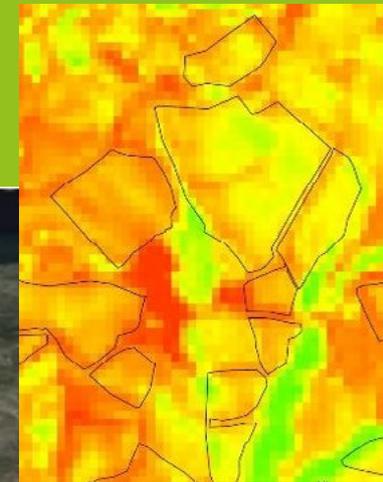
Soil and Desertification The case of Greece



Agronomist, PhD in Soil Science, former Director of the Institute of Soil Mapping and Classification of the National Agricultural Research Foundation (now ELGO DEMETER)

Soil has a key role in the carbon cycle, acting as a source and as carbon sink and thus significantly affecting the greenhouse effect. Soils retain more than three times the amount of carbon (C) of the atmosphere (2,400 vs. 750 Pg C respectively) and their management has a decisive influence on the flow of C between biosphere ecosystems. Deforestation causes large amounts of C release into the atmosphere (1.5 Pg/year). In Greece, most of the soils are in sloping areas and the management is such that it favors their erosion, intensifying the processes of desertification. More than 1/3 of Greek land is at high risk of desertification (Eastern Sterea, Aegean and Ionian islands, Evia, Crete, and Eastern Thessaly), 1/2 is at moderate risk and only about 15% of the land is at low risk of desertification. Desertification causes serious adverse effects on agricultural, livestock, and forestry production and farmers' incomes, loss of soil resources, environmental degradation, and the creation of economic and social problems leading to poverty, abandonment, and migration. Combating desertification is closely related to the proper management of soils, leading to an increase in the sequestration and storage of C. Desertification can be dealt with faced through actions of the State that have the consent of societies, adopting measures such as sustainable management of the soil, vegetation, and water, forestry and reforestation, adoption of incentives and disincentives and development of systems for predicting and monitoring the phenomenon. To implement these measures, it is considered necessary to reestablish the the National Commission to Combat Desertification, which will update and implement the National Action Plan to Combat Desertification. Finally, the Country must be actively involved in the actions initiated by the UN through the revision of the Convention against Desertification.





A soil map that properly combines the very large volume of soil data that exists in various agencies (state and local) in our country is an immediate priority



Professor at the Agricultural University of Athens Geospatial technologies
in the erosion and desertification research

Geospatial technologies in erosion and desertification research



The soil is subject to a number of degradation processes and threats. These include erosion, reduction of organic matter, spot and diffuse pollution, compaction, sealing, salinization, floods and landslides. Combining these with aggravating climatic conditions (e.g. drought, climate change) can lead to desertification. Desertification is accompanied by a significant reduction in soil fertility and leads to a reduction in agricultural production, a reduction in biodiversity and ultimately human migration.

Desertification is a multifactorial problem. It is approached and studied using simple variables such as soil permeability, rainfall or using indicators (e.g. dryness index which is a combination of annual rainfall and potential evapotranspiration). Also with the assessment of calculated qualities such as soil quality or vegetation quality that aim to assess the situation e.g. soil taking into account a set of individual soil properties.

All the properties that affect and determine the risk of desertification show spatio-temporal differences. The recording of the values of these properties requires the use of geospatial digital technologies such as Geographic Information Systems - GIS (with development of geodatabases and methods of spatial analysis) and Remote Sensing (using vegetation indices as well as other indices). These technologies that will monitor and analyze geospatial data will support the operation of a necessary National Spatial Observatory of Desertification. However, it is required first to create a Digital Spatial Repository of Natural Resources data, such as soil, vegetation, climate, in the appropriate detailed scale. A soil map that properly combines the very large volume of soil data that exists in various agencies (state and local) in our country is an immediate priority. Only through these steps and with the new technologies will we achieve the necessary updated desertification maps and a system of permanent monitoring of the phenomenon.



Meadows and rangelands are the areas of the earth with the highest desertification



Sustainable pasture management against desertification: good implementation practices



Meadows and rangelands are the areas of the earth with the highest desertification of the earth because they usually occur in marginally productive soils of dry and semi-arid climates and have been managed recklessly (e.g. overgrazing, fires, etc.).

Sustainability in pasture management means the provision of grazing material for animals both on an annual basis and over time, but without compromising the long-term productivity of the meadows and their multiple uses.

Ensuring sustainability in meadows and rangelands is achieved when herbaceous and woody plants coexist (shrubs and trees). These plants provide food for animals during the critical periods of winter and summer, when the herbaceous plants have reduced production or dried up, while more effectively protecting the soil, increasing biodiversity and storing large amounts of carbon.

Two good practices are recommended: a) the planting of shrubs and trees in the meadows and b) the over-thinning of the dense shrubs or the dense bushy basement of partially forested areas, in order to create groups of shrubs and trees in shrub or wood pastures, respectively.

Especially for the planned reforestation of the Ministry of Environment and Energy, it is proposed that a significant part of the trees to be installed in the deserted meadows of our country with a sparse planting link (eg 10x10 m.) in order to create wood-pastures.





Practical and well-focused policies to support livestock breeding of autochthonous animal breeds are crucial for the maintenance of local communities and economies in marginal island and mountain areas of Greece



Autochthonous farm animal breeds and desertification: how can we “re-green” our islands?

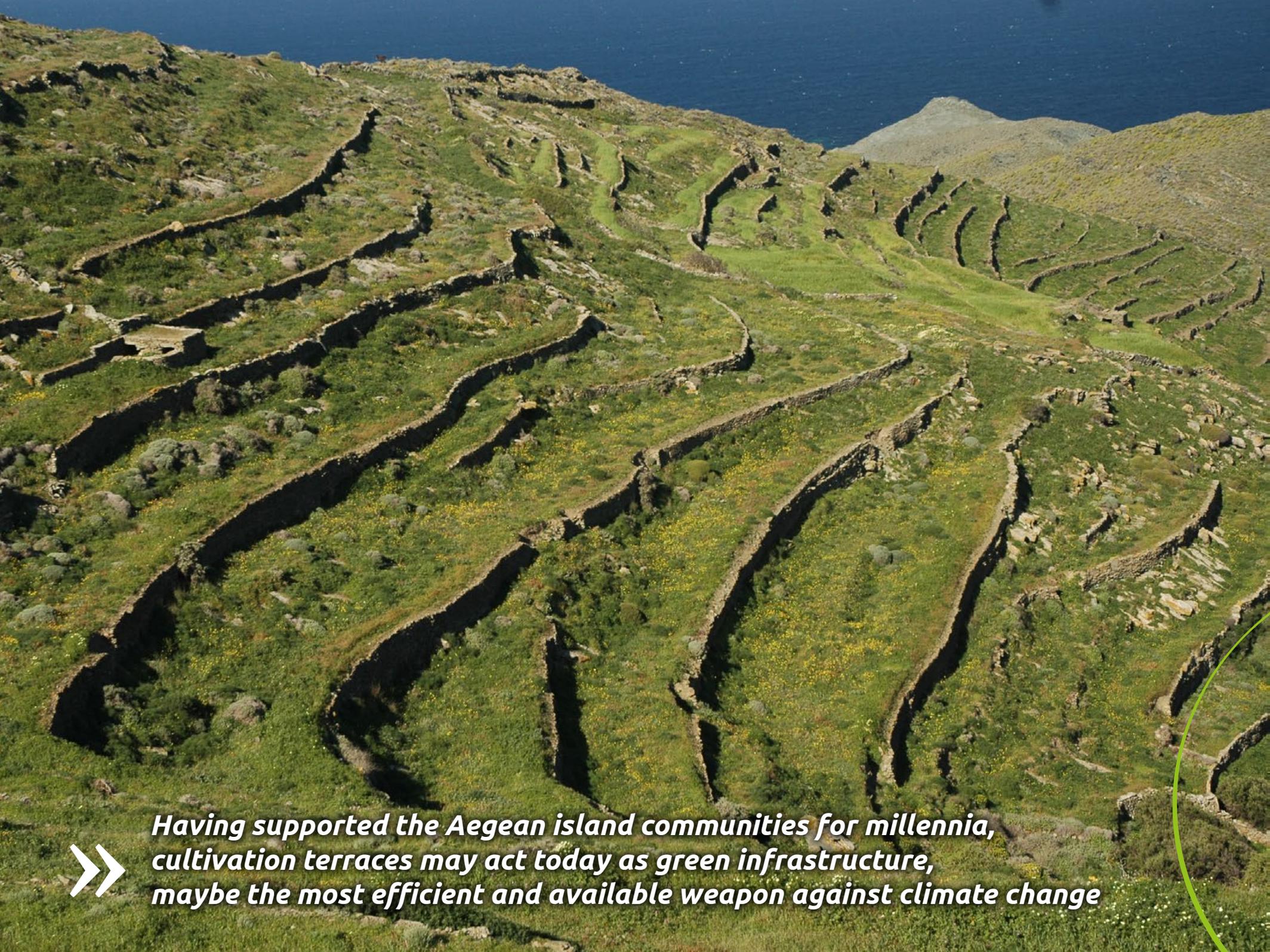


Agronomist – Rangeland expert, Assoc. Prof. (University of Thessaly, Greece),
Sec. Gen. of the Greek Shorthorn Cattle Breeders’ Association

Desertification is, unfortunately, in progress or already a fact in many island and mainland areas of Greece. Uncontrolled extensive stock-breeding activities lead to irrational grazing which causes degradation of rangeland ecosystems, but there are ways to improve this situation if serious policy decisions for the natural environment and stock-breeding are made and put into practice. The aim is to “re-green” not only islands, but the Greek countryside in general in terms of natural and social environment.

Sheep, goats, bovines and other animals of autochthonous breeds are perfectly adapted to the harsh environmental and terrain conditions of many island and mountainous areas; they are small and hardy, and make ideal use of the vegetation of natural rangelands, consume little water and require minimal veterinary and zootechnical care. Compared with animals of improved breeds, they have lower yields, e.g. in milk and meat, but with lower production costs, while, at the same time, their products are of high quality and nutritional value, as evidenced by recent research on the water buffalo meat, and other research, in progress, that highlights the characteristics of the meat of the Greek Shorthorn Cattle Breed. From one point of view, the characteristics of these animals can be considered as adaptations to climate change or ways of mitigating its effects.

Best practices of extensive livestock breeding – including the utilization of autochthonous farm animal breeds through production processes – should be properly assessed and forwarded during the preparation of the Grazing Management Plans for the whole of Greece that will begin in 2021, as well as management tools to be applied in the 446 Natura 2000 sites of the country, for which Special Environmental Studies (with Management Plans and draft Presidential Decrees) are currently under production. Throughout the country, and especially in island areas, basic infrastructure works – such as small or moveable slaughterhouses, well-placed watering troughs and restoration of terrace stone walls – should be financed to achieve the coveted ‘re-greening’.



Having supported the Aegean island communities for millennia, cultivation terraces may act today as green infrastructure, maybe the most efficient and available weapon against climate change



Landscape restoration in the Aegean: the example of Andros and the project LIFE TERRACESCAPE



Besides their usefulness and the purposes they were constructed for (creation of new cultivation land in steep terrain, support of cultivation and post-cultivation activities, elimination of stones from the soil, creation of soil etc.), cultivation terraces did not cease to constitute diachronic **green infrastructures** that prevented erosion, facilitated rainwater percolation and enriched groundwater aquifers, all-in-all acting as a deterrent factor to climate extremities and vicissitudes. Research shows that their effectiveness as green infrastructures is interlinked with their continued function as cultivation areas, as opposed to the current situation of land abandonment and overgrazing all over the islands of the Aegean Archipelago.

The above constitute the basic idea behind the project LIFE TERRACESCAPE (Employing Land Stewardship to transform terraced landscapes into green infrastructures to better adapt to climate change, LIFE16 CCA/GR/00050), which is being implemented in the island of Andros (2017-2022). The direct objective of the project is to restore and re-cultivate abandoned terraces at a large-scale demonstration (at least 150 ha), by employing smart agricultural practices to improve ecosystem adaptability to climate change and enhance the agricultural production originating from local varieties, thus contributing to the preservation of traditional agricultural heritage. An indirect objective is to demonstrate that climate adaptation on the islands is feasible by considering and using terraces as green infrastructures.

The project employs an approach which is innovative for our country, i.e. Land Stewardship, a voluntary cooperation between small landowners, farmers, local authorities, research bodies, as well as local enterprises, aiming at an integrated management of the rural landscape by applying modern practices that are socially and economically sustainable.





Invited speakers are

Name	Profession - specialty	Title of the presentation
Dr. Athanasios Kizos	Professor of Rural Geography, Department of Geography, University of the Aegean	Priorities and Actions for the preservation of Agroforestry landscapes through the promotion of product development
Dr. Ioannis Xatzigeorgiou	Ass. Professor of Agricultural University of Athens	The necessity of restoration of grazing areas and management measures aiming for sustainability
Dr. Nikolaos Dalezios	Retired Professor of Agrometeorology - Remote Sensing, University of Thessaly	Agro-climatic zoning and priorities for the protection of the country's agroforestry ecosystems
Dr. Despina Paitaridou	Forester - Environmentalist, Department of Forest Nurseries, Forest Genetic Resources and Reforestation, Ministry of Environment & Energy	Selection, management and utilization of genetic forest resources in practice
Dr. Peri Kourakli	Forester - Environmentalist, Coordinator of National Forest Strategy Working Group, Ministry of Environment & Energy	National Forest Strategy, reforestation and funding opportunities for action in the context of climate change
Dr. Petros Kakouros	Forester - Environmentalist, Member of the Editorial Committee of the magazine «ECOTOPIA»	Climate change and forestry priorities in reforestation to restore multi-functional landscapes

An honorary greeting will be given by: Dr. **A.Drougas**, Ministry of Rural Development and Food

The event will be coordinated by the Forest Ecologist Dr. **Rigas Tsiakiris** on behalf of the Scientific Committee of the Green Institute Greece



3rd Online event

Climate Change, EU Recovery and Resilience Fund and Productive Reforestations*

Tuesday **30** March 2021

 **18:00**

*This event is part of the project entitled: "Greece: Climatic change- desertification- erosion and productive reforestations" being part of the wider "Deforestation and Climate Change" (GEF-20-28)

This event is organised by the Green European Foundation with the support of FREDa and Green Institute Greece and with the financial support of the European Parliament to the Green European Foundation



Areas with agroforestry systems have been a natural and cultural heritage throughout the Mediterranean basin for thousands of years, now threatened both by land intensification and abandonment



Priorities and Actions for the preservation of Agroforestry landscapes through the promotion of product development

Areas with agroforestry systems are important parts of the coevolution of natural and cultural heritage throughout the Mediterranean for thousands of years. Major technological and socioeconomic changes have changed their uses in the last decades and they are threatened by both intensification and abandonment. At the same time, they are very important in the efforts to adapt to climate change, but also in conservation and enrichment of biodiversity. An effort to make them functional again and to continue to be managed has to take into account two different dimensions: (a) to document the use of management practices that contribute to in the conservation of so-called 'public goods' (that include climate change adaptation) in order to be eligible for agri-environmental and other rural development actions, (b) to produce products and/or services that will offer incomes to their farmers, with a priority to certifications that will refer to these practices and their contribution to conservation and climate change adaptation. This double dimension can and has to be included in the CAP, in direct subsidies and in the context of the so-called 'greening', but also in Rural Development schemes with tailor made agri-environmental measures and schemes that will implement the 'from farm to fork' strategy.





The country's grazing land can be regenerated and offer valuable ecosystem services



Associate professor at Agricultural University of Athens

The necessity of restoration of grazing areas and management measures aiming for sustainability

Grazing areas are important ecosystems which provide many types of ecosystem services to society, such as the provision of goods, regulation of processes (storage of carbon, water, etc.), support for biodiversity and leisure as well as cultural services. These areas in our country have been created over thousands of years, but in many cases, in recent decades, have been degraded due to lack of proper management, resulting in an inability to provide the above services. Proper management presupposes the regulation of grazing in time and place of the areas from the proper species and breeds of livestock. Given the importance of these services for society as a whole, degradation should be treated as a social problem and the state should methodize its reversal.

An important tool against degradation is to ensure the presence of legume forage species that support the creation of rich ecosystems. Moreover, the preservation of traditional ecosystems can be effected through appropriate (quantitative and qualitative) animal populations. It is proposed the activation through funding from the 'Recovery Fund' of the action foreseen in the RDP 2014-2020 entitled the 'Environmental restoration of degraded pastures'. It is also important to organize research and local seed production of species and landraces of suitable forage legumes. In addition, it is necessary to identify and characterize with modern genetic methods the appropriate species and populations of grazing animals that can yield the expected results of conservation of these areas through grazing.





Agroclimatic zoning identifies sustainable zones for optimal production within a climatic region, which may lead to crop restructuring



Agroclimatic zoning and priorities for the protection of the agroforestry ecosystems of the country



Agroclimatic zoning identifies sustainable zones for optimal production within a climatic region, which may lead to crop restructuring. The objective is double: first, identification of sustainable production zones by implementing contemporary methods of agroclimatic classification based on remote sensing and GIS, and second, an optimal plan of agricultural production. The first objective is achieved in three stages. First, hydroclimatic zones are developed based on aridity index (AI) and vegetation health index (VHI), to define zones adequate for sustainable farming according to water limitations, called water limited growth environment (WLGE) zones. Second, WLGE zones are combined with soil maps and a digital elevation model (DEM). Third, the Growing Degree Days (GDD) and Net Radiation (Rn) are computed, to define sustainable crop production zones, considering environmental limitations and sustainable use of natural resources. For the second objective, a Decision Support Systems (DSS) is developed by using multi-criteria analysis in each production class by combining different criteria in a utility function under heterogeneous sets of many different factors and constraints, which refer to agroclimatic, social, cultural and economic conditions. As a result, optimal production can be computed for each sustainable production zone, at a multi-scale level, within major climatic regions.





Genetic diversity ensures that forest species can survive, adapt and to evolve in a changing environment



Selection, management and use of forest genetic resources and forest practice



It is well known that forest ecosystems cover large areas of Europe and play a multifunctional role (social, economic, environmental, ecological and cultural functions).

In Greece, the coexistence of various forest species (trees, bushes and herbs) resulted in a vegetation composition distinguished by its biodiversity of all types and characteristic peculiarity. Specifically, genetic diversity ensures that forest trees can survive, adapt and evolve under changing environmental conditions. Furthermore, genetic diversity is also needed to maintain the vitality of forests, to cope with pests and diseases and adaptation to climate change.

Since 1970, the Forest Service, in collaboration with other Forest Institutions, started to identify, select and register forest seed stands with superior quality traits and growth properties of native species throughout the country, as well as developing seed orchards, taking into consideration the fact that conservations, management and appropriate use of genetic resources is a crucial element of sustainable forestry.





National and European strategies directly influence policy decisions and funding priorities



Dr. Forester-Environmentalist, Working Group for the National Forest Strategy Coordinator, Ministry of Environment & Energy

National Forest Strategy, reforestation and funding opportunities for action in the context of climate change

National and European strategies directly influence policy decisions and funding priorities. For Greece, the most relevant strategy is the National Forest Strategy. It is a mandatory strategy decision with long-term implications (20 years) which was developed as a bottom-up approach document by all the relevant forest stakeholders. Moreover, it introduces a new management model entitled as *'Mediterranean forestry'* which is based on priority axes and key action pillars. Climate change has been one of these priority axes including key actions such as *'restoring and maintaining good quality forest cover through reforestation and afforestation'*, but also *'exploiting forested agriculture areas for the benefit of the national economy and encouraging agroforestry'*.

Regarding the European strategies, the European Strategy for Biodiversity is crucial for afforestation and reforestation in Europe. It includes three major related actions: (a) tree eco-planting, focusing on cities and agroforestry, (b) developing guidelines for biodiversity-friendly reforestation and (c) taking advantage for reforestations and afforestation of existing (CAP Strategic Plans, Cohesion Fund, LIFE Program) and new funding tools (European Platform for Ecological Orientation, Green Deal, Recovery Plan & Mechanism, Just Transition Fund).

Taking into consideration EU and national strategies relevant with afforestation and reforestation, there are three proposals for any Greek Reforestation Plan:

1. Maintaining and enhancing a multi-functional model based on retro-innovation and environmentally friendly management in all reforested areas
2. Only selecting endemic forest tree species at a national level, which are good for climate change adaptation
3. Direct interaction (practically, not in bureaucracy) during planning, establishment, and management of reforested areas among managers and relevant Public Authorities (Forest and Agricultural)





Smart plantings to strengthen Mediterranean forestry. Smart plantings for biodiversity, climate, mountain and island communities





Climate change and priorities of the forestry sector for the restoration of multi-functional landscapes



In countries with high biodiversity such as Greece, the restoration of forest ecosystems should be in accordance of their unique ecological characteristics. Restoration must come as a response to degradation compared to an ideal but achievable standard. In Greece, forests in general show clear trends of natural recovery, due to *'close to nature forestry practices'* in wood exploitation, effective protection and the growth of forests as a result of land abandonment. Thus large-scale reforestations to increase timber production or carbon sequestration are probably not feasible since practically where forests can grow this happens naturally. On the other hand, this perspective is threatened by climate change. Forestry must be adapted and restoration actions are not excluded. Adaptation here means to give lead to targeted, small-scale actions with carefully selected species and their provenance, which will support Mediterranean, multifunctional forest landscapes. This will allow for the differentiation of forest products, in such a way that the production of non-woody products may become economically as important as wood production (e.g. beekeeping products). Moreover, the foreseen reduction in annual growth of forests will reduce the potential harvests, while an increase in wood stocks, often required for these products, is desirable. These adjustments are also consistent with the aim of increasing the ecosystem services provided by forests, such as soil protection. At the same time, these adjustments will also increase carbon capture. Fostering of multiple functions with strategic interventions were also achieved in the post-war period in Greece, when targeted plantings preventing erosion and advancing flood protection also preserved important vegetation types and species. As in all sectors, it is also important in the forestry sector to promote the adaptation of associated social groups, especially mountain and island communities. These must be the actual agents of adaptation and the main beneficiaries of economic and scientific support. In Europe, these approaches have recently been described as climate smart forestry. In Greece, a Mediterranean country with a centuries-old tradition in the conservation of multifunctional landscapes by mountain and island communities, was described in the National Forest Strategy as Mediterranean forestry.



How FAO GIAHS works

1. At Global level by identification, selection and recognition of GIAHS.
2. At National level by capacity building in policy, regulatory and incentive mechanisms to safeguard these outstanding systems and use them as sustainability bench mark systems.
3. At Local level by empowerment of local communities and technical assistance for sustainable resource management, promoting traditional knowledge and enhancing viability of these systems through economic incentives.



FAO-GIAHS systems: Local development programs in remote rural areas that combine traditional agriculture and art, architecture, morphology, ecology, and culture

Globally Important Agricultural Heritage Systems (FAO-GIAHS). A new Agricultural Policy for the development of rural mountainous, semi-mountainous and island areas through the production of local agricultural products with traditional techniques

The Globally Important Agricultural Heritage Systems (GIAHS) programme aims to identify, support and safeguard agricultural systems that sustain and conserve our biodiversity and genetic resources for food and agriculture, rural livelihoods, knowledge systems, cultures and remarkable landscapes. They are the quintessence of what sustainable development should be. The Food and Agriculture Organization (FAO) of the United Nations together with its national and local partners, works towards their recognition and dynamic conservation.

Worldwide, specific agricultural systems and landscapes have been created, shaped and maintained by generations of farmers and herders based on diverse natural resources, using locally adapted management practices. Building on local knowledge and experience, these ingenious agricultural systems reflect the evolution of humankind, the diversity of its knowledge and its profound relationship with nature.

These systems have resulted in the maintenance and adaptation of globally significant agricultural biodiversity, outstanding landscapes, indigenous knowledge systems and resilient ecosystems, but above all, in the sustained provision of multiple goods and services, food and livelihood security for millions of indigenous local communities poor and small scale farmers.

The GIAHS programme recognizes the crucial importance of the well being of family farming communities in an integrated approach while directing activities towards sustainable agriculture and rural development. It further seeks to support the present day resilience of these traditional agricultural systems and thus provide a sustainable legacy for the benefit of future generations.

In practice this means:

- Leverage global and national recognition of the importance of agricultural heritage systems and institutional support for their safeguard;
- Build capacity of local farming communities and local and national institutions to conserve and manage GIAHS, generate income and add economic value to goods and services of such systems in a sustainable fashion;
- Promote enabling policy, regulatory and incentive environments to support their conservation, evolutionary adaptation and viability.



Summary of conclusions and recommendations for productive reforestation and agroforestry ecosystems

Addressing the effects of climate change and biodiversity loss requires substantial policy change in the agricultural and forestry sector, where agroforestry systems can play a critical role.

Therefore, the Scientific Committee of the Green Institute Greece organized three relevant scientific webinars and summarizes here their key findings. It is widely recognized that there are increasing threats that Greece is expected to face from climate change and among them the worst is the risk of erosion and desertification of a large percentage of its land. However, mitigating such threats could be done through selective reforestation of trees useful for livestock, fruit production and beekeeping aiming to protect, restore and revive the agroforestry landscapes of Greece and to create new such landscapes throughout both Greece and Europe.

The main conclusion of the three days of webinars is the following:

The gradual post-war transformation of several existing agroforestry systems into purely livestock, forestry or agriculture land use, based on the political and financial distinction between agriculture, animal husbandry and forestry, is an important factor for the degradation of biodiversity, reduction of the resilience of agro-ecosystems to climate change, desertification and erosion. This situation must be reversed today, due to the urgent need to prepare the country for the effects of climate change. New agricultural, livestock and forestry practices and **interdisciplinary approaches and policies are needed to make ancient multi-functional agroforestry ecosystems economically viable again**, to address abandonment and to provide incentives for the production of innovative high local quality products.

The declared goal of the EU by 2030, is the planting, 3 billion trees. In the above framework the Ministry of Environment and Energy in Greece aims for the reforestation of 500,000 acres of forest land across the country for the restoration and adaptation of forest ecosystems to the effects of climate change. The proposal of the Green Institute

Greece specializes and expands this orientation by formulating recommendations for immediate implementation, highlighting some good examples presented by the scientific community in the three webinars. The proposal concerns reforestation with productive trees using suitable plants of the native Greek flora useful also for livestock rearing, fruit production and bee keeping. For example, experts recommend the carob tree (*Ceratonia siliqua*) as a suitable endemic forest tree of the Eastern Mediterranean useful in livestock and beekeeping, resistant to forest fires and with fruits suitable to feed animals, which can also produce dozens of innovative products. (see <https://repository.incredibleforest.net/oppla-factsheet/20231>).

The goal is triple:

1. To adequately deal with desertification, erosion and soil degradation in general, especially in the declining agroforestry landscapes of the Greek islands
2. To assist the efforts to halt biodiversity loss and
3. To have a parallel contribution and benefit to the local economy

In this way, **locals can become advocates and guardians of the actions needed** to mitigate the effects of climate change.

All participating scientists unanimously asked for the **re-establishment of the National Commission for Combating Desertification**, in order to draft an updated **National Action Plan**, since 49% of the country is below average and 34% at high risk of desertification. Important tools are: (1) the **Grazing Management Plans** and (2) the Management Plans of the Protected Areas of the **Natura 2000 network**, that will result from the launched Special Environmental Studies and the relevant Presidential Decrees.

There is, among other things, an urgent need to properly census the existing agroforestry land which is underestimated or omitted while being a significant percentage of existing land use and use them as **intergovernmental tools in tackling the two biggest challenges of our time, climate change and biodiversity loss**. These ancient anthropogenic agroforestry ecosystems can play a key role mitigating the effects of both crisis.





Greece should actively participate in international processes in compliance with its commitments, such as the Convention on Biological Diversity (1992), the Convention on Desertification, the Convention on Climate Change, but also the statutory National Forest Strategy (2018-2028).

Some measures that need to be immediately implemented:

1. Activate and use the payments for reforestation for the **forest sub-measure 8.2. of the Agricultural Development Program 2014-2020 for the creation and maintenance of agroforestry systems**. This is an imperative and necessary measure for the revival of the countryside in accordance with Article 23 of the European Regulation 1305/2013, regarding the National, and the new European Forest Strategy under consultation. This measure has not been used in our country, unlike in many other European countries, and despite the fact that Greece has one of the highest rates in agroforestry land cover in Europe, with 31.2% of the agricultural land being used as agroforestry land (3rd country in Europe, after Cyprus with 40.1% and Portugal with 31.8%) and with great potential this to be increased. **Afforestation needs to be prioritized in deserted rural areas, in areas with terraces and in marginally productive lands** in order to increase adjacent local communities income and create an economic incentive to re-cultivate them, with targeted plantings of productive wild trees and shrubs that produce fruits, nuts and berries.
2. Utilize the local **genetic potential of endemic shrubs and trees** (producing fruit, nuts and berries) by utilizing nursery material of native species with scientific certification and genetic certification, especially those that have strong indications of adaptation to local conditions and climate change. Thus, productive reforestation will contribute to the protection, conservation and increase of biodiversity and, with proper management, supporting in parallel local livestock and beekeeping production and meeting the growing demand for local, high quality products, wild fruits, nuts and berries. For this purpose, **special tree nurseries should be organized**, utilizing the existing active or inactive forest tree nurseries of the country and following the example of Cyprus, as well as the potential of the private sector with the

synergy of tree nurseries, scientists and academic institutions willing to contribute. Seed nurseries seed banks of local genetic resources, orchards of origin and clones and the processing - control - certification of forest reproductive material are fundamental and necessary steps to transform forest tree nurseries to rescue sites for local genetic material, but also to meet the urgent needs for reforestation with a greater variety of plants, especially of the above categories and not only those used until today.

In particular, **endemic legume seed production needs to be created immediately** instead of importing foreign species into soil enrichment programs and targeting the regeneration of degraded land (which can contribute to the seizure of 90 to 150 tons of carbon per acre in 30 years), which will greatly facilitate general policies to combat climate change.

3. **Treat the terraces (dry stonewalling) as a 'green infrastructure'** adapted to climate change. Unfortunately, although in 2018 the dry stone walls have been included in the Intangible Cultural Heritage of UNESCO, the abandoned terraces continue to be destroyed by livestock and their collapse is already causing huge soil loss, erosion and desertification, as there is still no conservation policy. The goal of their protection and conservation needs to be accompanied by the goal of their productive reuse. These two objectives can be excellently served by the new CAP and in fact with special protection, maintenance and restoration measures that must be conducted by the Ministry of Environment and Energy and the Ministry of Agriculture.
4. **Establish new innovative land use tools** such as: (1) participatory land surveillance and (2) the UN World Agricultural Heritage Systems (FAO-GIAHS) (3) High Nature Value Rural Land, which supports agricultural products and traditional production systems in semi-mountainous, mountainous and island areas.
5. Implement the proposed program of the Ministry of Regional Development and Infrastructure for the maintenance of the 250 **existing hydro meteorological stations** and their **increase to 400** for an effective climate monitoring and the implementation of selective precision agriculture for timely forecasting and treatment of natural disasters, saving large sums of money, compensation etc. There is also a





need to develop innovative systems for predicting-monitoring the multi-factor and spatial-temporal phenomenon of desertification with appropriate indicators (140 variables), as well as creating a Digital Spatial Repository of Natural Resources data, such as soil, vegetation, climate, at the appropriate scale. Another priority goal needs to be the identification of sustainable production zones by applying modern methods of agro-climatic classification using remote sensing and Geographic Information Systems (GIS), and secondly, an optimal agricultural production plan.

Some innovative measures that need political support:

1. Traditional Mediterranean forestry, which includes agroforestry, needs to be recognized as the **climate-smart Mediterranean Forestry**. Greece needs to proceed taking advantage for reforestations, afforestations and plantations, especially in agroforestry landscapes, capitalizing existing financial opportunities (CAP Strategic Plans, Cohesion Fund, the Public Investment Program, as also the LIFE, INTRERREG and Horizon Europe Programs), and new funding tools such as the Green Deal, the Recovery and Resilient Plan & Mechanism, the Just Transition Fund, as well as the European Platform for Ecological Orientation in accordance with other European strategies e.g. the EU Climate Change Strategy, the European Strategy for Biodiversity, the new EU Forest Strategy 2013-2030 and the EU's commitment to zero land degradation by 2030 (Land Degradation Neutrality). Now is the time to give more emphasis to the economic importance and sustainable use of **Non-Wood Forest Products**, including them as key products of specific forest management plans such as honey (70% of which is produced in forests), mushrooms and truffles, resins, acorn flour, Mediterranean pines, aromatic and medicinal plants, etc. Scientific research on retro-innovation opportunities with such products needs to be a strategic direction for future research. Appropriate forest management and targeted plantings that introduce the **multi-functionality of forests** and **agroforestry landscapes** can thus be socially acceptable in the effort to increase forest ecosystems' resilience to climate change and **involve citizens** in their protection.
2. Greece must pay particular attention to **management plans required by the new CAP** in which, soil, erosion and organic material are for the first time measurable

variables, especially since soil erosion, reduction of available water and degradation of soil contribute to the increase of greenhouse emissions, that accounts to 25% of the total globally.

3. **Natural pasturelands and rangelands represent the country's largest natural resource**, but they have been largely degraded both ecologically and productively, particularly in arid and semi-arid areas.

The **regeneration of pasturelands and rangelands** and their sustainable use should be accompanied by a new concept of management and financial support, in order to address effectively in particular, erosion, desertification, abandonment and reduction of soil biodiversity, as it has been foreseen in the RDP 2014-2020 entitled: «Environmental restoration of degraded pastures» with its reactivation through funding from the “Recovery and Resilient Fund”. This could be achieved in particular through:

- The effective combat of **overgrazing** as an important factor for desertification, particularly in the Aegean islands, where unattended high numbers of livestock (especially goats) have a disastrous effect on vegetation and demolish the dry stonewall terraces, as well as the under-grazing in mountain areas due to land abandonment, which directly leads to the accumulation of large volumes of flammable biomass, thereafter leading to mega-fires.
- The implementation of supporting policies for **extensive livestock farming activities** as well as **transhumance** (the latter is also included in the UNESCO Intangible Cultural Heritage list) using its environmentally friendly aspects, as well as animal welfare, with a coherent strategy to ensure its sustainability through the certification and promotion of unique dairy products manufactured by this activity;
- The adoption of seasonal grazing practices with different animals and **mixed grazing systems, the avoidance of the transformation of extensive small scale sheep farming activities into semi-intensive cattle farming**, particularly in mountain areas, and the adoption of practices such as electric fences to control it;
- The implementation of **productive reforestation** with selected shrubs and trees for the restoration, improvement and creation of new agroforestry systems in or-





der to reduce the seasonal vegetation shortage during the critical periods of winter and summer, ensuring sustainability in meadows and rangelands through the coexistence of herbaceous and woody plants (shrubs and trees).

- The use of **local breeds** of grazing animals which are resistant to climate change and can give high quality and unique dairy products and the application of policies to discourage their replacement with foreign breeds in areas which are traditionally used for extensive livestock farming activities.
4. The dynamic relationship between **biodiversity, anthropogenic ecosystems and traditional agricultural activities** such as beekeeping, livestock farming and new land uses, such as recreation should be recognized and prevail whereas new models of operational management should be created. This is in what the Grazing Management Plans and the Management Plans of the Natura 2000 Protected Areas Network need to contribute in order to:
- the implementation of coherent policies to ensure the retention of the sustainable use of economically marginal lands as well as recently naturally reforested abandoned agricultural land in High Nature Farmlands with appropriate conservation or re-cultivation incentives and **abandonment disincentives**
 - the creation of a **'biodiversity criterion'** by allocating resources to areas and holdings supporting the highest biodiversity ensuring their economic viability;
 - **Changes in land uses caused by RES** (wind farms and PV) in cases of high productivity land and ancient cultural mountain and island landscapes are unacceptable. A coherent spatial planning that does not conflict with other EU and National policies is urgently needed. This should create a clear business environment with priority for energy production with energy cooperation, giving priority to cover local demands and energy saving projects in the agricultural sector.
5. The **new CAP should strengthen the support to small scale agricultural production and local consumption that has the minimum carbon footprint**. The policy of reducing the environmental footprint is served if there is local consumption of local production and if small scale production is favored and supported especially

in the mountainous and island regions that are collapsing from land abandonment of marginally economical land, two small but critical issues to tackle both climate change and rural depopulation supporting social cohesion. Such opportunities are given by the **Globally Important Agricultural Heritage Systems** (GIAHS) program, aiming to identify, support and safeguard agricultural systems that sustain and conserve biodiversity and genetic resources for food and agriculture, rural livelihoods, local knowledge systems small scale cultivation technics and remarkable landscapes, which needs to carefully but dynamically and immediately enter to the global market. Such examples are the mastic villages of Chios, the sericulture with the specific cocoon silkworm rearing houses of Soufli in Evros and other 32 areas with local products and traditional know-how that are under consideration in the country.

6. Greece should specialize in the new CAP in order to promote the **diversity of rural landscapes** with measurable environmental objectives such as: (1) the maintenance of the environmental capital of entire regions and (2) the reduction of the environmental impact of intensive agriculture practices.
7. **Quality and certification criteria** should include additional criteria, such as the preservation of so-called 'public goods' (including adaptation to climate change), with systematic care that, in addition to the creation of local labels and the certification of processes and services, as well as safety during production with ISO and HACCP certifications, but also for environmental practices by **linking the quality of the "region" with the quality of the "production"** that will also concern the implementation of the Strategy "From farm to fork".
8. Land degradation should be treated as a social problem, while its sustainable management for biodiversity, which also concerns the conservation of agro-forest genetic resources, local breeds of farmland animals and local varieties, as well as local cultural practices and landscapes, should be considered as an **irreplaceable National Capital**.





- ✿ In addition to preserving and restoring the country's ancient agroforestry landscapes threatened by either abandonment or intensification, **there is a great potential for the creation of modern agroforestry systems** in our country for economic and environmental purposes, both on agricultural and forest land, in particular in the context of the need to mitigate the effects of climate change and biodiversity loss.
- ✿ On **agricultural land** productive reforestations and the planting of valuable trees producing fruits, nuts and berries is expected to make an important contribution for the improvement of the rural environment in the country's treeless plains, increasing farmers' income and producing also valuable high-quality technical timber.
- ✿ In **forest areas**, the above is expected to contribute to the improvement of the productivity of wood-pastures, increasing animal production, reducing the risk of forest fires and increasing biodiversity.
- ✿ Our aim should be to implement a **climate smart innovative product policy** with high added value, involving local farmers and achieving their economic viability.





**1st Event on
Reforestation
for productive
purposes: pasture,
beehiving &
recreation in
Greece**

For an invitation to the 1st online event please go to:

<https://www.facebook.com/events/180741243527455/?ref=newsfeed>

Publication of the results of the 1st event:

"Scientific proposals outlining the great potential for combating climate change: There are realistic and innovative management solutions. Productive reforestations are at the forefront", please go to:

<https://bit.ly/3h6e1LW>

Watch the full audiovisual material of the 1st event, as well as the debate that followed, here:

<https://www.youtube.com/watch?v=HA8tcSpA0I4>

**2nd Event on
Desertification
- erosion and
productive
reforestation**

For an invitation to the 2nd online event please go to:

<https://www.facebook.com/GreenInstituteGreece/photos/a.511578128950702/3848120405296441/>

Publication of the results of the 2nd event:

"In a policy-making workshop has been developed the online interdisciplinary, cross-university event on the role of productive reforestation in tackling desertification and erosion: Greece, after 20 years of absence, must actively work with the UN for the implementation of the Convention to Combat Desertification through the reestablishment of the National Desertification Committee", please go to:

<https://bit.ly/3vM8u0Z>

Watch the full audiovisual material of the 2nd event, as well as the discussion that followed, here:

<https://www.youtube.com/watch?v=akqLxuodvQM>

**3rd Event on:
Climate Change,
EU Recovery and
Resilience Fund
and Productive
Reforestations**

For an invitation to the 3rd online event please go to:

<https://www.facebook.com/events/1161657624293351/?ref=newsfeed>

Publication of the results of the 2nd event:

"Combating climate change demands fundamental policy shifts with regards to agroforestry systems. Fifteen necessary proposals for funding until 2027", please go to:

<https://bit.ly/3h26fmd>

Watch the full audiovisual material of the 3rd event, as well as the discussion that followed, here:

<https://www.youtube.com/watch?v=pR-qmB7lbd4>

For the official letter send by the by the Green Institute of Greece to the Ministries of Agriculture and the Environment with the scientific conclusions of the three online academic events, please go to:

<https://bit.ly/3ekXTnV>



This book gives to the reader the opportunity to travel to a familiar world: the world of the forest, pasture, fruit trees and flowering plants, farming terraces and the Greek rural landscape in general. The reader will find in these pages simple, understandable and applicable proposals to address significant productive deadlocks and problems of the post-war period, while tackling climate change.

The conclusions from the three scientific conferences organised by the Green European Foundation and the Green Institute Greece is that the opportunities, given by the newly revised Common Agricultural Policy and the Climate Change Recovery and Resilience Plan 2021-2027 should not be lost.

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