

Francesco Piras

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WORK EXPERIENCE

07/12/2022 – CURRENT

RESEARCH ASSISTANT - UNESCO CHAIR UNIVERSITY OF FLORENCE - DEPARTMENT OF AGRICULTURE, FOOD, ENVIRONMENT AND FORESTRY - DAGRI

Research Assistant at UNESCO Chair "Agricultural Heritage Landscapes".
Chair holder: prof. Mauro Agnoletti.

01/09/2023 – 30/11/2023 Florence, Italy

EXTERNAL COLLABORATOR - ASSISTING GIS LAB IN MAPPING POTENTIAL SITES, USING GIS SOFTWARE UNIVERSITY OF FLORENCE - DEPARTMENT OF AGRICULTURE, FOOD, ENVIRONMENT AND FORESTRY - DAGRI

Non-habitual freelance work contract, functional to the specific needs of the project "GIAHS Capacity Building-AICS". The activities involved the use of GIS software to analyze and elaborate cartographic data related to potential GIAHS sites.

01/09/2022 – 31/08/2023

RESEARCH GRANT UNIVERSITY OF FLORENCE - DEPARTMENT OF AGRICULTURE, FOOD, ENVIRONMENT AND FORESTRY - DAGRI

Topic: Technical and scientific support to the teaching activities of the international master course "agricultural heritage systems"

The activity concerns investigations aimed at collecting research material and scientific texts on the FAO program Globally Important Agricultural Heritage Systems (GIAHS) in order to support the teaching activities of the international master course "Agricultural Heritage Systems" in the framework of the project "Building capacity: international advanced course on GIAHS to evaluate resilience in three different social, environmental and bio-cultural contexts: Africa, Asia and Latin America", co-financed by the Italian Agency for Development Cooperation and the DAGRI Department of the university of Florence, as well as the teaching activities of the related university courses on this topic. The investigations will take into consideration sources and methods, temporal and spatial scale and processes involved, as well as techniques concerning GIAHS. Concerning sources primary and secondary sources should be considered, such as printed matters and manuscripts, as well as scientific articles and books. Material sources will also be taken into consideration, as also oral interviews. Particular attention will be dedicated to food systems, biocultural diversity, traditional knowledge, social and cultural values and landscape associated to agroforestry systems in the GIAHS context. Besides the support to teaching activity the outputs of the activities will be a book about GIAHS and scientific articles.

01/09/2021 – 31/08/2022

RESEARCH GRANT UNIVERSITÀ DEGLI STUDI DI FIRENZE

Topic: Analysis of the agro-silvo-pastoral landscape using GIS based methodologies for the elaboration of qualitative and quantitative data.

Analysis of the agro-silvo-pastoral landscape using geographic information systems (GIS) to collect and process qualitative and quantitative data. The proposed research activity focused on analyzing the characteristics of landscape mosaic structure in areas identified with traditional and non-traditional agro-silvo-pastoral systems to assess their maintenance and evolutionary dynamics. The work was carried out through literature research, analysis in a GIS environment and field surveys.

30/11/2019 – 30/05/2021

RESEARCH GRANT UNIVERSITY OF FLORENCE

Development of GIS-based information technology tools to support the educational activities of the *Agricultural Heritage Systems* Master's degree program and the promotion activities of potential GIAHS sites identified by the *GIAHS-Capacity Building* project. The work was carried out through the use of GIS programs and with field surveys. Several scientific articles on the topic were also written and published during the work.

2018

INTERNATIONAL INTERNSHIP - GIAHS SITE ANALYSIS

During the two-week internship, it has been possible to study and analyze in detail three mountain oases (Midès, Chebika, and Tamaghza) for the preparation of a GIAHS site application dossier.

The internship, carried out through the collaboration of students from all over the world, involved activities of spatial, social and economic analysis of a traditional rural agricultural system and its components.

The work led to the production of a final paper useful for the application of that site through the production of detailed cartographies of land use and hydraulic systems, supplemented with interviews with local people and descriptions of numerous traditional techniques.

2017

INTERNSHIP - HISTORICAL SPATIAL ANALYSIS HORIZON SRL

The internship involved multitemporal analyses of historic landscapes, with a focus on the forestry component, using GIS tools and data processing to create thematic maps and read them.

Literature research was also conducted during the internship to collect historical and environmental information.

2012 Greytown, South Africa

INTERNATIONAL INTERNSHIP - MANAGEMENT OF TREE PLANTATIONS MONDI SRL

During my two-month internship in South Africa at the company MONDI srl, I was able to witness and participate in the work of local foresters in the industrial management of tree plantations, dedicated to the production of pulp for paper and cardboard.

The work provided an understanding of how a business system works both at the international and local level, and provided technical and management skills.

2008 Firenze, Italy

VOLUNTEER FOREST FIREFIGHTING ACTIVITIES VAB - VIGILANZA ANTINCENDI BOSCHIVI

During my time as a member, I have performed civil defense and forest fire watch duties, worked together with other volunteers, and attended training courses on chainsaw use and personal protective equipment (PPE).

EDUCATION AND TRAINING

12/2018 – 05/2019 Firenze, Italy

INTERNATIONAL MASTER COURSE - "AGRICULTURAL HERITAGE SYSTEMS" University of Florence

International master's program that involved students from around the world in the study and understanding of GIAHS sites, promoted by FAO. Within the master's program, both technical and theoretical topics of historical, economic and social analysis of rural communities were covered in order to identify and propose new GIAHS sites.

National classification 107/110

2013 – 2018 Firenze, Italy

MASTER'S DEGREE IN FOREST SYSTEMS SCIENCE AND TECHNOLOGY School of Agriculture

The Master's degree program allowed for further expansion of the skills learned in previous studies.

The course of study chosen for the second year, Planning, Landscape and Forest Territory, integrated knowledge in forestry with aspects of ecological design and planning, landscape conservation and enhancement, skills also expanded by knowledge of computer tools for land study.

During the course, I also participated in field activities at Vallombrosa and Modigliana, where I was able to put the theoretical knowledge acquired into practice.

Supervisor: M. Agnoletti.

Field of study Agriculture, forestry, fisheries and veterinary | **Final grade** 106/110 | **National classification** Valutazione: 106/110 |

Thesis The historical evolution of the Tuscan forest landscape. Relations with the interpretations of forest components in the Territorial Management Plan of the Region of Tuscany

2006 – 2014 Firenze, Italy

BACHELOR'S DEGREE IN FORESTRY AND ENVIRONMENTAL SCIENCE School of Agraria

Solid background in technical and theoretical disciplines related to the study, management and planning of forest environments and training in the environmental field. Agronomic, chemical, biological and mathematical skills.

During the course, I participated in several field activities at Vallombrosa, where I was able to develop practical skills to support the planned theoretical studies.

Thesis title: "Biomass production for pulp and paper in South Africa."

Advisor: E. Marchi.

Field of study Agriculture, forestry, fisheries and veterinary | **Final grade** 93/110 | **National classification** Valutazione: 93/110 |

Thesis Biomass production for pulp and paper in South Africa

LANGUAGE SKILLS

Mother tongue(s): **ITALIAN**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	C2	C2	B1	B1	C1
FRENCH	A2	A2	A1	A1	A1

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

DIGITAL SKILLS

Competenze digitali

Basi di R | Basi di Python 3 | Windows | Utilizzo del browser | Basi di Linux/Ubuntu | Fogli di calcolo | Q GIS (+GRASS) | Padronanza del Pacchetto Office (Word Excel PowerPoint ecc) | Gestione autonoma della posta e-mail

Digital skills

Proficiency in Office Package (Word Excel PowerPoint etc.) | Basic knowledge of Linux/Ubuntu OS | basic knowledge of Python 3 | Basic knowledge of R software | GRASS gis | Qgis

ADDITIONAL INFORMATION

CONFERENCES AND SEMINARS

04/12/2023 – 06/12/2023 – International Water Research Institute (IWRI) in Benguerir, Morocco.

Training on Spatial Analysis Seminar conducted by me upon the invitation of UM6P. The class included 18 hours of lectures, related to using QGIS software to conduct multi-temporal landscape analysis using VASA methodology, to a class of 22 PhD students and 2 postdoctoral researchers. The seminar covered a brief introduction to the use of GIS software and data, followed by an in-depth look at the digitization of land use by photointerpretation in two different periods, and then concluded with the elaboration of an informative layer of the landscape evolution dynamics.

08/11/2023 – Florence, Italy

TRADIZIONE PER LA TRANSIZIONE: L'AGRICOLTURA DELLA RESILIENZA Organization and management of the final conference of the "GIAHS Building Capacity" project related to the FAO Important Agricultural Systems of World Heritage Program, an initiative co-funded by the Italian Agency for Development Cooperation (AICS)

10/07/2023 – 14/07/2023 – Nairobi (online), Kenya.

IALE 2023 - European Landscape Ecology Congress Speaker: Peri-urban Agroforestry Heritage System. Past, Present and Future of the Mulberry-Dykes and Fishponds GIAHS site of Huzhou City, China

11/07/2022 – 15/07/2022 – Varsavia (online), Polonia.

IALE 2022 - European Landscape Ecology Congress Poster: Identification of touristic routes and creation of heritage maps for the enhancement of the historical landscape. The historical landscape of Leonardo da Vinci's Gioconda.

05/11/2021 – 07/11/2021 – Florence, Italy

Primo Congresso Nazionale dei Paesaggi Rurali Storici Organization and management of the conference.

01/10/2021 – 03/10/2021 – Konavle (online), Croatia.

17th international congress on dry stone walling Speaker: Dry stone terraces in the Shouf Biosphere Reserve (Lebanon).

23/08/2023 – 27/08/2023 – Gattatico, Italy.

15th edition of the "Emilio Sereni" School of Landscape Lecture held at the summer school "Emilio Sereni", focused on "Landscape and Environmental Crisis". The workshop offered to the students the use of GIS systems to elaborate maps of the impact of wind turbines on the landscape.

PUBLICATIONS

Assessment of Tuscany Landscape Structure According to the Regional Landscape Plan Partition – 2021

The landscape is considered a strategic asset by the Tuscan regional government, also for its economic role, meaning that a specific Landscape Plan has been developed, dividing the region into 20 Landscape Units and representing the main planning instrument at the regional level. Following the aims of the Landscape Plan and the guidelines of the European Landscape Convention, it is necessary to develop an adequate assessment of the landscape, evaluating the main typologies and their characteristics. The aim of this research is to carry out an assessment of the landscape diversity in Tuscany based on 20 study areas, analyzing land uses and landscape mosaic structures through the application of landscape metrics: number of land uses, mean patch size (MPS), Hill's diversity number, edge density (ED), patch density (PD), land use diversity (LUD). The results highlight a correlation between the landscape typologies (forest, agricultural, mixed, periurban) and the complexity of the landscape structure, especially in relation to MPS and PD, while the combination of PD and LUD calculated on the basis of a hexagonal grid allows obtaining landscape complexity maps. Despite the phenomena of reforestation and urban sprawl of recent decades, Tuscany still preserves different landscape typologies characterized by a good level of complexity. This is particularly evident in mixed landscapes, while agricultural landscapes have a larger variability because of different historical land organization forms. The methodology applied in this study provided a large amount of data about land uses and the landscape mosaic structure and complexity and proved to be effective in assessing the landscape structure and in creating a database that can represent a baseline for future monitoring.

Forest Area Changes in Cinque Terre National Park in the Last 80 Years. Consequences on Landslides and Forest Fire Risks

– 2021

Cinque Terre, one of the most important Italian cultural landscapes, has not been spared from depopulation and agricultural abandonment processes, that involved many rural areas in Europe, as a consequence of socio-economic transformations that occurred after WWII. Depopulation of rural areas, especially in mountains or in terraced areas, caused significant environmental consequences, such as the decrease of biodiversity, the landscape homogenization, the increase of hydrogeological and forest fires risks. Cinque Terre National Park (STNP) was established in 1999, and, differently from other Italian National Parks, not just for protecting natural habitats, but mainly to preserve, restore and valorize the historical terraced landscape. Moreover, the area is a UNESCO cultural landscape site and it is partly protected by three Sites of Community Importance. The research intended to investigate the transformations that have affected forested areas inside the STNP in the period 1936–2018, also highlighting the connections with hydrogeological and forest fires risks, as a support for the Park planning strategies and the conservation of the UNESCO site. Results highlighted that 37% of the current forests are the consequence of dry stones terraces abandonment that occurred in the twentieth century, with negative effects on the stability of steep slopes, hydrogeological risk, forest fires and on the conservation of a unique cultural landscape. This confirms the current national trend showing no deforestation occurring, but rather a continuous increase of forests on abandoned land. While STNP policies and actions are effectively aimed at pursuing an equilibrium between cultivated areas and forests, the Sites of Community Importance located inside the Park mainly focuses on the conservation of “natural habitats”, even if the current vegetation is also the result of secondary successions on former cultivated land. The research highlighted the need to valorize “cultural values” in forest planning as well as the importance of forest history for an accurate planning of forest resources in protected areas.

Forest surface changes and cultural values: the forests of Tuscany (Italy) in the last century – 2021

Despite the definition of social and cultural values as the third pillar of Sustainable Forest Management (SFM) in 2003 and the guidelines for their implementation in SFM in 2007 issued by the Ministerial Conference on the Protection of Forest in Europe (MCPFE), the importance of cultural values is not sufficiently transferred into forest planning and conservation. Tuscany is widely known for the quality of its cultural landscape, however, the abandonment of agro-pastoral surfaces as a consequence of rural areas depopulation, has led to widespread reforestation and to the abandonment of forest management. In addition, due to the interruption of a regular forest management and to the fact that most of the population lives in cities, forests are no more perceived as part of the cultural heritage, but mainly as a natural landscape. Due to this trend traditional forest management techniques, such as coppicing, have also been considered as a factor of degradation and not even a historical management form. The aim of the study is therefore to analyze forest surface changes in Tuscany in the last century to assess the importance of cultural values. Results highlighted that already in 1881 most of forests were regularly managed and that in 1936 more than 76% of broadleaved forests were managed as coppice. Between 1936 and 2016 forests increased their surface from 876,518 to 1,161,383 hectares due to the abandonment of the countryside, and 30% of the forests currently included in protected areas are the result of secondary successions. The findings of this study suggest the revision of national forest policies and, more in general, the adaptation of forest strategies to local conditions.

The multifunctional role of linear features in traditional silvopastoral systems: the sabana de morro in Dolores (El Salvador) and the pastures with carob trees in Ragusa (Italy)

– 2021

Traditional agro-silvo-pastoral systems are becoming each day more important, representing multifunctional systems that can contribute to the preservation of agrobiodiversity and of traditional knowledge and associated culture, to the wellbeing of local communities and to sustainable development of rural areas, as testified by the increasing interest regarding the Globally Important Agricultural Heritage Systems (GIAHS) Programme of the Food and Agriculture Organization (FAO). Despite many researches on traditional agro-silvopastoral systems tend to focus only on land uses and land use changes, is also important to analyse the different features that characterize cultural landscapes, as well as to produce detailed spatial maps, in order to preserve and valorise these systems as a whole. The paper intends to compare two traditional silvopastoral systems in two different continents and environments: sabana de morro (El Salvador) and pastures with carob trees (Italy), considered as good example of biocultural diversity. Both these sites are

characterized by extensive cattle breeding in a hot climate under the shade of trees, whose fruits can also integrate the animal diet. The study analyzed the traditional landscape structure, with particular attention to the presence of linear elements, that act as property divisions and as ecological corridors, contributing to biodiversity at landscape scale. Sabana de Morro is characterized by a complex system of hedges that enhances the variety of species, while an extensive network of dry-stone walls divides the Sicilian pastures with carob trees. These two different types of linear elements created thanks to the local farmers' knowledge are made of different materials but can play a similar ecological and social function, acting as a division between one pasture and another, as a delimitation of property boundaries, and are necessary to allow a correct pasture management. Despite the differences, these two traditional linear features deeply characterize the landscape structure and fragmentation, creating important microhabitat for many animal and vegetal species and a network of ecological corridors. For these reasons the conservation of linear features should be promoted at planning level, as well as their restoration. Thanks to the applied methodology, it was possible to identify peculiarities and vulnerabilities of linear features and of the systems as a whole, so that it will be possible to create effective management and conservation tools.

Covid-19 and Rural Landscape: The Case of Italy. – 2020

Throughout the covid-19 emergency, health authorities have presented contagion data divided by administrative regions with no reference to the type of landscape, environment or development model. This study has been conducted to understand whether there is a correlation between the number of infections and the different rural landscapes of the country. Italy's rural landscape can be classified in four types, according to the intensity of energy inputs used in the agricultural process, socioeconomic and environmental features. Type A includes areas of periurban agriculture surrounding the metropolitan cities, type B areas of intensive agriculture with high concentration of agroindustry, type C hilly areas with highly diversified agriculture and valuable landscape, and type D high hills and mountains with forests and protected areas. Areas A and B are located in the plains, covering 21% of the territory and accounting for 57% of the population. They produce most of the added value, consume high levels of energy and represent the main source of pollution. Areas C and D cover 79% of the territory and 43% of the population. We find that provinces with 10% more type C and D areas exhibit on average 10% fewer cases of contagion. The result is statistically significant, after controlling for demographic, economic and environmental characteristics of the provinces. The pollution produced in more energy-intensive landscape has triggered an intense debate of how to ensure the economic competitiveness of Italian agriculture, without compromising environmental integrity or public health. Our findings speak to this debate, by suggesting that planning for more rural territory with lower energy inputs may come with the added benefit of new development opportunities and decreasing the exposure of the population to covid-19. Cost benefit-analyses should take into account that policies aimed at repopulating more rural areas may reduce the economic impact of covid-19 and of potential future pandemics.

Terraced landscapes of the Shouf Biosphere Reserve (Lebanon): analysis of geomorphological variables – 2021

This work aims to characterize the agricultural heritage system surrounding the Shouf Biosphere Reserve (SBR) in Lebanon, through a landscape analysis based on assessing current ecosystems. In the past, the SBR landscape was intensively terraced and cultivated to produce many different crops. Today, although the terraced surface has been reduced, it is still a characteristic of the area, encouraging the quality of the landscape and increasing local biodiversity. During and after the war (the 1950s), the migration of population caused the abandonment of many cultivated terraces with the loss of a wide range of ecosystem services. This trend should be reversed to ensure these ecosystem services. The diversity of the land uses, and the richness of fauna and flora species raise the importance of the role of the SBR in maintaining the complex ecosystem and increasing its resilience capacity. The objectives of preserving biocultural diversity and traditional local agricultural practices can be achieved through sustainable development policies for the dynamic conservation of landscapes. In this study, it was shown that distance from roads to terraced areas is a fundamental factor in the preservation and maintenance of terraces. As well as the aspect and the slope influence the positioning of the terraces and therefore the species cultivated on them.

Agroforestry Heritage Systems as Agrobiodiversity Hotspots. The Case of the Mountain Oases of Tunisia – 2020

Traditional agricultural systems are receiving increasing attention at the international level due to their multifunctional role. The Globally Important Agricultural Heritage Systems (GIAHS) programme of the Food and Agriculture Organization (FAO) aims to identify agricultural systems of global importance, preserve landscape, agrobiodiversity and traditional knowledge and apply the principles of dynamic conservation to promote sustainable development. Biodiversity associated to traditional agricultural practices is particularly important, especially in difficult environments, like traditional oases, for ensuring food and nutrition to local communities. We documented landscape and biological diversity associated with traditional agricultural practices in three traditional oases in Tunisia, through a landscape analysis based on land-use survey, and an assessment of cultivated species. Results show that the landscape structure is dominated by agricultural land uses and characterized by a high level of diversification. Agrobiodiversity is high: we identified 20 varieties of date palm, 21 species of fruit trees, 21 vegetable species and two fodder crops. Results highlighted that traditional oases, as other agroforestry and agricultural heritage systems, continue to play a crucial role in maintaining genetic resources and agrobiodiversity. Farmers who, all over the world, still cultivate applying traditional practices are the main actors that practice a real conservation of genetic resources and diversity by maintaining traditional cultivars and a diversified landscape structure. Our methodology, based on the combined assessment of land uses and agrobiodiversity, can be replicated in other agricultural heritage systems to evaluate and measure possible transformations and identify the best strategies for their preservation.

The Agroforestry Heritage System of Sabana De Morro in El Salvador – 2020

Traditional agroforestry systems are recognized as having great importance for providing multiple benefits for local communities all over the world, especially in tropical countries. Thanks to their multifunctional role, they can support small farmers, contribute to hydrogeological risk reduction, water regulation, preservation of soil, agrobiodiversity and landscape, as well as being examples of mitigation and adaptation towards climate change. The Globally Important Agricultural Heritage Systems (GIAHS) programme of the Food and Agriculture Organization (FAO) aims to identify

agricultural systems of global importance, preserving landscape, agrobiodiversity and traditional knowledge, through dynamic conservation principles. The Sabana de Morro is a traditional agroforestry system located in El Salvador based on cattle grazing in pastures with the presence of *Crescentia alata* and *Crescentia cujete* trees, locally called Morro or Jícaro. We documented the main characteristics of this system, that has never been deeply studied, in the Municipality of Dolores, in accordance with the five GIAHS criteria, and through detailed land use mapping, to assess the relations between landscape structure, agrobiodiversity and traditional silvopastoral practices. Sabana de Morro proved to be based on strong interactions between trees, cattle and farmers. The pulp of the Morro fruits is eaten by grazing cattle, completing their feeding and giving a peculiar taste to the locally produced cheese. Morro trees provide shade for the animals while cattle contribute by spreading their seeds that also take advantage of the manure. Results show that this agroforestry system contributes to the preservation of a rich agrobiodiversity and of the traditional landscape. At the same time, it supports local farmers' livelihood and is consistent with the aim of the GIAHS programme, even if further surveys and research are needed to assess the real possibility of the inclusion in this FAO programme.

The role of the jessour system for agrobiodiversity preservation in Southern Tunisia – 2021

Mediterranean countries are still characterized by a great variety of historical cultural landscapes, as a result of the millenary human presence that has shaped the territory through agro-silvo-pastoral practices. In the arid regions of south eastern Tunisia, the land use is predominantly olive trees cropping and, because of the difficulties related to water scarcity, local population have developed a peculiar water harvesting technique ensuring the cultivation activities and minimising the risk from droughts. Jessour consist of small dams built across gullies and wadi thalwegs, creating a succession of terraces that partially retain the surface water and sediments required for crop growth. These structures are commonly built inside the watercourses to intercept runoff and sediments or at the foot of slopes. Considering that the biodiversity associated to traditional agricultural practices is important, especially in difficult environments, for ensuring food and nutrition to local communities, it results fundamental to preserve these peculiar practices. Moreover, taking into account that the presence of these water harvesting techniques allows the existence of a wide variety of flora and fauna species it results to be even more important to identify and maintain them from an ecological point of view. The research focused on the jessour identification and mapping in order to define their distribution nearby Douiret, in south of Tunisia, and describe the wide variety of species cultivated thanks to this traditional water harvesting solution. Moreover, using QGIS software it was possible to analyse both jessour structure and peculiarities as well as their distribution according to the local morphological structure.

The Role of Trees Outside Forests in the Cultural Landscape of the Colline del Prosecco UNESCO Site – 2022

The multifunctional role of Trees Outside Forests (TOF) is largely recognized in scientific literature, but they are still rarely considered in forest inventories and planning, with consequent underestimation of their role and amount. In addition, their cultural role has rarely been considered both at scientific and management level as well as in UNESCO sites. TOF characterize many European cultural landscapes, including the one of the Colline del Prosecco, inscribed in 2019 in the UNESCO World Heritage List. One of the reasons of the inclusion, in fact, is the landscape mosaic made of vineyards interspersed with small woodlands and tree rows. This paper focuses on two types of TOF, Small Woods and Linear Tree Formations (TOF NON A/U). Their detailed mapping and the performing of different spatial analysis allowed us to assess their role and to provide data for future monitoring and for local forest planning. Results confirmed that TOF NON A/U are one of the main features of the UNESCO site landscape: despite the limited overall surface (1.95% of the area), 931 different patches have been identified. Spatial analysis highlighted the key landscape and ecological roles, acting as intermediate features between large forest patches, and also an important role for hydrological protection (they can be found also in slopes above 80% of inclination). The study provided a detailed mapping and database of one of the main features of the Colline del Prosecco UNESCO site cultural landscape, verifying the multifunctional role of TOF NON A/U and the necessity to include them into local forest planning, but also suggesting their inclusion in national forest inventories.

Small Cultural Forests: Landscape Role and Ecosystem Services in a Japanese Cultural Landscape – 2022

Small woods, linear tree formations, or scattered trees in agricultural areas are receiving increasing attention for their multifunctional role, especially if associated to cultural landscapes. Osaki Kodo's Traditional Water Management System for Sustainable Paddy Agriculture represents one of the most important cultural landscapes (*satoyama*) of Japan, also included by the FAO in the GIAHS (Globally Important Agricultural Heritage Systems) Programme. Here, local farmers surrounded their farmhouses with small woods, called *igune*, as a protection from the cold winter wind, creating a peculiar landscape characterized by an intensively cultivated plain dotted with small wood patches. The research aims at deepening the knowledge of *igune*, evaluating the landscape role and monitoring their changes in the last 20 years, through multitemporal and spatial analyses. In addition, a literature review has been performed to assess other Ecosystem Services (ESs) provided by *igune* within the study area. Despite the limited overall surface, 1737 *igune* and small woods currently characterize the area, with 72% of them having a surface smaller than 0.5 hectares. The multitemporal and spatial analyses show that their number, distribution, and spatial pattern remained almost completely unchanged in the last 20 years, testifying their key role in characterizing the local cultural landscape. Least-Cost Path analysis highlighted a crucial role in connecting the two forest nodes of the region, as 90% of the path passes inside more than 70 different *igune* and small woods. Literature review demonstrated that *igune* and other small woods still provide various ESs, including ecological network, habitat for various flora and fauna species, firewood, and byproducts, as well as cultural services. This maintenance of the traditional management in cultural forests is crucial not only to retain their landscape role, but mostly for the preservation of the related ESs, as changes in the management can lead to changes in horizontal and vertical structures, and in species composition.

From Flood Control System to Agroforestry Heritage System: Past, Present and Future of the Mulberry-Dykes and Fishponds System of Huzhou City, China

– 2022

Peri-urban traditional agroforestry systems are considered a priority at an international level, as they serve as a link connecting cities and rural areas, providing local food and ecosystem services for people living in the cities. The