Universitat d'Alacant
Universidad de Alicante
Facultat de Dret
Facultad de Derecho

LAW FACULTY

INTERNATIONAL RELATIONS DEGREE

FINAL DEGREE PROJECT

ACADEMIC YEAR [2022-2023]

TÍTULO:

PERMACULTURE: CONTRIBUTING TO SUSTAINABLE DEVELOPMENT BY DESIGNING RESILIENT COMMUNITIES

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ABSTRACT

In the face of a late response from the institutions to the climate crisis, - it was not until 2015 that the Agenda 2030 on Sustainable Development (SD) was established-, grassroots movements and community-based initiatives appeared. Permaculture was one of these initiatives. This study aims to better understand the concept of permaculture and to point out how it can contribute to SD by designing resilient communities. Three characteristics make permaculture a worthwhile contributor to SD, it is a design system, a culture/ way of living, and an international network. Fieldwork was conducted in *Permatopia*, a permaculture ecovillage located in Denmark. By analyzing the structure, governance and the inhabitants' perspectives, this work reflects on the possibilities to widen its application. Findings that are drawn state that permaculture is valuable not as something that could contribute to SD, but as something that does so already. As a result, it should be acknowledged as a proposal that encourages a paradigm shift by valuing small, local, and decentralized actions by a great number of practitioners and in a variety of scenarios (both rural and urban areas, as well as in different dimensions of a community). Additionally, it suggests combining permaculture with other bottom-up proposals that collaborate and contribute to the process of SD.

KEYWORDS

Permaculture, design system, sustainable development, grassroot movement, ecovillage.

1. INTRODUCTION

It has become increasingly obvious that human development and the emergence of global environmental issues (climate change, soil degradation, biodiversity loss, deforestation, alteration of water reservoirs, etc.) are interlinked. These problems surge in the context of an unsustainable system that relies on large-scale extraction of materials (oil, gas, coal, heavy metals), resulting in the exhaustion of energy and material resources; that creates global warming, air, soil, and water pollution; and, that physically interferes with the natural cycles, which causes ecosystem deterioration,

depletion of oceans and farmland, water scarcity and droughts. Anthropocene[1] was the term (unofficially) proposed to define this new geological epoch into which the Earth has entered due to human action. This term groups the impacts of the accelerated accumulation of GHG (Greenhouse Gases) on climate and biodiversity, and the irreparable damage caused to the natural resources by human activity.

By the late 1960s, there were growing concerns about the environmental degradation of the planet, with an increasing understanding that this degradation was intimately related to levels of economic development that were unsustainable (Leary & Pisupati, 2010). However, it was not until 1987 that the international bodies seemed to realize it, when the World Commission of Environment and Development released the Brundtland Report in which it recognized the need to ensure a sustainable development.

Facing the lack of initiatives by national or international institutions, other actors decided to mobilize and act by proposing a series of initiatives that were community-based. These initiatives did not only address the environmental issues, but also the social and economic injustices that derived from the existing problematic system. One of these grassroots initiatives was permaculture.

Permaculture is a holistic design framework, developed by Bill Mollison and David Holmgren in the mid-1970s, which seeks to create sustainable human settlements, integrating multiple aspects of society (economy, food supply, energy, living space, etc.), to create a culture where people embrace and coexist harmoniously with nature. It employs ecological management practices and locally adaptive solutions to generate resilient communities.

While counterculture environmental movements and initiatives, like permaculture, were expanding to different regions in an informal way, important changes in the institutional international framework were also making their way through. Finally, in 2015, the Agenda 2030 on Sustainable Development (SD) was established with the definition of 17 Sustainable Development Goals (SDGs) to be achieved by 2030. This Agenda created an overall framework for sustainability. The framework that preceded the SDGs was that of the Millennium Development Goals (MDGs) (2000-2015). This new agenda differed from that of the MDGs in that, for the first time, the ecological dimension was

[1] It was coined in 2000 by the chemist Paul Crutzen and the biologist Eugene Stormer. It derived from *anthropo* ("man" in Greek) and *cene* ("new" in Greek) (National Geographic Society, 2022).

given the same importance than the economic and social one. In the SDGs the ecological dimension is envisaged as cross-cutting and essential for the success of the other two dimensions (social and economic). Although the strategy is promoted by the UN, its implementation should not be conceived as a top-down policy. There is a need of collaboration between international institutions and the informally created initiatives and networks. Therefore, the current overall framework of sustainability needs to recognize the importance of alternative proposals such as permaculture.

This work aims to shed light on the concept of permaculture and to highlight its potential contribution to sustainable development. To achieve that aim, this research has the following objectives:

- Provide a basis to understand the concept of permaculture and its complexity.
- Analyse the use of the concept (or rather its absence) by international institutions.
    - Comparing permaculture with other proposals that are currently present in stablished frameworks (both international institutions and academia).
- Conduct a mini ethnography in a community devoted to the permaculture ideas.
- Assess implementation experiences, to understand how the theoretical concept is practically applied.
- Reflect on the contribution of permaculture to sustainable development.
- Understand the relationship between permaculture and institutionalized discourses on sustainability.

Bearing in mind those objectives, this work first offers a theoretical analysis of permaculture, describing its origins, founders, and characteristics, defining the traits that make it a potential contributor to sustainable development and comparing it to other proposals for development. Then, the focus goes into the methodology carried out during the fieldwork and the description of the ecovillage in which it occurred. Later, the results collected are exposed and analysed. While in the first part the focus is more on bringing theoretical basis to the potential of permaculture to contribute to sustainable development, in this part the focus is on analysing the informants' views about it. Finally, some conclusions connecting with permaculture's contribution to sustainable development will be presented.

2. CONCEPTUAL FRAMEWORK

2.1. UNDERSTANDING PERMACULTURE

2.1.1. Context and origin

As mentioned, the concept of permaculture was born in the mid-1970s in the minds of Bill Mollison and David Holmgren. To better understand its origins, it is essential to comprehend the historic context and the life and experiences of its two co-originators.

The context

The emergence of "the environment" as a political concern took place on the 1960s and 1970s. A series of events and publications influenced the early days of the Environmental Movement. (1) In 1962 it was published *Silent Spring*, a book that warned of the harmful effects of pesticides on the environment and blamed the chemical industry for the increasing pollution. (2) In 1972 the Club of Rome published the *Limits to Growth* warning that growth in population and production could not continue without leading to the collapse of social and economic systems. (3) Some industrial accidents occurred that made people think about technology and industrial system differently (e.g., the Nuclear Incident in Seveso in 1976 and the Three Mile Island in 1979).

Meanwhile, M. King Hubbers predicted that US oil extraction will reach a peak between 1965 and 1971. This fear made many people start considering alternatives for an Energy Descent future, as well as to look for ways to be self-sufficient and independent from the oil system.

Holmgren noticed the big influence that the *Limits to Growth* report had on the people's perception of the unsustainability of the industrial society (Osmond & Alexander, 2015). People started wondering what would happen if population and resource extraction kept growing, whether it would provoke a decline or even a complete collapse of humanity. But he thought there had to be a middle-space between what he calls "techno-explosion future", - characterised by a *business-as-usual* approach of onward and upward acceleration[2] - and a (global) system collapse. He believed in the

[2] The Great Acceleration is a period that goes from the mid-20th up until today. It is the synchronous acceleration of a different series of trends: GHG emissions levels, global temperature, ocean acidification, terrestrial biosphere degradation... The uprising trends start with the Industrial Revolution and increase after the Second World War.

idea of the “techno-stability future”, finding a way in which population and extraction of resources would get stabilized and create a durable/ permanent system.

The origin

Bill Mollison was born and raised in Tasmania, where he worked as a forester, trapper, and guide before becoming a field biologist, researcher, and university professor. Along his multiple fieldworks he identified fundamental ideas and patterns of sustainable design based on his observations of indigenous cultures and natural ecosystems. He wrote and published a book on the history of the Tasmanian Aboriginal people in 1972. In that same year, while working as a tutor at the University of Australia, he met David Holmgren, a student who was interested in his land-use research (Hemenway, 2015).

David Holmgren was a first-year student of Environmental Design when he met Bill Mollison. At that time, his interests were gravitating around the concepts of ecology (branch of biology which studies the interactions among organisms and their environment), agriculture (science and art of cultivating plants and livestock) and landscape design – (profession, design, and art tradition, which create plans combining nature and culture), and he wanted to find a way to connect them. The connection between agriculture and landscape design could be traced, but he had not seen an example in which the three of them were connected (Clitheroe, 2019).

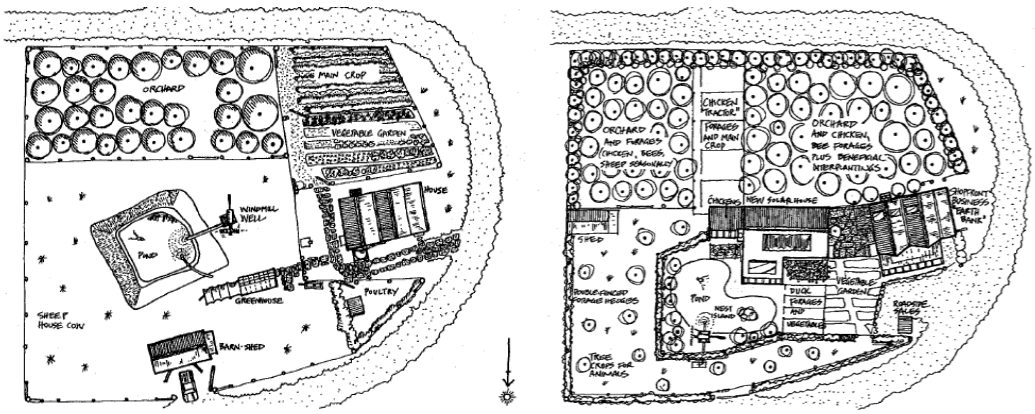
Holmgren shared with Mollison his interest in the intersection between these three elements and thus their collaboration started. They wanted to answer the following question: If nature works creating forests that are dominated by perennial plants and trees, why was modern agriculture system not operating similarly to a forest? Why was it dominated by annual crops? Why was agriculture not following the design rules of nature? (Osmond & Alexander, 2015)

Under Mollison’s direction, Holmgren wrote his undergraduate thesis that evolved into *Permaculture One*, the ground-breaking book that first explained the principles of permaculture. This first manual, took inspiration from agroforestry (and the book written by American economic geographer J. Russel Smith *Tree Crops: A Permanent Agriculture* published in 1929). They considered that Smith elaborated an interesting first approach for a “tree crop farm”, but that his proposal, while providing some

pennaculture[3] potential, was still a very straightforward crop system. They also draw inspiration from the Italian farmers in the Po Valley that integrated yields by using a multi-layered agriculture of trees, subsoils, and grain strips. They were really interested in transferring the four-layered structure of forests into agricultural systems [4]. Although the ideas were based on existing propositions, a system-thinking that considered the productive landscapes in terms of ecology – prioritising interactions, linkages, and energy functions over the individual components -, was rather a relatively new idea at that time. The focus of that first manual was settled on: integration and diversity, perennial species rather than annual crops, soil conservation by cultivating the *humusphere*[5], and some models of land-use design that safeguarded against natural hazards such as fire, drought, or plagues[6].

Some years after *Permaculture One* was written, Mollison pursued developing the concept of permaculture in a second book. In *Permaculture: A Designers Manual*, he gave some examples and guidelines on how to transition from contemporary/western agriculture into permaculture farming (Figure 1).

Figure 1. Transition from non-integrated systems into permaculture/integrated systems



Mollison (1988/2009)

[3] Based on perennial species, that perdure over time.

[4] 1st Layer: The forest floor – formed by bacteria, fungi and insects; 2nd Layer: the understory – dark and gloomy, a good nursery for young saplings; 3rd Layer: the canopy –50 to 90% of the rainforest's species live in this part; 4th Layer: The Emergent layer – the oldest and taller trees provide habitat for large birds and primate species (Global Forest Watch, 2005).

[5] "The *humusphere* absorbs and stores nutrients (leaves and manure) and water for later use by the plants. It acts as a control on pioneer plants (weeds) and reduces leaching, runoff, and erosion, but most importantly, harbors flora and fauna of great variety" (Mollison & Holmgren, 1990, p. 7).

[6] This ensures that if these changes occur, some species and the system could be affected, but "the basis for a productive permaculture will remain" (Mollison & Holmgren, 1990, p. 7).

By combining ecology, agriculture and landscape design, Mollison (1988/2009) advocated for transitioning from a plot-divided design that conceived the terrain to be divided into concrete functions (e.g., main crop, orchard, vegetable garden, poultry) into one design in which areas were conceived as multifunctional and different species were present (e.g., animals were present in different areas) (Figure 1).

Holmgren remarks that although the concept was coined by both, it was Mollison who spread it to the world, and therefore, he considers him the father of the Permaculture Movement (Clitheroe, 2019). Disappointed with the way the university and some academics were taking his ideas, Mollison founded the Permaculture Research Institute, an experimental farm where the principles of permaculture could be taught and practice. As the movement started growing, he designed the Permaculture Design Course. Different agents were educated, and a network of practitioners started to take form.

2.1.2. Defining the concept

Concept

Mollison (1988/2009) first defined permaculture as the "design and maintenance of agriculturally productive ecosystems which have the diversity, stability and resilience of natural ecosystems" (p. 9). A design-system advocating for the integration of landscape, nature, and people in such a way that the needs of the latter (food, energy, shelter, etc.) do not jeopardize the existence of the others (or future others). Barely three years later, Mollison (1991) widened the scope of the concept, by defining its aim to be the creation of life-supporting systems (going beyond the creation of agriculture systems). Holmgren (2002, cited by Krebs & Bach, 2018), defined it as the conscious design of "landscapes which mimic the patterns and relationships found in nature, while yielding an abundance of food, fibber and energy for provision of local needs" (p.5).

The concept has blossomed from one focused on the contraction of "permanent" and agriculture" to that of "permanent culture". "Permanent" – meaning it persists through time – and "culture" – the activity/ way of living that supports human existence –. If these two concepts are combined, permaculture can be understood as a "persistent system that supports human existence" (Clitheroe, 2019).

The Permaculture Institute, founded by Bill Mollison holds the copyright of the term ensuring that its usage is limited to educational purposes and protected from unauthorized use. It defines permaculture as "a *design approach* to regenerating ecosystems, creating just and peaceful communities, and thereby increasing permanence in human *culture*. With an ethical framework and the principles of the natural world as guidestones" (emphasis added) (Permaculture Institute, 2020).

There are some ideas in that definition that need to be highlighted:

Permaculture is a (1) design-system. And as so, it offers a framework for organizing the integration of ecology into all the different dimensions of society. It provides people with a set of tools to redesign and rethink their communities in order to work seamlessly with its natural world. Building communities that are adaptable to a changing climate.

Permaculture also proposes an (2) alternative culture/ way of living by defining 3 ethics that constitute the core of the concept (Earth Care, People Care and Fair Share), and that should be at the core of every system applying permaculture. It is about rebuilding relationships between people, land, and the supporting system around them. Through these relationships permaculture seeks to build resilient communities.

There is one more thing that is not present on that definition but that makes permaculture relevant. The evolution of the concept is explained by the decentralized and informal way in which it has spread around the world, creating an important (3) international network. Permaculture has evolved as a movement with no central structure, but with a strong sense of common goals.

Permaculture Ethics and Design Principles

At the core of permaculture there are the 3 ethics.

1. Care of the Earth: Provision for all life systems to continue and multiply.
2. Care of People: Provision for people to access those resources necessary to their existence.
3. Fair Share: Limits to consumption and redistribution of the surplus. This third ethic depends on and synthesizes the meaning of the previous two.

They were drawn from studies on community ethics. These are shared by all traditional "cultures of place" that have linked people to the land and wildlife throughout history, with the significant exception of contemporary industrial societies. This emphasis of

permaculture on learning from indigenous, tribal and "cultures of place" follows the idea that these cultures have persisted for a long time and have done so by living in harmony and balance with their environments (Holmgren, 2020).

These ethics intertwine to create an effective base that permaculture practitioners follow to transform and build their local systems. Permaculture insists on considering them before any action is started. Reflect on how that would affect the surroundings (Earth Care), what resources will be needed (Fair Share), and whether would enhance people's empowerment and equality (People Care) (Starhawk, 2016).

What distinguishes permaculture from other concepts that arose as an alternative to the modern system, is that it does not stay in the theory, but it focuses on the practice. Rather than "analysing human extinction" and protesting against the world they did not want, it was fundamental to start acting (Osmond & Alexander, 2015). As a design-system, permaculture offers a guideline for its implementation. The principles are:

1. Observe and interact.
2. Catch and store energy.
3. Obtain a yield.
4. Apply self-regulation and accept feedback.
5. Use and value renewable resources and services.
6. Produce no waste.
7. Design from patterns to details.
8. Integrate rather than segregate.
9. Use small and slow solutions.
10. Use and value diversity.
11. Use edges and value the marginal.
12. Creatively use and respond to change.

The approach of the principles differs. While the first six are based on a bottom-up methodology, the second half can be viewed from a top-down designer's perspective. Moreover, the concepts are interrelated: generating *no waste* (6^{th}) and applying *self-regulation* (4^{th}) all contribute to the *integration* of elements (8^{th}), which enables people to respond to change in innovative and *creative* ways (12^{th}) (Krebs & Bach, 2018).

These principles do not merely serve to create healthy and resilient agriculture systems, but they serve to create resilient living-systems, by tackling the different dimensions of

societies. As exposed by Holmgren (2007), permaculture tries to harmonize the ecological, social, and economic dimension, by understanding and transferring the patterns found in nature to every aspect of human societies.

For example, the 1st Principle refers to "observe", that is, making a holistic diagnosis of the place before acting, and assessing the feedback once the action has been implemented; and to "interact", using plant interactions to enhance productivity. Permaculture looks at plants in the garden not as isolated entities but in terms of how they interact and provide fertility or protection for one another. This same approach should be applied to societies, observing, and examining interpersonal relationships.

The 7th Principle, the design from patterns to details, refers to the need of using natural ecosystems as models for effective site planning, for sustainable land use and for sustainable communities. Ecosystems evolved over a very long time to be operational under specific environmental conditions.

In the 8th Principle, integrate rather than segregate the same principle works for plants in a garden and people in a community. Conversely to the industrial system that stretches everything in a long supply chain, permaculture promotes the contraction of the productive and consumption process. Another example of segregation is town planning, with residential areas separated from commercial and working areas.

The 10th Principle, using and valuing the diversity, emphasizes multifunctionality and diversity using polycultures and perennial crops, by varying the land use and an integrated management of water (Didarali & Gambiza, 2019). Diversity is one of the bases of ecosystems' adaptability and stability. Increasing biodiversity benefits productivity in terms of producer and consumer abundance, erosion management via increased plant root biomass, nitrogen cycling and decomposer activity (Krebs & Bach, 2018). In human systems, valuing diversity might lead to enhance resilience. A diverse community considering ages, genders, ethnicity, sexual orientation, etc., will have broader viewpoints, deeper awareness of problems and occurrences, and, as a result, more resilient responses (Starhawk, 2016).

Principle 11th is about using the edges and valuing the marginal. Edges are more diversified and productive because resources and services from both adjacent ecosystems are present. A variety of fauna is linked with margins, some of which may be pest species, while many others serve as crop pollinators or pest predators, improving

the presence of beneficial species in crops and thus lowering pesticide use, contributing to the sustainability of agriculture (Krebs & Bach, 2018). From a social perspective, where two systems converge, a third, dynamic and diverse system, arises. Where human systems collide, tension and conflict may arise but also creativity (12th Principle) may be expected. In fact, systems transform from the edge.

The goal of permaculture is making human culture and natural living systems more resilient, which depends more on flexibility than on rigidity. Surprisingly, any small-scale and short-lived change in a system, supports higher-order system stability. High rates of change in the current system offer the impression that change is never-ending and neither sustainable. However, appreciating the dynamic balance between stability and change contributes to working with an iterative design, characterized by creativity (12th Principle), rather than one that is rigid (Holmgren, 2020).

These principles are also aligned with the 3rd Ethic, that of Fair Share. Permaculture Principles serve as a guide for developing solutions tailored to the requirements and particularities of the system they are designed for. Rather than taking a top-down or universally applicable approach, they are designed for each specific environment in which they are to be used. It is distinguished by a participatory form of engagement in which the local community must be consulted before, during and after design activities. It is also link to the "Economics of Permanence" in which society is structured in small, independent, and politically autonomous communities (Schumacher, 1973/2011).

2.1.3. Permaculture, going beyond sustainability

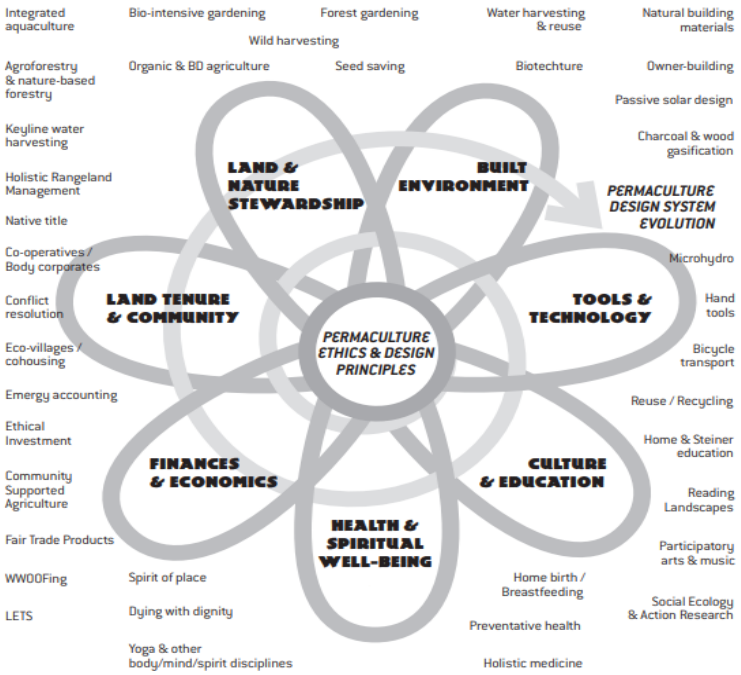
Evolution of the concept

As exposed, the concept of permaculture has been evolving along the years. Being now a design-system of sustainable land use and sustainable living systems. It is not hard to draw a connection between the three ethics of permaculture and the three pillars of sustainability (ecological, social, and economic) proposed in the 2030 Agenda and the SDGs. In that connection partially lies the relevance of permaculture.

However, permaculture has nurtured from other practices (such as organic gardening, natural building, renewable energy, and even decision-making and social-justice processes) becoming a toolbox of all of them. It is a design-system that connects

different disciplines and utilizes diverse strategies and techniques to prepare communities for an Energy Descent future[7] (Hemenway, 2015). The progressive application of its principles in more detailed areas of societies, permaculture now aims at designing the seven domains needed to sustain societies (see Figure 2).

Figure 2. The Flower of Permaculture



Essence of permaculture (Holmgren, 2007)

Holmgren (Osmond & Alexander, 2015) highlights that the evolution of permaculture as a movement has meant the incorporation of ideas from other sustainability-related practices. Consequently, it has changed according to different climatic environments. There is not just "a" permaculture, as it is different everywhere. The 3 Ethics and Design Principles are the only universal part of permaculture, but the strategies diverge.

But that is, in fact, the goal of permaculture. Preparing for an Energy Descent world means realising that there is not just a universal answer to be applied everywhere, but that local adaptative responses are required. It is not about copying or imitating, it is about understanding and acquiring a design-thinking, a problem-solving approach that considers the characteristics of each place.

[7] In opposition to those that believe that a transition to renewable energy will solve the problems that energy production causes (both in terms of climate change and natural resources depletion), permaculture considers that renewable energies are not the solution defending that the only feasible future for humanity is to design low-energy-consuming societies.

Permaculture vs. Sustainability

Permaculture advocates (after all) to meeting the needs of the community without putting in danger the needs of the planet and other animals, or future generations. This conceptualization, although, aligned with the first definition of sustainable given by the Brundtland Commission[8], goes beyond it.

The Brundtland Commission's definition has two important limitations: (1) it takes an anthropocentric point of view by worrying about the environment and other species insofar as they are necessary for human survival; and (2) it advocates for changing the future practices to avoid producing further harm, but it does not give a solution for repairing what has already been damaged.

Permaculture, on the contrary, is concerned with every aspect of life in the planet without needing to link it to human survival, and it does not try to be only sustainable, but regenerative. Rhodes (2015) claims that, considering the current situation, all sustainable solutions will be unsustainable over time, unless they are regenerative. The situation would not worsen but neither would it improve.

Moreover, permaculture embraces the concept of resilience[9], and specifically of community resilience[10]. For achieving community resilience, Berkes (2007) presents four techniques: (1) encouraging diversity in the ecological, economic, and socio-cultural spheres; (2) preparing for potential changes; (3) promoting learning; and (4) increasing communication. This very much involves enhancing the ability to self-organization and self-sufficiency, as to decrease the vulnerability to climate change (Graugaard, 2012). Aligned with these four strategies, permaculture serves as a promoter of community resilience and self-organization. It is present in eco-communities, urban gardens, and cooperatives, all grassroots practices that shift from production for exchange to production for use, and that are based on voluntarily

[8] The Brundtland Commission defined sustainable development, in its final report released in 1987, as a human development that ensures "that it meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland, 1987, p. 16).

[9] Resilience is generally understood as the system's ability to maintain its core qualities despite going through change (Graugaard, 2012). Holling (1973) used the concept to describe "a measure of the persistence of systems and of their ability to absorb change and disturbance and still maintain the same relationships between populations or state variables" (cited by Graugaard, 2012, p. 245).

[10] Community resilience is the "existence, development, and engagement of community resources by community members to thrive in an environment characterized by change, uncertainty, unpredictability, and surprise" (Magis, 2010, cited by Henfrey, 2018, p.1).

activity. They are practices of commons[11] and examples of degrowth[12] (Alisa et al., 2015). Communities in which their members are the producers and consumers of their goods and services, and do not depend on market forces but only on local demand (Schumacher, 1973/2011). Small-scale operations are less likely to harm the environment than large-scale ones because their individual strength is small in relation to the regenerative forces of nature, allowing resilience (Schumacher, 1973/2011).

However, this study refers to sustainability as a process and a framework, and not as much as its initial definition. This is, even if the concept of permaculture *goes beyond* the initial definition of sustainable, permaculture *contributes to* sustainability. To the process of transition and creation of sustainable human development.

2.2. PERMACULTURE AND SUSTAINABLE DEVELOPMENT

Permaculture can contribute to the process of sustainability because it serves for both (1) mitigation and (2) adaptation. (1) On the one hand, it encourages reducing the consumption and use of both products that were the result of a highly pollutant production process (e.g., metal fences) or that pollute when being used (e.g., heavy machinery using petrol) what results in a decrease on GHG emissions; at the same time it creates ways to absorb these GHG, by growing trees and perennials plants that bring these gases back to the soil, and protecting the soil so that they stay there (no-tilling[13] technique). (2) On the second hand, by enhancing resilience in communities, it also improves their adaptive capacity to future impacts [14].

It can also provide to the framework of SD with a bundle of principles to create resilient communities, three ethics that are at the core of every action, and finally a network of practitioners that promote local actions at a global level. In the following section, each of these characteristics will be better introduced.

[11] Commons are something that a whole community can freely and democratically access and enjoy.
[12] Degrowth is a critique of growth. It advocates for the abolition of economic growth as a social goal. It defines a desired direction in which societies will organise differently and use fewer resources. “Sharing”, “simplicity”, “care”, “conviviality” and “commons” are some of the traits (Alisa et al., 2015).
[13] “No-till agriculture, (…) technique in which the soil is disturbed only along the slit or in the hole into which the seeds are planted; reserved detritus from previous crops covers and protects the seedbed” (Encyclopedia Britannica, n.d.).
[14] The ability of a system or a species to respond to climate change in a way that reduces harmful impacts. This comes from reducing communities’ vulnerability.

2.2.1. A design-system

Permaculture works as a holistic design that combines knowledge from different disciplines: agriculture, geography, architecture, livestock science, soil science, economics, sociology, agroecology, etc. It pays attention to understanding the specific context in which it operates. It works with adaptive management[15] what makes it suitable for a complex and changing world (Alexandra, 2020).

As systemic design, permaculture tackles the different dimensions existent on the complex reality and that are aligned with the three pillars of sustainability. Permaculture is, thus, both ecological, social, and economic design.

As shown in the flower of permaculture (Figure 3), as a design system it aims to address every aspect of society by creating a system that is permanent in the long-term, so it can be connected to the Agenda 2030 goals. Permaculture directly contributes to the following SDGs (Permaculture Journeys, 2021):

- SDG 2 – Zero Hunger. Permaculture is all about abundance. Its priority is creating regenerative farming systems that produce a variety of healthy crops.
- SDG 3 – Good Health and Well-being. By contributing to healthy soil, clean air and clean water, and healthy food, permaculture offers access to healthy lifestyles. Communities that grow based on the permaculture idea create a common purpose for existing, which supports mental wellness.
- SDG 6 – Clean Water and Sanitation. Decreasing the contamination of the waterways (often brought on by chemicals sprayed on lands and then leaking into subsurface water sources) contributes to achieving this goal. Rainwater is collected, slowed down, and stored in permaculture systems, creating closed-loop systems that allow used water to be directed to and filtered through greywater treatment systems before being used again for plants.
- SDG 7 - Affordable and Clean Energy. Permaculture has also a focus on creating local community energy systems. It promotes self-sufficiency with the use of renewable energies such as solar or wind energy. But most importantly, it promotes reducing the consumption of energy to the minimum.

[15] Adaptive management is a strategy to managing natural resources despite uncertainty. It is systematic, deliberate, and not just random trial and error. It aims at considering the effects of actions taken and to improve future actions through that consideration (experimental learning) (Webb, J. A. et al., 2017).

- SDG 9 – Infrastructure and industrialization. It promotes using resilient building methods like building that is natural, non-toxic, and adapted to climate.
- SDG 11- Sustainable Cities and Communities. Designing sustainable communities based on observing and imitating the diversity, stability and resilience of natural ecosystems is in the very definition of permaculture.
- SDG 12- Responsible Consumption and Production. Fair Share, the third ethic of permaculture, entails putting a cap on consumption and sharing the surplus. It involves creating productive systems that are regenerative. In addition, it is in the principles of permaculture to avoid the creation of waste.
- SDG 13 – Climate Action. Permaculture itself is a way to cope with the effects of climate change (CC). It constitutes an action that contributes to fighting CC. By lowering overconsumption, food miles, pollution, and other detrimental habits, it directly addresses many of the primary causes of global warming.
- SDG 14 – Life below water. By guaranteeing clean water cycles, zero-waste systems, and on-site fish habitat, such as in ponds and riparian areas, permaculture protects life below water.
- SDG 15 – Life on Land. The whole approach of permaculture is essentially about creating a safe climate and diminishing our footprint and to rewire nature. It focuses on restoring and/or establishing permanent systems like food forests and native habitat for animals and plants in a specific bioregion.
- SDG 16 – Peaceful and inclusive societies. Permaculture is implemented bearing in mind the building of systems that benefit all life forms, eliminating circumstances prone to disputes. It integrates rather than segregates and has developed a global movement that ensures this goal.

The only way to implement successfully the SDGs is using a holistic approach, and permaculture is a practical pathway to implement many of them.

2.2.2. A culture / A way of living

Permaculture is pertinent to sustainability because its techniques are accompanied by a philosophy of life that promotes the necessary behaviour changes to promote sustainability. Many are advocating for the introduction of a 4th pillar for SD, one of culture. Considering that culture ultimately influences people's understanding of

development, and it determines how individuals behave in the outside world, the way in which people think about nature determines the way in which people interact with it.

The evolution of Permaculture from that of "permanent-agriculture" to that of "permanent-culture" connects with the idea that cultures cannot survive for long without a sustainable agricultural base and an ethic of land use. It is recognized as a way of living, an ethic or philosophy of working with nature rather than against it, of observing it carefully rather than acting hastily, of considering systems in all their functions and letting them evolve autonomously (Mollison, 1988/2009). It surges from the need to switch from "war and waste" (what can I get from it/him/her?) to "peace and plenty" (what can this/him/her provide if we cooperate?) (Mollison, 1991).

Permaculture is consistent with a life philosophy that integrates communities and nature into a seamless whole and reacts directly to the Anthropocene concept's problematization of the human. By changing the way in which human relates to nature, there is the possibility of changing the role of "Anthropos" from negative to positive.

The European Cooperation in Science and Technology highlighted in 2011 three potential functions for culture within SD: culture "in", "for", and "as" SD. "In" as a 4th autonomous pillar of SD; "for" as a mediator between the other 3 pillars; and "as" as the general framework and structure for achieving the aims of the SD (Sabatini, 2019).

The present work is aligned with that of culture "as" SD, but instead of considering it as a framework, to consider it at the *core* of SD. Welzer claims that ninety-five percent of our actions are embedded on routines and habits, and not respond so much to conscient thinking (Meynen, 2019). To success on the process of sustainability, building a culture/ way of living that is consistent with SD is needed. Permaculture can contribute to SD thanks to (1) the creation of an imaginary that is at the core of the transition, and (2) by creating analogies to traditional concepts.

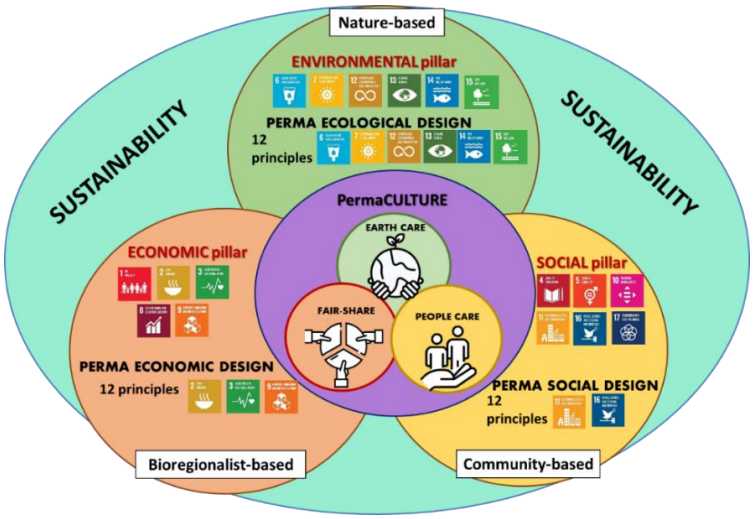
On the one side, permaculture can give alternative ways of organizing responses to the eco-social crise thanks to the combination of local and situated design approaches (Roux-Rosier et al, 2018). It can help to define alternative social imaginaries, by combining elements of agricultural practices, ecology, social justice, utopian, and mythic worldviews. These have been impacted by local, traditional, and indigenous worldviews and methods of using the land (Roux-Rosier et al, 2018). Bill Mollison in one interview (London, 2005) exposed this by saying:

> I know a Filipino man who always plants a chili and four beans in the same hole as the banana root. I asked him "Why do you plant a chili with the banana?". He said, "Don't you know that you must always plant these things together?". I worked out that the beans fix the nitrogen, and the chili prevents beetles from attacking the banana root.

On the other side, permaculture can contribute to this transition by the creation of analogies. It is not only a scientific, innovative approach that people can feel cold and remote, but it is a concept that by creating analogies wants to promote a behaviour change. Permaculture combines traditional knowledge and new scientific research, allowing individuals to build ecological practices and frames, by using analogical and metaphorical frames that people already possess (Lockyer & Veteto, 2015).

Permaculture is also a care culture. As mentioned, its Ethics are Care for the people, Care for the Earth, and Fair Share. This focus connects with ideas from ecofeminism. With the premise that the world currently faces a dual crisis of care for people and care for the environment (Floro, 2012), it defends that everyone should become a caretaker. This care culture needs to be rescued and serve as a central inspiration for a socially and ecologically sustainable society (Pascual Rodríguez & Herrero López, 2010). The ethics of care are seen as "feminine" in patriarchal system but should be seen as "human" in democratic systems (Pla-Julián & Guevara, 2019).

Figure 4 – PermaCULTURE at the core of the SD



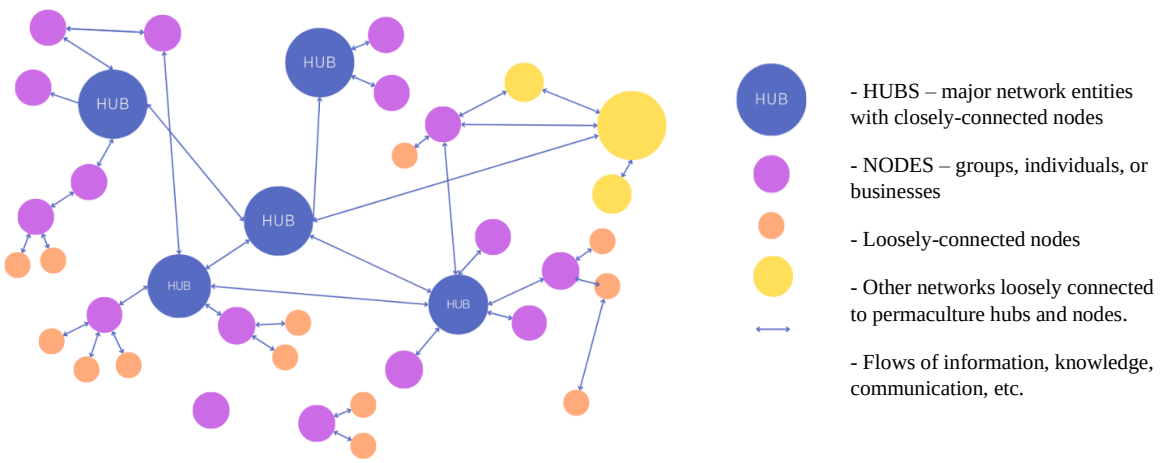
Own elaboration

2.2.3. An international network

To tackle SD, a pluralistic approach needs to be taken, one that can deal with many players and levels. That is why many actors advocate for the inclusion of governance as part of the SD framework. This governance, however, cannot be one that replicates what is already in place. When faced with wicked problems, social complexity, and weak institutionalization, relying on "traditional" hierarchical government institutions diminishes. Instead, it becomes more suitable to shift towards shared governance as a collective responsibility (Zeijl-Rozema et al., 2008). Appraches that are people-centred and allow the empowerment of the community gain momentum in the current transition.

Permaculture advocates for a governance that is participatory and in which communities are empowered. Thus, contrary to the Agenda 2030 that can be perceived as an institutional “top-down” strategy, permaculture defends a bottom-up action from communities. It fosters a global movement of committed social change agents who share a dedication to its social philosophy, its methodology and design approach (Henfrey, 2018). Characterized by de-centralized structure, it is based on the mobilization of participants in agrarian and urban settings in ways that help transcend the agrarian/metropolitan binary. Action networks and cultural service professionals (e.g., teachers or designers), are distributed across rural-urban areas (Ferguson, 2015). This network is characterized by having major permacultural entities (Hubs) that connect to nodes of groups and individual agents employing permaculture, by sharing information, knowledge and a final goal. There are also other networks sustainability or social justice-related that connect to these nodes and hubs (see Figure 5).

Figure 5– Permaculture’s international network



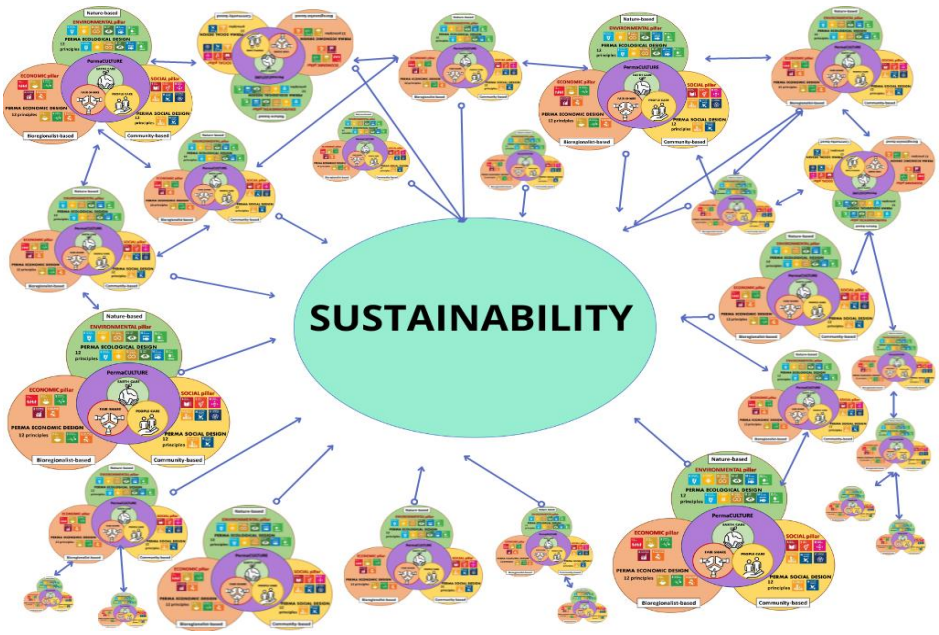
Own elaboration with data from Grayson (2022)

Networks are a pattern found in nature. Food webs form a network of feeding of interaction between soil life, plants, herbivores, omnivores, and carnivores. This network's effect provides healthy and functional ecosystems. It also ensures resilience since the failing of one of the agents does not result on the failing of the whole system.

Permaculture is a social movement that includes and supports other social justice initiatives while actively participating in a multi-species vision of politics (Haraway, 2015). It is intersectional because it is based on the combination of responses to many sources of injustice. Although there is a local focus on this social movement, one of its fundamental goals is to disrupt global structures. Ultimately, it becomes an international network of local actions. Permaculture as a social movement challenges the system and places a great emphasis on social inclusion and togetherness. It functions as a social counter-power to an established system (Roux-Rosier et al, 2018).

Permaculture serves as a framework to combine knowledge and practice from several academic fields and encourage cooperation between diverse groups of scholars, stakeholders, and land users. It provides chances for participatory action, research, and mobilization. Since it functions as a worldwide network generally independent of the influence and backing of major institutions, it is self-sufficient.

Figure 6- SD from a bottom-up approach



Own elaboration

As a design system permaculture can contribute to SD by providing it with practical steps and guidance as well as by its holistic approach and use of adaptive management (adequate for this complex and changing world). As a culture it can constitute the core for sustainability to be achieved, so that the actions in the different pillars are implemented in a beneficial manner for the planet, the people and economic justice. As a social movement it relies on bottom-up action from communities. It focuses on the local, but its main objective is the disruption of global structures and ends up constituting an international network of local actions. This network very much benefits the overall SD framework and contributes to sustainability in a decentralized and self-regulatory way. In short, it constitutes a new paradigm that contributes to sustainability.

2.3. PERMACULTURE AND OTHER PROPOSALS FOR DEVELOPMENT

When Permaculture was first introduced in the mid-1970s, it was quite a revolutionary proposal. In recent years, however, the SD Agenda has stablished a framework that has given rise to a number of sustainability-related concepts, which, like Permaculture, employ a circular and systemic approach. These proposals have also gain strength since the Paris Agreement of 2015, that recognized adaptation an equal status to mitigation. Seeing the connection between these other concepts and permaculture, as well as analysing their differences allows to better understand the concept as well as to see the potential of combining them. Permaculture should not be seen as the only solution, but it has to be approached as a strategy to be used together with other initiatives.

Some of these proposals can clearly be linked to permaculture. Classifying them according to which sustainability pillar they address, these are (see Table 1):

- Ecological pilar: Agroforestry, Agroecology and Nature Based Solutions (NBS).
- Economic pilar: Circular Economy (CE) and Doughnut Economy (DE).
- Social pilar: Bioregionalism and Ecovillages.

Table 1. Proposals that can be linked to permaculture.

Pillar	Concept	Definition	What are they	Common grounds	What differentiates them
Ecological pillar	**Agroforestry**	Agroforestry can be understood as the combination of agriculture and forestry that acts improving the management of natural resources and the sustainable use of land by intentionally growing trees and bushes alongside livestock, crops, or other agricultural products (Vella, 2010).	- Scientific discipline	Mollison and Holmgren took Russel Smith's focus on the value of tree crops for soil stabilization, provision of fodder, and development of stable foods for human consumption (Ferguson, 2015). Both enhance the relevancy of the small and the value of edges for diversity and productivity. They take longer to develop and become fully productive and profitable than industrial farming (Krebs & Bach, 2018).	It is a specific body of knowledge that only focuses on ecological aspects, while permaculture approach is wider and applies to all facets of human societies. Agroforestry is an academically more accepted approach.
	Agroecology	A scientific field studying ecological principles, functions, and processes in agricultural systems. It has evolved into a catchall for sustainable farming, that no longer prioritizes crop production but values ecosystem preservation. It is also a social movement that advocates for a more environmentally and socially balanced food system (Krebs & Bach, 2018)	- Scientific discipline - Set of agricultural practices - Social movement	Permaculture shares a complex layered definition, focusing on the intersection of ecology and agricultural production, a normative orientation towards agroecological transformation, and an association with popular movements largely made up of land users (Ferguson & Lovell, 2013).	Permaculture is usually understood as a set of agricultural practices and social movement but hasn't managed to establish itself as a formal scientific discipline.
	Nature Based Solutions (NBS)	Cost-effective, nature-inspired, and nature-supported solutions that deliver environmental, social and economic benefits and contribute to build resilience (European Comission, n.d.). They have gained a lot of ground in the last years and have produced benefits (improving risk management and resilience, restoring degraded ecosystems, developing CC adaptation). It aims to increase the capacity of both human and natural systems to adapt to the negative effects CC (Dushkova & Haase, 2020).	- Scientific discipline	Both try to create resilient living systems by imitating the structures, processes and patterns seen in nature (Krebs & Bach, 2018). They use nature to address societal challenges and required the participation of local communities to be designed and implemented.	NBS brings together city governments, SMEs, academia, and the civil society to co-create useful and actionable knowledge and governance frameworks (Dushkova & Haase, 2020). Although permaculture arose earlier, NBS accounts with wide support from the academia and the acceptance of the institutions (Krebs & Bach, 2018).
Economic	**Bioregionalism**	It is based on the idea that human and human	-Social	They both emerged in the 1970s.	Bioregionalism is focused on

pillar		activity are fundamental parts of the ecosystems, not something separated. Human organization should be dictated by natural systems rather than arbitrary political boundaries. It uses environmental anthropology's earliest theories and ethnography as a primary reference (Lockyer & Veteto, 2015).	movement - Philosophy - Economic system approach	They both focus on what is available and the role of the community on participating on the decision and implementation process.	the organization management of community settlements but is not based on a design and technical methodology and principles like permaculture is.
	Ecovillages	Intentional communities that employ participatory decision-making, cooperative and common property structures, local economic networking, integrative design, and other techniques to reduce their ecological footprints and meet their necessities in a sustainable way. They often implement bioregional philosophy and permaculture technique at the community level.	Social movement	Part of the Transition movement. They both advocate for a simpler live based on the available resources. They are characterized by knowledge acquisition through peer learning (Didarali & Gambiza, 2019).	These two concepts connect on their origins and purposes, but they are independent. Permaculture can be applied in other contexts and there are ecovillages that don't integrate the permaculture approach.
Economic pillar	**Circular Economy (CE)**	An economy in which success is judged both monetarily and environmentally, in opposition to the linear economy. By improving the output and lifespan of natural resources and moving toward renewable energy sources, nature is incorporated into the economy (Everett, 2022).	Scientific discipline	They both rely on energy from renewable sources, create a design system that reduces/does not create waste – systemic way of thinking-, they believe on the building of resilience through diversity.	CE lacks a social aspect what diminishes its capacity to be sustainable.
	Doughnut Economy (DE)	It strives to integrate social and environmental concerns within the economic structure. There are planetary boundaries that cannot be passed and societal boundaries where society should stay within to meet people's needs. It goes one step further than the CE, by incorporating the social pillar and being regenerative and distributive by design.	- Visual framework for SD	They both introduce the social pillar into the system that they pretend to achieve, this guarantees that the economic model is in line with the SDGs. The combination of DE and Permaculture with CE creates a potential holistic economic model for the future.	DE is more theoretical, aims to apply to the bigger system. While permaculture tries to be more practical and focuses on the small and concrete contexts.

Own elaboration

The concepts connected with the ecological pillar have a better acceptancy and are more promoted by different institutions than the others. They either emerges from the academia or they are easier to institutionalise (they do not challenge the system in a disruptive way). Permaculture differs because, while it surges within the academia, the promotion was done outside by directly reaching famers, local developers, designers, etc. This resulted in the development of a unique international network, but there was also a dearth of research that would have given permaculture a scientific foundation.

The lack of exposure, comprehension, and legitimacy of permaculture among academics and a certain disdain versus practitioners have prevented it from entering formal research (Henfrey, 2018). According to practitioners, scientists and institutions do not value permaculture's radical approach. At the same time, the credibility of the practitioners is damaged by their peculiar use of scientific terminology or the propagation of scientifically unproven allegations (Krebs & Bach, 2018).

As with other social movements – such as feminism – there are tensions between practice and theory. Permaculture still sets itself apart from the other concepts highlighted in the social dimension in that it provides a practical framework of principles and tools. It does not advocate for social justice with no tangible arguments, but it gives guidelines on how to put into place this alternative design system.

Permaculture straddles the line between being a social movement and a technical design system. That makes it difficult to delimit it and, therefore, to implement it. It is not only a design system, but it neither is only a social movement. It fails to be introduced as a scientific discipline due to its social movement nature, but at the same time it differs from other approaches that are entirely based on community action as it has an established praxis.

3. METHODOLOGY

The aim of this work is twofold, on one hand it intends to shed light on the concept of permaculture, on the other, it seeks to understand how its implementation could contribute to Sustainable Development by creating resilient communities. In order to achieve those objectives, fieldwork was conducted in an ecovillage, where permaculture principles and ethics are followed.

The topic of this work was chosen almost two years ago. After informal conversations with colleagues and experts, reading books and watching conferences, it was evident that the only way to test if it could contribute to SD was to see how it was implemented by a concrete community. Since the idea was not only understanding the theory but, also, to acquire the practical tools, I wanted to find an ecovillage that was actively looking for volunteers to help them in the fields. It was with these two ideas in mind that *Permatopia* emerged as the ideal choice. *Permatopia* could be understood as a combination of "*perma* (culture)" and "(u)*topia*", an idyllic place where permaculture was being implemented or as "*perma*(culture)" and "(hetero)*topia*" - the term created by Foucault meaning transformative -, this is, as a transformative community.

The research philosophy chosen was interpretivism, so the informant's subjectivity and perception were always respected. Instead of choosing a positivist approach (reality as facts), this research wanted to observe the community's perspective on reality. It was especially important to understand their own meanings for the concept of permaculture and what was their view on its application (both in the future and for SD). Therefore, a qualitative approach was chosen. Qualitative methods are (1) holistic and systemic, they try to understand the reality of society in a comprehensive and interrelated way, and (2) work closely with social agents (Arias, 2002). The sample of this research was relatively small, so every individual interviewed was valuable.

The research strategy selected was that of a mini ethnography, also named focused ethnography. While maintaining the ethnographic approach, this method is used when focusing on a specific topic, as it is the case of this study. It is particularly adequate when time and budget are constrained (Fusch et al., 2017). Fieldwork lasted for a month between end of July to end of August 2021. Partially in accordance with Fusch et al., (2017) guidance on the methodology for a mini-ethnographic case study, the fieldwork data was collected with:

1. Direct observation. The daily life of the citizens in *Permatopia* was observed in an uncontrolled environment. Self-reflection was also critical, as I was aware that my role in this research was doble: I was both observing and interacting, and therefore my presence could have an effect on their dynamics.
2. Participant observation. It involved working in the fields, having dinner with the citizens of the ecovillage, participating in conversations about the creation of sustainable societies and their views of the world, reading books borrowed by

the citizens, assisting to an open-air performance mixing nature and arts, getting involved in the organization of the Jord (Earth) festival, etc.

3. Field notes. These included: observation, methodological, theoretical, and personal notes. Mixing what I heard on the fields with what I had previously read. These notes were relatively short due to my role not only as a researcher but also as a volunteer on the fields.
4. A reflective journal. Every night I reflected on the events, the conversations, and the experiences that unfolded during the day. Personal feelings and statements were also written down, helping on understanding the perspectives and behaviours of the citizens in *Permatopia*.
5. Unstructured interviews. Key agents of the ecovillage were chosen for this interviews that followed a model script of flexible and open questions. For some of the informants the concrete question was important, and they carefully took the time to answer. These "open interviews" took place in locations where the informant was at ease and in a casual setting: their own homes, or the common Café or the Loen (common house), while enjoying a cup of tea or a snack, what is reflected in the meetings' length (between an hour and an hour and a half). Some of these interviews were conducted with a colleague, another researcher working in a different topic, what diverted the conversations in certain points.

Eight interviews were conducted in the ecovillage, six women and two men. They have been classified considering their role in the ecovillage. Six of them were from the older generation (over 60 years old) and two were part of the younger one. Five of them were often working in the fields and the other three had other tasks in the ecovillage (Table 2). These traits impacted how they approached permaculture. Some of the informants in the ecovillage were reached directly by me, but others were contacted by the Head Farmer. That fact influenced the sample. He predominately contacted those that were working closely with the concept, especially implementing it as "permanent-agriculture", but for me was also important to understand the view of those that were not every day in the fields but that still had an important role in the community and were working with permaculture in other areas.

There are two informants that were key to this research paper but that were not connected with *Permatopia*. Two experts on permaculture that enriched my understanding of the concept.

Table 2. Classification of the interviewees

Name	Code	Sex	Nationality	Age	Fieldwork	Time living in the ecovillage	Priorities	Duration interview	Location of the interview
Head of Permaculture Garden 1	Head P Garden 1	Female	Danish	Around 70	Soil regeneration	One of the founders	Protection of the soil	2:25:22	Her house
Head of Permaculture Garden 2	Head P Garden 2	Female	Danish	Around 60	Social work	Almost from the beginning	Protection of the soil and the environment	1:18:00	New Perma Garden
Head of the Greenhouse	Head Greenhouse	Female	Danish (lived in France, exhusband was Tunisian)	60-70s	Architect	Almost from the beginning	Protection of the environment	1:22:34	Her house
Head Farmer	Head Farmer	Male	Danish	Around 60	Organic farmer	Does not live in the ecovillage	Growing food and protecting the planet	1:19:02	First in the table where we had lunch. Later walking around all the ecovillage
Mayor	Major	Female	Danish	50-60s	Opera Singer + major in Permatopia	Almost from the beginning	Social permaculture + community governance - democratic consensus	1:07:23	The common Café
Artist	Artist	Female	Danish (married with a Norwegian and lived there some years)	40-50s	Artist (singer, actress, etc.)	Almost from the beginning	Environmental and social aspect + **cultural dimension**	1:10:31	Her house
Citizen 1	Citizen 1	Male	Danish	60-70s	Social work and nature conservation	Only few years - newcomer	Biodiversity	2:04:34	The common house
Citizen 2	Citizen 2	Female	American (some years living in India and in France)	30-40s	Yoga teacher	Not from the beginning, neither newcomer	Environment is not a priority for her. She chose to live in the ecovillage for other reasons.	1:17:45	Her house
External permaculture expert 1	Expert 1	Male	French	30-40s	Permaculture gardener	Is not related to permatopia and my ethnography there	Engineer in a company. Quite his job to work with permaculture	1:00:00	His garden
External permaculture expert 2	Expert 2	Male	Dutch (now living in Nepal)	60s	International Cooperation	Is not related in any way to the fieldwork	Sustainable Tourism combined with permaculture	1:34:14	Zoom

Own elaboration

Informants have been coded according to their role on the ecovillage, age, sex, fieldwork, and area of interest (Table 2). In contrast with general practice, in the ecovillage there is a higher presence of women in tasks related with the fields and agriculture. Age is an important factor in *Permatopia* as several of its inhabitants pointed the existence of two generations that differed in:

- The approach on how things should be done in the ecovillage. The older generation was more for volunteering, free-will, and agreeing everything in consensus, while the younger generation was more about establishing responsibilities over the tasks so that people will do what they are supposed to do, and some even advocated for labour-wage.
- Their time availability to devote to working in the ecovillage. According to the seniors, those over 60 years old were working longer hours than the others.
- Areas in which they were working. There was a higher presence of seniors working on the fields, while the youngers were working in "less visible" areas.

They all worked with the concept of permaculture, but they had different understandings of what it meant and different approaches on how it should be applied.

All interviewees were informed about the aims of this research and signed an informed consents to this effect (see annex 1). Promoting sustainable living systems is part of their reasons in choosing to live in an ecovillage. Since their aim is to make *Permatopia* a model than can be replicated, hence they need visibility and promotion, they were very approachable and eager to share their knowledge from the beginning.

There were some limitations to fully understand the functioning of the ecovillage. First, the time was constrained, the fieldwork took place for only 4 weeks. This meant that the interviews had to be scheduled and the number of people that could be reached easily was relatively low. Thus, the people that was interviewed were those that were commonly on the fields and that had more time-availability, this is, those of the older generation. Secondly, *Permatopia*'s population is large (more than 200 people), so it was hard to meet everyone. Consequently, the sample ended up being relatively small in comparison. These two limitations could be saved by emphasising quality rather than number, focusing on participants with the necessary knowledge, abilities, and expertise to respond to the research question (Fusch et al, 2017).

4. CASE STUDY

4.1. *The ecovillage*

Permatopia describes itself as an ecovillage based on the concept of permaculture. It aims to prove that it is possible to live in sustainable environments and to build systems

that perdure in the long-term. To create systems that do not undermine their own existence. Although there is much attention given in the public discourse to the use of non-renewable energies, there is not enough to the soil and its degradation (nutrients like phosphorus are scarcer every day) as well as to the alteration of natural cycles. *Permatopia* advocates, and tries to become a model, for the creation of communities that are conscious of their bioregion, protect what they have and value what is available.

The initial project as well as the system of geothermal heat located under the houses were planned by a bank. Because of its complexity, there were several companies involved. Unlike other ecovillages where people build their own house, here the houses are owned by a real estate agency, what affected the population profile. The project ended up being delayed for years, so many of the citizens had to move from one house to another until it was finished. The construction company went bankrupt what still has an impact on the economy of the ecovillage and its governance nowadays.

Figure 7. Location of *Permatopia, Denmark*

Google (n.d.)

Its closeness to Copenhagen explains some characteristics of *Permatopia*. Many of the citizens have in some moment of their life lived in Copenhagen. Two general profiles can be established, what serves to simplify and better understand the functioning of the ecovillage: (1) people over 60 years old that lived in a farm when they were children but then moved to the city and were part of the hippie movement and, (2) young families (generally around 30 years old) that fit in the description of neo-rural, people from the city that want to raise their children in a different environment (“back-to-the-roots”).

While other ecovillages tend to completely disconnect themselves from the outside world, in this one, many of the citizens work on Copenhagen and commute every day.

In some cases, this was voluntarily (they didn't want to alienate themselves from society) but in other instances was instead a result of how expensive was to live there.

4.2. *Characteristics and physical structure*

Some of the characteristics of the ecovillage are:

(1) its innovative nature, while other ecovillages were against technology, this one incorporates circularity and innovation in all the processes: the sewage is treated via a willow cleaning beds that evaporate the water and storage the nutrients, the compost and harvesting is mixed with farm residues to recap the nutrients that are later on placed on the fields, the energy comes from a wind turbine producing power for general use and for heating and cooling (via a 210-kw central heat pump with a heat storage).

(2) its size, conformed by 180 adults and 75 children.

(3) it wasn't completely disconnected from the world.

(4) the profile of the population was that of privileged and well-educated middle class.

All the houses are supplied with geothermal heat. The geothermal heat pump is powered by a wind turbine, and it is connected to a heat storage. It is used to transport both heating water and domestic hot water. The system is Cradle to Cradle Certified™[16].

Although the aim is to use the land management design of permaculture, they are still transitioning from the previous use that was given to that terrain, that of a traditional farming. So the field was transitioning from monoculture and intensive agriculture into organic agriculture, with the aim of organizing it in a permaculture way in the future.

Figure 8. Physical structure of *Permatopia*

[16] Which means that no environmentally harmful materials are used in production and that valuable raw materials can be easily recycled for later reuse.

Own elaboration using Google (n.d.)

Figure 9. Physical structure and division by house modalities

Own elaboration

Permatopia consists of 90 terraced houses, a farm, and services. As exposed, it is designed following permaculture principles, using renewable energy, in a circular and self-sufficient way. There are three types of houses: owned, rented and cooperative houses (*andelsbolig). Andelsbolig* are a modality of house that is common in Denmark, not only in this ecovillage. Cooperative houses are owned by a social housing agency,

whose aim is to provide adequate housing for everyone who needs it at a reasonable price. The financing of this kind of properties consists of a 10% municipal capital base, 2% of the residents' deposit and 88% of a state-guaranteed loan. Decisions such as painting the walls need to be commonly agreed by all the neighbours living in this modality of house. The older generations were often the ones that had owned houses.

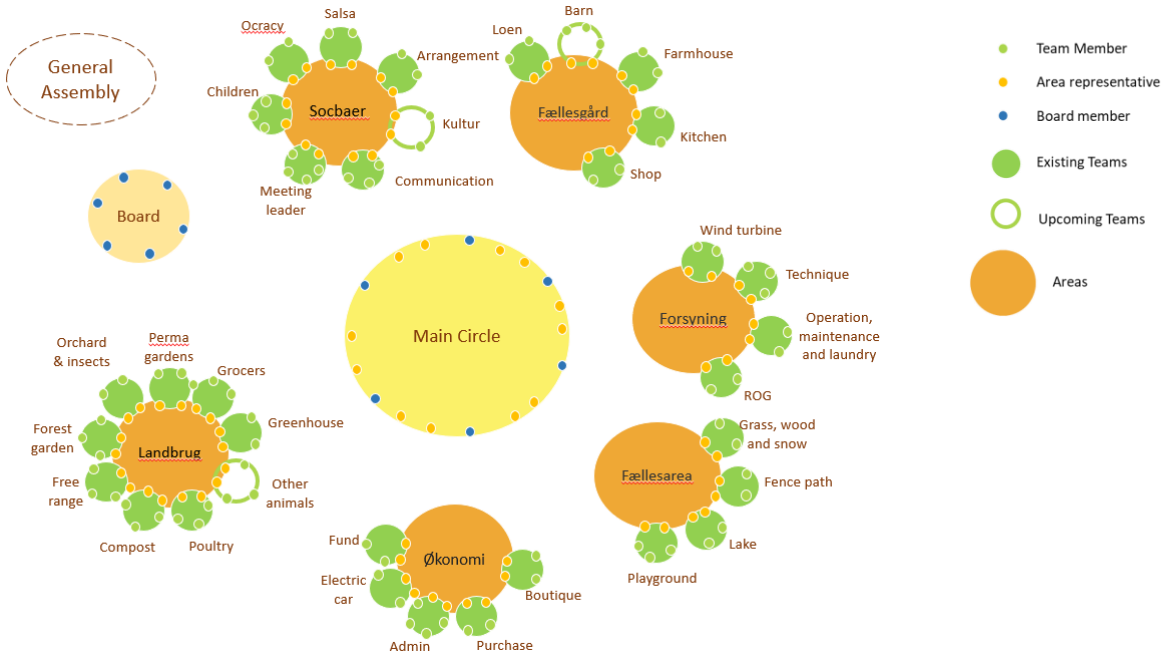
4.3. *Governance bodies of the ecovillage*

The ecovillage works as a sociocracy[17], a system that goes further than mere cooperativism and highlights the importance of building a structure that can enable self-organization, and not the people, because people change over time. Some of the principles of sociocracy are: that shared decisions are based on consent rather than on consensus (the focus is not on the "yes" of everyone, but on the manifestation of any reasoned objection); the existence of circles that work as semi-autonomous and self-organized units in respect to its goals (in *Permatopia* are called "groups"); this circles are connected by double-linking, they are interconnected by two links, one top-down (a manager) and one bottom-up (the representative); and, members of these groups are elected democratically, with a focus on roles and responsibilities (Eckstein, 2016).

The areas of governance of *Permatopia* are related to the 3 Permaculture Ethics (Earth Care, People Care, Fair Share) and with technical needs of the ecovillage.

Figure 10. Governing bodies

[17] It is founded on the following principles: (1) Consent-based decision making rather than consensus-based decision making; (2) Circles as semi-autonomous entities (a circle is a group of people with a common aim and equal rights) that make policy decisions by setting boundaries, rules and guidelines so that the group can work together; (3) Circles are interconnected by two links, one top-down (manager) and one bottom-up (representative/delegate), who work as regular members of their circle but also as part of the circle one level above and are asked for consent when making decisions; (4) When electing people for tasks, it focuses on roles and responsibilities (Eckstein, 2016).



Own elaboration based on *Permatopia's* design

AGRICULTURE GROUP (LANDBRUG): due to *Permatopia*'s focus on self-sufficiency, agriculture is the central aspect of *Permatopia*, operate with regenerative agriculture that ensures the future of the community. The idea is also providing an area pleasant to work in, beautiful to observe and a source of mental rest.

SOCIAL SUSTAINABILITY (SOCBÆR) - This group focuses on strengthening *Permatopia*'s social and cultural cohesiveness by involving the inhabitants in open decision-making processes, coordinating group efforts in transparent structures and working with appreciative communication.

COMMON GARDEN/BUILDINGS (FÆLLESGÅRD) - This group oversees the administration, operation, and maintenance of the Loen (the common building where the community kitchen is located), the farmhouse (where the crops are stored), the barn, the shop, and all other jointly owned buildings on the old farm, as well as the kitchen and catering.

COMMON AREAS **(**FÆLLESAREA**)** - They are in charge of maintaining the communal outdoor spaces, including gardens, shared playgrounds, green common areas, and roads and trails. They plan to make every space usable and welcoming, considering the vision of *Permatopia*: permaculture, community, movement, and peace/immersion.

ECONOMY (ØKONOMI) - The finance group oversees handling *Permatopia*'s cash flows such that the other working groups can simply, clearly, and meaningfully understand them. It is responsible, among other things, for: gathering information for use in half-yearly and annual accounts; working with the board to assist with overall financial management and financial development strategy.

SUPPLY (FORSYNING) - They work on making the ecovillage completely closed-circuit and self-sufficient in energy. As mentioned, geothermal heating is used in *Permatopia* to heat the houses and a sizable portion of the communal yard (e.g., the water that flows out of the taps). The geothermal heat pump, the community yard, and the electric car charging stations are all powered by *Permatopia*'s own wind turbine.

4.4. *Key informants of this research*

In order to better understand the results from the research, it is important to describe more in-depth each of the informants. Their background impacted the way in which they saw the concept of permaculture.

Head of P Garden 1:

She was presented by the Head Farmer as one of the persons in the ecovillage that knew the most about permaculture. She was one of the founders of *Permatopia*. Her main role is in the *Landbrug* area (also as a representative), particularly in the team of perma gardens (old perma garden), but she was also leading the compost-making and was present in the orchard team. She understood that not everyone could be involved in the fields as she was, but she sometimes felt frustrated and tired. She proposed to the Head Farmer ways to introduce permaculture principles in the fields that were still working with organic farming, and there were already areas working with permanent crops (such as asparagus). She is a valuable member of the community because, despite her frustration on doing more than others, she was very diplomatic and understanding with the other's situations, and at the same time she was respected by the Head Farmer, so he listened to her and considered applying what she proposed.

Head of P Garden 2:

She was also reached by the Head Farmer due to its knowledge on permaculture. She joined the ecovillage sometime after it was already established. Her main role was also

in the *Landbrug* area, particularly in the perma gardens (new perma garden), but she was also in charge of the poultry and also supervised the other animals. She was not so understanding with people not participating in the fields. In her understanding the ecovillage was established around those fields and the idea of being completely self-sufficient, which could not be achieved if only a few people got involved.

Head of Greenhouse:

It was also the Head Farmer who contacted her. She was an architect that lived some years in France where she met the father of her sons, that was Tunisian. Even if in the end they moved and lived in Denmark, these first years of her life, shaped her. She described herself as someone that grew up in a rural context and that as a young adult rebelled against the conservatist values of her parents and moved away. But she insisted in that she was always aware of the environmental effects of consuming food that was produced in an unsustainable way, so she had her own garden. She said that every morning before going to work she took care of her garden and thought that everyone could do such an effort. In *Permatopia* she is also part of the Landbrug area, and she is representative of the greenhouse team that works closely with the grocers' team.

Head Farmer:

As a renown organic farmer in Denmark, he was contacted by the current Mayor when the ecovillage was established. He does not live in *Permatopia* but instead commuted from Copenhagen every day, what impacted its perception of the ecovillage. He oversaw the planning and production of food from the big fields (that were in practice the ones nurturing the citizens). They also started a collaboration with different organic restaurants that were buying *Permatopia's* products. He was very critical of those that did not participate in the fields and was firm in his definitions and statements. He valued the effort and the labor.

Mayor:

Being self-sufficient and having access to healthy and green food were very important for her, but she did not join the ecovillage considering the fields the central part of *Permatopia*. She understood that in order to build such a sustainable community, people was needed in the different areas. Her role, for example, was not on the fields, but on coordinating that people were taking care of their responsibilities. The problem was not

that people was not getting involved, but that they were indirectly relieved of their responsibilities, because someone else was doing them. She understood the feeling of the Heads, but she also understood the feeling of those that felt as "not needed" and ended up disregarding their responsibilities. At the same time, she insisted on pointing out that all the areas were important for the survival of the ecovillage. She is part of the board and coordinates the Main Circle, as well as the General Assembly.

***Artist**:*

She was also involved from the beginning. As the others she is part of the Landbrug area, however, she was also involved in other areas. Her value in the ecovillage is that she is an activist. She moved there for a political reason because she wanted to change things (part of this is showed in the documentary of "Journey to Utopia" directed by her husband). Her work is not only inside the ecovillage, but she works on promoting the values that they are trying to defend there. She is interested in creating a Permaculture Center in which seminars, training and exchange takes place. She also tries to share the benefits of living in a place such as permaculture to the people living in Karise (town were *Permatopia* is located), by organizing activities with the local schools and inviting the children to the ecovillage. She is inspiring in her speech, but she is also a hard-worker, and that is why also the Head Farmer respects her.

Citizen 1:

He is one of the persons that moved to the ecovillage recently, and he is happy with his decision. He is interested in biodiversity and particularly in insects. He photographs all the different species that he observes (children look for him when they see some "special" insect). He is also part of the Landbrug area, he is involved in the Forest Garden team, and he goes to the fields almost every day.

Citizen 2:

She is American but has been living in different countries. She moved some years ago to the ecovillage with her husband, that is French. She is part of the *Forsyning* area, particularly part of the maintenance and laundry. Every week she participates one morning in the fields. She likes to live there, but in opposition to what the others defended, she doesn't see it as a revolutionary act, she does not think that this "project"

would change the world. She did not move there with that goal, but more for the social aspect and for giving her son a healthy environment to grow up.

Expert 1:

He became an informant of this research even before the fieldwork on the ecovillage was considered. He was giving a workshop connected with permaculture in la Ferme des Tournesols, not far from where I studied in France. In the following months several meetings took place, always conversing while working applying permaculture in the fields. He had completely changed his life by dropping his job as an engineer in a factory to fully work on implementing and teaching permaculture. He was so inspiring that partially motivated the development of this research.

Expert 2:

After the fieldwork was completed, with a better understanding of the concept, it seemed adequate to contact another expert who could answer to some of the questions that were still not concretely answered. This informant is an expert in international cooperation with formation in Forestry, Nature Tourism and Cultural Geography. He recently started his own project to promote sustainable tourism, a mindful destination development in Nepal, a farm-resort in which permaculture is integrated in the land (permaculture training courses are offered and the products to be consumed by the clients are cultivated in these fields).

5. ANALYSIS

5.1. DEFINING THE CONCEPT

One of the main themes that emerged while the fieldwork was conducted was the different vision that the citizens of *Permatopia* had about the concept of permaculture. Therefore, the first question in any conversation or interview became that of: “How would you define permaculture?” The answer to that question already gave clues about where the priorities of the informants laid, and what was their view about the concept and about the common project of *Permatopia*. Two main visions were identified, permaculture as “permanent-agriculture” and permaculture as “permanent-culture”.

5.1.1. Permaculture as "permanent-agriculture"

Part of the informants focused on the ecological pillar and highlighted the importance of having a healthy soil to be able to grow food. They centred their comments on biodiversity, environmental protection, and mitigation. In biodiversity, highlighting permaculture's role for "*dealing with the plants in a way that takes into account the resources we have locally (…) practices that keep, restore, and rebuild the natural life*" (Citizen 1). It was value for environment protection since it was to be applied "*in our terrain. (…) eat [*from*]where you live, instead of importing from faraway*" (Head Greenhouse). The focus was settled on the first guidelines, highlighting some of its principles "*producing food in a system with very high biodiversity, mixing crops that help each other growing"*(Head Farmer), corresponding to the 1st and 8th Principle, and the idea highlighted by Mollison (1988/2009) of working with nature rather than against it *"(…) it takes care of nature and works together with it instead of trying to beat it"*(Head Farmer). But also, as a way to mitigate climate change by "managing *to do carbon sequestration*" (Head Farmer).

These descriptions draw a clear link to bioregionalism (Lockyer & Veteto, 2015) and the idea of understanding what resources are available and how to use them sustainably. The connection with agroforestry (Ekblaw & Smith, 1929) was also highlighted during the interviews. Working with permaculture meant considering the principles, defined by Holmgren and Mollison (1990), for which they "*looked very much into forestry and forestry soils*", and to start "*thinking about an agriculture in which we can always have plants on the soil so that the soil remains healthy and strong. Having them at different layers, just as you will have it in forests (tree level, bushes level, and then plants on the forest floor)*" (Expert 2). Using permaculture to *"preserve the environment and come up with an agriculture that is beneficial for the soil, for the plants, for the animals and for the people that live there*" (Expert 2).

For these informants, the value of the concept of permaculture relies on its capacity to advocate for an agricultural system that imitates nature. With that in mind, they are for the need of encouraging people to engage in agricultural activities in the fields. They understand permaculture as the initial definition of the concept (Mollison, 1988/2009). They conceive the concept in a more constrained-way, as "permanent-agriculture", to be applied in "agriculturally productive ecosystems" (Mollison, 1988/2009, p.9).

5.1.2. Permaculture as "permanent-culture"

Part of the informants approached the concept from another perspective. The ecological pillar was important, but it was not their only priority. For example, the Mayor was drawn to the concept because the aims of permaculture were diverse, there was space not only for the environmental but also for money and social questions, with *"goals related to the soil but also to human beings"*. Permaculture seen as something that is not merely done in the fields but that functions as *"a way of living, a circular way of thinking about money, about the soil and about human beings*" (Mayor).

The Artist explained it as "*a culture that is so sustainable that can be permanent"* (Clitheroe, 2019). *"To take care of the environment and the soil in a way that you can keep a permanent structure which keeps restoring*" (Artist).

She also said that as someone who works with arts, she believes that *"in the meeting between human and nature, you create culture"* and that it is in "*the way we construct the relationships between human and nature that we create different types of culture"*. As above-mentioned, the way in which people think about nature determines how they interact with their surroundings. *"It is a way to think about everything I do and that everything contributes to that process to create a culture which is permanent*" (Artist).

Those working in a daily basis on the implementation of the concept had a much more holistic way of understanding the concept that the ordinary citizen of *Permatopia*. The ones in charge of the permaculture gardens defined it as a "*permanent way to culture"*.

"It is not about farming but about the way we live. Permaculture wants to bring us back to the moment in which nature was an equal to what we are. To look at nature as the example and try to get as closer as possible" (Head P Garden 1).

It goes beyond regenerating the soil, it is "*the way of keeping the ground healthy and keeping people healthy. (…) not a religion, but it's a sort of system you can use, it's a way of living, a philosophy"* (Head P Garden 2).

This last definition very much falls into what Roux-Rosier et al. (2018), describes as a Holistic Life Philosophy[18]. However, this imaginary, that notion of culture so related to spirituality, can be hard to apply in wider contexts and its very much constrained to a group of people with specific characteristics. The Head Farmer expressed that he didn't share this spiritual approach, because those advocating for it, talked about these principles and ethics as if it was a sort of dogma. The approach to culture discussed in this work is not that of Roux-Rosier et al. (2018) imaginary, but more as a change in culture/ way of living that still is based on analogies. Lockyer and Veteto (2015) provided some experimental proof of this transition in culture/ way of living by using permaculture. They aimed to shift the perspectives of the Houstonians (from Houston Foodshed) from "getting food" (restaurants and supermarkets), "farms" (out-of-state agribusiness) and "gardening" (lawns or azaleas) in favour of affordable, organic, and locally produced food. Something similar was also occurring in the ecovillage, the parents wanted their children to grow by establishing a meaningful connection to the soil, to the surroundings, and in general, to nature.

These informants were more in favour of considering permaculture as "permanent-culture". As something to be applied in all the different dimensions of a society and not only for agriculture production. They perceived it as a way to design resilient communities, and not only regenerative agriculture systems.

However, conceiving it as "permanent-culture" also makes the concept very wide. This has both negative and positive effects on widening the implementation of permaculture to contribute to sustainability.

As positive effects it can be highlighted that the wideness of the concept makes people with different interests come together (Henfrey, 2018). It bridges specific local experience with broader socio-political ideologies in ways that enable practitioners to imagine alternatives to the conventional human-nature relationships of the contemporary period. Moreover, as in the case of *Permatopia* having each person focusing on a different field helps to cover the multiple areas present in a community.

[18] The perception of permaculture as a Holistic Life Philosophy is explained by the fact that the term importantly relies on concepts of cyclicality connected with Aboriginal mythology. The followers of this imaginary are back-to-the land, spiritually motivated group that emphasizes transcendentalism and an imagined oneness between the whole and its components (Roux-Rosier et al., 2018).

As negative effects it can be pointed out that it diminishes the understanding and dissemination of the concept. It can hinder permaculture's capability to contribute to sustainability, since it is so generalist that each person chooses the part, they feel most connected to – which is not necessarily bad in the context of an ecovillage but can be prejudicial when applying it to other contexts. It ends up resulting unclear to people what it is about and why should it be special. It was particularly shocking to discover that there were many people living in *Permatopia* that didn't clearly know what the concept was about (e.g., Citizen 2).

Even if concreting its meaning could bring benefits, some contend that the focus should be on practical issues of land use rather than "spread itself too thin", since opposition to concise definitions can obfuscate its aim (as a proposal for sustainability) and create a sense of exclusivity (for just some that advocate for it) (Spangler et al., 2021).

5.2. WIDENING ITS APPLICATION

5.2.1. Strategies

Since the aim of this work is to better understand the potential of permaculture as a proposal for sustainability, one of the first questions that arose was how to extend its application. When trying to answer to this question, it became clear that a distinction had to be made between two possible interpretations, that of "expanding its application" and that of "applying it to larger areas". Does permaculture intend to be high-scaled and applied in bigger scenarios or does it intend to be applied by a larger number of actors?

One of the fundamental limitations that suffered *Permatopia* was that since the population was too large, the production of the little perma-gardens was not sufficient for nurturing all the people, so the fields were also working with organic farming. The production of the perma gardens was limited due to a *"lack of hands and time"* (Head Farmer). Nevertheless, the Head P Garden 1 expressed that she was optimistic that permaculture could be high scaled in the future by using innovative technology.

> *"If we put enough money, it is possible to apply it in bigger scale. (…) (To use technology), run by solar energy, white-wheeled machinery that is controlled by GPS, that is the only way to apply it in a higher scale. (…) (But) as long as this*

"agriculture industry", that uses heavy machinery and fossil fuels… as long as they get the law for their sake, it is difficult that it changes".

She claims that "*with all the knowledge we have, we should put more money in trying to bring our topsoil back, bring the biological life back to the soil*", soil regeneration should be possible. Scaling up permaculture passes through the realisation of the importance of the soil "*if the soil is alive, you don't need to add nutrients, because the nutrients are already there*" (Head P Garden 1).

While the idea of scaling up permaculture is about ways to apply it in larger areas through innovation and technology - and by centralizing and mainstreaming the concept-, the other approach, that of expanding its use, means decentralizing and applying it in small and very diverse areas. In opposition to the Head of P Garden 1, the two experts pointed out that it is not the aim of permaculture to contribute to sustainability by merging on the current functionality of the system but challenging that paradigm to one of creating a network.

5.2.2. Scaling up vs. expanding use

Scaling up its application would bring some benefits, such as: encouraging innovation and technological improvement; that permaculture is more visible and the impact is perceived as bigger, (e.g., in the regeneration of the soil); and offering an alternative to the current agricultural system. By doing so, it will go closer with approaches such as organic farming, and it will be less disruptive. Permaculture can be perceived as intrusive and be rejected by those who have the tools to apply it. The Head Farmer expressed frequently that it was really exasperating for him that those that were not working on the fields but merely reading about the concept and principles of permaculture were the ones *"lecturing"* him. He also said that he couldn't do what the heads of perma garden were doing, using the no dig method to not alter the life under the soil. "*I'm a farmer, not a gardener*" (Head Farmer).

However, it is an approach that also brings up some problems.

(1) First, it does not challenge the current system since it merges with the approach of "the bigger the best". "*Scaling-up permaculture would in the long-term mean*

creating a competition with food imported from other parts of the world" (Expert 2). Copying what already is in place.

(2) Secondly, there is a risk of falling into Ecomodernism[19] (Dauvergne, 2016).

(3) Thirdly, if applied on a larger scale permaculture could lose its fundamental principles. Being one of them the use of the edges (profiting the biodiversity of different habitats and ecosystem merging) (Mollison & Holmgren 1990).

(4) Finally, when scaling it up, something like what happens with Circular Economy could happen. That the ecological and economic dimension are considered, but that the social one is completely let aside, bringing injustices (Everett, 2002).

On the other hand, the second interpretation, that of maintaining it small but applying it by a higher number of practitioners brings up several limitations. For example, it is not so efficient, the positive impact is not so much perceived or visible or many hands are needed. Moreover, it can be perceived by some people as the contrary to progress.

However, the practitioners claim that the benefits that it may bring are bigger than those limitations. The Expert 2 pointed out that, permaculture, and other ways of agroecology, are especially gaining strength in mountainous areas, where industrial agriculture is not possible (large estates do not exist). He was reticent to scale-it-up, instead he considered that although applying it in small areas could mean producing less efficiently (what could be fixed with a good organization) in the short-term, it should be compensated with the benefits of producing more and having vegetables for more time, more diversity, and more food security in the long-term. Some of its benefits would be:

(1) More food abundance in the long-term and healthier ecosystems

(2) Changing the paradigm and starting to value the small. "*To see a transformation in the system, we needed to change the paradigm"* (Expert 1). To stop thinking about big groups and instead approach society in small groups. "*Permaculture is about promoting the change from bottom-up, creating an international network of local initiatives*" (Expert 1).

(3) Higher participation of the local communities, being community-based. *"The change has to come from ground-upwards*" (Head P Garden 1).

[19] It defends things such as: not changing our current system but trusting on the innovation and potentiality of technology, decoupling us from nature and concentrating in urban areas, and in general keeping on doing the same and trusting the progress. Environmental movements are a counter force to the forces of market and the *status quo* (Dauvergne, 2016). But ecomodernists' arguments support the establishment.

(4) Applying it to a larger number of scenarios. The potential of not only permaculture, but also other agroecological practices, relies in that they can be applied in both rural and urban areas. Contrary to what ecomodernism promotes, permaculture is about integrating nature in our daily life, even in cities.

5.2.3. Extending its applications to new scenarios

The potential of permaculture is that it can be applied in cultural landscapes or *anthromes*, human-dominated areas that inexorably combine cultural and natural processes (Alexandra, 2020). This term underlines the way in which nature and culture intrinsically co-evolved and opposes to the cartesian duality that decouples humans and nature. Permaculture means going beyond the idea of "protect and conserve" into that of "co-create" (Alexandra, 2020). Communities need to work on their own resilience.

Permaculture wants to couple back humans and nature. However, it does not intend to do so by obliging people to go to work on the fields against their own will. It does point out that it is not logical that the production of food (especially in the Global North) depends on such a small percentage of people, because that often means simplification of the ecosystems (with prejudicial consequences for biodiversity), mechanization and use of pesticides. But it also highlights that communities can apply permaculture both in rural and urban areas and in different dimensions.

Permaculture provides beneficial solutions for many of the environmental and social problems of today, and cities are, actually, the places where those remedies are most required (Hemenway, 2015). Urban food production has been recommended as a means of concurrently addressing a range of environmental, social and health issues. It helps to redistribute the surplus of edible food to the needy populations (Permaculture's 3rd ethic). In addition to assisting in reducing food waste, this will help to stop the flow of food into landfills (Mohan et al., 2020). Permaculture can contribute to a new way of urban living. It offers opportunities for establishing abundant food supplies, energy security, tight-knit neighbourhoods, regional employment opportunities, and sustainable policies in cities and towns (Hemenway, 2015). From creating community gardens, to avenues with fruit trees or plants producing vegetables that everyone can pick up, and to

creating Keyhole Gardens[20]. Urban areas, with land limitations and water scarcity, can easily implement this method in a decentralized manner (Mohan et al., 2020). In short, these initiatives foster the development of local food networks, boost self-sufficiency, and contribute to creating resilient communities.

Moreover, becoming a producer does not only mean growing food. As showed in the Permaculture Flower (Figure 2), permaculture should be applied in various dimensions of a community. This was evident in *Permatopia*, its principles were being applied in the different governing areas, and those areas were equally important for the survival of the ecovillage even if its work was not as visible as that done in the fields.

5.3. THE CHALLENGES OF INSTITUTIONALIZATION

5.3.1. The anti-institutional nature of permaculture

The breadth of the concept and the fact that it creates a decentralized network of practitioners around the world is what makes permaculture so unique.

> "So, it's a revolution. But permaculture is anti-political. There is no room for politicians or administrators or priests. And there are no laws either. The only ethics we obey are care of the earth, care of people, and reinvestment in those ends" (Mollison, 2005, cited by London, 2005).

As above-mentioned, is this anti-institutional nature and that permaculture goes away from formal academic literature, what explains that is less mainstreamed than other concepts. The rejection to the academic language and to the way institutions operate, constrains the global application of permaculture. This undermines the potential of applying permaculture in areas such as international cooperation or local municipalities.

Nevertheless, the reasons that make the academia reluctant to apply the concept, make it attractive for the outside academia (Henfrey, 2018). This disconnection to institutions empowers practitioners because they are the recipients and defenders of the concept. When reflecting about whether permaculture was accessible to everybody, the Artist answered affirmative and said that "*we need to be aware that when we go into this*

[20] A KHG is a self-regenerating garden with a circular organic composting unit in the middle. The fundamental idea behind a KHG is to combine various elements in a way that yields results are superior to those that could be obtained with just one (1st principle) (Hemenway, 2015).

"intellectual mindset" we sometimes do things more difficult and complicated than they really are. [With the] *use of a language that sounds complicated and difficult and very mind-blowing*". Instead, the adage of "I do not believe anything that cannot be explained to everyone" should be followed. Anything that matters should be explained in a really simple way, "*making things complicated cannot be a goal*" (Artist).

This anti-institutional nature is also visible in the way that the knowledge and practice of the concept has been transferred. One thing that characterizes permaculture (and ecovillages) is knowledge acquisition through peer-learning (Didarali & Gambiza, 2019). Permaculture is an example of societal learning (Henfrey, 2018). However, given that permaculture is a knowledge-intensive system, it is difficult to address problems without formal expertise (Didarali & Gambiza, 2019).

Its institutionalization could bring different benefits such as (1) making the scope wider – that is not limited to privileged, well-educated, middle-class from the Global North -; (2) that it is recognized and gains credibility; (3) opening the door to formal research to exploit the potential of permaculture; (4) creating an structure as well as a series of indicators to monitor and evaluate its impact.

But many positive things could be lost in the way. Many of the people involved in permaculture have transformative ideas about education and prefer to rely on social and practical learning (and creativity) than what is established by the system. There are two main fears: that the action, the practice is let aside and the scholars "lecture" the practitioners; and that when institutionalizing the concept, the criticism is lost, that it does not challenge the system anymore but contributes to the establishment. This last point is especially tricky because permaculture surged as a counterculture project.

5.3.2. Is it restrained to ecovillages?

Ecovillages are intentional communities that come together with the goal of developing a more compassionate and environmentally friendly way of living. The emergence of ecovillages benefits the SD, especially in terms of building resilient communities.

However, the potential reach of permaculture extends beyond them. These ideas (bioregionalism, circularity, etc.) need to spread to cities and worldwide, not just to those who are already so aware as to leave their old lives and settle in an ecovillage. "*I*

think we need both. You need to look for solutions that are sustainable. I am happy that this sort of communities exists. But you don't need to "unlink" yourself completely from the real world. You can't, and I don't want to" (Expert 2).

The idea is not that of creating communities isolated from the "outside world" but more that of building stronger connections and sense of togetherness in the communities of the different villages, towns, and cities already existing. Climate action and sustainable practices bring people together. They are good for the well-being of the planet (less resources) but also of the people. The Artist declared that by being in *Permatopia* she knew she "*won't save the world*". But that it was also a "*practical survival trip*".

Christian (2003) explains that a culture-wide "switch" is being experienced. That people started to long for a way of life which is warmer, kinder, and more cooperative. A realization on the health benefits of community living is being experienced. When connected to others, one's health improves. Interpersonal interactions are coming to be seen one of the most important factors affecting people's health. Being socially connected keeps one physically and mentally healthier than being alone (Christian, 2003). This was evident in *Permatopia* when looking at the older generation's households, which were frequently made up of a single man or a single woman.

Permatopia itself was a different example of ecovillage since the link to the "outside world" was not lost. Innovation was present, especially in the youngest generation. The Head Farmer said that the biggest dilemma of his generation (seniors), instead, was that refusal to any modern thing or any technology. "*A nostalgy from the old days. But that's bullshit, the old days were not better, were not more beautiful*" (Head Farmer).

In short, it can be easier to apply in a community that has just being created and that needs that sort of vision/mission. But it is not limited to them. There are many ways of applying permaculture in the existing communities (both in rural and urban areas).

5.3.3. Combining it with other initiatives for local development

The aim of this work is not that of perceiving permaculture as the solution to climate change, but more that of contributing to its understanding and expose the potential value that it may bring to sustainability. However, it does not make sense to perceive it as something isolated, but its benefit can rely on its combination with other initiatives.

It needs to be highlighted that permaculture surged as a counterculture because at that time the general framework of development was very much far from the idea of sustainability. Nowadays, those advocating for permaculture are not anymore, a bunch of hippies fighting the system, but they are very well-prepared practitioners following techniques and principles. This been said, that does not mean that the society or the system are now in line with the ideas behind permaculture, but more that at least the overall institutional framework and setting vision of the future is aligned with it.

Throughout this work it has been highlighted how permaculture ideas lay behind or align with many initiatives that surged later and that yet have been better acknowledged by the institutions and the academia. This was done to show that permaculture should gain that recognition. But at the same time, to create synergies and combinations with other initiatives that are already implemented. And permaculture will always bring benefits to the other initiatives because of the international network that has created.

One of the concepts that is being implemented by the Agencies of United Nations is that of Ecosystem based Adaptation (EbA). This is a very much top-down practice, since it is even present in the NAPs (National Adaptation Plans) that the members of the United Nations Climate Change Convention (UNCCC) are expected to elaborate; and however, still has a bottom-up working methodology. EbA planning is community-based, and it promotes a new way of local development in which the local needs are considered. One of the cross-cutting topics when planning and implementing EbA is that Local, Traditional and Indigenous Knowledge need to be considered (LTIK) (IISD, GIZ & IUCN, 2022). Permaculture principles surged from the research of its founders of different worldwide agriculture (and living) methodologies that were in line with the natural cycles, and very importantly were inspired by indigenous knowledge.

At the same time, bringing permaculture closer to those other initiatives may bring benefits for it. For example, EbA has a clear operational framework that includes conceptualization, planning, assessing the risks, implementation, monitorization, and evaluation. There are a series of indicators which help to measure its impact. The same happens with the SDGs and the NBS. Permaculture could be improved by the introduction of such scientific tools, while still valuing the personal experience of the practitioners and the social learning methodology. That could help on the implementation of permaculture in areas like international cooperation. In addition, it could help on the dissemination of the concept.

CONCLUSIONS

Throughout this work a definition of permaculture has been provided. Both from a theoretical perspective, as outlined by Mollison and Holmgren, and from an empirical perspective, analyzing the implementation experience of different key informants, particularly those living in *Permatopia*. This has led to the realization that even if the theoretical notion of the concept is now closer to that of "permanent-culture" that assesses every dimension of a community, there are practitioners that have stayed with the initial definition and understand it as "permanent-agriculture".

Contrary to many other sustainability-related proposals, permaculture has not been adopted by the international institutions and the academia, which can be explained by the fact that permaculture emerged as a counterculture movement. This anti-institutional nature and distance from the academia have constrained its implementation in some areas. Bringing permaculture closer to these, could potentially widen its application.

As the concept and phenomenon are further studied, a deeper understanding of its contribution to sustainability can be gained, leading to opportunities for improvement. Other case studies need to be assessed since its application would differ depending on the context. Conducting the fieldwork, it became evident how important was for the dissemination of the concept the experiences of those involved in its implementation. The environments in which permaculture is normally applied, not only ecovillages but also in other scenarios, are areas of great richness for social sciences research. They are usually places in which aspects of equity, social fairness and climate justice are discussed and prompt proactive social action. In addition, permaculture should incorporates the tools that other proposals use to assess its implementation impacts. However, the approach to the concept should bear in mind that it is both a design system, a culture/ way of living and a social movement. Widening its scope without considering the three could lead to forget the social and economic dimension.

Likewise, a recognition from the institutions could extend its use in areas in which it could bring several benefits, such as international cooperation. This acknowledge would not be detrimental as long as its nature as a decentralized network of localized solutions and actions is respected, of participatory governance – instead of hierarchical-, and practitioners are the empowered agents of the concept. Permaculture should not stop being a bottom-up initiative. Instead, it should preserve that characteristic and, in

combination with other initiatives, contribute to the SD process from a community-based approach. Broadening its application shouldn't pass through scaling it up and applying it on a large-scale, but rather to change the paradigm and using it in a larger number of scenarios (both in rural and urban areas) and by a greater number of agents.

This research has led to the conclusion that the emphasis should shift from permaculture as potential proposal for contributing to Sustainable Development (SD) to permaculture as an existing practice that actively contributes to SD. It is worthwhile to take this perspective because it already is: (1) a design system that considers and works in all the dimensions of societies – ecological, social, and economic-; (2) a "permanent-culture" that embodies a shift on cultural patterns, human perception and connection to nature; and (3) a social movement, a decentralized international network of practitioners, that apply local solutions. This is permaculture already contributes to SD as a process.

The value of permaculture as a new way of living/culture should not be overlooked. It can be easy for the academia and the institutions to incorporate permaculture's guidelines and techniques (as they have a scientific basis), but it can be less evident to bring the cultural aspect to the international agenda. The existing global system is based on the western-pragmatic-cartesian idea that prioritize observable facts while diminishes what is not so easily understood by the scientific method. A general framework on sustainable development has been established and many initiatives arise to contribute to that transition, but can there be a real change, can there be a just transition if that switch in culture/ way of living does not accompany it? It is very unlikely. Permaculture provides that change in culture and depends on the communities to extend.

It is not about considering permaculture the ultimate solution to fight climate change, it is rather about recognizing the role that such community-based, local, small-scale, and bioregional initiatives play in contributing to SD. Transitioning from a paradigm of universally and top-down solutions, to one that designs in connection to the environment in which they are to be applied. As Holmgren pointed out, it is not about copying something that already exists and works, but about acquiring a design-thinking, problem-solving approach that considers the characteristics of each place. The Agenda 2030 could be conceived as the framework for SD, but when considering SD a process, it relies on the collaboration with bottom-up initiatives to occur, and in that sense permaculture accounts with a unique global network of local actions to make it happen.

REFERENCES

Alexandra, J. (2022). Designer ecosystems for the Anthropocene—deliberately creating novel ecosystems in cultural landscapes. *Sustainability*, *14*(7), 3952. https://doi.org/10.3390/su14073952

Alisa, G. D., Demaria, F., & Kallis, G. (2015). *Degrowth a vocabulary for a new era*. Routledge, Taylor & Francis Group.

Berkes, F. (2007). Understanding uncertainty and reducing vulnerability: Lessons from resilience thinking. *Natural Hazards*, *41*(2), 283–295. https://doi.org/10.1007/s11069-006-9036-7

Brundtland, G.H. (1987) Our Common Future: Report of the World Commission on Environment and Development. Geneva, UN-Dokument A/42/427

Christian, D. L. (2003). *Creating a Life Together: Practical Tools to Grow Ecovillages and Intentional Communities*. New Societies Publishers.

Clitheroe, C. (Director). (2019). *Permaculture The Documentary: How it started* (Documentary). DogsGoWoof Productions.

Dauvergne, P. (2016). Conclusion: The allure and illusion of riches. *Environmentalism of the Rich*. https://doi.org/10.7551/mitpress/9780262034951.003.0012

Didarali, Z., & Gambiza, J. (2019). Permaculture: Challenges and benefits in improving rural livelihoods in South Africa and Zimbabwe. *Sustainability*, *11*(8), 2219. https://doi.org/10.3390/su11082219

Dushkova, D., & Haase, D. (2020). Not simply green: Nature-based solutions as a concept and practical approach for Sustainability Studies and planning agendas in cities. *Land*, *9*(1), 19. https://doi.org/10.3390/land9010019

Eckstein, J. (2016, May 1). *Sociocracy: Proceedings of the Scientific Workshop Proceedings of XP2016*. ACM Other conferences. Retrieved October 14, 2022, from https://dl.acm.org/doi/pdf/10.1145/2962695.2962701

Ekblaw, W. E., & Smith, J. R. (1929). Tree Crops, a permanent agriculture. *Economic Geography*, *5*(3), 322. https://doi.org/10.2307/140558

Encyclopædia Britannica, inc. (n.d.). *No-till agriculture*. Encyclopædia Britannica. Retrieved April 22, 2023, from https://www.britannica.com/topic/till-less-agriculture

European Commission. (n.d.). *Nature-based solutions*. Research and innovation. Retrieved October 24, 2022, from https://research-and-innovation.ec.europa.eu/research-area/environment/nature-based-solutions_en

Everett, E. (2022). Combining the circular economy, doughnut economy, and permaculture to create a holistic economic model for future generations. *ICSD 2021*. https://doi.org/10.3390/environsciproc2022015019

Ferguson, J. (2015). Permaculture as farming practice and international grassroots network: a multidisciplinary study. *University of Illinois at Urbana-Champaign*.

Ferguson, R. S., & Lovell, S. T. (2013). Permaculture for agroecology: Design, movement, practice, and worldview. A Review. *Agronomy for Sustainable Development, 34*(2), 251–274. https://doi.org/10.1007/s13593-013-0181-6

Floro. M. S. (2012). *The Crises of Environment and Social Reproduction: Understanding Their Linkages. Volumen 4; Volumen 12 of Working Papers/ Economics, College of Arts & Sciences*. American University. Department of Economics.

Global Forest Watch. (2005). *How to Build a Rainforest*. World Resources Institute. Retrieved April 24, 2023, from https://www.globalforestwatch.org/blog/data-and-research/tropical-rainforest-ecology-and-threats/

Google (n.d.). [Google Maps location of Karise *Permatopia,* Denmark]. Retrieved May, 19, 2023, from https://www.google.es/maps/place/Karise+Permatopia/@55.3056,12.0581977,10.67z/data=!4m6!3m5!1s0x4652e63cd6669527:0xaad90890b9f3b31f!8m2!3d55.301142!4d12.189751!16s%2Fg%2F11g7kl31td?hl=es

Graugaard, J. D. (2012). A tool for building community resilience? A case study of the Lewes Pound. *Local Environment*, *17*(2), 243–260. https://doi.org/10.1080/13549839.2012.660908

Grayson, R. (2022, August 25). *The structure of permaculture - understanding the network.* Medium. Retrieved February 21, 2023, from https://medium.com/permaculture-3-0/the-structure-of-permaculture-understanding-the-network-b41b5430732d

Hemenway, T. (2015). *The Permaculture City: Regenerative Design for Urban, Suburban, and Town Resilience*. Chelsea Green Publishing.

Henfrey, T. W. (2018). Designing for resilience: Permaculture as a transdisciplinary methodology in Applied Resilience Research. *Ecology and Society*, *23*(2). https://doi.org/10.5751/es-09916-230233

Holmgren, D. (2007). *Essence of permaculture*. Holmgren Design Services.

Holmgren, D. (2020). *Essence of permaculture*. Melliodora Publishing.

International Institute for Sustainable Development (IISD), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH & International Union for Conservation of Nature (IUCN). (2002). Unit 8.3: EbA and Traditional Knowledge and Indigenous and Local Knowledge. In *Ecosystem-based Adaptation: Working with nature to adapt to a changing climate* [MOOC]. SDG Academy-edX. https://www.edx.org/course/ecosystem-based-adaptation-working-with-nature-to-adapt-to-a-changing-climate

Krebs, J., & Bach, S. (2018). Permaculture—scientific evidence of principles for the agroecological design of Farming Systems. *Sustainability*, *10*(9), 3218. https://doi.org/10.3390/su10093218

Lockyer, J., & Veteto, J. R. (2015). *Environmental anthropology engaging ecotopia: Bioregionalism, permaculture, and ecovillages*. Berghahn Books.

London, S. (2005). *Permaculture: A Quiet Revolution — An Interview with Bill Mollison*. Permaculture - A quiet revolution: An interview with Bill Mollison. Retrieved February 14, 2023, from https://scott.london/interviews/mollison.html

Meynen, N. (2019). *Frontlines: Stories of global environmental justice*. Zero Books.

Mohan, S. V., Hemalatha, M., Amulya, K., Velvizhi, G., Chiranjeevi, P., Sarkar, O., Kumar, A. N., Krishna, K. V., Modestra, J. A., Dahiya, S., Yeruva, D. K., Butti, S. K., Sravan, J. S., Chatterjee, S., & Kona, R. (2020). Decentralized urban farming through Keyhole Garden: A case study with Circular Economy and Regenerative Perspective. *Materials Circular Economy*, *2*(1). https://doi.org/10.1007/s42824-020-00011-1

Mollison, B. (1988/2009). *Permaculture – A Designers' Manual* (2nd ed.). Tyalgum Australia: Tagari Publications.

Mollison, B. (1991). *Introduction to Permaculture*. Australia: Tagari Publications.

Mollison, B. C., & Holmgren, D. (1990). *Permaculture one: A perennial agriculture for human settlements*. Tagari Publications.

National Geographic Society. (2022). *Anthropocene*. Education National Geographic. Retrieved April 22, 2023, from https://education.nationalgeographic.org/resource/anthropocene/

Osmond, J. & Alexander, S. (Directors). (2015). *Interview with David Holmgren in Permaculture, Energy Descent and Future Scenarios* (Filmed for the Documentary A Simpler Way: Crisis as an Opportunity). Happen Films.

Pascual Rodríguez, M., & Herrero López, Y. (2010). Ecofeminismo, una propuesta para repensar el presente y construir el futuro. *Boletín ECOS, 10*.

Permaculture Journeys (2021, June 9). *Sustainability*. Permaculture Journeys. Retrieved February 20, 2023, from https://permaculturejourneys.com.au/pj/permaculture-sustainability/sustainability/

Permaculture Institute. (2020, November 27). *What is permaculture?* Permaculture Institute Inc. Retrieved April 22, 2023, from https://permaculture.org/about/

Permatopia. (n.d.). Retrieved February 24, 2023, from https://permatopia.dk/

Pla-Julián, I., & Guevara, S. (2019). Is circular economy the key to transitioning towards sustainable development? challenges from the perspective of care ethics. *Futures*, *105*, 67–77. https://doi.org/10.1016/j.futures.2018.09.001

Roux-Rosier, A., Azambuja, R., & Islam, G. (2018). Alternative visions: Permaculture as Imaginaries of the Anthropocene. *Organization*, *25*(4), 550–572. https://doi.org/10.1177/1350508418778647

Rhodes, C. J. (2015). Permaculture: Regenerative – not merely sustainable. *Science Progress*, *98*(4), 403–412. https://doi.org/10.3184/003685015x14467291596242

Sabatini, F. (2019). Culture as fourth pillar of sustainable development: Perspectives for integration, Paradigms of Action. *European Journal of Sustainable Development*, *8*(3), 31. https://doi.org/10.14207/ejsd.2019.v8n3p31

Schumacher, E. F. (1973/2011). *Lo Pequeño Es Hermoso*. Madrid: Akal.

Spangler, K., McCann, R. B., & Ferguson, R. S. (2021). (re-)defining permaculture: Perspectives of permaculture teachers and practitioners across the United States. *Sustainability*, *13*(10), 5413. https://doi.org/10.3390/su13105413

Starhawk. (2016). *Social Permaculture-what is it?* Global Ecovillage Network United States. Retrieved December 1, 2022, from https://www.gen-us.net/social-permaculture-what-is-it/

United Nations Sustainable Development Goals and Permaculture. (2020). *YouTube*. Retrieved February 20, 2023, from https://youtu.be/sGquFGP-bhk.

Van Zeijl-Rozema, A., Cörvers, R., Kemp, R., & Martens, P. (2008). Governance for Sustainable Development: A Framework. *Sustainable Development*, *16*(6), 410–421. https://doi.org/10.1002/sd.367

Vella, S. S. (2010). *Sustainable Agricultural Management and landscaping through Agroforestry and permaculture case study: Northern Malta*. JMU Scholarly Commons. Retrieved October 24, 2022, from https://commons.lib.jmu.edu/master201019/433

Veteto, J. R., & Lockyer, J. (2008). Environmental anthropology engaging permaculture: Moving theory and practice toward sustainability. *Culture & Agriculture*, *30*(1-2), 47–58. https://doi.org/10.1111/j.1556-486x.2008.00007.x

Webb, J. A., Watts, R. J., Allan, C., & Warner, A. T. (2017). Principles for monitoring, evaluation, and adaptive management of environmental water regimes. *Water for the Environment*, 599–623. https://doi.org/10.1016/b978-0-12-803907-6.00025-5

ANNEXES

Annex 1. Informed Consent

INFORMED CONSENT - ENGLISH

For interviews

Final Project of the Degree in International Relations – Subject Anthropology – UA

City and date _____

I_____

I have been informed by the student of the course in International Relations at the University of Alicante _____.

In order to carry out an ethnographic approach, an interview, taking photographs, video recording and other methods will be used to narrate the stories, memories, problems and social processes that, as a person and as a community, we wish to share in order to contribute to the ethnographic knowledge of the socio-cultural dynamics of a territory. Authorizing the student to compile, analyze and publish the audiovisual record of the interview. The above, for **exclusively academic purposes**, necessary to comply with the learning strategy of the course and the construction of a story and ethnographic approach to a territory. Based on the above and after evaluating the information received, in writing and verbally, I consider myself informed, I confirm that I have understood the above and previously explained, I ratify the consent, I accept these procedures and methodologies and I participate in the purposes announced by the UA student, and I sign below.

Signature of the participant_____

City and date _____

Signature of the student_____

Annex 2. Questions for the interviews

FLEXIBLE QUESTIONS

- ➔ How would you define permaculture?
- ➔ How did you get to know about it?
- ➔ Why did you like the concept?
- ➔ When did you discover about *Permatopia*? What was your life before *Permatopia*?
- ➔ Why were you willing to take the risk of moving to *Permatopia*?
- ➔ What is the role of permaculture to fight the climate crisis?
- ➔ Do you think it can be applied in a general ambit?
- ➔ What benefits does it bring at a social level?
- ➔ Is there any way to change the current economic system?

Annex 3. Fieldwork diary