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Par

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EdiCitNet: refinement of online tool "Explore and compare"; improving the performance of sustainability, urban challenges and ecosystem services; EdiCitNet Summer School on Water Resources and Environmental change.

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MOHAMED GAMOURA

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Dedication

Above all, praise to Allah, the Lord of the universe, the Most Merciful; the completion of my school and university studies would not have been possible without the strength and determination that He gave me.

I dedicate this modest work with gratitude to those who I would never be able to express to them my sincere love whatever the worn out terms.

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Abstract

In this document, I summarize the European project EdicitNet in the first part, the next chapter is a case study to identify the terminology's by analyzing the proposed terms, in the third chapter you will find the working package (WP2), which is the Toolbox of EdiCitNet, I have collected 148 links to information for users of the online platform related to «Sustainability, Urban Challenges and Ecosystem Services» in «Explore and Compare» part; finally, you will see a case study of the city of Girona , I participated in the study at the EdiCitNet Summer School on Water Resources and Environmental Change; we use problem-based learning and project-based learning as research methods, and the case study is about presenting the Girona scenario by 2050.

Keywords: Edible Cities Network (EdiCitNet), Nature Basted Solution (NBS), Editble Cities Solution (ECS), Urban planning.

Résumé

Dans ce document, je résume le projet européen EdicitNet dans la première partie, le chapitre suivant est une étude de cas pour identifier la terminologie en analysant les termes proposés, dans le troisième chapitre vous trouverez le paquet de travail (WP2), qui est la boîte à outils d'EdiCitNet, J'ai rassemblé 148 liens vers des informations pour les utilisateurs de la plate-forme en ligne liée à «Durabilité, Défis urbains et Services écosystémiques» dans la partie «Explorer et comparer»; enfin, vous verrez une étude de cas de la ville de Gérone , J'ai participé à l'étude à l'école d'été EdiCitNet sur les ressources en eau et les changements environnementaux; nous utilisons l'apprentissage par problèmes et l'apprentissage par projet comme méthodes de recherche, et l'étude de cas vise à présenter le scénario de Gérone d'ici 2050.

Mots clés : Réseau des villes comestibles (EdiCitNet), solution basée sur la nature (NBS), solution villes comestibles (ECS), urbanisme.

الملخص

في هذه الوثيقة، أوجز المشروع الأوروبي شبكة المدن الصالحة للأكل EdicitNet في الجزء الأول، الفصل التالي هو دراسة تحليلية و إحص لتحديد المصطلحات من خلال تحليل المصطلحات المقترحة، في الفصل الثالث ستجد حزمة العمل (WP2)، وهو صندوق أدوات EdiCitNet، جمعت 148 رابط الكتروني للمعلومات لمستخدمي المنصة الإلكترونية المتعلقة بـ «الاستدامة والتحديات الحضرية وخدمات النظام الإيكولوجي» في جزء «استكشاف ومقارنة»؛ وأخيرا دراسة حالة لمدينة جيرونا، بحيث شاركت في الدراسة التي أجريت في مدرسة EdiCitNet الصيفية للموارد المائية والتغير البيئي ؛ استخدمنا التعلم القائم على المشاكل والتعلم القائم على المشاريع كمناهج للدراسة و البحث، وتدور دراسة الحالة حول تقديم سيناريو لمدينة جيرونا بحلول عام 2050.

الكلمات المفتاحية: شبكة المدن الصالحة للأكل (EdiCitNet) ، الحلول القائمة على الطبيعة (NBS)، حلول المدن الصالحة للأكل (ECS) ، التخطيط الحضري.

List of abbreviations:

EdiCitNet: Edible City Network

EASME: Exclusive Agency for SMEs

ECS: Edible City Solutions

FRC: Front-runner city

FC: Follower city

SME: Small-medium enterprise

NGO: Non-Governmental organization

WP: Work package

NBS: Nature based solutions

MEC: The ministry of Education and Culture

PBL: Problem-based Learning

EU: European Union

GIS: Geographic Information System

BuGG: Bundesverband GebäudeGrün

FSUB: The Solidarity Foundation of the University of Barcelona

TO: Transition Oststeiermark

UT SEMIDE: Technic unity - Euro-Mediterranean Water Information System

BOKU: University of Natural Resources and Life Sciences

UdG: University of Girona

REACT: Association la Recherche en Action

RMIT: The Royal Melbourne Institute of Technology Europe

ICRA: The Catalan Institute for Water Research

LEQUIA: The Laboratory of Chemical and Environmental Engineering

UBER: The Humboldt-Universität zu Berlin

NIBIO: the Norwegian Institute of Bioeconomy Research

BIP: Erasmus Blended Intensive Program

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Glossary

Term	Description
Edible Cities Network (EdiCitNet)	Innovation action funded by the European Commission. A network that enables knowledge sharing, aiming to systematically explore the wealth and diversity of existing ECS and to adapt, plan and implement successfully proven ECS in their specific urban contexts.
Edible City Solutions (ECS)	Products, activities, measures and services that comprise all forms of urban food production, preparation, distribution, use and support in general. They empower local communities, contribute to climate protection, create new green businesses and jobs while generating local economic growth and fostering social cohesion.
Edible City Solution Initiatives	Organizations, businesses and other entities that implement Edible City Solutions.
ECS Toolbox	Multifunctional and interactive platform on the EdiCitNet website in order to promote ECS design, planning and knowledge sharing among citizens, urban planners and other actors willing to get involved and to foster or create ECS and the edible city approach in general. It contains an online collection of ECS as well as information on performance assessment, implementation and users' experiences on different ECS.
Living Labs	Temporal spaces where cities test strategies and processes for anchoring ECS in order to make the cities more sustainable, liveable and healthier.
Nature-Based Solutions	Solutions that are inspired and supported by nature, which are cost-effective, and that simultaneously provide environmental, social and economic benefits and help build resilience.

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General Introduction

The Edible Cities Network (EdiCitNet for short) is a growing international network of individuals, NGOs, corporations, universities and non-profit organizations working together to advance edible city solutions in different cities. All working together to explore the impact of edible, nature-based solutions on the society and the planet.

Edible urban solutions – whether urban farms or community kitchens – play a key role in creating more sustainable, livable and healthier cities. Edible City Solutions is not just about growing food, but using urban food growing to create a sustainable vision in the most comprehensive sense: using food growing to solve social, economic and environmental problems. In this way, Edible City Solutions empowers local communities to create better cities; As a network, aims to catalyze and replicate the success of the projects within the network by creating an open and participatory network of cities, in which best practice and knowledge from creating Edible City Solutions can be shared. The teams are learning from on-the-ground examples, and are replicating this knowledge for distribution within Edible City Network.

Its mission is twofold: to promote and enhance the richness and diversity of existing edible city solutions across the network, and to provide new members with the tools to adapt, plan for edible city solutions in their own regions and implement.

In this thesis, I used collected data from multi-places, do the curation and analysis, for terminology's , and also performing the toolbox of EdiCitNet, and how we can improove it in terms of "sustainability, urban challenges and ecosystem services", by uploading informtive links, that can be used by the members of the project ; Finally, I and my team of the EdiCitNet Summer school on Water Resources and Environmental change, want to be positive by choosed the optimist scenario for the city of Girona by 2050, and our topic was Unity in adversity IPCC 1.5-2°C stabilization (RCP 4.5), for this scenario we try to stop the increase of the heat island effect and heat waves in the city, we choosed an agriculture parc with multi-services coupled with nature based solutions between the industrial areas, and research for solutions and the benefits in social, environmental and economic fields, and the impacts of our scenario.

CHAPTER I : Edible Cities Network

I.1   What is EdiCitNet?

EdiCitNet (Edible Cities Network – Integrating Edible City Solutions for social, resilient and sustainably productive cities) is a project funded by the European Commission and running from September 2018 to August 2023 (Grant Agreement No. 776665). [1]

Together with a consortium of international partners and a growing network of edible city enthusiasts from around the world, EdiCitNet is designing and implementing urban food innovations and sustainable urban planning for greener, more edible and, above all, more livable cities.[1]

Edible City Solutions (ECS) are all forms of sustainable urban food production, distribution and use – from **neighbourhood gardens, to urban beekeeping and sheep farming, green facades or high-tech indoor farming, cooking and dining events and the use of locally grown urban food in restaurants**. [2]

Edible City Solutions have the power to:

- • make cities healthier, greener and more livable.
- • create new green businesses and jobs.
- • empower local communities to overcome social problems. [2]

Figure 1 : EdiCitNet examples (Self made)

I.2   What is the goal of EdiCitNet?

Food is not only a popular topic of conversation – it is shared by everyone and connects us all.

The Edible Cities Network is not a normal research project. It's an innovation action funded by the European Commission (EASME). That means we are working under real world conditions with real people, real challenges and real solutions. We are testing, demonstrating, piloting and transferring ECS in close cooperation with local people from the very beginning of the process, working together with them to improve the life in their cities. [2]

The inclusive and participatory dynamics inherent in ECS engender both local economic growth and social cohesion by empowering communities to strengthen social ties through communal events and to create new green businesses and job opportunities revolving around urban food production, distribution and use. The systemic use of urban landscapes for food production is a major step towards more sustainable, livable and healthier cities. [2]

I.3   Why EdiCitNet?

Figure 2 : EdiCitNet services and benefits [3]

A multitude of initiatives around the world, however fragmented, are prospering, forming a global movement of Edible Cities. The products, activities and services of Edible City Solutions (ECS) empower local communities to overcome social distances by their inclusive and participatory dynamics and to create new green businesses and jobs, thereby generating local economic growth and fostering social cohesion. [3]

EdiCitNet will leverage the substantial benefits that arise from ECS at a **local level** and **catalyse their replication in Europe and world-wide** by launching a fully open and participatory network of cities, empowering their inhabitants by a common methodology

- **to systematically explore the wealth and diversity of existing ECS,**
- **to adapt, plan and implement successfully proven ECS in their specific urban context.**

To make this happen, EdiCitNet will close knowledge gaps in the effective implementation of ECS and their transformation into sustainable, innovative business models. These new insights will feed into an **openly shared and globally accessible knowledge base and methodology** to **enable sustainable and evidence-based integration of ECS in the long-term urban planning of** cities covering a large spectrum of urban, climatic, social, environmental and cultural contexts. [3]

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Our Front-Runner Cities (FRC), supported by a highly interdisciplinary consortium of city authorities, SMEs, NGOs and academia, will demonstrate innovative but different forms of ECS within individual co-created Living Labs and transfer the knowledge generated to dedicated Follower Cities (FC), determined to replicate ECS for the benefit of their inhabitants. The careful selections of FRC and FC allow for the close observation of ECS implementation in a multitude of diverse environments and ensures truly global outreach with city partners based in five continents. In both FRC and in FC, all measures, plans and implementations are decided and implemented by City Teams that have been formed in advance and are as inclusive as possible, in order to test new planning techniques, increase transparency and identification and to involve different actors in the city society from the very beginning. [3]
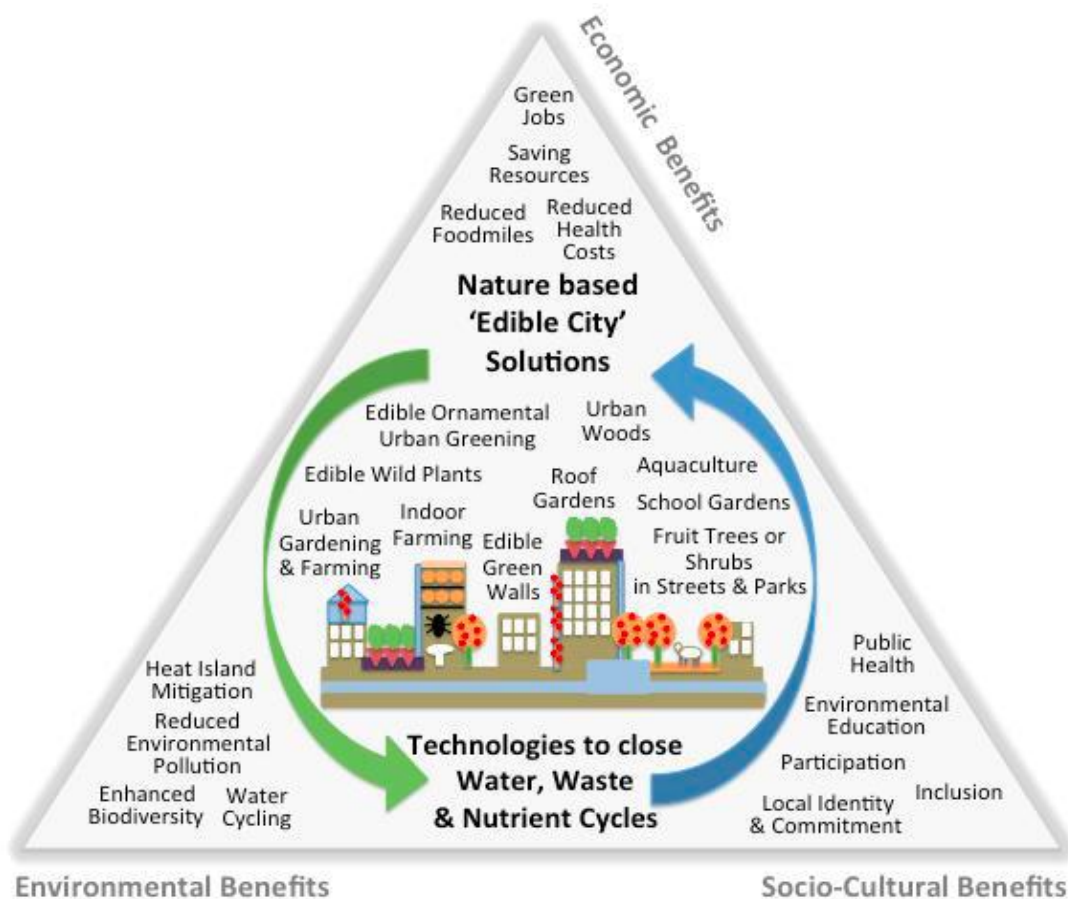

Figure 3 : The systemic use of NBS for food production [4]

I.4   Who is EdiCitNet?

The EdiCitNet Consortium is an international team of experts from different societal sectors and scientific disciplines related to Edible City Solutions (ECS). The whole group consists of 32 partners with representatives from local city administrations, Non-Governmental Organizations (NGOs), Small and Medium Enterprises (SMEs) and other Edible City Solutions around the world. [5]

The core of the project is a network of urban communities in Europe, Africa, Latin America and East Asia working together to build a better world for everybody in the cities. [5]

Project Number: 776665
Project Acronym: EdiCitNet
Project title: Edible Cities Network – Integrating Edible City Solutions for social, resilient and sustainably productive Cities

I.4.1   Coordination :

Humboldt Universität zu Berlin and Integrated Research Institute of Transformation of Human-Environment Systems [5]

I.4.2   Cities :

I.4.2.1   Front Runner Cities FRC

An important feature of the network's work is focusing upon the creation of Living Labs within our '**front runner cities FRC**'. These Living Labs function as testing grounds for the co-creation of innovative Edible City Solutions. [5]

Senate Verwaltung für Stadtentwicklung und Wohnen (Berlin - Germany) : Berlin is the only EdiCitNet city with the hybrid role of a Front Runner City and a Follower City. As a Follower City Berlin will take the chance of the master-plan to develop new and enhance existing ECS. While being a Front Runner City, Berlin will develop a living lab on two sites – a former cemetery and a former agricultural enterprise – together with the EdiCitNet partner PRINZ, which has a lot of experience in community gardening.

The goal of both interventions – the masterplan and the living lab – is to support socially disadvantaged neighborhoods, to promote social cohesion and to improve living conditions. [5]

Geemente Rotterdam (The Netherlands): The City of Rotterdam is one of the Front-Runner Cities (FRC) of EdiCitNet. As such, Rotterdam is responsible for running an innovative Edible City Solution (ECS) in Rotterdam as a Living Lab and mentoring Follower Cities (FC). Furthermore, the City of Rotterdam will lead the Work Package on Living Labs in FRC: Demonstrating innovative ECS for replication and up-scaling and will bring in its expertise and its views as a city. [5]

Stadt Andernach (Germany) : The City of Andernach is one of the Front-Runner Cities (FRC) of EdiCitNet. As such, Andernach is responsible for running an innovative Edible City Solutions (ECS) in Andernach as a Living Lab and mentoring Follower Cities. In addition Andernach supports the establishment of an international network. [5]

Oslo Komunne (Norway) : The City of Oslo is one of the Front-Runner Cities (FRC) of EdiCitNet. For a number of years Oslo has strengthened a network of actors in urban agriculture with a wide range of purposes, e.g. biodiversity, local food production, education, social cohesion, inclusion, entrepreneurship and innovation. The Oslo Living Lab will implement innovative Edible City Solutions to further local actors, strengthen its strategy on urban agriculture and mentor Follower Cities (FC). [5]

City of La Havana (Cuba) : HAVANA (2.1 million inhabitants) is an exceptional example for urban agriculture on large scale. After the break of the soviet bloc Havana fell into the worst economic crises in history. Since 1994 a governmental strategy made Havana by now to the most successful examples of urban agriculture worldwide. More than half of the consumed food is grown organically on-site. At first, yields were low, owing to lack of farming experience and inputs. But with strong government support, urban agriculture was rapidly transformed from a spontaneous response to food insecurity to a national priority. Urban farmers in Havana use predominately low tech technologies and practices achieving yields of up to 20 kg per m2, 10 fold higher yields than commonly achieved in mixed stands small scale agriculture. Among the used technologies are drip irrigation, organoponics, regular addition of compost and other good horticultural practices (e.g. the use of well-adapted varieties, mixed cropping, crop rotation and integrated pest management).

In the process, Havana has also become a pioneer in a worldwide transition to sustainable agriculture that produces 'more with less'. This example shows how ECS can be mainstreamed in a city and provides up-scaling and feasibility knowledge in a Living Lab, accompanied by huge experience on urban planning level and strategic implementation. [5]

I.4.2.2   Follower Cities FC

The living labs created in these cities, created using best practice and consultation from our network experts, are created with the intention of replication in our follower cities. The idea behind this is to create Edible City Solutions that can be remodelled internationally, initially in our follower cities but eventually in cities further. [5]

Ajuntament de Sant Feliu de Llobregat (Barcelona - Spain) : The City of Sant Feliu de Llobregat is one of the Follower Cities (FC) of EdiCitnet. The agricultural area of Sant Feliu has been ruled out by speculative processes as a non regulated area through dividing the farmland in small plots and increasing the renting of Sant Feliu's agricultural park. This prevented the formation of cooperatives of young or long-term unemployed migrants and the improvement of the diet of people with risk of social exclusion. A social farming project successfully includes 100 families. The municipality wants to extend the farming area and explore the creation of micro SMEs on Edible City Solutions (ECS). [5]

Občina Šempter-Vrtojba (Slovenia) : The Municipality Šempeter-Vrtojba is one of the Follower Cities (FC) of EdiCitNet. As such, Municipality Šempeter-Vrtojba is responsible for developing an innovative Edible City Solution (ECS) in Šempeter – Vrtojba in collaboration and under mentoring of Front Runner Cities (FRC) to find the best possible way how to integrate specific ECS to urban life and master plan. The Municipality Sempeter-Vrtojba is involved in WP1: Urban governance and network, WP2: Toolbox for enhancing ECS learning, WP4: Transition Pathway – Planning for ECS in Follower Cities and WP6: Consultancy, Business Development & Market Uptake. Within the project will participate in the knowledge transfer between FRC and FC. [5]

Commune de Carthage (Tunisia) : City of Carthage is one of the Follower Cities (FC) of EdiCitNet. As such, Carthage will follow mentoring from the Front Runner Cities in the project, to develop an urban plan on an innovative Edible City Solution (ECS) together with EdiCitNet project. [5]

Carthage is the main green city of Tunisia. The urban green space per capita is equal to $25m^2$ and ensuring the expansion and maintenance of this green area with the contribution of its citizens is a daily goal for the municipality. By participating in this project, Carthage aims to return food production to its urban space through the use of green areas. [5]

The city of Carthage was founded the 15 June 1919. It is located in the north-eastern Tunisia and bounded at East by the Mediterranean Sea. The Total area is 640 hectares with 63.58% as archaeological zone. The site of Carthage is classified on the World Heritage List established by "UNESCO". Most economic activities are linked to tourism and services. [5]

City of Lomé (Togo) : The city of Lomé is one of the Following Cities (FC) of EdiCitNet. It is our first experience in this field and we do it with dynamism and determination. We rely on the skills of the project team and organizations working in the environmental field, especially in the healthy food sector, such as OADEL (Organisation pour l'Alimantation et le Développement Local). Together with the newly elected local officials, we will develop and support the strategy for the implementation of Edible City Solutions. Finally, we will implement measures of sensitization, information and appropriation of the project by the inhabitants of Lomé through radio and caravans.

 EdiCitNet – City of Lomé is a pilot project to promote urban agriculture, the sale of organic fruits and vegetables without fertilizers or chemicals to the citizens of Lomé in order to ensure public health. The city of Lomé has five districts, in each of which gardens and fruit trees will be established in certain public spaces. [5]

Ministerio de Educación y Cultura (Montevideo- Uruguay) : The Ministry of Education and Culture as partner of the EdiCitNet project works in close coordination with the Municipality of Montevideo. Montevideo is a Follower City (FC) sharing the experience with other project partners, adapting to local context the best practices of Edible City Solutions (ECS) and Nature-

Based Solutions (NBS). The City has been working in Agro-ecological Urban Agriculture for over a decade and other related topics such as food security and sovereignty, community organisation, food production, nutritional education, promotion of healthy eating habits, attention to groups in vulnerable situations and their social inclusion. [5]

The Ministry of Education and Culture (MEC) is responsible for the coordination of national education, promotion of the country's cultural development and preservation of artistic, historical and cultural heritage of the nation, as well as innovation, science, technology, promotion and strengthening of human rights' observance. [5]

I.4.3   NGOs (non-governmental organization) & SMEs (Small and medium-sized enterprises)

BuGG Bundesverband GebäudeGrün e. V. : The Bundesverband GebäudeGrün e.V. (BuGG) is one of the NGOs of EdiCitNet and the expert for building greening. This includes technical and practical knowledge of all aspects which are connected with Green Roofs and Green Facades. In EdiCitNet the BuGG will share their knowledge and guide the other participants in installing Green Roofs and Green Facades for urban farming; The Bundesverband GebäudeGrün e.V. (BuGG) is the German-based network, for the dissemination of information on Green Roof, Facade Greening and Indoor Greening topics and technology.

More than 340 members belong to the BuGG. These include manufacturers, suppliers and processors from the fields of roof, façade and interior greening, architects, cities and municipalities, universities and institutes, as well as private individuals and students. Roofs and facades are very important parts of the building. Therefore, we place particular importance on high-quality greening systems, professional execution and compliance with standards.

Benefits of Green Roofs and Green Facades include an improvement of the urban climate, stormwater retention, biodiversity and protection of the waterproofing next to energy savings. Depending on the intended use, the roof can also serve as urban farming facility. [5]

Brighton & Hove Food parnership Ltd. : Our main projects include: teaching cookery; community & therapeutic gardening; redistributing & reducing food waste; tackling food poverty; improving buying policies for large caterers and nutrition programmes. We influence policy at a local level and share our message nationally to achieve long-term change.

Since 2008 we have worked with volunteers across the city on 70+ community food growing projects (including projects in public spaces) and have evidence of impact of these on health, wellbeing and community cohesion. [5]

Fundació Solidaritat Universitat de Barcelona : The Solidarity Foundation of the University of Barcelona (FSUB), is responsible in coaching the follower city of Sant Feliu del LLobregat (SFLL) in the planning and implementation of Edible City Solutions (ECS) throughout the project.

It focuses its work on social action and volunteerism, environmental sustainability, cooperation for development, promotion of peace culture, human rights & democratic memory. The water and environmental programme of the foundation focuses its activities on the promotion of sustainable water management & environmental awareness, and has an active role in boosting and implementing nature based technologies at international level, including developing countries. [5]

Transition Oststeiermark : Transition Oststeiermark (TO) is a not-for-profit grassroots NGO that operates in and around Gleisdorf in south-eastern Austria. It was created in 2012 and registered as an association on 30-01-2013. We believe that an environmentally friendly way of life is characterized by improved quality of life, an expanding number of social contacts, and increasing meaningfulness. By engaging citizens in active projects we can stimulate community awareness and create a world that lives in harmony – with nature, and with our fellow human beings, and improves the quality of life for generations to come.TO is part of the global Transition Towns Network, a movement of communities coming together to reimagine and rebuild our world and achieve a resilient society free of fossil fuels in a planned and smooth way. The idea is to make concrete small steps together in groups to ease the transition.TO consists of people working together in different groups, supporting a repair initiative, planning the erection of PV systems on individual and public houses, and closing resource loops, not least by making settlements edible. [5]

Unite Technique du Semide GEIE : UT SEMIDE is based in Sophia-Antipolis, south of France. It is an institutional network of Ministries in charge of inland water of the Euro-Mediterranean Partnership countries. It has a core activity on data management for integrated water resources planning. It aims at collecting and facilitating the sharing of information and experiences, as well as the development of common tools and cooperation programmes in the water sector. UT SEMIDE has been translating EU Water Frame Directive principles and the European Union Water Initiative lessons as well as European water innovation practices to the southern Mediterranean countries. It works closely with International and regional initiatives such as the Union for the Mediterranean, European Environmental Agency, UN Agencies on strategy development and assessment. UT SEMIDE is disseminating information using various means from multilingual websites, e-news flash (30 000 subscribers), social networks, multimedia support, physical products as well as events with stakeholders. UT-SEMIDE is part of the Management Committee the Cost Action Circular City and developing the exploitation plan for circular economy solutions based on NBS for water. [5]

Association la Recherche en Action (REACT): Association la Recherche en Action (REACT) is an NGO created in 2011 in Tunis and based in the City of Sciences of Tunis. REACT aims through its missions to put the research at the disposal of the development, the citizens and their Interests, to promote the international and euro-Mediterranean cooperation and to open up between specialities and stimulate the innovation, in order to develop longlasting solutions to clearly identified needs. To implement its missions REACT relies on the multiple, multidisciplinary and the high expertise of its members in various fields of research and innovation (water and environment, biodiversity, human health, IT, etc.). [5]

Hidrolab d.o.o : Hidrolab d.o.o.: was established in 2009. The basic mission of the company is to provide expert engineering services for designing and consulting in the field of water, drinking water, wastewater and irrigation management, enriched by years of experience and continuous improvement of knowledge. With state-of-the-art knowledge it connects technical, legal and economic aspects of the complex area of the public utility infrastructure and water management. The company is specialized in storm water, wastewater and drinking water management modelling,

with a special emphasis on sustainable use and management and risk prevention. Proprietary and open source CAD and GIS software is being used to develop and manage complex projects. [5]

Terra Concordia GmbH Mundraub : is an online platform for all who want to discover local fruits, nuts and herbs in public spaces and help shape the edible landscape worldwide. More than 70.000 users share POIs, set up planning and harvesting events and share information on everything fruit-related in local groups. By developing mundraub regions and/or edible districts, mundraub combined the digital aspect with real-life experiences – bicycle tours, harvesting & planning events. This involves preparation, organisation, execution and follow-up activities. In addition mundraub positions itself in the realm of Open Data collecting not only user generated POI data but also cadestrial data from municipalities and cities. [5]

As a social enterprise with an array of business models, mundraub supports the project with its expertise in the field of business model developing and market uptake.

A central part of mundraub is the mundraub map, a mapping tool already serving as an Edible City Solution (ECS) itself. Our almost ten year knowledge in collecting and visualising data will aid in creating and visualising the Edible City Network. mundraub takes part in the dissemination of the project as well as its goals and results. [5]

NABOLAGSHAGER : Nabolagshager leads the work package 6 that focuses on the development of Edible City Solutions (ECS) business and their market uptake as key strategies to ensure the longevity of EdiCiNet beyond project period. The work will include supporting ECS startups with tools and strategies for lasting economic, environmental and social impact, driving urban resilience and enabling global knowledge sharing. Furthermore, Nabolagshager will support the other work packages with its practitioner's perspective and experience. [5]

NABOLAGSHAGER is an Oslo-based social enterprise and consultancy kickstarting a transition to a greener and more just society. Our goal is promote a shift to sustainability through entrepreneurship and knowledge exchanges. Through local initiatives and international collaborations we co-create multifunctional bottom-up solutions to urban challenges, such as facilitating green job opportunities for youth, creating rooftop gardens, integrating vulnerable groups, and increasing urban biodiversity. Key local projects we have initiated include: Tak for Maten – an award-winning rooftop farm, Oslo Living Lab – an entrepreneurship program where

green jobs and circular economy are co-explored and co-created by local minority youth, Sjakkplassen – which regenerated an underused public space considered unsafe, by inviting in immigrant seniors, local businesses and tourists alike for shared experiences with outdoor chess and gardening. Internationally, we collaborate with partners in academia, business and the public sector across Europe on projects related to urban farming, placemaking, entrepreneurship and the circular economy. We work towards resolving the UN Sustainable Development Goals (SDG). [5]

Nolde & Partner : Located in Berlin, we want to implement and disseminate ECS in the FC Berlin, which has some lighthouse projects but additional implementations are difficult for many reasons. In the project we want to develop an open source greywater recycling technology, which should be tested in Tunisia. [5]

 – innovative water concepts look back on more than 25 years of expertise in the field of sustainable water and wastewater management. We are involved in planning, design and implementation of decentralised water recycling systems, in combination with heat and nutrient recovery from wastewater. We also offer a broad expertise in the field of decentralised rainwater and stormwater management and in the development of codes and guidelines for water reuse in buildings. [5]

Our small engineering firm (4 persons) is focused on water and energy recycling & resource efficiency. The so called "Waterhouse" in the centre of Berlin, is our lighthouse project which demonstrates since many years the successful implementation of efficient and sustainable urban water management solutions at a decentralized local level. Within the scope of the Roof Water-Farm project, household greywater and wastewater has been further explored to produce food from recycled greywater (aquaponics and hydroponics) and liquid fertilizer from blackwater. For us, wastewater is a resource for new water, energy and nutrients. [5]

Prinzessinnengarten / Nomadisch Grün gGmbH : Prinzessinnengarten is a social-ecological urban agriculture in Berlin. Our goal is to set low-threshold opportunities for environmental education and participation, to develop urban gardens as places for community learning about biodiversity, climate adaption an sustainable living in urban spaces. Therefore we transform urban spaces into publicly accessible green spaces such as community gardens for the neighborhood, environmental education spaces for local institutions and urban vegetable fields for the ecological production of vegetables. Our team hosts regular community gardening sessions to

enable public citizens to participate in the cultivation of plants, learn about the principles of regenerative agriculture and the value of good food. [5]

Royal Melbourne Institute of Technology Europe : The Royal Melbourne Institute of Technology Europe (RMIT) leads Work Package 1: Urban Governance and Network Infrastructure. RMIT is responsible for developing a cross-institutional governance model that will facilitate mainstreaming Edible City Solutions (ECS) into institutional, regulatory and decision-making frameworks at the municipal scale. Key tasks include supporting the City Teams, organising the Annual City Teams Meeting and Annual Awards events, supporting active city stakeholder participation and creating a network for sharing information among cities. [5]

I.4.4 Universities & Research Institutes

Fundacio Institut Catala de Recerca de L'Aiuga ICRA : The Catalan Institute for Water Research (ICRA) is WP2 leader. As such, ICRA is responsible for the proper development of the toolbox (DSS/catalogue, database and serious game) for enhancing Edible City Solutions (ECS) learning and implementation. ICRA will also have a relevant role in defining and analysing socio-economic and environmental indicators (WP5). [5]

The Catalan Institute for Water Research is a research institute inaugurated in 2009 by the Government of Catalonia within the framework of the Research Centres Programme of Catalonia (CERCA). ICRA seeks to provide a complete and efficient response to the problems and challenges related to integral water cycle and is, therefore, structured as a top-quality multidisciplinary centre around three main research areas: I) Resources and Ecosystems, II) Water Quality, and III) Technologies and Evaluation. Since his creation in 2006 ICRA has participated in more than 100 research and training projects, around 70 national and 30 European and international for a total of more than 14 M EUR. [5]

Humboldt Universität zu Berlin : The Humboldt-Universität zu Berlin (UBER) coordinates the project EdiCitNet and is involved in all 9 work packages via the Integrative Research Institute for Transformations of Human Environmental Systems.

In an international comparison, Humboldt- Universität ranks among the top ten of German universities. Scientists here research socially relevant topics and challenges of the future and communicate these with the public. Humboldt-Universität invests all its energy in being a place of

excellent research and teaching. Its aim is to promote young talents and to positively influence society and economy outside the university framework. [5]

University of Brighton : The project partners for EdiCitNet are located in the "School of Architecture & Design". They focus their mostly practice-based/action research around the subjects of space production and productive urban landscapes, including: green infrastructure strategies, urban agriculture and food systems design. University of Brighton will mainly be involved in tasks which aim to facilitate the coherent integration of Edible City Solutions (ECS) into urban planning strategies in Follower Cities (FC). University of Brighton will also contribute to the generation of transferable guidelines and reference frameworks. [5]

Univerza V Ljubljani : The University of Ljubljana is co-leading WP2 (Toolbox for Enhancing Edible City Solutions (ECS) learning and implementation). University of Ljubljana is responsible for the development of the EdiCitNet database and co-development of the Catalogue and the serious gaming. The University is also involved in WP4, particularly in assisting the Follower City (FC) Sempeter pri Gorici in applying the Transition Pathways methodology and in setting up the serious gaming. [5]

Universität für Bodenkultur Wien : University of Natural Resources and Life Science (BOKU), Vienna; The BOKU team aims at facilitating the integration of Edible City Solutions (ECS) with a social benefit within the overall urban planning process of the project's Follower Cities (FC). Specifically they use an innovative Transition Pathway Methodology, focusing on systems mapping, scenario development and transfer in order to foster ECS within FC masterplans. [5]

For that we innovate methods to create such ECS as part of urban masterplans in a collaborative manner and train and guide FC to apply them. [5]

The University of Natural Resources and Life Science, Vienna (BOKU) is one of Austria's leading Universities in the field of sustainable development and transformation research. BOKU is a teaching and research institution that focuses on renewable resources that are a prerequisite for human existence. The relationships between society and the environment forms the basis of all activities at BOKU, and its foremost aim is to make decisive contributions to securing the well-being of future generations. [5]

Universitat de Girona: (UdG) will contribute to the project efforts to design Master Plans for the Transition Pathways and will bring its interdisciplinary expertise of its team in socio-cognitive analysis, water management and environmental decision-making. Understanding stakeholders' perception will help tailor transition policies that can accommodate different value systems. Therefore, we will map the cognitive and cultural elements – problem identification, problem solving – that can help or hinder the transition path. UdG will also serve as a cord of connection between WP 4 and 2 and will work with Sant Feliu de Llobregat (Follower City) in their design of edible solution for their city. [5]

The Laboratory of Chemical and Environmental Engineering (LEQUIA) is a research group of the University of Girona (UdG) devoted to the development of eco-innovative environmental solutions; especially, within the water field. LEQUIA has a multidisciplinary team of 30 people, including university professors, postdoctoral researchers, PhD students and management support staff. Current research lines are: i) innovative bio-processes for treatment, resource recovery and synthesis of new products, ii) physico-chemical advanced processes for treatment and/or reuse of liquid and gas side streams, and iii) planning, control and evaluation of complex socio-environmental systems. [5]

Wageningen University: As academic partner, the Business Management & Organisation (BMO) chair group at Wageningen University & Research takes care of strategic management and monitoring of the EdiCitNet project, stakeholder management and analysis, business model analysis, and business development. It is co-lead for the 'Spreading the Seeds of Success' workpackage on consultancy, business development and market uptake of Edible City Solutions (ECS) to drive urban resilience and enable global knowledge sharing. In that role, the BMO group supports edible city startups with tools and strategies for lasting economic, environmental, and social impact, including analysis and further development of P(eople)P(lanet)P(rofit)-layered business model canvasses. [5]

OsloMet – Storbyuniversitetet: Oslo Metropolitan University (OsloMet) is responsible for supporting and coordinating the Living labs and also for documenting and monitoring their processes and results. [5]

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The Work Research Institute (WRI), which is part of the Oslo Metropolitan University, is an social science institute based on contract research. It's projects are mainly financed through funding from the Norwegian Research Council, Ministries, agencies, municipalities, workslife organisations, organisations within health and care and private companies. [5]

Norsk Institutt for Biookonomi : NIBIO – the Norwegian Institute of Bioeconomy Research has c.700 employees throughout the country. The institute delivers research, managerial support and knowledge for use in national preparedness, as well as for businesses and the society at large. NIBIO is owned by the Norwegian Ministry of Agriculture and Food. [5]

the Department of Landscape Monitoring conducts mapping, analysis and research on agricultural landscapes, land use, land cover and landscape change. Our main topics are Driving forces and consequences of landscape change, and Indicators for landscape monitoring, nationally and regionally [5].

I.5   Summary of the context and overall objectives of the project

EdiCitNet (Edible Cities Network) in SCC02-2017 "Demonstrating innovative nature-based solutions in cities – Nature-based solutions for inclusive urban regeneration" addresses societal challenges in cities, including mass urbanization, social inequality and climate change. In the face of uncontrolled urban sprawl, rapidly developing industrial activities, as well as increasing diversification, segregation and social exclusion in cities around the globe, we propose Edible City Solutions. [6]

The project has a multi-stakeholder-oriented, interdisciplinary planning focus, which allows for an overarching, formal implementation and promotes citizen participation. So far, EdiCitNet has successfully founded the EdiCitNet City Teams [6] **:**
The participants discussed the status of the **Work Packages (WPs)**, updated each other on progress since 2019; the teams and their roles are: [7]

✓   WP 1 "Urban Governance and Network Infrastructure".

✓   WP 2 "Toolbox for enhancing Edible City Solutions (ECS) learning and implementation" operates with the search & find options in an open-access environment. The interconnection between other working packages is difficult but is necessary to improve the

function of the toolbox as a whole. A test measuring the progress of the serious game will be conducted in Sant Feliu de Llobregat to improve storylines and rules.

The interconnection between the WPs and demand for enhanced communication and support became evident in this meeting.

- ✓ WP 3 "Living Labs (LLs) in Front-Runner Cities (FRCs): Demonstrating innovative ECS for replication and up-scaling"
- ✓ WP 4 "Transition Pathway – Planning for ECS in FCs"
- ✓ WP5 "Documentation and Monitoring" (WP 5) .
- ✓ WP 6 "Consultancy, Business Development and Market Uptake"
- ✓ WP 7 "Education, Knowledge Transfer and Dissemination"
- ✓ WP 8 "Coordination and Management" [7]

CHAPTER II : Report on alternative terminology for Edible City Solutions: data collection, curation and analysis

II.1   Overview

The broadness of the concept of Edible City Solutions has led to different interpretations among consortium partners and Working packages. Therefore, in order to ensure a long-term impact of the main outcomes of the project (public deliverables, services of toolbox and marketplace) and to facilitate internal communication, there was an urgent need to agree on a self-standing term/name easily understandable for people from inside and outside the project. Hence, ICRA and NHG joined forces to facilitate the process of agreeing on an alternative terminology for the Edible City Solutions.

II.2   Methodology

First, two types of ECS were identified a priory by WP2 and WP6 representatives, and thus represent mostly the frameworks from the toolbox and marketplace:

- **Examples of Type 1 (old ECS initiatives, institutions or organizations)**: NGO, Local government/Municipality, Regional-Level government, National-level government, Research Center /University, Private organizations (e.g SME), Cooperatives, Consumer organization, Community groups (e.g neighborhood association), Local market/store, group of friends, etc.

- **Examples of Type 2 (old ECS measures)**: Community Garden, Hen house, Private Garden, Green roof, Heritage Garden, Green wall, Urban orchard, Rain Garden, Community kitchen, Commercial indoor farming, Pocket Park/garden, High-yield commercial gardening, Large urban park Biomass feed-stock, Street trees, Green Corridors, Urban Forest, Aeroponics, Aquaponics, Hydroponics, Greenhouse, Beehives, Soil-based farm, Substrate-based farm, Pig housing, etc.

Second, during EdiCitNet annual meeting a workshop was performed using the MIRO (https://miro.com/) interface in order to gather together with the consortium possible user-friendly names for these two types of Edible City Solutions. During the workshop the participants were asked to propose possible names for two different types of ECS according to their role as

stakeholders in the project (Researchers, SMEs, Municipalities, NGOs, Neighbourhood associations, citizens).

Third, the data from the workshops was retrieved from MIRO boards (see figure 4, left) and organized in Microsoft Excel. (See figure 4, right). In order to ensure a proper analysis, the names proposed were refined by: **i) correcting grammatic errors** (e.g., Urban Food enterprise ➔Urban Food Enterprise or Urban Food initiatives ➔Urban Food Initiatives);**ii) Correcting similar names that were written deferentially;   iii)Eliminating acronym** (e.g., **ECS** ➔Edible City Solutions or **edible NBS** ➔Edible Nature-based solutions).
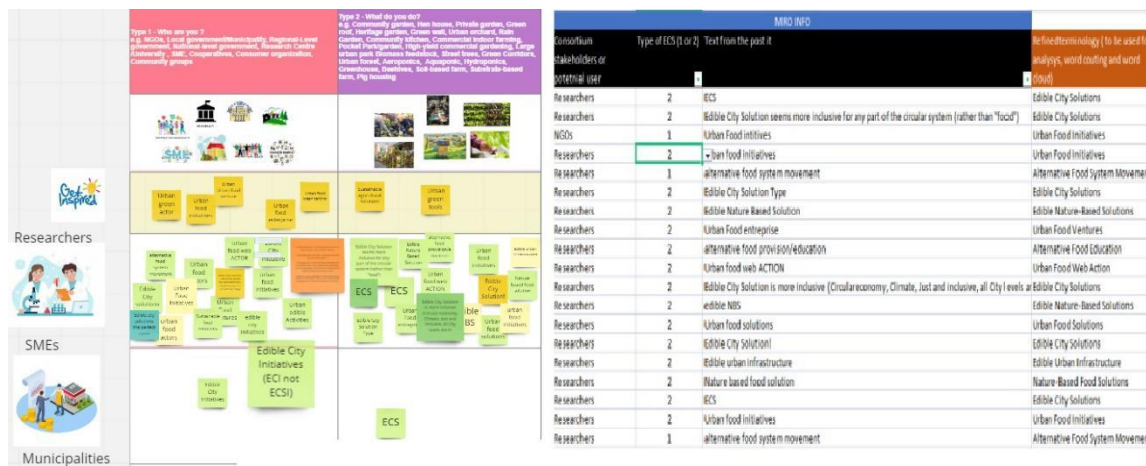
Figure 4 : Data collection and curation. Left: MIRO board for collecting inputs from consortium partners according to their role as stakeholders in the project (researchers, SMEs, NGOs, Municipalities, and others); Right: Data curation using Microsoft Excel.

Fourth, the data was analysed in Excel and using a Word counting webpage. The main analysed were focused on determining the following:

- Most common names proposed, regardless the typologies of ECS.
- Most common names proposed per type of ECS.
- Most common word and terms, in general and per type of ECS.

II.3   Main results

Researcher`s contributions represented the majority, providing 51% of all inputs during the workshop. The contributions of representatives of NGOs, others (e.g., neighbourhood associations and citizens), Municipalities, and SMEs, represented, respectively, 28%, 9%, 8% and 4% of all data gathered (Figure 5).
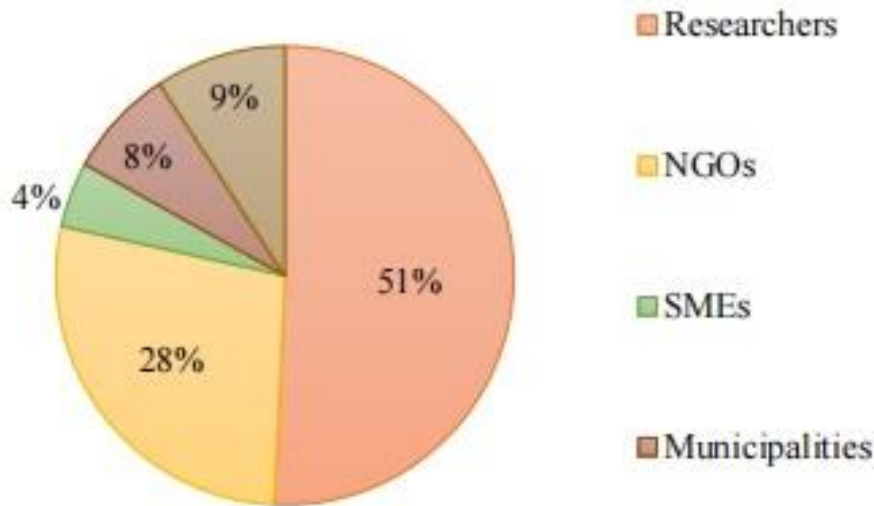
Figure 5 : Representatives of inputs provided by each type of stakeholders.

A total of 29 names were proposed. The most common names proposed can be seen in Table1. "**Urban food initiatives**" was the most common name (10 repetitions) without distinguishing per types of ECS. However, there was a clear preference for using this term for referring to type 1, even though this term was the second most cited for type 2 (see figure 5). The second most common name, "**Edible City Solutions**" (9 repetitions), was most used for referring to type 2.

Table 1 : Most common names proposed during the workshop (in bold are the top 10 names).

*Number of repetitions without distinguishing per type of ECS.

Temrinologies proposed (excluding duplicates)	N° of Repetitions		
	Total	Type 1	Type 2
Urban Food Initiatives	**10**	**7**	**3**
Edible City Solutions	**9**	**2**	**7**
Urban Food Actors	**4**	**3**	**1**
Edible City Initiatives	**4**	**4**	**0**
Urban Food Systems	**4**	**3**	**1**
Urban Food Solutions	**3**	**0**	**3**
Sustainable Urban Food	**3**	**1**	**2**
alternative food system movement	**2**	**2**	**0**
Edible Nature-Based Solutions	**2**	**0**	**2**
Urban Food Ventures	**2**	**1**	**1**
Nature-Based Food Solutions	2	0	2
Urban Green Tool	2	0	2
Urban Green Initiatives	2	2	0
Alternative Food Education	1	0	1
Urban Food Web Action	1	0	1
Edible Urban Infrastructure	1	0	1
Sustainable Food Initiatives	1	1	0
Urban Edible Activities	1	1	0
Urban Agriculture	1	1	0
Productive Urban Landscapes	1	1	0
Urban Green Actor	1	1	0
Edible City Community	1	1	0
Social and Environmental Justice Actor	1	1	0
Urban Green Solutions	1	0	1
Food Based Closed Loop Solutions	1	0	1
Food Systems Networking Building	1	0	1
Food System Faciliators	1	0	1
Sustainable Agricultural Solutions	1	0	1
Bouba Carthage	1	1	0

A total of 17 and 18 names were proposed for, respectively, type 1 and 2. In figure 6, the most common names for type 1 were: **Urban Food Initiatives (1 st)**, Edible City Initiatives (2 nd), Urban Food Actors (3 rd), Urban Food systems (4 th). Meanwhile the most common names for type 2 were: **Edible City Solutions (1 st)**, Urban Food Initiatives (2 nd) and Urban Food Solutions (3rd).
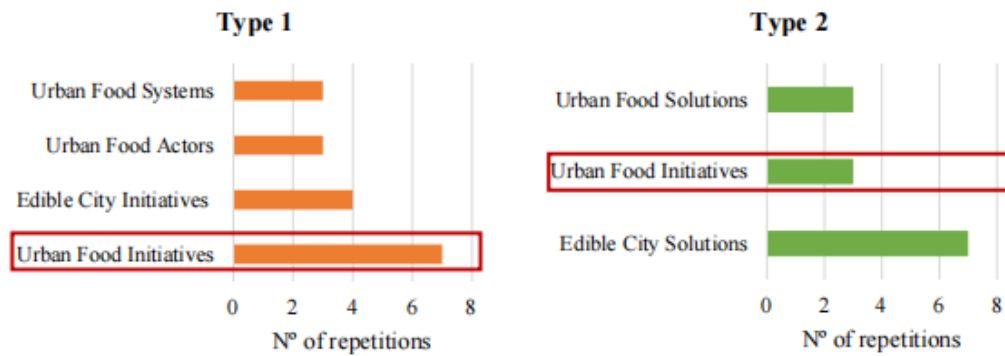
Figure 6 : Most common names for type 1 and 2 of ECS (only considering those that were cited at least more 3 times).

Both types included words such **urban, food and city**. These words were, in general, on the top 5 words more cited, being respectively cited, 37 times, 36 times and 14 times (Figure 6). However, the question remains, what are the terms/words that can help distinguish these two types of ECS? **For type 1** the most cited words were: **Urban (21 times)**, Food (18 times), Initiatives (14 times), edible (8 times), city (7 times), actors (3 times). **For type 2** the most cited words were: **Food (18 times)**, Solutions (17 times), Urban (16 times), Edible (10 times), City (7 times), Initiatives (3 times).
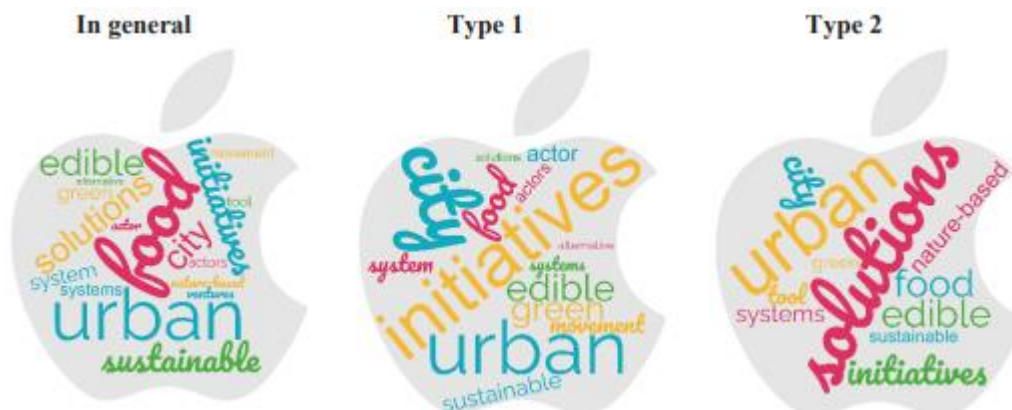
Figure 7 : Most cited words in general (without distinguishing per type of ECS) and for types 1 and 2.

When comparing the most cited synonyms (Figure 7), there was a clear preference for words such as "**Urban**" instead of "**City**", for "**Food**" instead of "**Edible**", regardless the type of ECS (Table 2); Finally, the results of the wording count suggest that type 1 and 2 are, respectively, more often related to the words "**initiatives**" and "**solutions**". Therefore, the results suggest the most proper names for type 1 and 2 would be, respectively, "**Urban Food Initiatives**" and "**Urban Food**

Solutions". This result is very much in line with the suggestion from consortium partners, since "Urban Food Initiatives" was also the most proposed name for type 1 and "Urban Food Solutions" was the third most proposed name for type 2 (see figure 7)

Table 2 : Most cited synonyms per type of ECS

Words / Synonyms	Type 1	Type 2
Urban	21	16
City	7	7
Food	18	18
Edible	8	10
Initiatives	14	3
Solutions	2	17

II.4   Excel formula used

Table 3 : excel formula used in the analysis[8]

Formula	Function	Example
COUNTIF	The **COUNTIF** function is a premade function in Excel, which counts cells as specified.It is typed =**COUNTIF**	*=COUNTIF('Database terminologies'!D20:D317;' Analysis and graphs '!A19)*
COUNTA	The **COUNTA** function counts the number of cells that are not empty in a range. It is typed =**COUNTA**	*=COUNTA('Database terminologies'!A3:A67)*
COUNTIFS	The **COUNTIFS** function is a premade function in Excel, which counts cells in a range based on one or more true or false condition.	*=COUNTIFS(D2:D155;G2 ;B2:B155;"1")*
ISNUMBER	• The **ISNUMBER** function is an information function used to find if the cell value in reference is a numerical value or not. It returns values as "true" or "false." • The formula for the ISNUMBER function is "=ISNUMBER (value)."	*=ISNUMBER(FIND("Urba n";D3))+ =COUNTIF(E:E;"TRUE")*
SUM	The **SUM** function adds values. You can add individual values, cell references or ranges or a mix of all three.	*=SUM(A2:A10, C2:C10)*
IF	The **IF** function allows you to make logical comparisons between a value and what you expect.	*=IF(C2="Yes",1,2)*

CHAPTER III : Toolbox collection of recommendation and informative links
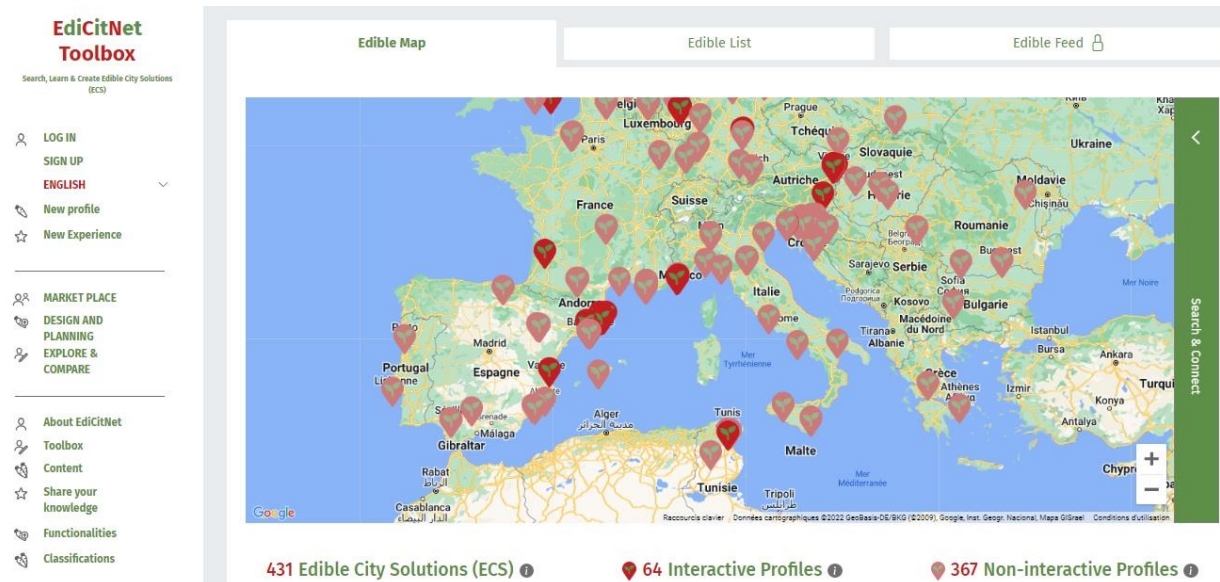
Figure 8 : Cover of the Toolbox

III.1 WP2 Toolbox for enhancing ECS learning and implementation Lead: ICRA

A multifunctional and interactive catalogue aims to collect information about local food initiatives while promoting knowledge sharing, networking and learning among people involved or willing to get involved with these initiatives. It contains a public online collection of diverse EDIBLE CITY SOLUTIONS (ECS), MASTER PLANS, FOOD-RELATED PROJECTS and BEST PRACTICES.[9]

It delivers an interactive catalogue of ECS and related knowledge, in which participants, in addition to providing data, will also be able to interact, connect and learn from each other. In addition, the EdiCitNet Toolbox facilitates the engagement of civil society with the edible cities movement. Moreover, the website supports public and private actors to make decisions about planning, implementing and managing (such as networking) towards creating more sustainable and just cities. The Toolbox contains the following functions:

- Edible Search, ECS Profile & ECS Experience
- ECS performance assessment and ECS design and planning. [9]
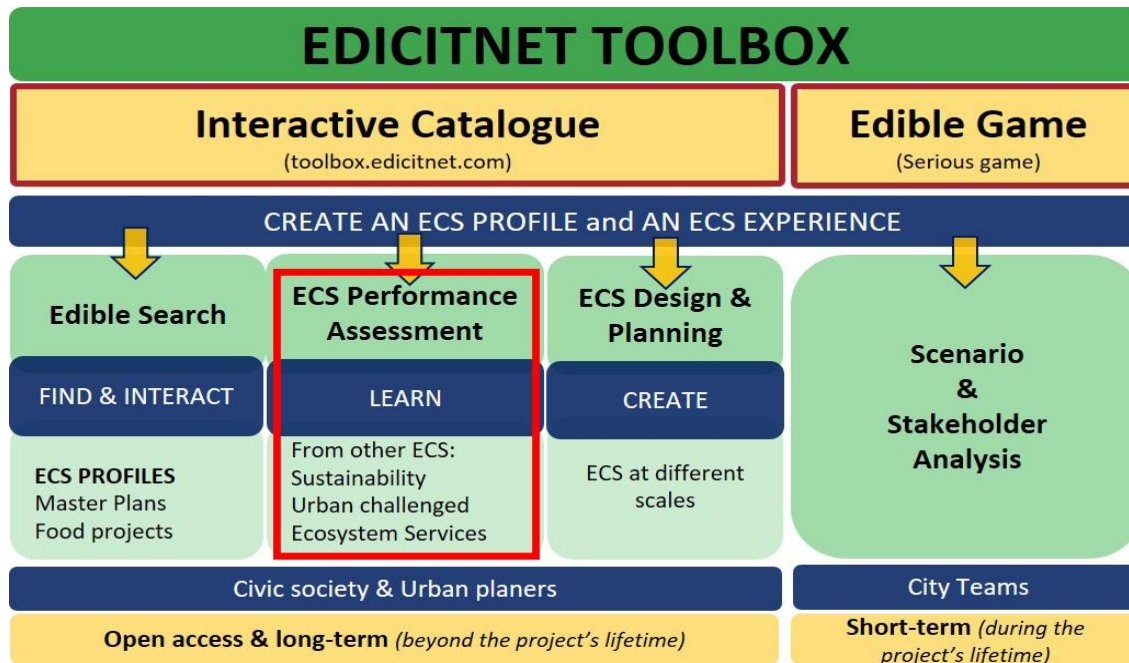
Figure 9 : toolbox schema (with red the task that I worked on) [9]

III.1.1   What is WP2 and EdiCitNet toolbox

WP2 is responsible for developing the EdiCitNet toolbox online platform (https://toolbox.edicitnet.com/), an online platform composed by a collection of tools for knowledge sharing, networking and learning, which aims at supporting stakeholders from the public and private sectors when dealing with **ECS .** The collection of tools presented in the EdiCitNet toolbox online platform include: [10]

✓ i) **An interactive catalogue** for exploring and interacting with **edible nature-based solutions or edible city solutions (ECS),** which includes community gardens, private gardens, community kitchen, local markets, food rescue enterprises, etc. This tool includes a set of interactive functions that makes it a true social network for users, since they can access the profile of a certain initiative and leave comments and questions or for instance follow it to receive updates on events and news (under construction) [10]

✓ ii) **Design and planning tool** which enables users to create their own **edible city solution(s)** by giving insights about resources needed and food potential;

✓ iii) **Performance assessment tool** which enables users to compare the performance of edible city solutions in terms of **sustainability, urban challenges, and ecosystem services** provided.

The "EdiCitNet toolbox" online platform is designed to address a wide diversity of end-users:

- **People willing to get involved with the edible movement in their cities** can use the **interactive catalogue** to find edible city solutions where they can buy local edible goods or for instance participate in a volunteering program. They can also use the **Design and planning tool** to support the implementation of their own initiative.

- **Owners/participants of edible city solutions** can use the **interactive catalogue** to increase the visibility of their initiative, connect with civic society or to expand their edible network, by finding other initiatives to learn from or collaborate with. Moreover, they can use the **Performance assessment tool** to check how the initiative is doing in terms of sustainability, urban challenges, and ecosystem services and also to get guidance on how to improve the functioning of the initiative.

- **Urban planners** can use the **Design and planning tool** to design **edible city solutions** at city scale and get an idea of food potential and resources required.

- **Researchers** can use the **interactive catalogue** to find potential cases of studies and to obtain data for scientific purposes. [10]

In terms of long-term operation (beyond the end of the project), the EdiCitNet toolbox is set up and curated in a way that ensures both **long-term data availability** (since all data can be extracted online in excel or json formats) and **long-term knowledge sharing** mechanisms (since any initiative worldwide can upload a profile and share their knowledge and experience). Besides, the API developed by Oppla will be tested for pulling NBS initiatives from other projects to the toolbox and sharing the ECS from EdiCitNet database and its indicators in the Oppla's repository, thus facilitating knowledge sharing among different NBS projects. To this end, we are attending the meetings of Task Force 1 in order to help in the development and testing of the Oppla's API and to contribute to the Data Management Plan. [10]

Finally, WP2 is also developing a serious game (built on a virtual 3D environment) as a support tool to facilitate exploring ECS implementation and impact assessment in participatory urban planning projects, under different scenarios and with multiple stakeholders. [10]

III.1.2   WP2 specific aims and results during this period were:

● Improve the design and user experience of the EdiCitNet Toolbox online platforms.

● Refine the online tools and Serious game concepts.

● Facilitate data collection, storage and sharing during the execution of EdiCitNet project and beyond.

● Integrate relevant knowledge generated within WPs (3, 4, 5 and 6)

● Expand the EdiCitNet database by integrating data from other projects dealing with edible nature-based solutions. [10]

III.2   Methodology :

III.2.1   Explore & compare :

As said in the previous title, one of the tools presented in the EdiCitNet toolbox online platform include : **Performance assessment tool** which enables users to compare the performance of edible city solutions in terms of **sustainability, urban challenges, and ecosystem services** provided. (Figure 10).

Figure 10 : Cover of the " Explore & Compare" in the toolbox[11] (Self Edit)

III.2.2   Collection of recommendation and informative links:

In this part, I made a collection of free links for the community of EdiCitNet; To be done; I collected links for three major fields (N°: 2 in Figure 10), the major fields are:

III.2.2.1   Sustainability :

Definition: Sustainability means meeting our own needs without compromising the ability of future generations to meet their own needs. In addition to natural resources, we also need social and economic resources. Sustainability is not just environmentalism. Embedded in most definitions of sustainability we also find concerns for social equity and economic development. [12]

In this field we collected documents that show **How to improve the Sustainability of Edible City Solutions;** the collection of documents was based on : Seeds/Seedlings; Weed/Pest management; Waste management; Water reuse; Packaging materials;Energy; Fuel; Fertilizers; Food rescue.

For this, we asks a questions that have relations with the sub-topics earlier quoted, the questions was **How To :**

✓   Prioritize locally produced seeds and seedlings; acquired through exchange or trade with local seed banks; prioritize the use of organic fertilizers (e.g. compost, manure, dried algae, bokashi, mulching) Locally produced or sourced from local producers;

✓ Properly recycle generated waste; Explore potential added value to generated waste; Produce organic compost from food waste or other green residues;

✓ Give surplus yield to local social projects;

✓ Prioritise the use of natural methods to control pests and phytodiseases; Prioritise the use of mechanical methods to control pests and phytodiseases; Prioritise the reuse of treated wastewater, For example, using green technologies (e.g., constructed wetlands, ponds, green clumps) for on-site wastewater treatment for the reuse of fruther (e.g., crop irrigation). It should be noted that local standards for water quality standards and required permits must be consulted.

✓ Prioritize the reuse of treated wastewater, for example, using advanced technologies (e.g., UV, chlorination, activated carbon, oxidation processes, reverse osmosis); Prioritize the use of diluted rainwater; Prioritize the use of bidegradable or recycled materials;

✓ Offer the possibility to recharge products; Donate or compost fresh products that deviate from what is considered "optimal", for example in terms of shape, size and color and finally Prioritize the use of electric vehicles/machines.
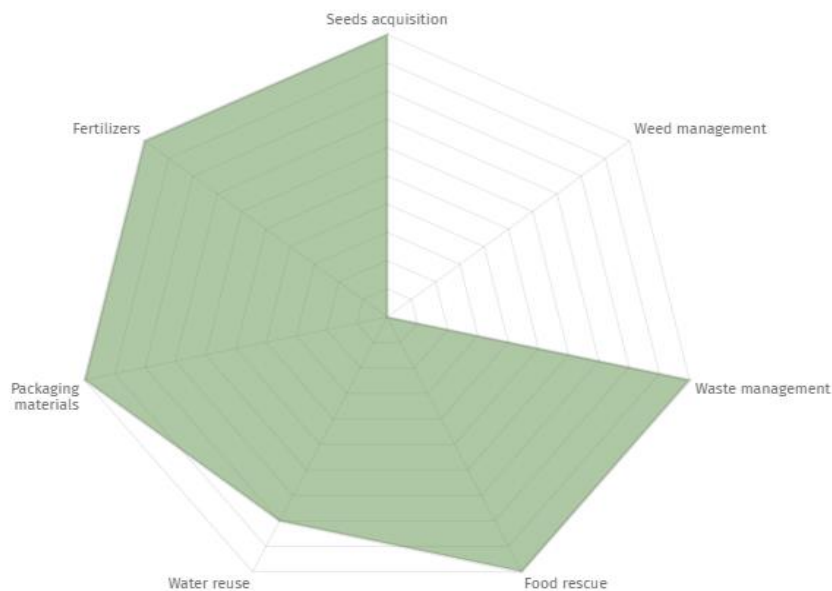
Figure 11 : the best ESC profile in the field of Sustainability [11]

III.2.2.2   Urban Challenges

Definition: When it comes to climate change, cities and metropolitan regions are key actors. Climate change and the demands of booming urban populations pose major challenges for infrastructure, buildings, energy supply, water systems and drainage, sanitation, waste management, housing and mobility. Cities need to be able to deal with climate risks and impacts and move to more sustainable, zero-carbon and resilient 'circular' pathways. [13]

In this field, we collected documents that show **How Edible City Solutions can help adress Urban Challenges ?**

The collection of documents was based on:

Climate change mitigation; Water management; Coastal resilience; Green space management; Air quality; Participatory planning and governance; Social justice and cohesion; Public well-being and health; Economic opportunities and green jobs and Urban regeneration.
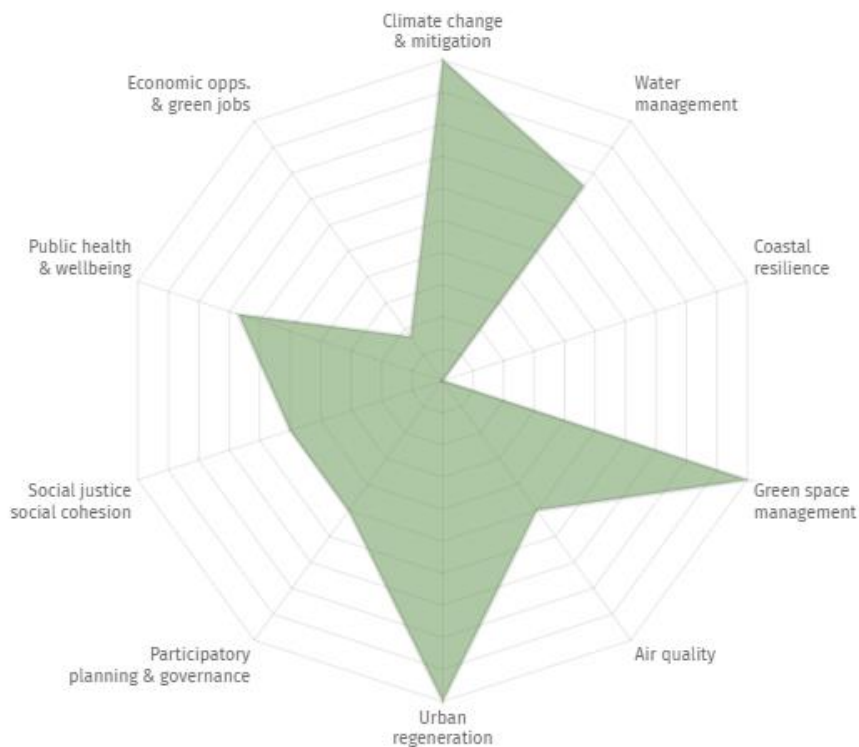
Figure 12 : the best ESC profile in the field of Urban challenges [11]

III.2.2.3   Ecosystem Services

Definition: Ecosystem services are the benefits provided to humans through the transformations of resources (or environmental assets, including land, water, vegetation and atmosphere) into a flow of essential goods and services e.g. clean air, water, and food.[14]

In this field, we collected documents that show **How to enhance the provision for Ecosystem Services of Edible City Solutions?**

The collection of documents was based on:

Aesthetic values; Recreation; Spiritual and religious values; Social relation; Habitat for species; Soil formation; Primary production; Nutrient cycling; Food and fibers; Fuel; Biochemical, Natural medicines; Fresh water; Climate regulation; Water regulation; Water purification; Air quality regulation; Pollination; Diseases and pest regulation; Erosion regulation.
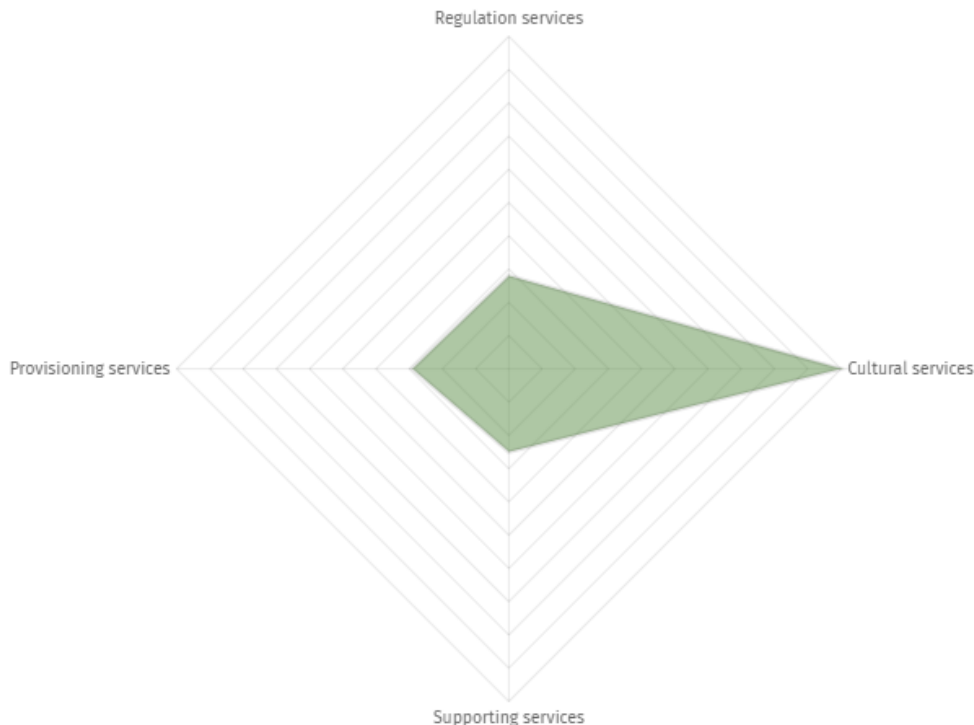
Figure 13 : the best ESC profile in the field of Ecosystem services [11]

III.3   Main result

III.3.1   Recommendation and informative links

For each sub-topic (Sustainability; Urban Challenges; Ecosystem services); i collected 4 links (**148** Links for sub-topics together); i used Excel to organize the documents; with the information bellow :

- ✓ **Type of content** (e.g. handbooks, guides informative videos, manuals, news, etc)
- ✓ **Title.**
- ✓ **Brief description of the content.**
- ✓ **Type of Edible city solutions** (Non-Governmental Organization, Community garden, Cooperative, Private garden, Small medium enterprises, Heritage garden ,Government Organization / Ministry School garden; City Authority /Municipality Urban orchard Neighbors' association Soil-based farm, Research Institute / University Substrate-based farm; Funding Organization High-yield commercial gardening; Local distribution company Commercial indoor farming; Local food rescue enterprise Greenhouse Consumer organization Green wall; Local manufacturing enterprise Green roof:; Local market/store Rain Garden; Local wholesale Aeroponics; Network Cities Hydroponics; Network Research Aquaponics; Beehives; Hen house; Pig housing; Large urban park; Pocket Park/garden; Urban forest; Green Corridors ; Street trees ;Community kitchen ; Biomass feedstock)
- ✓ **Language**
- ✓ **Link**

Figure 14 : the excel table used to collect informative links

This document will be updated in the online platform (N°: 3 in Figure 10) that will help the users of toolbox EdiCitNet to improve and enhance their projects.

III.3.2   Examples of some links:

The figures (15-16-17) show examples of recommendation and informative links, that will be uploaded in the toolbox of Edicitnet.

Figure 15 : Example of Link, in Waste management; Sustainability. [15]

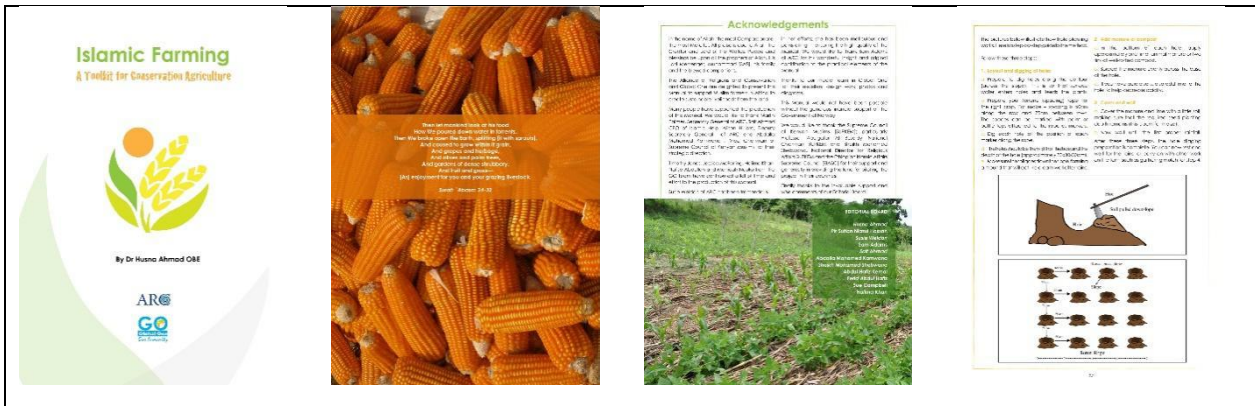Figure 16 : Example of Link, in Economic opportunities and green jobs; Urban Challenges. [16]

Figure 17 : Example of link, in Spiritual and religious values; Ecosystem services [17]

CHAPTER IV : EdiCitNet Summer School on Water Resources and Environmental Change - Erasmus Blended Intensive Program (BIP)

IV.1   About WORKSHOP

The Summer School is a 2-week intensive collaborative knowledge-creation experience for students, teachers, partners and local stakeholders from June 20th to July 1st 2022.

The intensive course will provide basic understanding of the interdisciplinary topic "The potential of Nature-based solutions (NBS) for water resources management in Mediterranean medium-sized cities"

in the context of climate change, using a hybrid approach that combines:

- On-line Problem-Based Learning (PBL) formation
- Face-to-face practical and interdisciplinary teamwork (Problem-based solution), in Girona (Catalonia) to solve a real urban assignment.

Students:

30 students with different backgrounds (environmental sciences, biology, geography, urban planning and engineers) from the following international universities:

- Humboldt-Universität zu Berlin, Germany
- University of Venice IUAV, Italy
- University of Sassari, Italy
- University of Genoa, Italy
- University of Ljubljana, Slovenia
- University of Girona, Catalonia, Spain
- University of Bordj-bou Arreridj, Algeria.

Establishment of three teams of 10 students with different background and origin.

IV.1.1   The first week (On-line mode)

The first week is on on-line mode and includes formation about Problem-based learning (PBL) methodology and about NBS for Water Resources management in the context of Mediterranean

cities, complementary conferences and PBL autonomous work, I was selected to be in Group 2 (Green contour in Figure 18) with the Pr. Antonina Torrens from Solidarity Foundation University Barcelona.

Figure 18 : Planning of the 1st week.

IV.1.2 Problem-based learning (PBL)

This methodology of learning in the on-line week, and it is based on:

- Semi-autonomous cooperative learning process in small groups of students where (real) complex situations are discussed in group instead of lecture-based classes
- PBL places the student at the forefront of the learning process by transforming the teacher into a coach who probes and challenges students towards constructing knowledge.

- Students formulate and pursue their own learning objectives by researching a situation, developing appropriate questions, and producing their own solution to an open problem. They learn concepts instead of just absorbing facts.

- These enquiry-based teaching methods engage students in creating, questioning, and revising knowledge, while developing their skills in critical thinking, collaboration, communication, reasoning, synthesis and resilience.

The PBL process does not focus on problem solving with a defined solution, but it allows for the development of other desirable skills and attributes. This includes:

- **knowledge acquisition,**
- **enhanced group collaboration,**
- **communication.**

IV.1.3   The second week (Presential mode) and Project-based learning.

The second week deals with the case study of Girona city where students will work at the faculty of Sciences, with groups using the PBL methodology the following topics:

- ✓ How can mid-size cities face challenges related to global environmental change and the climate emergency through Nature Based Solutions (NBS)?
- ✓ How can water cycle related NBS contribute to :
- Mitigate the heat island effect and heat waves?
- Urban food supply, food sovereignty and gastro-tourism?
- Flood prevention and biodiversity conservation.

Figure 19 : the planning of the 2ns week.

IV.1.4   Problem-based learning (PBL) vs Project-based learning

The problem-based learning is the methodology of study during the 1st week, and the Project-based learning is the methodology of study in the 2nd week, we summarize the difference in the Table 4.

However, both project and problem-based learning:

Focus on open-ended questions or tasks; Provide authentic applications of content and skills; Build 21st century success skills; Emphasize student independence and inquiry; Are longer and more multifaceted than traditional lessons or assignments.

Table 4 : Problem-based solution VS Project-based solution

Differences	
Problem-based learning	**Project-based learning**
Often multi-subject	More often single-subject, but can be multi-subject
May be lengthy (Weeks or months).	Tend to be shorter, but can be lengthy.
Follows general, variously-named steps	Classically follows specific, traditionally prescribed steps
Includes the creation of a product or performance	The "Product" may be tangible OR a proposed solution. Expressed in writing or in presentation
May use scenarios but often involves real-world, fully authentic tasks and settings.	Often uses case studies or fictitious scenarios as "ill structured problems"

IV.2   The autonomous work: the case study of Girona by 2050

IV.2.1   Overview:

- For each of the three case study subtopics (Heat; Food System; Floods & Biodiversity) there will be two workgroups.

- Each group will apply Problem Based Learning for designing Nature Based Solutions aiming at their particular subtopic.

- Urban resilience (social, economic and environmental) will be the normative work scenario for all the groups, but alternative development and environmental change scenarios will be applied as context conditions, in order to enhance creativity and the diversity of solutions designed.

- The following double entry matrix will be the basis for workgroup reflection and selection of their storyline and solution design approach.

Table 5 : Unity in adversity – IPCC 1.5-2°C stabilization, our group chosen scenario.

	IPCC scenarios for the Mediterranean region	
Scenarios for a Sustainable Europe 2050	**IPCC 1.5-2ºC stabilization (RCP 4.5)**	**IPCC +3.5ºC BAU trend (RCP 4.5)**
Technocracy for the common good		
Unity in adversity	X	
The great decoupling		
Ecotopia		

I was in-group of five students:

• Lorenzo R: master's degree student in Urban design from University of Sassari, Italy.

• Veranika A and Mary IVM: Master's degree students in Biology and Environmental change from University of Girona, Spain.

• Ana P: Master's degree student in Water resources and environmental change from University of Ljubljana, Slovenia.

We choose the field of how can water cycle related NBS contribute to:

• Mitigate the heat island effect and heat waves?

After analyzing the maps (Figure 20), and did some bibliographic research we choose the optimist scenario for Girona by 2050.

III.2.2   Methodology:

Across Europe, temperatures increased by 1'5-2°C. We are facing various environmental disasters, including the problem of heat waves. These recurring disasters have triggered a general acceptance of the need for a new approach to economic development and governance and for a more resilient, less consumerist way of life. EU governments have faced difficulties - and growing voter pressure - to respond by joining forces. Europe's new constitution requires economic and societal stakeholders to operate within strict environmental limits as its core guiding principle.

The increasingly severe environmental and climate pressures of recent decades have also shaped Europe's management of nature. There is a strong emphasis on investing in ecosystems to reduce the impacts of climate change and environmental degradation. Controversies about 'restoring' or 'rebuilding' ecosystems (restoring the former composition of species or rebuilding by introducing new ones) have sharpened the common understanding of ongoing environmental change.

Investments in nature are heavily promoted as a means of mitigating and adapting to the environment- and climate-related problems.

IV.2.3   Unity in adversity; IPCC 1.5-2.oC stabilization (RCP 4.5), Scenario of Girona by 2050.

In 'Unity in adversity', Europeans respond to severe environmental, climate and economic crises by empowering the EU to use stringent, top-down regulatory and market-based measures to set rigorously enforced boundaries for economic activity.

In 2050, Girona will face problems related to the consequences of global warming and heat waves, and such problems as urban expansions, lack of green spaces, excess emissions and social differences. With our interventions, we would like to reduce the problem of heat islands, improve urban regeneration and increase biodiversity. The main goal, of course, is to improve the quality of life of Girona people's.

In our project, we suspect that the most heated areas in 2050 will be the same as they are now, so we focused on one of the most heated areas in Girona (Figure 20- a) : an industrial area in the

southwest of the city, which is also the closest one to the center. The main problem of the area lies in industry-produced heat, there is a lot of traffic that is why there are many car parking's and beside there are many roofs. Those two, cover a large part of the area and are built of materials that absorb a lot of heat and thus further heat the atmosphere. The lack of vegetation in the area also adds to the heat island effects.

Figure 20 : Maps from left to right: a- thermographic analyzing map for determine heat waves areas in Girona;

b- Agriculture area between Vilablareix (Industrial area) and Salt (Commercial and Industrial area);

c- The 1st plan of Girona by 2050.

In this industrial part, we would plant more trees and other native vegetation on the empty open spaces and make some plant road dividers on the main street, which would connect other existing green areas around the industrial zone. Green permeable surfaces of the parking lots instead of the existing ones, and solar reflecting roofs and pavements instead of the classic ones will help with heat rise.(Figure 21)

Figure 21: The map plan of the industrial area (Vilablareix).

On the west side of the industrial zone there are big open areas that are now being used for agriculture. One part of this area would be used to build a park that would be multifunctional. One of the functions would be to reduce the heat. On the other side, a park would also represent areas where residents of the whole city could spend their free time in the fresh air. It is especially important to provide green open spaces for residents living north of this area, as there are no similar areas there. In the park we would put a fitness trim and spaces for children to play, for example football playground, sandboxes, swings etc. There will be a big amount of fruit trees present in this park, the harvest of which will be a common good for all the inhabitants.

One part of the agricultural area would retain its function, it would be divided into two parts. There are already some urban gardens, but we would increase their quantity. These would be aimed primarily at residents from the northern part, where people with lower incomes live. That way they could produce their own food. This would be one part of these agricultural areas and on the other part, we would establish agroforestry that would be owned by the government. According to the economic prognosis, the share of industry in Girona will decline over the years. Which is likely to leave some people jobless. Establishing agricultural parks would provide green jobs. The food that

would be grown on these lands would be sold at a nearby local market. This would boost the local economy and provide local food.

The plants to be used according to the study of the flora of the area have been able to observe the following plant species as well: Encinares, Pines, Choperas, Plataneras, which could be used as dominant species in the present gardens, also for the lining of the soil with minor vegetation instead of grass, it is planned to use the rabbit ear species that belongs to the Apiaceae family, it is a plant that measures 3 to 5cm long, perennial and resistant to heat, in addition to having a pleasant aroma and adapts to sunny spaces and requires less water consumption. (Figure 22)
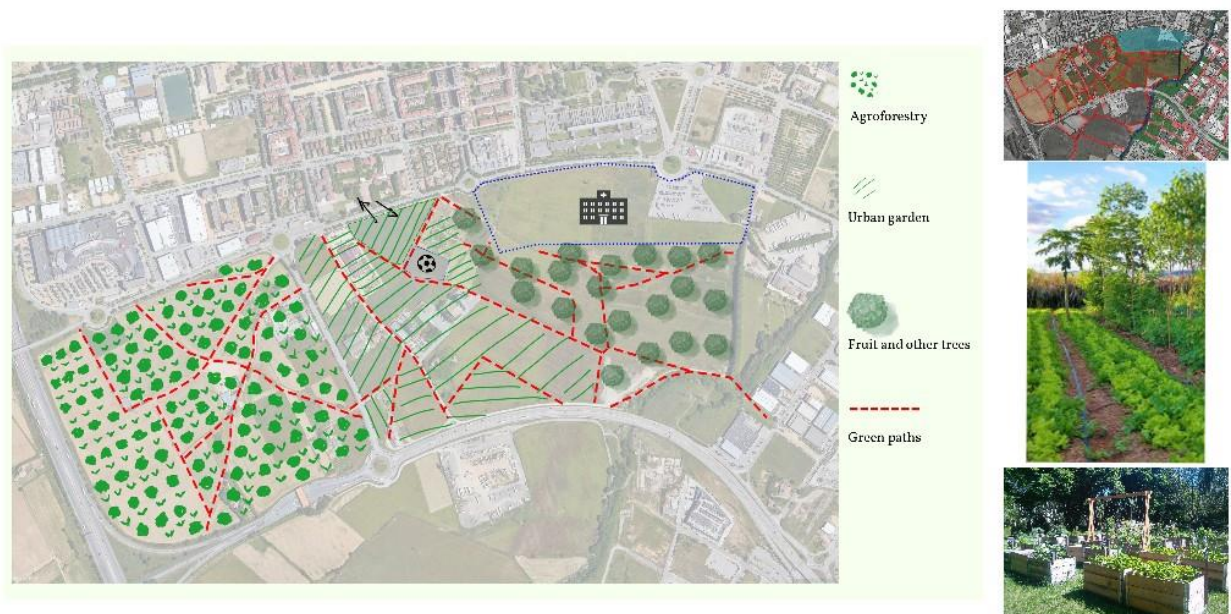

Figure 22 : The map plan of agricultural PARC and examples of Agro-forestry and green-jobs economic agriculture and an opportunity of green jobs.

IV.2.4   Main results
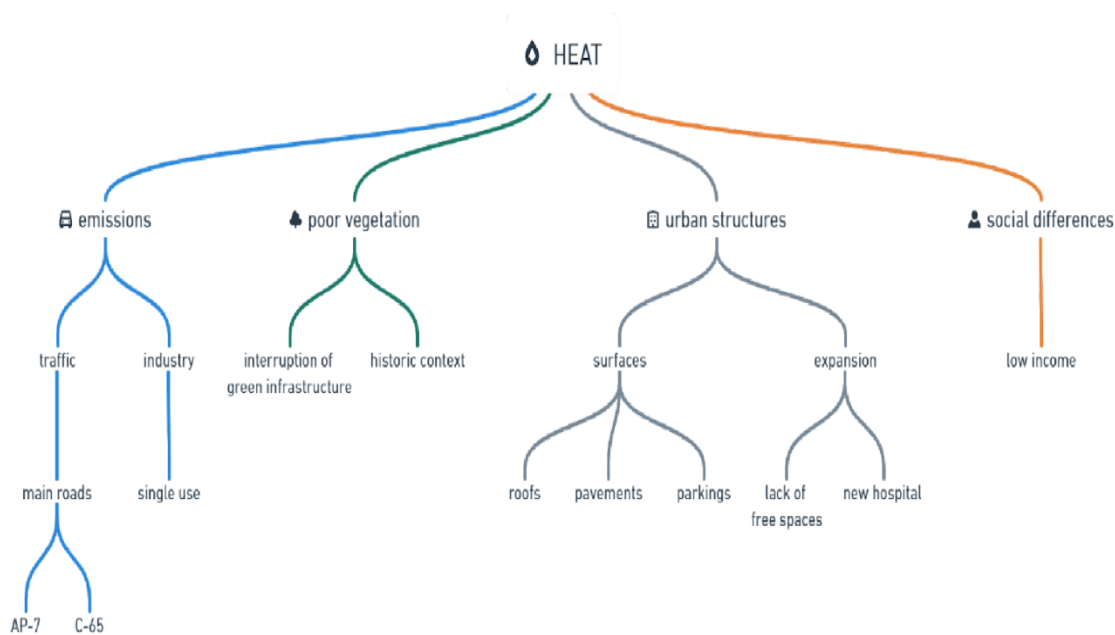
IV.2.4.1   Problems:

Figure 23 : Organigram that represents problems of the heat waves, case study of Girona.

This park would connect three different areas: industrial, agricultural and urban. In a more physical sense, there would be built a few underpasses to connect the areas separated by the roads, specifically the C-65 one: it will increase the connectivity and help biodiversity.

The implementation of these measures will require the cooperation of three different municipalities, Girona, Salt and Vilablareix, as the area lies on the border. Owners of facilities in the industrial zone and owners of agricultural land will also play an important role. Nevertheless, since we are in the Unity in Adversity scenario, they will cooperate with the government, because they understand the environmental situation and are more open to making changes.

From the combination of all these solutions, we expect to observe heat mitigation in the city and, specifically in this area, in between 2 and 10 years. We also expect this park to be a connective area that would serve social, economic and educational purposes, and in general, improve the

quality of life and biodiversity. In addition, our plan will help by trapping a big part of the emissions of Girona.

IV.2.4.2   Solutions:
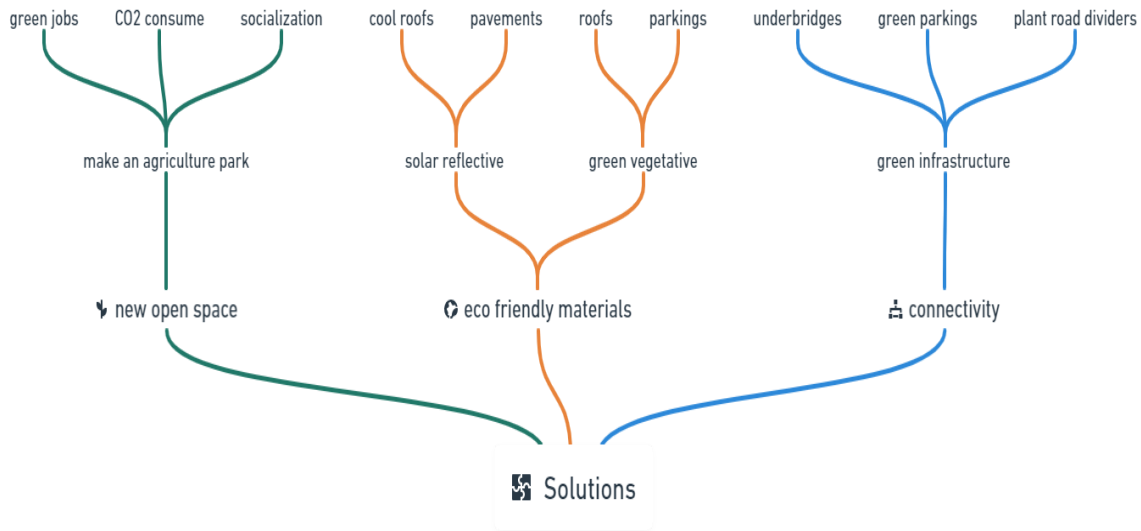
Figure 24 : Organigram that represent the solutions for heat: mitigating the heat island effect and heat waves.

IV.2.5   Social, Environmental and Economic benefits of our scenario:

Social

Social relations; Education in Agriculture field; Public well-being and health; Social justice and cohesion.

Environmental

Climate change mitigation; Resilience and sustainability; Urban island effect mitigation; Air, Water, Soil quality; Connectivity and conservation of biodiversity and landscape; Pollination.

Economic

Touristic place; Water reuse; Economic opportunities and green jobs; Promote local economy.

Conclusion

The term "environmental issue" describes a situation in which the ecosystem's order and law have collapsed because of human activity destroying the ecological role it formerly served. Conflicts between nature and humans are the cause of several environmental issues. The majority of the efforts made so far to pinpoint the root causes of these environmental issues and develop solutions have been technological in nature. The quantity of energy squandered below 100% efficiency is leading to a number of environmental issues; therefore, this technological technique cannot be an exception to the thermodynamic statement that "no energy conversion process can expect 100% efficiency." Therefore, no matter how advanced technology becomes, it still has shortcomings when it comes to resolving environmental issues.

NbS, or nature-based solutions, are approaches to social problems that rely on nature to help both people and biodiversity. The management of productive land and seascapes sustainably; the preservation, restoration, or management of natural and semi-natural ecosystems; or the development of novel ecosystems, such as urban "green infrastructure." Poorly constructed NbS can have negative effects, while well-planned NbS can help combat climate change and biodiversity loss while supporting many other sustainable development goals.

NbS are very crucial in the fight against climate change this century, but their impact pales in comparison to what must be accomplished through the quick phase-out of fossil fuel use. Furthermore, if greenhouse gas (GHG) emissions are not dramatically reduced, global warming will have a negative impact on many ecosystems' carbon balances, changing them from net sinks to net sources of GHGs.

For NbS to improve the delivery of ecosystem services to people in support of various societal concerns, all ecosystem types have opportunity. We must prevent ecosystems from switching from being carbon sinks to being carbon generators. The world's still-intact ecosystems and biomes are hubs for biodiversity and carbon storage, and they shield people from the effects of climate change. However, many of these locations are either poorly maintained or lack adequate protection. Ecosystem degradation greatly limits carbon sequestration and storage, and it makes us more vulnerable to climate-related risks like fire.

The EdiCitNet project use Nature based solutions in cities to reduce the environmental issues, GHG's by the implementation green projects in the city and to increase comunity self-sufficiency to combat demographic inflation and rural migration to cities.

Finally, i hope that this project will have benefits for humans in the future and of course for world-wide countries, to mitigate the climate change and to repair the mistakes made by Man in the past and be able to live in a grinding world.

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