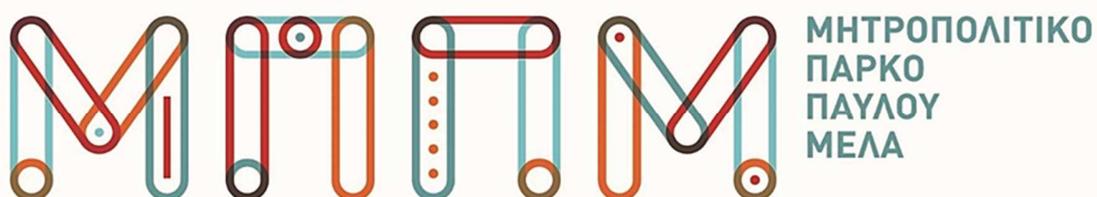




Connecting NATURE FRAMEWORK REPORT



MUNICIPALITY OF PAVLOS MELAS

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0. SUMMARY

The municipality of Pavlos Melas is located in the Northern Greece, in the Region of Central Macedonia, in the northwestern part of Thessaloniki. The municipality faces challenges in addressing issues in environmental, economic and social cohesion section. Through nature-based solutions, Pavlos Melas municipality intends to achieve environmental, social and economic benefits.

The flagship nature-based solution of Pavlos Melas municipality is the creation of Pavlos Melas Metropolitan Park on a former military camp (about 33 hectares) located in the dense urban fabric. Due to its metropolitan character and its large scale, the regeneration project has the potential to become a groundbreaking exemplar on the national level of how a wide range of benefits can be found in investing in green (re)development.

At the same time, Pavlos Melas camp is an important historical place for the community memory and local identity, that nowadays is considered an 'Urban Gap'. In order to reverse the situation, the municipality has focused on a co-created strategic regeneration plan that was co-created with key stakeholders and citizens through an extended public consultation process. The transition will be achieved unleashing its potential as a valuable natural resource, historical site and driving force for economic growth, job creation, social cohesion and environmental sustainability.

The project first phase (A) focuses on the environmental upgrade of the open space and the appropriate infrastructure construction to ensure accessibility and safe public use. It is estimated that phase A will have been finished by 2023. Next phase(s) projects will focus on the renovation of buildings, loading the Metropolitan Park with a diversity of uses & functions. The project will focus on the renovation of the preserved buildings (no new construction is permitted) and further development of outdoor spaces.

The participation of Pavlos Melas municipality in the CONNECTING Nature partnership (June 2017) as a fast-follower city was the most crucial transformation point. The CONNECTING Nature framework has been applied by the municipality as a novel process of strategic planning to transform the former military camp into the flagship nature-based solution of the city. During the Planning phase, Technical Solution and Business Model were the prioritized structural elements of the framework.

The basic target is the creation of a metropolitan park that will be a natural resource in the urban environment and not just a green infrastructure with sports and recreation facilities. Preservation of the physical characteristics of the former camp and the protection - promotion of its historical identity, were the basic design principles. The cultural and historical identity of Pavlos Melas Metropolitan Park is the key element for the place ownership and social inclusion development. However, through peer-to-peer meetings and communication with Genk, as a Front Runner City, other cities and UEL, it was recognized that ongoing adaptation of the technical solution will ensure long term sustainability and resilience.

In the framework of the project, the Business Model Canvas workshop, the Nature Based Enterprises Platform webinars and the ongoing calls with the related partners emerged new perspectives for the sustainability and resilience of Pavlos Melas Metropolitan Park.

In addition, Connecting Nature processes (Co-production and Reflexive Monitoring) and knowledge transfer procedure helped Pavlos Melas team to recognize that multi-level synergies are necessary to support this multi phases program of such a big scale.

At the same time and taking into account the minor monitoring and evaluation capacity in Pavlos Melas Municipality, the Impact Assessment Plan training program was a great opportunity to identify the most appropriate indicators and to design the evaluation plan of Pavlos Melas Metropolitan Park in order to support nature-based solution impact towards future funding.

The CONNECTING Nature framework figure of Pavlos Melas Metropolitan Park presents all the transformation points and trademarks during the transition (from left to right). It summarizes how the city have tailored and fit concepts and processes of Connecting Nature project to the city context in order to design, implement and operate Pavlos Melas Metropolitan Park in order to bring city to life and life to city.

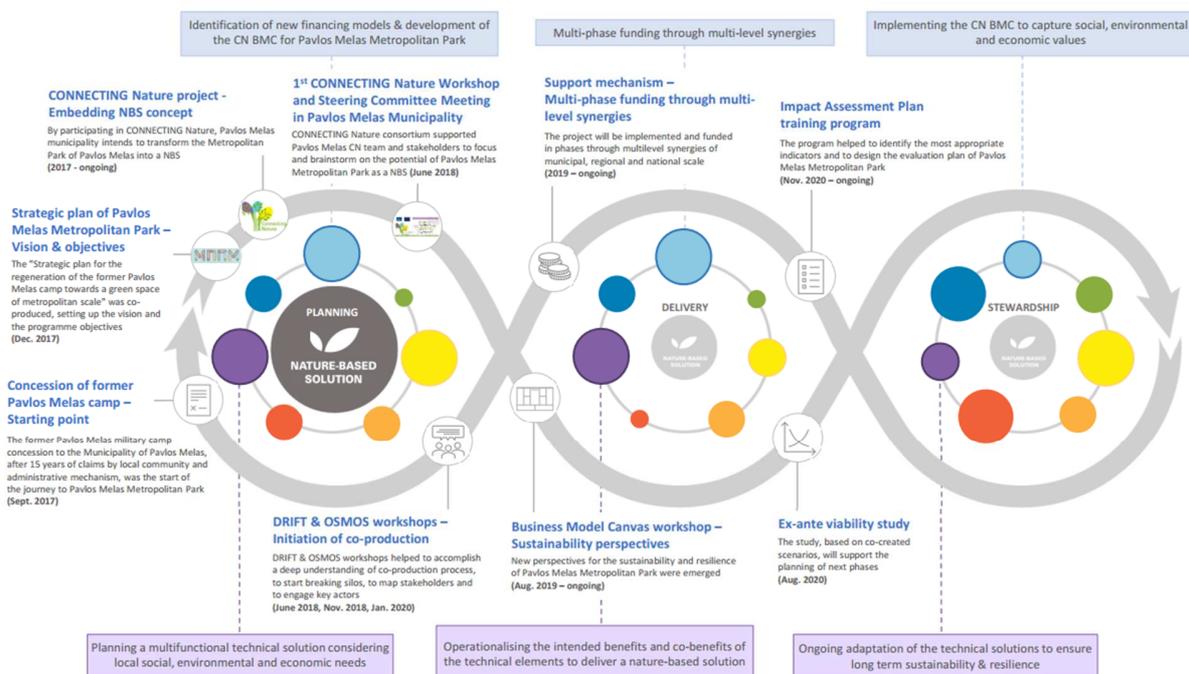


Figure 1: Pavlos Melas CN figure

During the timeframe of the Connecting Nature project, Pavlos Melas gained some important experience, understood the importance of peer-to-peer support and the reflexive monitoring process as a significant contributor to the overall understanding and subsequent application of the Framework in the city contexts, incorporated new ways of working, got involved in EU Projects to embed nature-based solutions in exemplar.

1. CONNECTING NATURE FRAMEWORK

Step 1 Identify the city context

The municipality of Pavlos Melas is situated in the Northern Greece, in the Region of Central Macedonia, in the northwestern part of Thessaloniki - the second biggest city in Greece. Since the first systematic habitation in the years of the refugee settlement in the wider area of the northwestern Thessaloniki, the advent of new populations at different time intervals has extended the city's urbanized and inhabited surfaces, creating urban pockets of residency with unique social characteristics where particular urban planning was applied. The 60% of the total area of the municipality today is urban and populated. The immediate proximity with major entry and exit transportation axes of the city has resulted to the existence of industrial and manufacturing units, many of which today are abandoned.



Figure 2: Pavlos Melas municipality in the Regional District of Thessaloniki

Pavlos Melas municipality, with the 80.50% of its workforce working in the tertiary sector, is among the municipalities with the highest rate of unemployment in Greece. Moreover, the municipality is considered as a deprived area and it faces challenges in addressing issues of continuing poverty, high rates of vulnerable social groups, low percentage of green area per capita ratio (currently being at 3.78 m²/inhabitant), air pollution and lack of opportunities for economic growth. At the same time, the municipality could have great opportunities of development by the incorporation of open innovation in its urban regeneration strategy to address its challenges and achieve environmental, economic and social revival. The integration of the former camps into the life of the city, the development of an urban green network including its peri-urban zone, the promotion of the cultural and historical identity of the city are recorded among these opportunities. The EU Green Deal strengthens the need for innovative processes to meet the city's challenges and take advantage of its opportunities for sustainability and resilience.

Undoubtedly, nature-based solution strategies have a crucial role in sustainable development. Natural capital can provide the much-needed holistic approach to policy making. In this respect, Pavlos Melas Municipality has included in its 5-years strategic plans nature-based or related to nature-based solutions for a sustainable, resilient and resource efficient urban development. In this context, many urban and peri-urban projects of NBS and green infrastructure have been

completed or are implemented. The key projects are bioclimatic regeneration of public spaces (squares, school yards, pocket parks), energy saving intervention projects, energy saving lighting projects, a “green core” of 5000 m² in a degraded area, a green roof in a school complex of 6.042 m² project, a peri-urban open air cultural center and water park and the Urban Botanical Garden of Pavlos Melas to support biodiversity (with 5000 m², over 1000 different plants). These NBS or related to NBS projects have been motivated by the need to protect the environment, to promote resource efficiency at urban level, to incorporate nature in the city and to promote sustainable development. NBS projects are entirely governed by the municipality and its departments. The projects management concerns mainly their maintenance.

So far the scale of NBS completed in Pavlos Melas municipality is small. The first big scale NBS in the municipality is the Metropolitan Park of Pavlos Melas. Due to its metropolitan character and its large scale, the regeneration project has the potential to become a groundbreaking exemplar on the national level of how a wide range of benefits (environmental, social, economic, sustainable management...) can be found in investing in green (re)development. However, innovative governance models, financing and entrepreneurship opportunities and effective assessment are the main issues to tackle related to NBS.

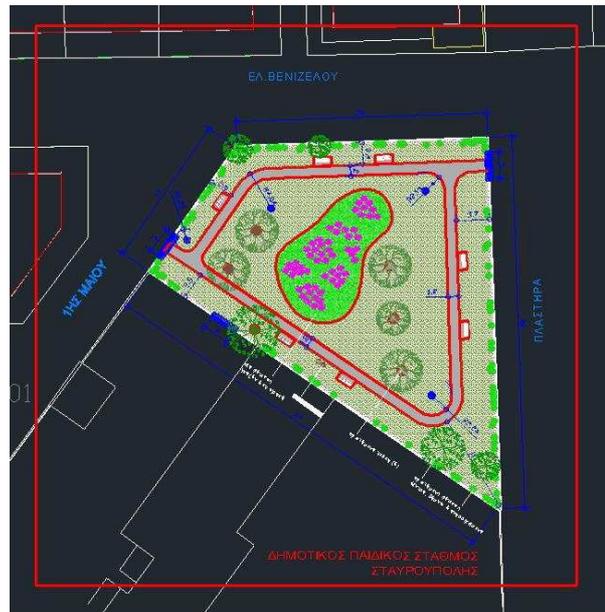


Figure 3: NBS in Pavlos Melas municipality

Step 2 Define the goals of your nature-based solution

The creation of the Metropolitan Park of Pavlos Melas on the former military camp of Pavlos Melas is the flagship nature-based solution of the city. Pavlos Melas ex-camp is a place of special historical and environmental value for the city. For the last two decades, its concession and public reuse have been strongly claimed by the administrative mechanisms of the Municipality and the local community. The demands are closely linked to the values of the place. The green area of the camp can significantly contribute to the improvement of the quality of life. The promotion of its multifaceted historical value is a critical factor and an important contribution to the historical-

cultural identity of the recent transitional years of Thessaloniki. The ultimate **goal** of the project is to highlight these values.

The text of the ex-camp concession from the National Defense Fund to the municipality of Pavlos Melas states that the program development **aims at** the integration of the former camp into the urban fabric and social life of the city, as a supra-local green space, and at the same time, the camp protection and its promotion as a cultural heritage site. Hence, strategic planning aims initially to create a green space that will bring nature to the city and protect the site identity. However, through nature-based solutions, which provide sustainable, cost-effective and flexible alternatives of multiple purposes, Pavlos Melas municipality intends to achieve environmental, social, cultural and economic **benefits** at the same time and to transform the Metropolitan Park of Pavlos Melas into an urban open innovation core. This transition will be achieved unleashing the ex-camp's potential as a valuable natural resource, historical site and driving force for economic growth and job creation, social cohesion and environmental sustainability.

The regeneration of the former military camp will deliver multiple **benefits and co-benefits** both to the local municipality of Pavlos Melas and the wider metropolitan city of Thessaloniki, such:

- More nature into the city
- Increased green space per capita ratio (currently being at 3.78 m²/inhabitant)
- Protection / enhancement of biodiversity and ecosystems
- Reduction of the “heat island” effect
- Reduction of the air pollution
- Decrease of the noise created by the adjacent streets
- Climate change mitigation – acting as CO₂ sink
- Water management and flood control
- Enhancement of human wellbeing
- Improvement of the citizens health
- Contribution to social cohesion
- Promotion of the cultural and historical identity of the region
- Awareness /knowledge on the environment and sustainability issues
- Green economy opportunities
- Enhancement of NBE
- Strengthening of the local economy

Pavlos Melas Metropolitan Park strategy is **legally binding** since, it is connected to existing policy plans and official documents. The project was included in the Operational Program of Pavlos Melas Municipality 2015 – 2019, in line with its goals to transform the city into a friendly, resilient and sustainable place to live. According to this strategic plan, five sectors were prioritized:

- protection and improvement of natural and urban environment,
- services for social support,
- improvement of educational, cultural and sports services,
- support of local economy, entrepreneurship and reduction of unemployment,
- improvement of public services' delivering, with the empowerment of administrative ability.

The NBS project is also included in the current Operational Program of Pavlos Melas Municipality that is under development.

Based on the ex-camp concession terms and after consultation with the city, the Municipality of Pavlos Melas carried out a guideline and programming document, the "Strategic plan for the

regeneration of the former Pavlos Melas camp in a green space of metropolitan scope", that was approved by the City Council. Following the directions of the Metropolitan Park strategic plan, the Special Spatial Plan was prepared for the determination of land uses and in general the urban planning in the area of the former camp. The Special Spatial Plan included in addition to the main urban planning, *Geological Suitability Assessment*, as well as *Environmental Impact Assessment*. After the approval of the strategic and urban planning, the Ex-ante Study of Economic Viability was finalized as an additional step towards the completion and specialization of the relevant decisions and submitted for approval to the municipal council.

Step 3 Identify your target audience and other relevant actor

The Connecting Nature Framework report is a useful tool for internal and external use, to introduce and promote the concept of nature-based solution and as a dissemination report to communicate Pavlos Melas Metropolitan Park, the first big scale nature-based solution in the city. Hence, it can be used for interdepartmental synergies and networking with different stakeholders. It can also be helpful as a means of citizen awareness and engagement. In addition, the Connecting Nature Framework report registers and organizes all the information about our exemplar and methodology.

However, language is definitely a barrier, as it is written in English. If it could be translated into the local language, then the multiplier effect would be greatly amplified.

The Connecting Framework Report has been developed by the Pavlos Melas Connecting Nature team with inputs from members of all the municipal departments that are involved in the Metropolitan Park program.

Step 4 Introduce your nature-based solution exemplar

PMMP is located in the area of an ex-military camp. This area is of great importance for the community due to its highly historical character. In 1895 the military camp was established by the Turkish army. In 1941 the camp was used by the Nazi as a concentration and execution camp during the Second World War (until 1944). Until 1949 the camp was used by the Greek army through the Greek civil war. The camp was used as a military site up to 2006, when it was abandoned. Nowadays it is an 'Urban Gap' in the city center that contributes at the deprivation of the area. In order to reverse the situation, the municipality has focused on a strategic regeneration planning based on different steps and procedures, with increased dialogue and cooperation of key stakeholders.



Photo 1,2 : Photos of the stables, September 12, 1916. Source: Ministère de la Culture (France) – Médiathèque de l'Architecture et du Patrimoine

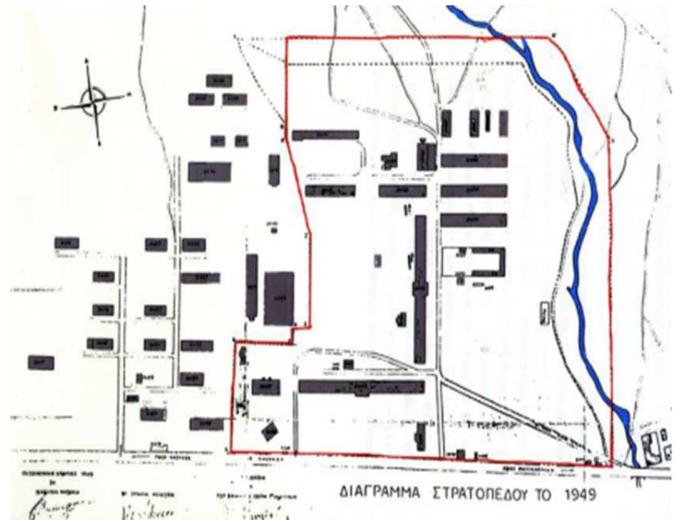


Photo 3: Photo of the 1929 military building. The skylights are also visible on the roof which today are no longer preserved . Source: Archive of B. Pantazopoulos as quoted in Psyllakis, 2012: 7

Photo 4: Schedule of the camp in 1949. Source: Archives of the Municipality of Pavlos Melas.



Photo 5: Photo of the south side of the camp in 1994. Source: Periodical publication of the Municipality of Neapolis as mentioned in Kourti, 2017: 213

The "Strategic plan for the transformation of the former Pavlos Melas camp in a green space of metropolitan scale" takes into account a number of guidelines and commitments on the camp reuse issues, the most important of which are:

- the protection status of the historic site of the camp,
- the existing property status and urban planning status,
- the current state of greenery, building stock, infrastructure, temporary and permanent uses in the area,
- the location of the camp in the urban complex and the demographic, social and urban characteristics of its wider area,
- the reuse proposals to date, the current guidelines from the above levels design, but also the general trends of green space regeneration at national and supranational level.

Based on all the above, the strategic plan sets out the objectives, pillars and basic planning principles of the former camp regeneration. It also determines the percentage of built – non built area, proposing the demolition of buildings that had no morphological, historical or functional value or were in a very poor state of preservation. For the remaining buildings, as well as the open space, the strategic plan proposes a land use scenario, provides guidelines for the maintenance and enhancement of greenery and organizes the next steps of the implementation in phases, recognizing that the intervention is a multi-year, costly and complex administrative program that is feasible and imperative to be implemented in phases.

The project first phase (A), for which the budget has already been secured, focuses on the green spaces in Pavlos Melas ex-camp. The object of the project is the environmental upgrade of the open space and the appropriate infrastructure construction to ensure accessibility and safe public use.

The project later phase(s) will install in the metropolitan park a diversity of uses, among which a new Town Hall. Except public uses attributed to preserved buildings, such as administration, museums, environmental awareness & sustainability development center, other uses, that could attract private investment (sport & leisure, social/creative/nature-based economy, hotel, conference center, etc.), could be foreseen for specific locations and for a limited number of buildings. The project later phase(s) will focus on the renovation of the preserved decaying buildings that are already present on the site, as no new construction on the camp site is permitted, and on the further development of the outdoor spaces.



Figure 4: Pavlos Melas former military camp current configuration



Figure 5: Metropolitan Park of Pavlos Melas after phase A implementation configuration

Step 5 Position this report

The participation of Pavlos Melas municipality in the CONNECTING Nature partnership as a fast-follower city was a crucial transformation point, as the nature-based solution concept was embedded in Pavlos Melas Metropolitan Park programme, offering new dimensions. In this context, the CONNECTING Nature framework has been applied by the municipality as a novel process of strategic planning to transform the former military camp into the flagship nature-based solution of the city.

The CONNECTING Nature framework elements and processes were tailored and fitted to the city context. The creation and involvement of an open innovation team of internal key stakeholders and external key experts from the planning phase was determinant for the effective implementation of the project and its sustainability. This cooperation created new perspectives for an effective interdepartmental way of working. In parallel, the team accomplished a deep understanding and built important experience on co-production procedure, that was approached, developed and incorporated in the business-as-usual work process, boosting the team capacity and strengthening the ability to cope with nature-based solution challenges. These challenges consumed time and resources to be initially identified and then commitment and constant work to be envisaged. However, practice and familiarization with the CN framework helped to address difficulties in an effective way.

2. TECHNICAL SOLUTIONS

Step 1 Define the nature-based solution

Pavlos Melas Metropolitan Park is the first big scale nature-based solution of Pavlos Melas municipality that will deliver multiple benefits to local and metropolitan level.

The former military camp is **located** on the northwestern and fully urbanized side of the metropolitan city of Thessaloniki, at the point of contact of three municipalities. The access to it is supported by Lagadas street, the main axis Connecting Thessaloniki with the ring road and the highway. In addition, a metro station in Pavlos Melas Metropolitan Park has been announced in the framework of the subway extension planning towards west Thessaloniki.

The area corresponds to 332.104 m² and comprises 63 buildings of 24.000 m².

The project will be implemented in phases based on its Strategic Plan.

The **phase A** of the project is entitled "Environmental upgrade and delivery of the Metropolitan Park of Pavlos Melas in common use" and includes a set of works that will lead to the environmental upgrade and the construction of infrastructure for accessibility and safe use of the open space area of the former camp by the public.

The start of phase A has been delayed due to operational difficulties during the COVID-19 pandemic crisis. The tendering procedure of phase A is ongoing and it will be completed with the designation of the successful tenderer in the next period According to **the schedule**, the works will be completed within 18 months from the day of their start.

Design principles

The basic **design principles** of the intervention are derived from the objectives for the protection of the environment, the upgrading of the space and its return to the public as follows:

- Preservation and enhancement of the physical characteristics of the former camp, ie of the ground, the view, the vegetation, the ventilation and the lighting through the adoption of mild interventions in construction and morphologically in the direction of minimizing the human intervention in the natural data and the preservation of the sense of the "semi-wild" park.
- Conservation, utilization and enhancement of existing vegetation in order to improve biodiversity and the urban ecological role of the city. Adoption of the central idea of the "tree



Figure 6,7: Metropolitan Park of Pavlos Melas logo

garden" that will reflect the dynamics of cyclical time through the changes of daily and annual cycles and will be a dominant functional unit through the environmental learning activities it can host.

- Connection of the park with the wider urban fabric and the city through new route layouts and new traffic regulations. In order to adapt the space to its new use as a park, the internal movements of pedestrians are rearranged through the new route layouts and the individual sections of spaces that they delimit.
- Adoption of design options to ensure the perimeter boundaries of the park, enhance accessibility by delimiting four parking spaces and block access to vehicles that do not serve operational needs.
- Design differentiation of outdoor spaces in terms of their function (gardens, sports fields, squares, outdoor events, exhibition spaces, etc.) and adaptation of the infrastructure and equipment of the outdoor space to this differentiated plan of functions with elements of various autonomous "episodes" as elements of surprise and play.
- Adoption of principles of bioclimatic design and interventions of renewable energy sources with reduction of the built surfaces, restoration of soils to the water permeable state, use of RES, energy saving methods in lighting, etc.
- Exclusion of internal and separation of the space through the configuration of "special purpose" areas (such as playgrounds or fenced fields).
- Protection of the preserved buildings and the historical character of the place.

Interventions description

The project includes all the basic interventions of the ex-camp conversion into a park, as well as all the necessary infrastructure (water supply, sewerage, electricity) to support the operation both of open space area and buildings. The main categories of works included in the project therefore concern the following:

1. Demolition works-soil rehabilitation



Figure 8: Building stock: 24.292 m² built surface. Green-16% (4.115 m²) in good condition, Yellow-26% (6.531 m²) in moderate condition and Red-58% (13.646 m²) in bad condition



Figure 9: Soil types in the intervention area

2. Temporary measures for the protection of preserved buildings



Figure 10: Protection scaffold of building

3. Infrastructure of irrigation - water supply – sewerage
4. Electromechanical installations
5. Green Configuration



Figure 11: Existing vegetation mapping

In order to create a metropolitan park that will function as a natural resource in the urban environment and not just as a green infrastructure with sports facilities and recreation areas, emphasis is given to technical planting projects and their maintenance.

The area of the former camp is abandoned but not without vegetation. It is covered by rich vegetation whose reformation requires gentle interventions in order to identify and utilize the natural shapes and lines composed of the existing, native and non-native, plant species. The ecological, functional and aesthetic value of the vegetation exists and should be upgraded with substantial interventions of landscaping and enrichment with a variety of resistant to the soil-climatic conditions native species of high ecological value. The existing vegetation must be maintained and shaped with the appropriate works and the new plantings must be "harmonized" with the existing landscape. The existing plant units that have a considerable variety of vegetation species, high resistance to soil and climatic conditions and low-cost maintenance requirements, are the comparative advantage of the former camp that needs to be exploited.

The network of green spaces that will be formed intends to: a) connect the different land uses in the Metropolitan Park with each other and with the city b) offer opportunities for recreation, environmental education and awareness, promotion of cultural heritage, social activation of open spaces, c) offer the opportunity for walking routes, d) enrich the biodiversity of the city and e) improve the urban microclimate.

The project includes all the works that contribute to the conservation, protection and "harmonization" of the existing vegetation with the new plantings. At the same time, it includes new plantations that will contribute to the expansion of forest ecosystems, the boundaries configuration of the metropolitan park, the connection of plant units with tree paths, as well as the creation of a tree garden for the maintenance and protection of which will require mild cultivation interventions and low energy requirements. Any intervention will not disturb the ecosystem balance, as the main functional goal of the vegetation protection and enhancement is the improvement and conservation of natural resources in the urban area with the ultimate goal of improving the quality of life of residents.

6. Space demarcation- paths - entrance gates - parking lots

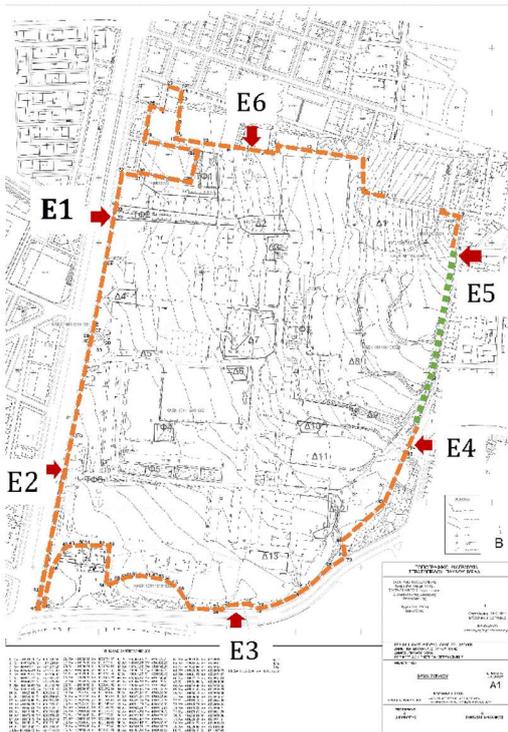
The internal paths are drawn taking into account the formed situation, the needs imposed by the redesign of the space, but also the promotion in the best possible way of the historical value of the buildings and the surrounding area. The coating materials (asphalt, cement, etc.) are removed along the paths that are maintained and permeable materials are applied to the new alignments. The final surface is formed with slopes that allow the natural outflow of water and its permeability. In this way, an attempt is made not to disturb the current efficient way of water drainage and the implementation of a nature-based solution.

7. Pergolas - living rooms

Three arrangements of pergolas with living rooms and photovoltaic panels are placed in the open space of the park.

8. Kiosks construction

Three kiosks will be built that will be distinguished from each other by the color of their external surfaces (red, yellow and green). The manufacture of kiosks is considered necessary as they include sanitary facilities to serve the public.



Figures 12,13,14: Location of entrances – exits, Entrance gate E1, Paths configuration



Figure 15: Pergolas



Figure 16: Typical kiosk

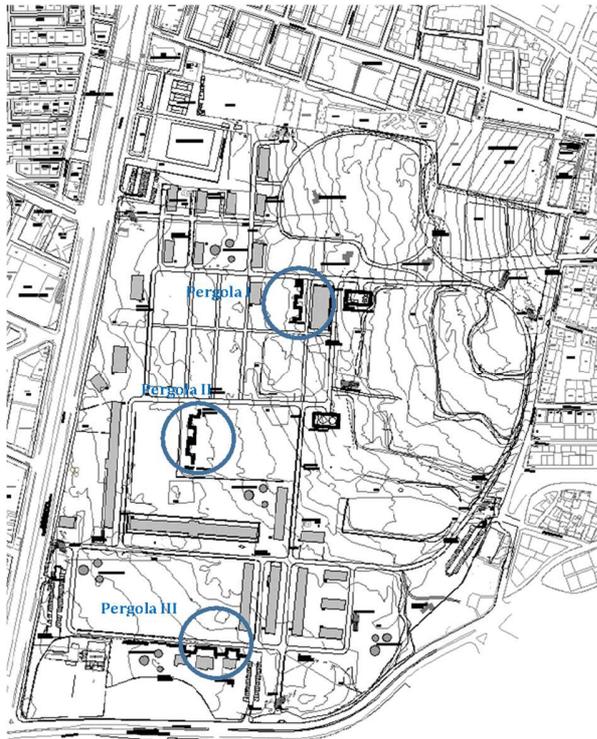


Figure 17: Location of pergolas

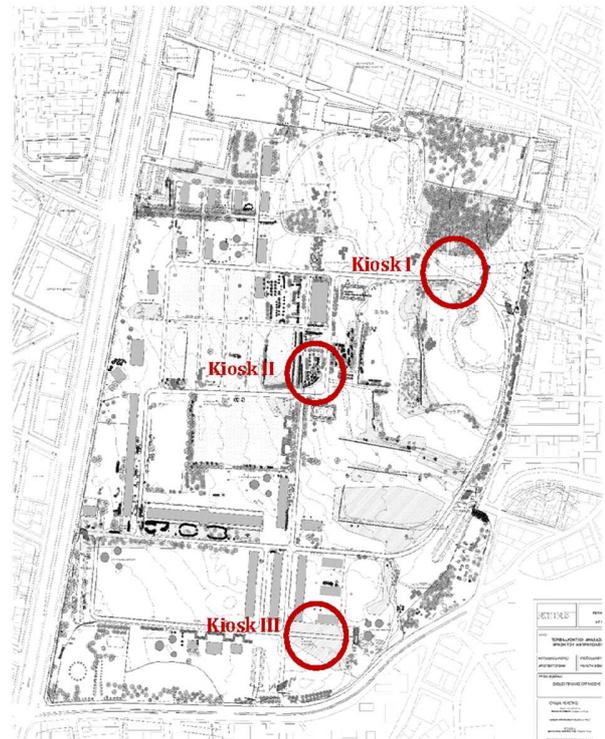


Figure 18: Kiosk location

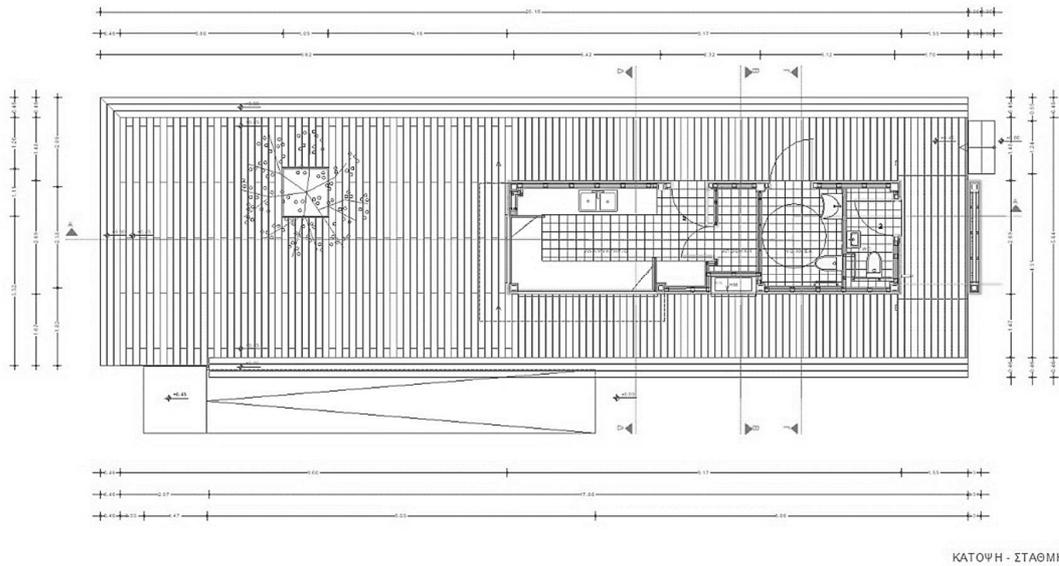


Figure 19: Typical kiosk floor plan

9. Outdoor equipment

Important elements of the park urban equipment are the wooden platforms.



Figures 20,21: Circular and rectangular platforms

Info points in six places are foreseen. Finally, in a central position a climbing - swing game will be placed that offers free play to children.



Figures 22,23: Information sign-point and swing toy

10. Memory cells

"Memory cells" are marble cubes with engraved inscriptions dedicated to the victims of the Nazi period of the camp. "Memory cells" are constructed in a way that can simultaneously function as sitting rooms.



Figure 24: Memory cells

Step 2 The landscape context and ecosystem services needs

The intervention area is part of the Municipality of Pavlos Melas. The extent of the municipality is 23.76 km² and, with a population of 99245 people, it is the 3rd largest municipality of Thessaloniki and the 18th in Greece, according to 2011's census. The intervention area is located in the middle of a very densely populated urban area, at the point of contact of the borders of three municipalities of Thessaloniki. The location of the area at a short distance from the historic center and core of Thessaloniki metropolitan city makes it directly accessible from the center of Thessaloniki and part of both metropolitan and regional planning for the overall development. In addition, it facilitates its connection to networks of local and of supra-local importance. This central location of the intervention area in the western part of Thessaloniki is additionally supported by:

- the existing dense road network, but also the planned transport infrastructure around the area,
- the adjacent regional centers of urban functions (center of commercial and urban functions of Polichni, ex-camp Strebenioti, linear center of Lagada street, etc.),
- the intensively inhabited and high-density neighborhoods around it.

The wider area of influence of the former camp is identified with the western part of Thessaloniki urban complex.

The road infrastructure surrounding the former camp is capable of supporting the potentially supra-local role of the Metropolitan Park. Specifically, the area has direct access to the ring road and the highway Connecting the Region of Central Macedonia with the other urban centers of northern Greece and South Europe. The metro station of the subway extension planning towards west Thessaloniki is located in direct contact with Pavlos Melas Metropolitan Park. This will give easy access to the park area even from the most remote areas of the city.

The immediate area of influence, which corresponds to a distance of about 1km perimeter or

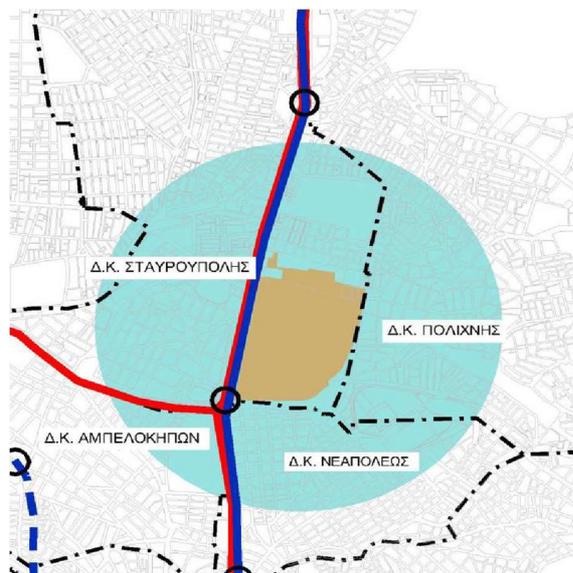


Figure 25: The immediate influence area of the intervention

about 15 minutes on foot to and from the intervention area, Figure 25 includes neighborhoods inhabited at different times and with different ways (based on city plan or spontaneous). This direct zone of influence includes areas that were inhabited during the refugee settlement, which then, as directly adjacent to the historic center of Thessaloniki, became denser in terms of urban planning and population. These areas were built based on urban planning however, particularly high building rates (2.4 and 2.0) were later adopted, which ultimately yielded high housing densities (256 and 187 respectively) and similar shortages of public places and public green spaces. The immediate area of influence also includes urban units that emerged through the formation of arbitrary settlements. In these areas the spatial

problems were and continue to be particularly acute despite the renovation projects that were implemented from time to time. These neighborhoods are areas inhabited by working people in the first post-war period and because they are considered places of misery and poverty, they were soon abandoned by the younger generations. Most of the neighborhoods in the immediate vicinity of the ex-camp are now experiencing massive population aging (urban shrinkage), significant degradation of building stock, low land values and concentration of various new vulnerable populations, such as immigrants and refugees.



Figure 26: The location of the intervention area in the metropolitan area of Thessaloniki

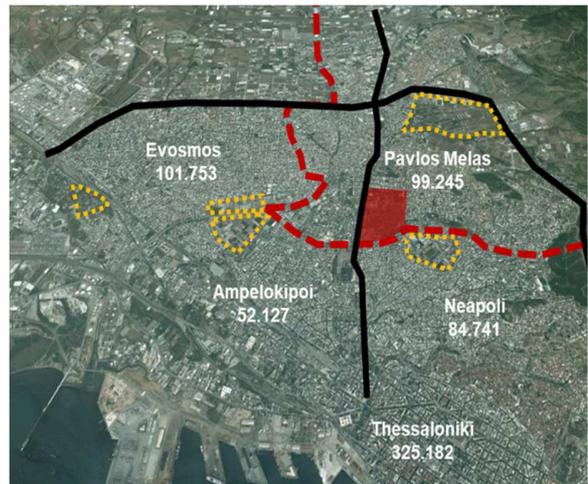


Figure 27: Pavlos Melas municipality in the Regional District of Thessaloniki

This population decline is due to a trend that has been observed since the 1980s and has become general in the last decade and concerns the movement of the population from the more central, denser areas with less public spaces, to the peripheral settlements. These newly built areas have a low average age and a larger child population. Therefore, in the wider zone of influence of the camp i.e., in western Thessaloniki, there is a complex phenomenon that includes both urban sprawl and general population growth in peripheral locations where newly built housing is available, but also population decline in older and more central neighborhoods.

A challenge, therefore, that the intervention must face at the demographic level, is to limit the outflow of population in the immediate zone of influence, but also to serve the needs for free space and recreation of the younger population in the wider zone.

In terms of economic activity, the urban units around the former camp were developed as residential areas, resulting in key deficiencies in the infrastructure and functions of the city center. Over the years, various parameters have contributed to the development of local centers, usually with a linear dispersion of uses, as trade, services and leisure, concentrated on main roads, as shown on the map, figure 25.

Cultural, sports and recreational uses are scattered around the former camp through the green zone on its north side and the important poles of the area around the cultural center of Moni Lazariston with leisure shops and a large hotel and the former camp Strempeniotis, an extensive service, sports, education and leisure center with an impact on the wider area of northwestern Thessaloniki. However, the prospects for further development of the centers, connection and creation of their multifunctional character are an economic challenge for the intervention sector.



Figure 28: Scattering of activity poles around the intervention area (yellow - linear local center of trade, services, leisure; red - linear development of culture, leisure; green - large green spaces, public activities)

Regarding the social challenges, the main feature of the human geography of Thessaloniki is the socio-spatial separation between the central-eastern areas and those on the west side. Although the conditions of the economic crisis have significantly affected the entire population in Greece, however, recent data confirm the significant consequences for the inhabitants of the study area. According to data from the Region of Central Macedonia, which are included in the text of the Strategy for Social Integration and against Poverty, the western regions have particularly high rates of vulnerable and special population groups, as well as high unemployment rates compared to the rest of Thessaloniki. Unemployment is the main social problem in the area of immediate intervention. Indicatively, it is mentioned that during the 2011 census the percentage of unemployed in the Municipality of Pavlos Melas was 27.5% of the active population, ten percentage points above the national average. Similar percentages were recorded in the other western municipalities of Thessaloniki.

In addition, the research on the conditions of poverty in the individual municipal units of Pavlos Melas municipality, conducted by the National & Kapodistrian University of Athens, estimated that the greatest deprivation is concentrated in the neighborhoods of the old residential core located in the immediate intervention pocket of the ex-camp, Figure 28. The same results were extracted by the spatial representation of the population addressed to the social service of the Municipality for social, labor, medical and welfare support.

An additional challenge facing the proposed NBS is therefore to help address the multifaceted pressures of the population in neighboring residential areas.

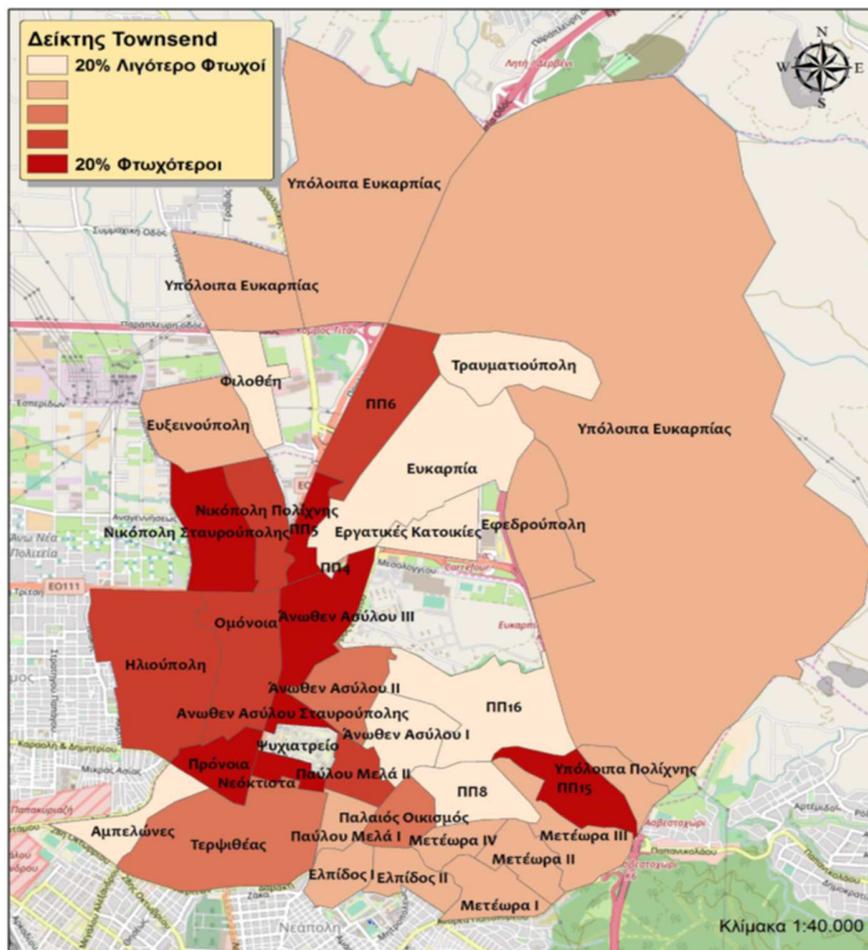


Figure 29: Degree of deprivation per municipal unit in the Municipality of Pavlos Melas. Source: Survey on the social profile of Pavlos Melas Municipality and its interconnection with the spatial scale.

Step 3 Embedding multiple functions into the planning, delivery and stewardship of the nature-based solution

The regeneration of the former military camp through flexible multi-purpose systemic interventions that will be co-produced with stakeholder and community engagement, will deliver environmental, social and economic benefits both to the Municipality of Pavlos Melas and the wider metropolitan city of Thessaloniki.

The planting of six thousand new plants (endemic species with low water requirements), the avoidance of soil cover, the (limited) application of environmentally friendly materials, the preservation of coarse natural landscape, etc., are intended to create environmental benefits.

At the same time, the programs and actions development in the Park for social cohesion, integration of vulnerable groups and promotion of the historical and cultural identity of the place, the co-production at all steps of Park's implementation and operation, the creation of a center for sustainable development and environmental awareness will create the social benefit potential of Metropolitan Park.

Moreover, the whole project will be supported by actions to boost economic growth, but also the project itself will create economic benefits.

Step 4 Monitoring and evaluation

Based on opportunities and goals, the Technical Solution, its details and features were identified. Considering the local needs, multiple functions were embedded into the technical solution to deliver environmental, social and economic benefits both to the Municipality of Pavlos Melas and the wider metropolitan city of Thessaloniki. However, it is recognized that ongoing adaptation of the technical solutions will ensure long term sustainability and resilience.

Using the framework of RM and applying the Impact Assessment System, learning outcomes will facilitate monitoring and evaluation of the NBS. In the framework of an ongoing monitoring throughout the Pavlos Melas Metropolitan Park program, evaluation will take place with a structured format and methodology, saving time and offering flexibility to use learning outcomes and translate them in actions at any time during the program evolution. Technical solution stewardship should be evaluated considering the bigger picture and combining different perspectives and types of knowledge along with the participation of different actors (civil servants, citizens, voluntary groups, nature-based enterprises and so on).

Step 5 Build an evidence base to promote nature based solutions to a wider catchment

As a result of the work of Pavlos Melas team in joint with key stakeholders in applying the CN Framework, Pavlos Melas Metropolitan Park has been developed as the first big scale nature based solution in the municipality and the wider metropolitan city of Thessaloniki. Besides to its strategic goals as a green space within the urban fabric to bring nature in the city, to promote social inclusion, to boost economic grow, to promote the historical and cultural identity of the place, the adoption of CN framework methodology, during the phases of planning, implementation and stewardship, will transform Metropolitan Park of Pavlos Melas in a model of urban NBS. Hence, by building evidence of the value of Pavlos Melas Metropolitan Park as a nature-based solution and sharing it, along with the experience of Pavlos Melas team, among a

wide audience, out scaling (reproducing nature based solutions in other areas) can be achieved at city, regional and national level. It should be recognized that tailoring the technical solution design to the needs and scale of any new area, is very important.

3. GOVERNANCE

Step 1 Make the case: aligning nature-based solutions with the wider goals of a city or community

The program of projects related to the transition of the ex-camp of Pavlos Melas to a Metropolitan Park is managed by the Department of Urban Development and Financing Programs, a department with cross-cutting responsibilities reporting directly to the Mayor. However, the multi-sectoral and multi-level character of the program requires the involvement of executives of many departments of the Municipality at different stages during the implementation and stewardship of the program. In the strategic planning of the project supervised by the department of Urban Development and Financial Programs, executives of the Technical Service, the department of Environment and Green, the Urban Planning and the Financial Service have participated. The involvement of the Department of Social Services, Culture, Sports & Education Department, Administrative Services Department, as well as the Municipal Police Department is carried out gradually in the framework of strategic planning and it is a necessary prerequisite for the implementation of the first large-scale NBS in the Municipality of Pavlos Melas.

The Mayor has the general supervision of the progress of Pavlos Melas Metropolitan Park program.

The interest in the development of the city's ex-camps dates back to the mid-1980s and is based on the significant shortages of Thessaloniki, and Greek cities in general, in land for the development of public spaces. In recent years, these initiatives have been reinforced by mass movements and citizens' initiatives demanding the increase of public green spaces through the utilization of the available undeveloped areas of the city.

The same need has been found in official planning texts. The current regulatory plans of Athens and Thessaloniki give instructions for the development of recreation poles of supra-local importance. More specifically, it is proposed to create a system of recreational, sports and cultural functions, which will serve the entire city. It is also foreseen the promotion of large-scale interventions, such as the connection of large historical sites, the creation of axes of historical importance, but also the rehabilitation of highly degraded areas, such as the western areas of Thessaloniki. Finally, in the strategic and operational plan of Thessaloniki, it is emphasized that in order to address the serious shortages of the city in green spaces, areas resulting from relocations or land use changes, such as ex-camps, should be characterized as green spaces.

The project therefore responds substantially to the need, in which "top-down" policies and "bottom-up" demands converge, to increase functional green spaces and large-scale parks in the city.

At the same time, the project and the type of interventions it includes meet and contribute ideally to the goals of Cohesion Policy 2014-2020, as they are transformed into the Partnership Agreement. In this context, development is governed by the principles of sustainability, which means that it must be managed in a way that is economically, socially and environmentally sustainable.

To this end, the thematic objective 6 "Preservation and protection of the environment and the promotion of the efficient use of resources" has been included in the PA (Partnership Agreement

for the Development Framework) 2014-2020, as well as other objectives that jointly promote environmental protection and biodiversity, the mitigation of climate change, social equality and public participation.

The financial mechanism of Integrated Territorial Investments also contributes to the complex concept of social, economic and spatial cohesion, which through the simultaneous utilization of various development axes promotes the territorial capital and the comparative advantages of the intervention area.

Step 2 Current status of the location: identify the current use, ownership and management of where you want to implement your nature-based solution

The former camp was given in 2017 to the municipality of Pavlos Melas by the National Defense Fund and since then it is managed by the municipality. Despite the methodical and intensive actions of the municipality for the strategic planning, and the technical and financial promotion of the regeneration of the former camp of Pavlos

Melas in a green area of metropolitan scope, the actions for its regulation and governance have not been completed. As a consequence, the site maintains the characterization of an urban gap. The term "urban gap" is used for spaces that lack the clarity of a specific use in physical and functional continuity with the structure of a city. At the same time, they are places for spontaneous and informal appropriation by formal and informal practices that give these spaces temporary or permanent identities. The former camp of Pavlos Melas confirms both of these properties of urban gaps, as while it is in organizational abandonment since 2006, however, it has been developed into an emblematic place of events and festivals of all kinds. This fact shows the need of the people of the city for free public spaces that host aspects of their collective life and, on the other hand, the public character of the camp as a place that is multifunctional and open to spontaneous appropriation.

In the ex-camp there are installed "permanent" and scattered uses, such as activities related to the existing church on the west side and the daily operation of the support services of the municipality in the center and north sector.

However, the area is occasionally used by various associations, organizations or groups, but also the Municipality of Pavlos Melas, who organize actions or events, such as festivals, performances, concerts, protests and open meetings, as well as educational, environmental and sports programs organized by the municipality.

Concerning non-organized occasional uses, the ex-camp is used daily for many uses, such as walking and sports of all ages, recreation for children and pets, a break for professional guides, seclusion for groups of teenagers. All the above uses are diffused in the western zone of the camp which is more safe, due to the permanent uses that are developed in it.

The buildings are temporarily used by refugees, migrants, Roma or the homeless as accommodation or dormitories. This occasional use of the buildings as a residence is estimated to have caused some of the fires occurred in the camp. In addition, various illegal or less "permissible" behaviors have been reported occasionally within the area, especially at night and mainly on the east side, which is more isolated.

Step 3,4 & 5 Who are the required partners, how will you work together and what will you need to succeed?

In order to achieve the goals of Pavlos Melas Metropolitan Park as a multipurpose place with environmental, social, cultural and economic benefits, the need for an innovative approach, compared to a regular urban planning process, was emerged. The fundamental opportunity for the Metropolitan Park programme was not in developing the site but in embedding an inclusive and change oriented process that could have much greater impact for the city. The necessity to set up an Open Innovation Team within the municipality was obvious and it was brought up that even before considering to involve in external actors, the priority lied in creating an open innovation team between the various departments of Pavlos Melas municipality. Seen the scale and complexity of the programme, it was necessary to have almost all the departments of Pavlos Melas involved and this with a dynamic exchange, as most workstreams to be dealt with require interactive exchange.

A leading core open innovation team of motivated and committed people from each department was necessary, that should be expanded later. In order to establish such a team, clear and regular internal communication was needed, which required a solid understanding and strong clear vision on the project.

Through a mapping session in which all the departments discussed in relation to the contribution they could and should bring to the nature-based solution development and what they need to achieve this, as well as their potential gains. The necessity for most departments to contribute actively (in contrary to passive task fulfilment) was illustrated and for this dynamic and regular exchange was required.

In order to find enough workforce to carry all the workload, the next steps were to open up the core team. The idea for an open call to join and work on the project was suggested, involving more actors within the municipality as well as external ones, such as the university, citizens and private actors. In this way, new perspectives for the involvement of each department in Pavlos Melas Metropolitan Park were identified and developed in practice.

The creation and involvement of the open innovation team of internal key stakeholders and external key actors from the planning phase was determinant for the effective implementation of the project, as well as the project sustainability. This cooperation created new perspectives for an effective interdepartmental way of working. In parallel, the team accomplished a deep understanding and built important experience on co-production procedure, that was approached, developed and incorporated in the business-as-usual work process, boosting the Pavlos Melas team capacity and strengthening the ability to cope with nature-based solution challenges.

In addition, the need of an innovative and agile governance model was illustrated as a key to ensure long term success and sustainability.

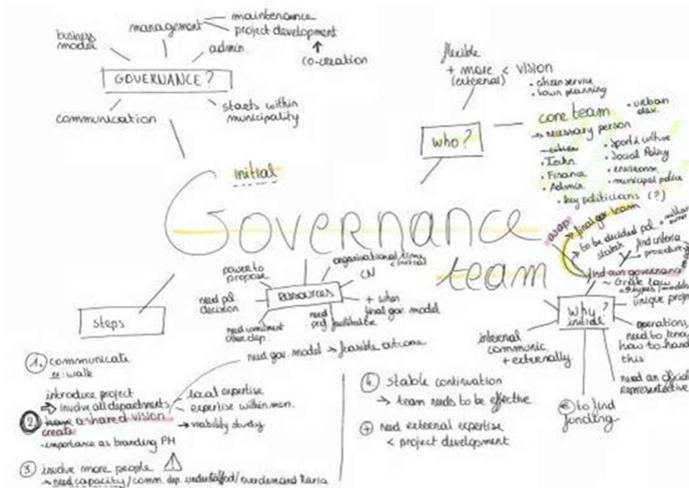


Figure 30: Multiple facets of a novel governance model

CN processes (Co-production and reflexive monitoring) and knowledge transfer procedure helped Pavlos Melas team to recognize that the intervention is a multi-year, costly and complex administrative program. Therefore, multi-level synergies are necessary to support this multi phases program of such a big scale. In this framework, directly related to the Governance building block, a multi-level synergy of municipal, regional and national scale was developed to support the municipality during the program implementation and stewardship. In this framework the program is being implemented in phases through a model of governance, totally novel for the municipality and its extroversion and at the same time effective.

4. FINANCING AND BUSINESS MODELS

Step 1: Lessons learned from how NBS has been financed in each city to date

In Pavlos Melas municipality many urban and peri-urban projects of NBS and green infrastructure have been completed or are implemented. The key projects are bioclimatic regeneration of public spaces, energy saving intervention projects in sport centers, energy saving lighting projects, a green roof in a school complex of 6.042 m² project and a peri-urban, open air cultural center and water park. These NBS or related to NBS projects have been motivated by the need to protect the environment and to promote resource efficiency at urban level. In Pavlos Melas Municipality, the capital expenditure costs of green infrastructure projects have been financed mainly from national funds and EU structural funds, while the respective ongoing operational costs are included in the annual budget of the municipality. Concerning the governance structure, NBS projects are entirely managed by the municipality and its departments. Since no actions to create added value have been undertaken and no collaboration with private sector has been developed, the projects management concerns mainly their maintenance. The absence of need, culture or relevant legislative framework led to the operation of the public sector without external collaboration or even synergies with non-public bodies.

Connecting Nature has crucially improved the capacity of the municipality to handle major Nature-Based Solution issues as well as has strengthened the ability to cope with Nature-Based Solution business model and governance. In parallel, the staff of the municipality is highly qualified, knowledgeable about sustainable development transition goals and needs of the city, has expertise in environmental, social and economic policies and strategies and more than 15 years working experience. In accordance, the municipality possesses adequate number of skilled employees, as well as external advisors and collaborators at city, regional and national level, to assist the project, apart from the project team. That is, there is the possibility to use additional personnel when a necessity arises.

Step 2: Explore opportunities , in financing, governance and business models

The potential of opportunities for new sources of financing of capital expenditure and operational costs and for governance models has been investigated in the framework of the Connecting Nature project. Concerning alternative models of financing, it came out that there has not been used (neither in prior projects in the municipality nor elsewhere in Greece) anything that could be altering the traditional ways such as direct financing from central government or municipal sources, stimulating a paradigm shift for our NBS. We have discussed the contribution of local citizens in the form of tax-increments financing, development charges, value captures or green bonds. We realized that citizens are rather reluctant to contribute since they are suspicious about the implementation and completion of the project. However, the opportunity of engaging those who will participate in the exploitation of the buildings directed to be rent by the private sector has been assessed. It came out that once the project is completed and the buildings are

rent at least 70-80% of the operational costs can be covered from the annual rents eliminating the burden on municipal budget.

Step 3: Planning the financing and business model of Connecting Nature NBS exemplars

Brief Description of exemplar:

The flagship nature-based solution of Pavlos Melas municipality is a project for the transition of a former military camp in the city center into a Metropolitan Park. Pavlos Melas ex-military camp, established by the Turkish army at the end of the 19th century, used as a concentration and execution camp during the Second World War and as a military site up to 2006 when it was abandoned, nowadays is an 'Urban Gap' contributing to the deprivation of the area. In order to reverse the situation, the municipality has focused on a strategic regeneration planning based on different steps and procedures, with increased dialogue and cooperation of key stakeholders.

The former military camp is located on the northwestern and fully urbanized side of the metropolitan city of Thessaloniki. Access to it is supported by Lagadas street, the main axis Connecting the city with the ring road and the highway. In addition, a metro station in Pavlos Melas Metropolitan Park has been announced in the framework of the subway extension planning towards west Thessaloniki.

The area corresponds to 332.104 m² and comprises 63 buildings of 24.000 m². According to the strategic plan, any new construction on the camp site is excluded, 315.700 m² of green space will be shared (*project phase A*), 10.000 m² of poorly maintained buildings will be demolished (*project phase A*) and a use plan for the remaining buildings (*project phase B*) will be adopted. According to the latter, public uses (administration, museums, environmental awareness and sustainability development center, etc.) are attributed to preserved buildings, while uses that can attract private investment and contribute to the sustainability of the park (such as gyms, sport and leisure, social/creative/nature-based economy, small scale hotel, conference center, etc.) are foreseen for specific locations and for a limited number of buildings.



Photos 6,7: Pavlos Melas ex-military camp, current configuration

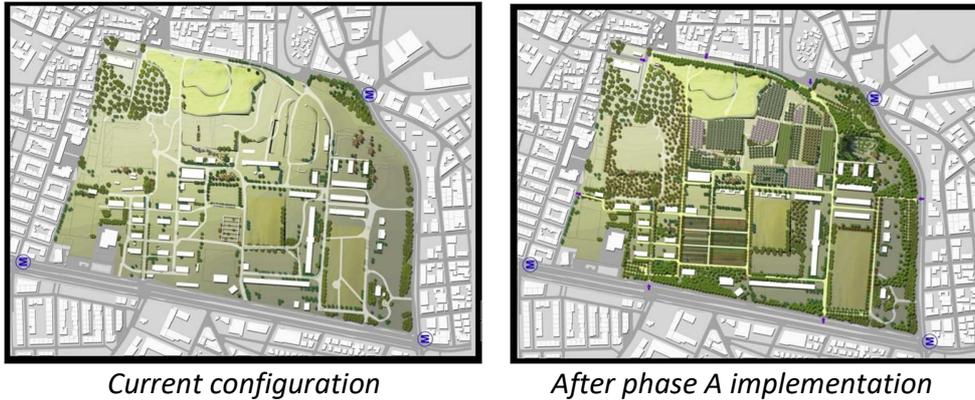


Figure 31,32: Transition of Pavlos Melas ex-military camp into Pavlos Melas Metropolitan Park

A business model approach is followed to planning for the financing and sustainability of the NBS exemplars to be implemented in the Connecting Nature project. The financing plan identifies the upfront capital costs required and potential sources of financing. In the framework of the business model planning, the costs required to sustain ongoing NBS activities, how those costs can be reduced and how to capture the value of NBS, both in terms of direct revenue generation and in terms of translating the wider value delivered by NBS (environmentally, socially and economically) into sources of ongoing operational revenue, are considered.

| | | | | | |
|--|--|--|---|---|--|
| Business Model for Sustainability | Key Activities: | Key Resources | Value proposition | Key Partners | Key Beneficiaries |
| | <ul style="list-style-type: none"> Economic viability study Co-production action plan Indicators and monitoring PMMP Governance model Marketing strategy Public security action plan Strategy of PMMP branding Technical works for open space regeneration project Planting programme Plants & space maintenance Financial tools and funding Entrepreneurship Strategy Sport & recreation actions Social cohesion actions Sustainable development and environmental awareness center Cultural and historical branding strategy | <ul style="list-style-type: none"> Human resources Specialized knowledge and skills CONNECTING Nature partners Networking and clusters Experts: technical consultants, environmental, economic and social sector experts, communications experts and facilitators etc. Financial resources Infrastructure & equipment | <ul style="list-style-type: none"> Green space/capita increase Climate change mitigation Flood alleviation Reduction of heat island Reduction of gas pollution Noise reduction Biodiversity and ecosystems Access to nature Local economy growth Circular, creative, social economy Unemployment, poverty reduction Entrepreneurship & Nature based entrepreneurship New skills development City brand name creation Property values increase Quality of life, health & well-being Social cohesion Participatory processes Education & awareness Historical and cultural identity | <ul style="list-style-type: none"> Community Municipality (staff, council) Major Development Agency of Thessaloniki S.A. Designers-Planners-Engineers Schools Universities Local cultural sector Leisure Economy (enterprises, Social Cooperatives) Fund Health Media | <ul style="list-style-type: none"> Community Municipality Region & central administration Tourism, leisure, sport, culture Entrepreneurs, sponsors Owners of land, real estate agencies Health sector Insurance companies Schools Universities |
| Financing Up-front Costs | Cost Structure | | Cost Reduction | Capturing Value | |
| | <ul style="list-style-type: none"> Governance / Administration Maintenance of green space and infrastructure Public space security Environmental and social actions programmes Marketing and communication (including community animation and engagement activities) Monitoring costs Property/casualty insurance | | <ul style="list-style-type: none"> Smart design and smart solutions to save resources (water & energy) Tree/park adoption by citizens/schools Volunteering Contracts for maintenance services & employment Revenue generation: kiosks, open spaces, buildings Sponsorships, donations, charity, corporate social responsibility, increase in municipal taxes | <ul style="list-style-type: none"> Number of visitors Revenue generation Indicators for indirect benefits (citizen health and wellbeing, quality of life, social cohesion, vulnerable groups inclusion, historical and cultural identity preservation, climate change mitigation and adaptation, etc.) | |
| | Capital Expenditure Costs | | Sources of Capital Investment: | | |

Figure 33: Business Model Canvas and Financing Plan for NBS exemplar(s) (in August 2020)

Brief explanation of major elements/assumptions:

Value proposition:

The regeneration of the former military camp will deliver multiple benefits both to the Municipality of Pavlos Melas and the wider metropolitan city of Thessaloniki. The transition of the ex-military camp of Pavlos Melas into an urban nature-based solution will be achieved unleashing its potential as a valuable natural resource, historical site and driving force for economic growth and job creation, social cohesion and environmental sustainability. Strategic planning aims to create a green space within the urban fabric that will bring nature to the city. The planting of six thousand new plants (endemic species with low water requirements), the avoidance of soil cover, the (limited) application of environmentally friendly materials, the preservation of coarse natural landscape, etc., are intended to create environmental value. At the same time, the programs and actions development in the Park for social cohesion, integration of vulnerable groups and promotion of the historical and cultural identity of the place, the co-production at all steps of Park's implementation and operation, the creation of a center for sustainable development and environmental awareness will create the social value of Metropolitan Park.

Moreover, the whole project will be supported by actions to boost economic growth, but also the project itself will create economic value.

Through all these flexible multi-purpose systemic interventions that will be co-produced with stakeholder and community engagement, the transition of the ex-military camp into Pavlos Melas Metropolitan Park will create value propositions, as presented in Table 1.

| Environmental | Economic | Social |
|--|--|---|
| <ul style="list-style-type: none"> • increase of green space per capita • climate change mitigation • flood alleviation • reduction of heat island • reduction of gas pollution • noise reduction • protection /enhancement of biodiversity and ecosystems sustainability • Access to nature | <ul style="list-style-type: none"> • growth of local economy and opportunities for circular economy, creative economy, social economy • reduction of unemployment and poverty • entrepreneurship •boosting of nature-based entrepreneurship • development of new skills • creation of city brand name • increase of property values | <ul style="list-style-type: none"> • quality of life, improvement of health and well-being • social cohesion • participatory processes • education and awareness • boosting of the community ownership • preservation of historical and cultural identity |

Table 1 Pavlos Melas Metropolitan Park value propositions

Value creation:

Activities, required to deliver the value of Pavlos Melas Metropolitan Park and considered in environmental, economic and social terms, are presented in Table 2:

| Environmental | Economic | Social |
|---|---|---|
| <ul style="list-style-type: none">• Ongoing co-production process• Impact Assessment System• Governance model of PMMP• Communication plan - Metropolitan Park branding• Action plan for public security | <ul style="list-style-type: none">• Financial tools and funding for next project phase (buildings renovation)• Entrepreneurship strategy• NBE support programme• Metropolitan Park NBE cluster• Skills development• Incentives for green start-up/job creation | <ul style="list-style-type: none">• Sport and recreation actions & programmes• Social cohesion actions (Community workshops, Volunteering, actions for community ownership, etc.)• Sustainable development and environmental awareness center |

Table 2 Key activities required to deliver Pavlos Melas Metropolitan Park value propositions

According to the table 2, the propositions that include the technical works, the financial tools and funding and the entrepreneurship strategy are considered priorities. Concerning the technical works for the open space regeneration project, the contract for the environmental upgrade of the Pavlos Melas Metropolitan Park has been signed in 27th of September, 2021 and has to be completed in 2 years.

Regarding the financial tools, the municipality of Pavlos Melas has been searching for additional funding resources in order to have a complete and functional Metropolitan Park by the end of 2028. To this direction, apart from the secured funding described at the Finance Summary table below (table 4), it has been checking for the possibility to exploit funds from The National Recovery and Resilience Plan “Greece 2.0”. Currently we are working on producing all the technical studies for the building being in the area of the park in order to submit the relevant funding proposals.

The goals of NBEs strategy is to raise awareness of NBS and NBE. We have had conversations with the Chamber of Commerce to explain the NBS exemplar and the concept of NBE, and we are planning to map existing NBEs as a first step.

At this moment the Municipality of Pavlos Melas is working through co-creation processes in order to create an optimal governance model.

The co-production action plan is being conducted in order to boost co-creation capacity of the city and to ensure the engagement of experts and stakeholders. The involvement of the quintuple helix actors from the planning phase is determinant for the effective implementation of the project, as well as the project sustainability.

Another activity of immediate priority is the Impact Assessment Plan development to identify and describe the multiple impacts generated by the NBS. At this moment, we have made a significant progress in the Impact Assessment planning. We have selected, through a long list, all the indicators that will be used to measure the impacts of the NBS. This selection was a difficult

and complicated procedure. We have also selected the methods that we will use for the measurement of each indicator. Finally, we managed to make a progress in the policy process field on how we will disclose the results of each indicator and to which stakeholder.

Concerning resources required for the identified above key activities, human resources consist an immediate priority with key contribution to the implementation and operation of the Nature-Based Solution project. Municipal staff, new personnel, local and extra-local community, stakeholders, etc. need to get involved in the project from the first steps and are required for immediate priority activities. From 2019 until 2022, unfortunately the concerning resources are the same. Also from 2019 until 2022, the incremental resources equal to 4,4 million € from the operational program “Antonis Tritsis” plus 1,5 million € from the national public investment program plus 136.500,00€ from the national program “Green Fund”.

At present time, the contribution of **specialized knowledge** to the study of economic viability and the involvement of **Connecting Nature partners** (TCD, UEL, DRIFT, La Coruna University, etc.) in support of actions related to the governance model, monitoring indicators, co-production and co-creation processes are immediate priority resources for achieving the nature-based solution. At the same time and taking into account that the project is the first large scale nature-based solution in the city of Pavlos Melas, **partnership** is a crucial resource for sustainability. Networking and creation of clusters for nature-based solutions in Greece and south-east Europe would support the project and promote NBS in urban environment.

In addition, the contribution of **experts**, such as technical consultants, environmental, economic and social sector experts, communications experts and facilitators for co-production workshops etc., is a prerequisite for the quality of the project and the achievement of its potential value proposition.

Moreover, **financial resources** required to create infrastructure and equipment and to design and implement support programs and actions are a key resource for achieving the value proposition of Pavlos Melas Metropolitan Park. Other required resources are **new skills and knowledge, infrastructure and equipment, communication**.

Finally, the transition of the former military camp of Pavlos Melas into an inclusive Metropolitan Park of urban innovation should be driven by a **coordinated vision**, to inspire all the engaged actors during its design and implementation and to engage inspired actors during its operation. Key partners and beneficiaries. Who needs to be involved to deliver the different value propositions. What is your city’s ‘ideal’ governance model for the long-term management of the NBS e.g. city-managed or citizen-managed?

In order to create a sustainable project, the city pursues to connect partners with experience, knowledge and expertise with the municipal departments, the community and entrepreneurs. To deliver the MPPM value propositions through the key activities the following immediate priority **key partners**¹ need to be involved:

Local and Metropolitan city scale **community**:

- Residents/citizens
- Volunteers network of Pavlos Melas municipality
- “Adapt a tree” and “Adapt a park” municipal programmes

¹ There have been some discussions with some of the immediate priority key partners but until now there is no update. At this moment, the Municipality is in this process of refining the immediate priority key partners list again.

Municipality

- Municipality departments (urban planning, technical implementation, environment, economy, education, culture, etc.)
- Municipality staff
- Municipal Council

Metropolitan scale administration

- Major Development Agency of Thessaloniki S.A.

Designers-Planners-Engineers

- TBC

Schools

- Network "School Open in the Neighborhood - Active Citizen in the Municipality of Pavlos Melas"
- Parent associations

Local cultural sector

- Museums MOMus Metropolitan Organisation of Museums of Visual Arts of Thessaloniki-State Museum of Contemporary Art
- The Drama School of the National Theatre of Northern Greece
- Festival of Moni Lazariston

Leisure

- Concert Organizers
- Open air cinemas
- Escape rooms

Economy

- Local enterprises
 - Lazart Hotel
 - Cafes & restaurants
 - Fitness center
- Local Social Cooperatives
 - Social Cooperative of Limited Liability of Western Thessaloniki

Fund

- Sponsors
- Donators
- Banks
- Financial institutes
- Foundations

So far we have been connected to local residents/citizens (local associations) where we informed them about the regeneration process and the time schedule of the completion of the Park.

We have made a contract with the Major Development Agency of Thessaloniki S.A. for conducting all the technical studies for the building stock of the park.

We have approached the school community via their administrative directions and we are preparing some environmental education packages.

Besides, we cooperate with the local administrative department of Ministry of Culture for the supervision of the works taking part in the Park and we are expecting to have some reports about their findings.

In addition, and according to the ongoing implementation of project phase A and the uses to be attributed to buildings in Metropolitan Park during the project phase B, other potential partners, especially metropolitan city level, could be engaged.

Potential partners that could be engaged to the project are:

Economy

- Chambers (of commerce & industry, Professional, Economic, Technical Chamber of Greece)
- Real Estate Federation of Thessaloniki
- Thessaloniki Port Authority S.A.
- Thessaloniki International Exhibition Centre
- Attico Metro S.A.
- Incubators
- Creativity platform
- Metropolitan city scale enterprises

Tourism

- bodies, ministry
- Thessaloniki Hotels Association

Environment

- Environmental centres and bodies
- Environmental Education Centre of Eleftherio Kordelio & Vertiskos
- NGOs Nature Conservation
- Green Services Providers

Sports

- sports clubs/associations

Leisure

- Theme Parks & Actions Providers
- Dream Workers
- Leisure & Education Electronic Guide for Children & the Family

Health

- Psychiatric Hospital of Thessaloniki
- Papageorgiou Hospital of Thessaloniki

Media

Universities and Research institutes

- Aristotle University - Fine Arts AUTH _ School of film (located at the municipality)
- University of Macedonia
- CERTH

Public Security

- Center for Security Studies

There have been some discussions with some of potential partners but until now there is no update. As far as the chambers are concerned, we have been working thoroughly with the ones of professionals in order to specify the extent to which some private investors could engage in the Park. I.e. how many buildings can be rent for establishing businesses such as art cafes, restaurants, gyms etc. There has been some enthusiasm from their side, still we cannot proceed to any official cooperation until the regeneration of the green area is completed.

The **key beneficiaries** of Pavlos Melas Metropolitan Park value propositions will be both the direct end users of the park and the indirect co-beneficiaries.

The transition of the former military camp into a park will create an asset for the municipality, as well as for the metropolitan city and region of Thessaloniki and respectively, for the residents of the municipality, the city and the wider area. The departments of the municipality, the region and central government ministries will also benefit from this transition through the contribution of Pavlos Melas Metropolitan Park to the various pillars of their strategic planning and the achievement of related Sustainable Development Goals.

All stakeholders, public and private, in the field of tourism, leisure, sport and culture will benefit from the increase of visitors and the ability to provide actions and services (with or without economic profit).

In addition, the potential entrepreneurship and advertising through sponsorships in and around the park will provide financial benefits to the respective public, social or private companies, cooperatives and foundations.

At the same time, the owners of land, the real estate agencies, as well as the municipality through the potential for increased local taxes in the long run, will benefit from the increase in land value. Moreover, beneficiaries of the citizens health and well-being improvement will directly be the physical and mental health sector(through hospital congestion, reduction in drug consumption, knowledge about the impact of nature on health, etc.) and indirectly, insurance companies (through the medical costs reduction of their insureds).At the same time, the neighboring Psychiatric Hospital of Thessaloniki can use the park as a place of contact with nature in the context of alternative therapies and investigation of its benefits.

Finally, the creation of the Center of Environmental Awareness and Sustainable Development, as well as Pavlos Melas Metropolitan Park as a whole will be a green place of environmental, social and economic experimentation, with beneficiaries the school, research, university and local community.

The **governance** model of Metropolitan Park of Pavlos Melas has been one of the issues studied in the ex-ante economic viability study. The research has been focused on the existing governance schemes in Greece, the alternatives and the current legislative environment to develop new models of governance.

The city's ideal governance model for the long-term management of Pavlos Melas Metropolitan Park figures as a key challenge for the first big scale Nature-Based Solution in the city and it has to be addressed through co-production in the next steps of the project.

At present, peer to peer contact with the fast follower cities of Ioannina and Nicosia are organized to share experience and examples of alternative governance models tested in each city and to discuss the lessons learnt.

At this moment the Municipality of Pavlos Melas is working through co-creation processes in order to create an optimal governance model. We are about to cooperate with an expert in order

to update the potential models according to the Greek law. Apart from that, the municipality is planning to meet representatives from the Metropolitan Park of Antonis Tritsis in Athens in order to exchange experiences from its so far operation. The ultimate goal is to have a functional management body for our park avoiding deficiencies having occurred in the past in other equivalent places.

Value capture

The most important **ongoing cost categories**, including personnel costs, required to deliver the value propositions of the PMMP, through the identified key activities and resources, are:

- **Maintenance** related to green space and infrastructure of the park.
- **Security** of the public space related to lighting, required applications, technology operation, etc.
- **Programmes** delivery related to environmental and social actions
- **Marketing and communication** (including community animation and engagement activities)
- **Monitoring** costs
- **Property/casualty insurance**

Considering Pavlos Melas Metropolitan Park spatial scale of 33 ha, it is obvious that maintenance costs are the largest category of ongoing costs. Reducing these costs can be achieved by adopting smart solutions to save resources, e.g. water and energy, cost-effective technology solutions, as well as architectural design methods that help reduce operating costs e.g. design that allows visual contact with the space from busy locations leads to a reduction in the need for security measures and lighting. The choice of non-water demanding plants and of targeted planting techniques (e.g. to reduce lighting requirements and security measures), the application of efficient irrigation system for water management (system tested at the municipality of Pavlos Melas in the framework of the Lysis –Interreg programme) and the installation of photovoltaic panels are alternative ways to reduce costs. Social actions such as adoption of trees by citizens or part of the park adoption by schools can serve the same purpose.

At the same time, contracts for maintenance services and employment of individuals in collaboration with social cooperatives, the neighboring Psychiatric Hospital of Thessaloniki, schools (apprenticeships), university (traineeships, internships) and the volunteer network of the municipality can help reduce personnel costs.

In addition, the ability to generate revenue in the park is a key factor in covering operating costs. The kiosks and their operation, the renting of open spaces for festivals, concerts, sports or leisure activities, the operation of outdoor markets or theme parks can be a significant source of revenue. Also, the use of existing buildings is a potentially important source of revenue for the sustainability of Pavlos Melas Metropolitan Park. According to the strategic regeneration plan, uses that can attract private investment and contribute to the sustainability of the park (such as gyms, sport and leisure, social/creative/nature-based economy, small scale hotel, conference center, etc.) are foreseen for specific locations and for a limited number of buildings.

Sponsorships, donations, charity as well as corporate social responsibility and the long-term increase in municipal taxes in the Park area can also be identified as sources of revenue.

The indication of the potential opportunities that may cause a reduction in costs is still a work in progress and no decisions have yet been made.

The value proposition delivery should be translated in economic, environmental and social terms. With regard to the value propositions of Metropolitan Park proposal that are directly related to revenue generation, the output is measurable and can be easily evaluated. However, the creation of Pavlos Melas Metropolitan Park can yield indirect benefits (citizen health and wellbeing, quality of life, social cohesion, vulnerable groups inclusion, historical and cultural identity preservation, climate change mitigation and adaptation, etc.) that are not related to revenue generation and are not easy to be evaluated. The contribution of Connecting Nature partners (in particular the University of A Coruña) to the support of the Municipality for a Park Monitoring & Evaluation System is a priority for the NBS project.

Step 4: Implementation of financing and business model plans for specific NBS exemplar

| Name of NBS exemplar | Action to be undertaken (arising from BMC & financing plan) | Responsible person | Timeframe for implementation |
|--------------------------------|---|--------------------|------------------------------|
| Pavlos Melas Metropolitan Park | Applications for funding/financing | | |
| | | | |
| | | | |
| | | | |

Table 3: Implementation of financing and business model plans for specific NBS exemplar

In early 2021, we have completed the financial feasibility study and the municipal council has accepted it. That is, we have estimated potential expenses and revenues that may accrue from the implementation and full operation of the Park. What it has been marked, is the fact that we should stick on the strategic plan we already approved without altering it to the extent that could corrupt the principal goal (an open green space with nature based solutions).

Finance Summary Table

| City | Pavlos Melas Municipality | |
|--|---|--|
| Capital Financing required for NBS Exemplar | € 64.8m | |
| Capital financing applications submitted /secured | <ul style="list-style-type: none"> € 19.9m Regional Operational Programme of Central Macedonia 2014-2020 - Partnership Agreement for the Development Framework 2014-2020 - European Regional Development Fund (2018 secured) € 2.5m Operational Programme "Competitiveness, Entrepreneurship and Innovation" (EPAnEK) - | |

| | | |
|---|--|--|
| | <p>Partnership Agreement for the Development Framework 2014-2020 - European Regional Development Fund (2019 secured)</p> <ul style="list-style-type: none"> ● € 1.5m Public Investment Program (2020 secured) ● € 4.4m Antonis Tritsis Development Programme for Local Government- Partnership Agreement for the Development Framework 2014-2020 - European Regional Development Fund (2021 secured) <p>Total: € 28.3 m secured + 136.500€ “Green Fund” Architectural Competition</p> | |
| Unsuccessful capital financing | UIA-INCLUSIVE Parks (2019) | |
| Sources of capital investment (1) City budget (public) (2) Regional / national / EU other public sources (3) Private/third sector (4) Financial Institutions | 2. € 28.436.500 Total: € 28.436.500 | |
| New financing partnerships <ul style="list-style-type: none"> ● Capital ● Stewardship | Capital: Public sector, EU funds, Municipal Own contribution ² Stewardship: Municipal financing of ongoing stewardship costs | |
| Key Innovations | <ul style="list-style-type: none"> ● Governance model | |

Table 4: Finance Summary Table

² There is no new innovation here.

5. ENTREPRENEURSHIP

Step 1: Awareness and strategic alignment

The municipality of Pavlos Melas aims to address some serious challenges that concern environmental, health-wellbeing, social cohesion and economic sections. Specifically, the municipality faces challenges in addressing issues of continuing poverty, high rates of vulnerable social groups and lack of opportunities for economic growth. Through nature-based solutions, Pavlos Melas municipality intends to achieve environmental, social and economic benefits at the same time.

Especially the priorities for economic development include large-scale interventions to strengthen the local economy and synergy measures to tackle unemployment and strengthen the active population. The municipality of Pavlos Melas is among the municipalities with the highest rate of unemployment in Greece.

Hence, the municipality has to undertake some actions in order to achieve the above. These are:

- Government initiatives for employment support
- Providing support services for the unemployed to promote them in the labor market
- Promoting social entrepreneurship
- Participation of the Municipality in development partnerships to support the unemployed.

The proposed NBS, the transformation of the former Pavlos Melas camp into a green space of metropolitan scale, is trying to address the multifaceted pressures of the population in the neighboring and city-level area, such as the environmental degradation, the social exclusion, the poverty, etc. Pavlos Melas Metropolitan Park strategic goals are connected to the Operational Program of Pavlos Melas Municipality 2015 – 2019 ³and are in line with its goals to transform the city into a friendly, resilient and sustainable place to live. According to this operational plan, one of the prioritized sectors is the support of local economy and the reduction of unemployment and poverty. In addition, the goals of the Metropolitan Park also align with global frameworks such as the UN Sustainable Development Goals.

In this framework, a program to support nature-based enterprises is planning. The ultimate goal of this approach is the awareness raising for nature-based solutions in general and more specifically the value that the nature-based enterprises can create in delivering nature-based solutions. Besides to the culture of nature-based entrepreneurship foundation, the plan aims at the support of the start-up of NBEs and their involvement in the Metropolitan Park implementation and stewardship. Some types of NBEs that could contribute to the park may be art cafes, outdoor gyms e.t.c.

There are some challenges and enables from Pavlos Melas Municipality perspective in involving NBEs in the implementation of NBS.

Some of the challenges are:

- low awareness of NBS in general and particularly of economic benefits,

³ There is no update in the Operational Program of the Municipality. The Operational Program of Pavlos Melas Municipality 2015-2019 is still in effect.

- no alignment with economic policy,
- lack of expertise to support enterprises in department,
- lack of entrepreneurial culture / low support for entrepreneurship in general,
- public procurement policies

On the other hand, some of the enablers include the open innovation team approach and the collaboration between different departments.

Step 2: Building alliances

From NBE perspective, there are some challenges and enablers to start-up and growth of NBEs. Some of the challenges that the NBEs have to face are the lack of awareness of NBS and lack of knowledge on the NBS concept and good practices. Moreover, the lack of entrepreneurship strategy and the lack of eligibility for financial entrepreneurship support at municipal level are challenges for the NBEs. Nevertheless, the potential of Pavlos Melas Metropolitan Park to become a driving force for economic growth, social cohesion and environmental sustainability is a very important enabler for the NBEs.

A wide variety of innovation ecosystem stakeholders needs to be involved in the building and delivery of the plan to support nature-based enterprises. Initially, cross-department collaboration in the Municipality is needed. In the framework of the **internal open innovation team**, the CN project team is working with **other departments**, such as the finance department and the legal assistance office, the employment support office of social services department and the education department in order to explore the current conditions and the framework to design and deliver the NBE plan. Through the internal open innovation team, the CN team manages to work and cooperate with other departments of the Municipality.

Research and academic actors, related networks, as well as **chambers of commerce and associations** are in contact with the Municipality to introduce their experience and expertise. During co-production labs on the ex-ante feasibility study of Pavlos Melas Metropolitan Park, the CN project team created an innovation ecosystem stakeholders related to the project viability and hence, nature-based innovation and entrepreneurship opportunities in the Metropolitan Park are investigated.⁴

In addition, it is important to include **nature-based enterprises** directly in this process to ensure the support measures planned meet their actual needs. During the NBE platform foundation, the city came in contact with local and supra-local NBEs in order to create an initial core and explore the current situation and needs of NBEs in Thessaloniki. These NBEs were registered in Connecting Nature NBE Platform and are members of its featured communities.

Step 3: Planning, implementing and monitoring a customized support program

The department of Urban Development and Financing Programs, that has responsibility and knowledge for Nature Based Solutions, is going to lead on the awareness raising programme for

⁴ Due to Covid-19 all these processes have been delayed. The municipality of Pavlos Melas is planning to do it in April – May.

nature-based enterprises. The leading department is in collaboration with other departments, in the framework of the internal open innovation team, as described above. In addition, the department of Urban Development and Financing Programs is going to hold two workshops with NGOs (WWF, Birdlife international e.t.c) as well as with those stakeholders addressed during the conduction of the financial feasibility study, in order to promote nature based solutions revealed during the implementation of HORIZON CONNECTING.

Funding to raise awareness towards NBEs is included in the budget for the promotion of the NBS concept and effectiveness. However, the level of funding required to support the start-up and growth of NBEs is important and should be secured in order to implement a full scale NBE strategy. At the same time, the required resources for further NBE support should not be underestimated.

In order to stimulate the emergence of a culture of nature-based entrepreneurship, to support the start-up of NBEs and to enhance their involvement in the Metropolitan Park, a local NBE support plan is developing.

Taking into account the main challenge, the general lack of awareness of NBS and their multiple benefits that leads to a lack of support and funding towards NBEs, the Municipality focus on the evidence provision of the effectiveness of the NBS and the promotion of the NBE concept.

At the same time, the sector is highly fragmented and it is difficult to reach NBEs. In the framework of the support programme, the registration in the Connecting Nature NBE platform and networking of local and supra-local NBEs could take place through the creation of the Cluster of Metropolitan Park NBEs on NBE platform. In the forthcoming period, we are planning to hold two workshops with key representatives from the business sector and we are expecting to establish a supportive team of entrepreneurs who intend to invest in the Park.

Another important barrier to be considered is that NBEs are less competitive, compared to conventional enterprises, as the non-monetary indirect benefits are not well established and they are not taken into account in the framework of a cost-benefit approach. Concerning the competitiveness of NBEs, the fact that such initiatives have not been implemented in Greece implies that there is no much funding availability from the financial system as the uncertainty for the economic results is rather high.

In order to justify whether conventional enterprises can deliver NBS, we should wait to see the results for the planned workshops that are planned to be held in the summer. Initiatives to support NBEs through promotional events and the development of partnerships and networks, as well as exploration of the legal framework for procurement procedures adaptation are support measures that will be put in place during the next phase of the project.

On the other hand, considering the European Green Deal, a nature-based approach is adopted in a wide range of policies, creating opportunities for NBEs. The potential of the ex-camp as a driving force for economic growth and job creation, social cohesion and environmental sustainability is an important enabler. Expert training and skills development programmes will ensure that new and existing NBS suppliers meet the market demand.

The viability study of Pavlos Melas Metropolitan Park, predicts plenty of building use scenarios, such as:

- Buildings for educational use
- Buildings for commercial use

- Workshops
- Gyms
- Buildings for recreational use
- Buildings for cultural use (e.g. museums)
- Buildings for administration

Hence, the Municipality of Pavlos Melas will organize workshops with representatives of catering, congress, sports and other sectors.

In order to build the evidence of the value connected to NBEs it is necessary to measure their impact. This is directly connected to the impact of the supporting plan of NBEs. The suitable indicators are included in the Impact Assessment Plan that is under development in the framework of the CN project and described in detail in the relevant section of the report.

| NBS | NBS Phase | Type of NBE Involved | Challenge | Goal of NBE Program | How will this be achieved? | Partner | What does success look like and how will you measure it? |
|--------------------------------|-----------|----------------------|--|--|---|---|--|
| Pavlos Melas Metropolitan Park | All | All | <p>Lack of support and funding towards NBEs due to lack of NBS and their benefits awareness</p> <p>Fragmentation of NBE sector</p> <p>NBEs competitiveness, compared to conventional enterprises</p> <p>Lack of entrepreneurship strategy at the municipality</p> <p>Lack of eligibility for financial entrepreneurship support at municipal level</p> <p>Funding & resources for NBE strategy</p> | <p>Metropolitan Park sustainability</p> <p>NBE promotion</p> <p>NBS promotion</p> <p>Local economic growth</p> <p>Job creation</p> | <p>Cluster of Metropolitan Park NBE on NBE platform</p> <p>NBE raising awareness through CN dissemination activities</p> <p>Expert training and skills development programmes</p> | Pavlos Melas Municipality, Associations, Chambers, Universities, NBEs | No of NBE in cluster |

Table 5: strategy summary table

6. CO-PRODUCTION

Step 1 Define the goals of the co-production process

The main goals for using co-production in Pavlos Melas municipality were:

- Transforming Pavlos Melas Metropolitan Park into a nature-based solution, through combination of both tacit and expert knowledge to include a multiple of perspectives.
- Creating a vision for Pavlos Melas Metropolitan Park program.
- Developing the strategic plan of the regeneration program.
- Bursting silos, vertical, as well as horizontal and enabling inter-departmental collaboration.
- Empowering involved actors to participate in Pavlos Melas Metropolitan Park stewardship (long-term commitment)
- Mobilizing local actors and metropolitan city level actors to create economic values in Pavlos Melas Metropolitan Park
- Development of concrete solutions through networks and collaborations to promote the city historical identity and create social values in the Metropolitan Parc.

The exemplar is visioned to be a nature-based solution, an open innovation place that is much more than just a green park and that will deliver multiple values. In order to bring different knowledge, actors from different sectors, environment, economy and society, were involved in addition to city, region and national level actors. At the same time, the multi-sectoral and multi-level character of the program requires the involvement of executives of many departments of the Municipality at different stages during the implementation and stewardship of the program. Actors with double roles were also involved, such as municipal officers, who are also residents and hence, Metropolitan Park users. Increased dialogue, cooperation with key stakeholders, formal and informal co-production workshops and labs took place to engage actors.

Step 2 Use the design principles to flesh out the co-production goals and structure

Co-production is a new way of working in Pavlos Melas municipality. The design principles helped to introduce this new process to all departments and to approach the co-production process and its outputs quality.

Thinking about the Legitimacy of the process, it was important to ensure that new members trusted this new way of working. In addition, the initialization of the co-production process through small core groups created the appropriate conditions to trust each other, to have a clear sense of responsibilities and hence, to trust the procedure.

Including a facilitator helped to give voice to different actors and opinions (inclusivity and openness).

Concerning actionable knowledge, the co-creation activities of the planning phase delivered outputs linked to Pavlos Melas Metropolitan Park strategy and useful to be used in the program, as they were related to concrete solutions for adaption or adoption, as well as to reflection on previous steps.

Co-production was also used to align disconnected activities related to the ex-camp and taken by different departments, such as culture department, department of education & sport,

department of social services, department of the environment, in order to create links (extending institutions) and interdepartmental synergies.

Co-production activities of the implementation and stewardship phase will focus on the production of outputs (usable knowledge) to mobilize and empower societal actors to take action in the development of the Metropolitan Park program.

Step 3 & 4 Plan the co-production activities and select the co-production tools

Different co-productive activities, as presented in the next table, were taken or planned for next program phases, in order to achieve different process goals, such as:

- Co-creation labs in the framework of the ex-ant viability study. Workshops with different sectors: i.e. via the different professional chambers representatives of different sectors (culture, sport, science, tourism, entrepreneurship...) that could be part of the economic activities in the parc were invited to discuss how to create economic values and sustainability in the parc. Public consultation open to everyone was used to validate the final scenario for using the buildings in the parc. This was done mostly online.
- Collaboration with the network Open school to society - Active citizen in Pavlos Melas municipality to engage the educational community of primary and secondary schools, children, teachers and parents, in the Metropolitan Park program with focus on the historic character of the site, the sustainability and the inclusivity.

| What are the steps and activities? | What was the goal of each activity? | Who was/should be involved? | What tools were used? |
|---|---|--|---|
| Regeneration of Pavlos Melas ex-camp 2017 | Co-production of the strategic plan | Regional government, local government, stakeholders, local citizens | <ul style="list-style-type: none"> • Formal dialogues • Public consultation |
| Co-creating the transitions of the ex-camp into a NBS 2018 | To communicate NBS concept and explore the perspectives | Stakeholders from Pavlos Melas municipality, public and private sector stakeholders from metropolitan city, municipal officers, citizens | <ul style="list-style-type: none"> • Workshops • On site visits |
| OSMOS workshops 2019-2020 | Stakeholders mapping | Local stakeholders, Municipal officers | <ul style="list-style-type: none"> • Interviews • Workshops |
| Ex-ant feasibility study 2019-2020 | <ul style="list-style-type: none"> • Buildings uses and functions in the Metropolitan Park • To validate the ex-ant feasibility study and its scenarios | <ul style="list-style-type: none"> • Public & private sector stakeholders • Consultation open to everyone | <ul style="list-style-type: none"> • Interviews • Group sessions per sector • Online public consultation |
| Internal workshops 2020-ongoing | <ul style="list-style-type: none"> • Silo breaking • Co-production of PMMP governance | <ul style="list-style-type: none"> • Internal open innovation core team | <ul style="list-style-type: none"> • Internal informal workshops • Webinars |

| | | | |
|--|--|---|--|
| | model, regulations and security issues | (Municipal executives and officers) • Internal sectorial teams | |
| Educational community in the Metropolitan Park of Pavlos Melas 2021-2022 | <ul style="list-style-type: none"> • To engage educational community • To promote the city historical identity | Open school to society - Active citizen in the Municipality of Pavlos Melas, Network of primary and secondary schools community (Children, teachers, parents) | <ul style="list-style-type: none"> • Informal workshops • On site visits • Webinars |
| Inclusive Pavlos Melas Metropolitan Park 2022-ongoing | Development of concrete solutions to create social values in the Metropolitan Parc | Open to everyone | <ul style="list-style-type: none"> • Informal workshops • On site visits • Webinars |

Table 6: co-production activities and co-production tools



Photos 8,9,10: Regeneration of Pavlos Melas ex-camp – 2017



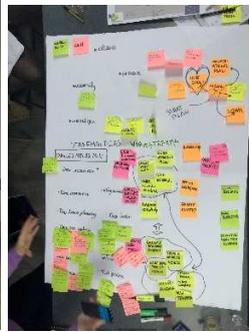
Photos 11,12,13: Co-creating the transitions of the ex-camp into a NBS - City level stakeholders & CN partners – 14/06/2018



Photos 14,15,16: Co-creating the transitions of the ex-camp into a NBS – Regional level stakeholders – 25/07/2018



Photos 17,18,19: OSMOS workshops – 15 & 16/11/2018



Photos 20,21,22: OSMOS workshops 30 & 31/01/2020



Photos 23,24,25: Internal workshops - 2020-ongoing



Photos 26,27,28: Ex-ant feasibility study - 25/09/2020



Photos 29,30,31: Educational community in the Metropolitan Park of Pavlos Melas - 2019-ongoing

Step 5 Reflect on the co-production process and results

The main results of the co-production process were:

- Breaking down departmental silos became easier through a methodological approach.
- Positive feedback and willingness, as co-production gave everyone the opportunity to participate.
- Energy in the project because there were more perspectives and ideas to work with.
- Co-production of Pavlos Melas Metropolitan Park vision and strategic plan.

Hence, the process of co-production through the new knowledge embedded to the Metropolitan Park project and the commitment of new internal and external partnerships supports the transition of the Metropolitan Park project into a nature-based solution program.

At the same time, the main opportunities related to the co-production of the first big scale NBS project in the city were:

- the high potential of the site (natural resource, historical site and driving force for urban sustainability,
- the need for contact with the nature and the perspectives for NBS in the post COVID-19 period,
- the knowledge transfer through the CONNECTING Nature project and
- the commitment for the project created from the core group.

The main barriers experienced throughout the co-production process were the following:

- Considering the scale of Pavlos Melas Metropolitan Park and hence, the number of potential users, it was impossible to involve everyone. Mapping of community groups and related experience sharing with CONNECTING Nature partners is used to define the community representers.
- Due to the multi-sectoral and multi-level character of Pavlos Melas Metropolitan Park program, it was difficult to invite everyone from the municipality departments in working with the concept of nature-based solutions, especially when having little time and capacity. Hence, a core group was initially established, creating commitment.
- It took time to figure out how to set up workshops: deciding on how to facilitate and how to balance between the number of politicians, stakeholders and citizens participating. OSMOS

and DRIFT workshops helped to structure the process, using external facilitators when it was possible and holding thematic co-production processes to address concrete issues.

- COVID-19 restrictions canceled live co-production workshops and labs. However, during the lockdown period there were the space and time to set up more structured co-production webinars.

The lessons learnt for future co-production process are highlighted below.

Any difficulty faced with the process should be addressed with practice and familiarization with the procedure. The success of collaboration and the ease of participants to collaborate in this way depends on the age, background, culture and it takes time.

Participant profile and expected outputs are factors that determine the co-production process context adaptation.

The co-production process should be aligned to the design principles in order to achieve the intended results.

Finally, it is important to create a team to support co-production and to select appropriate internal or external facilitators to plan co-production activities for stewardship phase of Pavlos Melas Metropolitan Park to promote the city cultural identity and to enhance place ownership.

7. REFLEXIVE MONITORING

Step 1 Rethink what learning process you need to achieve the goals of the nature-based solution

In order to achieve the goals of Pavlos Melas Metropolitan Park as an urban open innovation core with environmental, social, cultural and economic benefits, the need for an innovative learning process, compared to a regular planning process, is obvious.

The implementation of this big scale nature-based solution that combats complex challenges, such as climate change and social exclusion, needs an approaching methodology that gives insight into the progress of the project in real time, aligning daily activities with long-term ambitions and impact and allowing for the adapting of activities. **Proactive problem solving**, by solving the problem in real time and not retrospectively is needed for a successful NBS throughout the project planning, implementation and stewardship phases. Day to day activities should be evaluated considering the bigger picture and combining **different perspectives** and **types of knowledge** along with the participation of **different actors** (civil servants, citizens, voluntary groups, nature-based enterprises and so on).

Reflexive Monitoring (RM) was adopted as a process to identify barriers and translate them into opportunities, through reflection on problems and solutions. By revealing the complexities of the problem and breaking it down into learning questions, RM turns learnings into actions. By focusing on learning, barriers and structural changes are addressed and translated into actions and learning outcomes.

The creation of this learning environment in the municipality has been consolidated and developed through a series of ongoing Connecting Nature support activities, as following:

- A webinar to introduce the reflexive monitoring process methodology to the fast-follower cities, FFC, (12.12.2018).
- A workshop on the reflexive monitoring methodology and good practices from the frontrunner and the fast-follower cities with a peer-to-peer learning set up in Nicosia during the 'Learning Transfer Workshop' (23.01.2019).
- Bilateral webinars to guide FFCs through the process of integrating the reflexive monitoring process methodology in their daily activities to help filling in a dynamic learning agenda (DLA), (May-June 2019).
- A workshop to reflect upon the Knowledge Transfer workshop and gain experience with applying the dynamic learning agenda in Malaga during the Annual General Meeting (02.10.2019).
- Learning Objectives Survey for FFCs (June-September 2020).
- Learning Platform Webinars to present Learning Platform structure, survey results and RM groups of front-runner cities (FRC) and fast-follower cities (FFC) and to present learning outcome analysis and verify with RM groups (October 2020-ongoing).
- RM group one-on-one support meetings (November 2020-June 2021).
- One-on-One support session RM Chapter in CN Framework report (April 2021)
- Reflexive monitoring guidebook (September 2020)

Step 2 Define the roles within the project team

The department of Urban Development and Financing Programs forms the core project team that is also involved in the reflexive monitoring process. The Connecting Nature project manager is the reflexive monitor. However, the RM team consists of five members, who are sharing the different tasks of the reflexive monitor in order to divide the monitoring responsibilities and to prevent conflicts between the roles of project manager and project reflexive monitor.

Contact to and coaching from DRIFT, front runner city of Genk and OSMOS helped to be familiarized with the reflexive monitoring tools and the capacities required for the process. However, the familiarization with the process is an ongoing procedure. The RM process evolves and adapts to the daily work mentality of the team, with the ultimate goal of being integrated into the daily design and implementation function.

Step 3 Recording important events and analyzing critical turning points

In order to avoid parallel processes between project and Reflexive Monitoring meetings, the second ones are connected to the “regular” project meetings.

The reflexive monitor is responsible to produce the dynamic learning agenda and the other team members are involved in different levels. The agenda is shared also with the broaden project team members, especially when other departments are directly connected to the actions that have to be undertaken as follow up actions.

The RM team used to have a weekly scheduled meeting where the progress of the NBS project was monitored. During the COVID-19 period and its restrictions, these periodic meetings were limited to monthly.

These meetings are not labelled with Reflexive Monitoring. However, the work is done in the same way, trying to identify Critical Turning Points and to summarize the follow up actions to find the solutions.

Follow up actions are implemented in practice in order to address barriers and structural changes, in real time and not retrospectively, and turn learnings into actions.

Good practices and lessons learnt sharing with the front runner city of Genk during Reflexive Monitoring Sessions is a follow up action linked to the NBS communication strategy of Pavlos Melas Metropolitan Park (Critical Turning Point) and the Learning Questions: "What kind of support should be asked for the NBS communication plan?", "How to convert Connecting Nature outputs into communication tools?".

The Impact Assessment Training Programme was another example of follow up action that links to the critical turning point of NBS evaluation and to the Learning Question "How benefits related to wellbeing and quality of life are measured?".

Step 4 Use learning sessions to identify learning outcomes

The barriers experienced throughout the RM process were, initially, getting familiar with the procedure concept and its tools and then, finding time to work on the RM. However, the challenge to apply a cycle monitoring methodology to reflect on the project in real time, to

identify and solve problems, to fill in gaps, to correct mistakes and to adapt it to new conditions, from the beginning of the Metropolitan Park of Pavlos Melas project and throughout all the project phases was an opportunity for the first big scale NBS project in the city.

At the same time, an opportunity related to the RM was the established way of working in the Department of Urban Development and Financing Programs which included daily reflection and adaptation in a very similar and close to the RM way, but not in a structured framework with methodology and tools.

Using the framework of RM, learning outcomes were effectively embedded in the PMMP project. A typical example is the governance model of Genk shared with Pavlos Melas team during the learning sessions. Based on that, the importance of implementing our project by identifying the main pillars according to its objectives was emerged. This helped to coordinate all the departments and their partial projects related to the PMMP under the same umbrella.

Step 5 Share your findings with others

The lessons on RM learnt from other cities were important to approach the process itself.

All the cities faced difficulties with the process at the beginning, that were addressed with practice and familiarization with the process.

The city context is also a factor that determines the RM process adaptation in each city. It is important to create a team to support RM, like Genk, and to give time to be familiar with the process in order to work with RM as a useful tool in the planning and design approach.

Innovations/lessons learn throughout the one-to-one RM sessions with Genk gave answers to Learning Questions, such as the one related to the balance between the biodiversity protection and the increase of visitors of a NBS place: "Geographical zoning is utilized in the Stiemmer valley. for some segments of the valley the biodiversity objectives are prioritized thus, opportunities for segmentation are reduced." - Genk, RM Session #2.

Step 6 Reflecting on the method and peer-to-peer sharing

Reflexive Monitoring is an innovative process that facilitates monitoring and evaluation of NBS projects. However, it is not totally different from the working concept in the department of Urban Development and Financing Programs of Pavlos Melas Municipality. In the framework of an ongoing monitoring throughout each project timeline, informal reflection meetings took place but without a structured format and methodology. Tools and methods of RM save time and offer flexibility to use learning outcomes and translate them in actions at any time during the project evolution.



Photos 32,33,34: Knowledge transfer workshop in Malaga

8. IMPACT ASSESSMENT

STEP 1 Engage in structured reflection on NBS impacts, pathways and trade-offs

The strategic objectives of Pavlos Melas municipality were set in municipality's Operational program. The municipality's objectives are classified in the following axes:

1. protection and improvement of the environment,
2. expanded social support services,
3. development of education, culture and sports services
4. support for the local economy, entrepreneurship and the unemployed
5. improving the services provided by strengthening the administrative capacity of the municipality

The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by the United Nations in 2015 (table....). The city's strategic goals are directly related to many of the 17 SDGs. The table below presents the city's strategic goals and the links with the United Nations Sustainable Development Goals.

| Sustainable Development Goals | |
|-------------------------------|---|
| 1 | No poverty |
| 2 | Zero hunger |
| 3 | Good health and wellbeing |
| 4 | Quality education |
| 5 | Gender equality |
| 6 | Clean water and sanitation |
| 7 | Affordable and Clean Energy |
| 8 | Decent Work and Economic Growth |
| 9 | Industry, Innovation and Infrastructure |
| 10 | Reduced Inequality |
| 11 | Sustainable Cities and Communities |
| 12 | Responsible Consumption and Production |
| 13 | Climate Action |
| 14 | Life Below Water |
| 15 | Life on Land |
| 16 | Peace and Justice Strong Institutions |
| 17 | Partnerships to achieve the Goal |

Table 7: Sustainable Development Goals (SDGs)

| City's strategic goals | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|
| Protection and promotion of natural environment | | | • | | | | | | | | • | • | • | | • | | |
| Increase of public spaces | | | • | | | | | | | | | | | | | | |
| Development of degraded areas | | | • | | | | | | | | • | | • | | • | | |
| Reduction of urban pollution | | | • | | | | | | | | • | | • | | • | | |
| Promotion of city identity through the protection of historical - archeological sites and monuments | | | • | | | | | | | | • | | | | | | |
| Tackling the humanitarian crisis, combating discrimination and social exclusion | • | | • | | | | | • | | | • | | | | | | |
| Support of local economy, entrepreneurship and the unemployed | | | | | | | | • | | | | | | | | | |
| Strengthening the administrative capacity of the Municipality | | | | | • | | | | | | • | | | | | | • |

Table 8: City's strategic goals and links with the United Nations Sustainable Development Goals (SDGs)

Pavlos Melas municipality applies NBS in large scale. The implementation of NBS in Pavlos Melas Municipality concerns the creation of an **urban metropolitan park** (about 332.104 m²).

More specific, the project concerns the transition of an ex-camp, a place of historical and environmental value, into a metropolitan park. Nowadays the ex-camp is an "Urban gap" in the city center and contributes at the deprivation of the area. In addition, Pavlos Melas ex-camp concession have been strongly claimed by the administrative mechanisms of the Municipality and the local community, based on the significant shortages in land for the development of public and green spaces. Finally, the concession was completed in 2017 aiming officially at the integration of the former camp into the urban fabric and social life of the city, as a supra-local green space, and at the same time, the area protection and promotion as a cultural heritage site. The strategic regeneration planning was based in different steps and procedures, with increased dialogue and cooperation of key stakeholders and community. The "Strategic plan for the regeneration of the former Pavlos Melas camp in a green space of metropolitan scope" sets out the objectives, pillars, basic planning principles and the implementation steps in phases, recognizing that the intervention is a multi-year, costly and complex administrative program that is feasible and imperative to be implemented in phases.

The first phase of regeneration focuses on the environmental upgrade of the open space and the appropriate infrastructure to ensure accessibility and safe use by the public. Operational difficulties during the COVID-19 pandemic crisis have delayed the start of phase A, which is ongoing and will be completed with the designation of the successful tenderer in the next period. According to the schedule, the works will be completed within 18 months from the day of their start.

The later phase(s) projects will load the metropolitan park with a diversity of functions. Except public uses (new Town Hall, museums, environmental awareness & sustainability development

center, etc.), other uses that could attract private investment (sport & leisure, social/creative/nature-based economy, hotel, conference center, etc.) could be foreseen for specific locations. The projects will focus on the renovation of the preserved buildings (no new construction is permitted) and further development of outdoor spaces.

The objectives of Pavlos Melas NBS are:

- Creation of a green park,
- Economic growth (Create economic values),
- Creation of an open-safe-inclusive place for social interactions,
- Promotion of the cultural identity of the place,
- Co-production in all steps

The vision of PMM (Pavlos Melas Municipality) is the transformation of a historical military camp to a green multifunctional park where the visitors can relax, participate in various activities, have fun and hope to revisit. The PMMP (Pavlos Melas Metropolitan Park) will highlight the uniqueness of the character of the place, establish a new urban identity and meet the requirements for more urban green.

The Metropolitan Park will be a natural resource in the urban environment and not just a combination of green areas. In PMMP there will be a combination of different functions. Also, the development of a new green network into the park will connect all the different functions inside the park area, will create walking paths, enrich the existing biodiversity, improve the urban microclimate and extend the forest ecosystem. In addition, the new green network will promote the environmental education, the sports activities, and the elevation of cultural heritage.

The objectives of Pavlos Melas NBS implementation are related to some actions. In some cases, the same goal may be related to more than one action. The NBS actions are presented in the following table.

| NBS Actions | |
|-----------------|--|
| Action 1 | environmental upgrading actions |
| Action 2 | Pavlos Melas Metropolitan Park (PMMP) governance model |
| Action 3 | Communication strategy |
| Action 4 | Funding strategy |
| Action 5 | Strategy of entrepreneurship |
| Action 6 | Creation of social values strategy |
| Action 7 | Co-production labs |

Table 9: NBS actions

Through the implementation of NBS, Pavlos Melas Municipality expects some crucial results. The primary expected result is an **increased and “inclusive” use of the park**. With the implementation of NBS, PMM aims to address some serious challenges that concern environmental, health-wellbeing, social cohesion and economic sections. In general terms, the implementation of NBS in PMM is expected to have:

A) environmental results

The creation of a new park in the city will increase the green areas in the urban fabric and have as a result the **increase of the green per capita**. Through the regeneration and reinforcement of the lush vegetation of the area, the enhancement of the natural shapes and routes and the

harmonization with the existing natural landscape, PMMP will meet its greatest environmental goal which is the maintenance and reinforcement of the biodiversity. Procedures such as the maintenance of the existing native species, the regeneration of the existing plant sections and the enhancement with native species will have as result the **enhancement of biodiversity**. In addition, all these procedures will also mitigate the climate change – acting as CO2 sink, reduce the “heat island” effect, reduce air pollution and noise, manage water and flood control and support biodiversity and generally **improve the micro-climate**. Moreover, the close interaction with nature and the environmental education centre (that will be created in one of the buildings in the park area) will help to the **raise the environmental awareness**.

B) results in human health and wellbeing

As it is known close interaction with nature and the promotion of sports have a direct impact on health and human wellbeing. The creation of walking paths, the promotion of sports and in general all the processes of environmental upgrading can help **improve the health** of citizens and visitors of the park.

Furthermore, the creation of an open-safe-inclusive place for social interaction will help promote positive impacts (social, economic, environmental) and also increase social interaction through the PMMP and finally **upgrade the quality of citizens’ life**.

C) results in social cohesion

PMMP will be a green multifunctional park and at the same time an open-safe-inclusive place for social interaction, as well as a space that creates a sense of security and tranquility. All these characteristics make PMMP an excellent place that can contribute to **the social integration of vulnerable groups**.

Also, the creation of museums and the maintenance of the historical character of the place will **promote the cultural and historical identity of the region**.

Moreover, both the creation of an open-safe-inclusive place for social interactions and the promotion of cultural identity will improve the community bonds.

D) economic results

One of the main goals of the NBS in PMM is the economic development. The creation of a new park will **create new jobs, reducing unemployment**. Reducing unemployment is one of the most important challenges, as PMM is among the 17 Municipalities with the highest unemployment rate in Greece.

Also, some other results that are related to the goal of economic development are the **development of new skills, the creation of a city brand name and the enhancement of Entrepreneurship**.

In addition to the above expected results, there are also some results related to the implementation process of the exemplar. These are the **creation of a governance exemplar, the improvement of the administrative & operational capacity of the Municipality and the creation of co-production culture & skills**.

The following table presents the expected results after the implementation of NBS in Pavlos Melas Municipality.

| NBS Expected Results | |
|--|--|
| Primary (PI)⁵ | Increased & “Inclusive” use of the park |
| Environmental (Env) | Increased green/capita |
| Environmental (Env) | Enhanced biodiversity |
| Environmental (Env) | Improved micro-climate |
| Environmental (Env) | Enhanced environmental awareness |
| Health and Wellbeing (HW) | Improved health |
| Health and Wellbeing (HW) | Improved quality of life |
| Social Cohesion (SC) | Vulnerable groups integration |
| Social Cohesion (SC) | Improved community bonds |
| Social Cohesion (SC) | Promoted culture heritage identity |
| Economic (ECO) | Decreased unemployment-job creation |
| Economic (ECO) | New skills development |
| Economic (ECO) | City brand name |
| Economic (ECO) | Entrepreneurship opportunities |
| Participatory planning and governance (PPG)⁶ | Governance exemplar |
| Participatory planning and governance (PPG) | Improved administrative & operational capacity of the Municipality |
| Participatory planning and governance (PPG) | Co-production culture & skills |

Table 10: NBS Expected Results

Finally, the following table presents how the NBS objectives are related to the NBS actions and the expected results. In some cases, the same goal is related to more than one action and one action to more than one results.

⁵ Results related to the use of the exemplar, for example, that the NBS is visited 3 times a week by neighbours, or that the average visit lasts 20 minutes

⁶ Results related to the implementation process of the exemplar, for example, that citizens have confidence in decision-makers

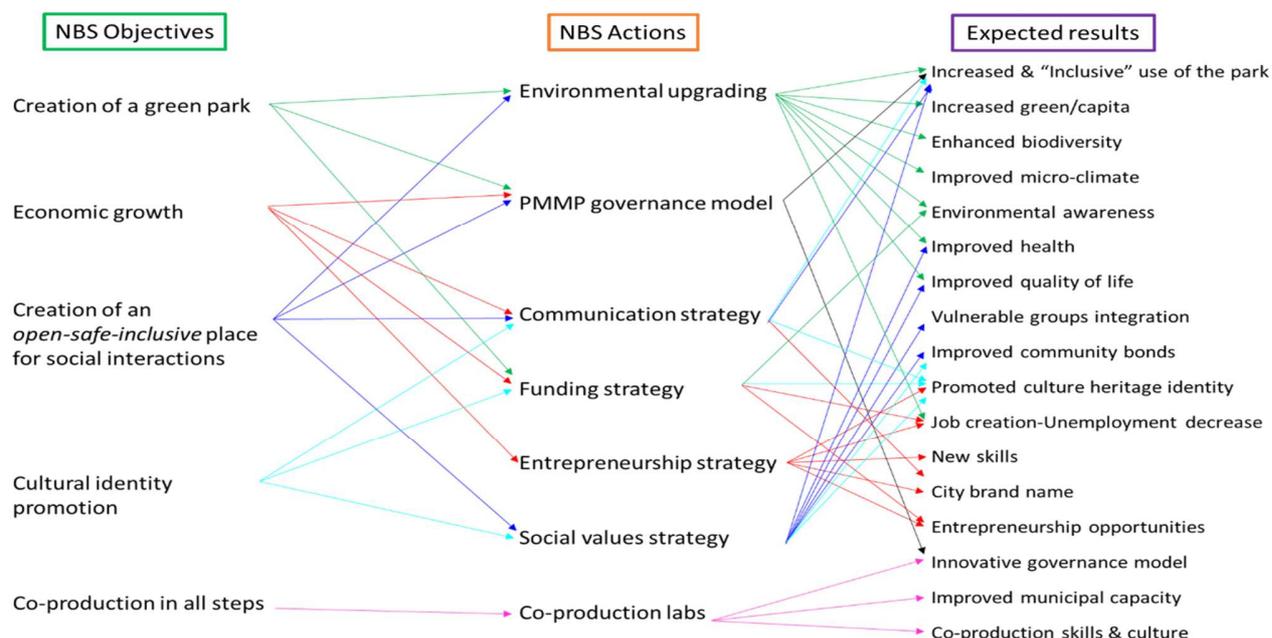


Table 11: Pavlos Melas' Theory of change

Some of the results may show synergies with others (a positive effect on one result also has a positive effect on another) or trade-offs (achieving a positive effect on one result has a negative effect on another or a positive effect on a social group entails a negative effect for another). The following table presents the assumptions of why a certain action causes a certain result, the synergies and the trade-offs.

| NBS Actions | Expected results | Assumptions | Synergies | Trade-offs |
|--|---------------------------|--|--|----------------------------------|
| Phase A project actions (environmental upgrading actions & basic infrastructure development) | Increased use of the park | A green park attracts much more visitors than an abandoned ex-camp | If citizens use park, they will improve their health and wellbeing, they will interact more with others and more opportunities for enterprises will be created | none |
| Phase A project actions (environmental upgrading actions & basic infrastructure development) | Increased green/capita | The planting of more than 6000 plants will increase the ratio of green per capita in the city | More vegetation in the park will enhance the biodiversity and improve the micro-climate | none |
| Phase A project actions (environmental upgrading actions & basic infrastructure development) | Enhanced biodiversity | Dense and planned vegetation will allow the introduction and survival of a greater number of species | Increasing biodiversity will favour a greater number of visitors | Some species may cause allergies |
| Phase A project actions (environmental upgrading actions & basic infrastructure development) | Improved micro-climate | A green park functions as a green lung that affects | Improving local climatic conditions will bring more visitors in the park | none |

| | | | | |
|--|--------------------------------------|--|--|------|
| basic infrastructure development) | | climatic conditions locally | | |
| Phase A project actions (environmental upgrading actions & basic infrastructure development) | Enhanced environmental awareness | The use of a green place and the contact with nature arises environmental awareness | Environmental awareness will enhance responsibility towards the biodiversity | none |
| Phase A project actions (environmental upgrading actions & basic infrastructure development) | Improved health | The contact with nature and the opportunities for physical activities in the park improves mental and physical health | Good health will contribute in better quality of life | none |
| Phase A project actions (environmental upgrading actions & basic infrastructure development) | Improved quality of life | An upgraded environment, even the visual and aesthetic upgrade, as well as a greener environment creates better living conditions | If the quality of life is improved, social bonds are stronger | none |
| Phase A project actions (environmental upgrading actions & basic infrastructure development) | Job creation - Unemployment decrease | The implementation and stewardship of PMMP will create new jobs and opportunities for economic growth in the area | New jobs will contribute in better quality of life | none |
| PMMP governance model | Increased use of the park | A governance model that ensures the park viability, the compliance with regulations and the public security will bring more visitors to the park | If citizens use the park, they will improve their health and wellbeing, they will interact more with others and more opportunities for enterprises will be created | none |
| PMMP governance model | Governance exemplar | A governance model that will ensure the added values of the park will formulate an exemplar of governance for urban NBS | If the governance model ensures sustainability, the park will attract more visitors and will support economic growth | none |
| Communication strategy | Increased use of the park | Communication will bring more visitors from metropolitan and regional district and more opportunities for economic activity | If citizens use the park, they will improve their health and wellbeing, they will interact more with others and more opportunities for | none |

| | | | | |
|------------------------------|-------------------------------------|--|--|------|
| | | | enterprises will be created | |
| Communication strategy | Promoted culture heritage identity | A tailor-made communication strategy of the park can promote the local culture heritage identity | A local culture identity will strengthen the community bonds and it can be an element of the city brand name | none |
| Communication strategy | City brand name | The communication strategy can promote the generation of a city brand name | A city brand name will bring more park users and more opportunities for economic activity | none |
| Funding strategy | Enhanced environmental awareness | Funding will ensure the creation of the sustainability and environmental awareness center in the park | Environmental awareness will enhance responsibility towards the biodiversity | none |
| Funding strategy | Promoted culture heritage identity | A culture heritage promotion program needs funds | A local culture identity will strengthen the community bonds and it can be an element of the city brand name | none |
| Funding strategy | Decreased unemployment-job creation | The funding of the rest phases of the project will enhance the entire project implementation and will create more jobs | New jobs will contribute in better quality of life | none |
| Funding strategy | Entrepreneurship opportunities | The funding and implementation of the rest phases of the project will create more opportunities for economic development | The operation of new enterprises will create new skills and new jobs | none |
| Strategy of entrepreneurship | Promoted culture heritage identity | A culture-related entrepreneurship strategy will enhance the promotion of local cultural identity | A local culture identity will strengthen the community bonds and it can be an element of the city brand name | none |
| Strategy of entrepreneurship | Decreased unemployment-job creation | The municipality will create opportunities for new jobs through entrepreneurship initiatives | New jobs will contribute in better quality of life | none |
| Strategy of entrepreneurship | Entrepreneurship opportunities | The municipality will create opportunities for new enterprises based on PMMP potential | The operation of new enterprises will create new skills and new jobs | none |

| | | | | |
|------------------------------------|---|--|--|------|
| Strategy of entrepreneurship | New skills development | A strategy for a nature-based, circular, creative economy will enhance the development of new skills | New skills will decrease the unemployment | none |
| Strategy of entrepreneurship | City brand name | The city brand name could be based on the thematic innovation promoted by the entrepreneurship strategy, i.e. NBS, technology, culture... | A city brand name will bring more park users and more opportunities for economic activity | none |
| Creation of social values strategy | Increased & "Inclusive" use of the park | Tailormade social programs will bring more users of the park | If citizens use the park, they will improve their health and wellbeing, they will interact more with others and more opportunities for enterprises will be created | none |
| Creation of social values strategy | Improved health | Social interaction will help mental health improvement | Good health will contribute in high quality of life | none |
| Creation of social values strategy | Improved quality of life | Social interaction will help wellbeing improvement | If the quality of life is improved, social bonds are stronger | none |
| Creation of social values strategy | Vulnerable groups integration | Tailormade social programs will integrate vulnerable groups into the stewardship and use of the park | An inclusive park will strengthen community bonds | none |
| Creation of social values strategy | Improved community bonds | Having a space where people meet, gaining the sense of common use and of sharing a cultural identity will facilitate social interaction | If strong bonds are established in the community, the quality of life will be improved | none |
| Creation of social values strategy | Promoted culture heritage identity | Programs for the history and identity of Pavlos Melas camp will help build a local culture identity and will contribute in making the citizens proud of it | A local culture identity will strengthen the community bonds and it can be an element of the city brand name | none |
| Co-production labs | Governance exemplar | The participatory process will create | If the governance model ensures | none |

| | | | | |
|--------------------|---|--|--|------|
| | | and support alternatives in governance | sustainability, the park will attract more visitors and will support economic growth | |
| Co-production labs | Municipal capacity empowerment - Silos degradation - Transparency | The participatory process will promote inter-departmental collaboration, transparency and will strengthen the municipal capacity | If the municipal capacity is improved, co-production processes and governance alternatives will be supported further | none |
| Co-production labs | Co-production culture & skills | The participatory planning, implementation and stewardship of the park will create co-production culture and skills | The participatory process will create alternatives in governance and transparency in administration | none |

Table 12: NBS actions- Expected results – Assumptions -Synergies

STEP 2 Choose appropriate indicators

The table below presents the indicators that Pavlos Melas Municipality has select in order to measure the expected impacts of the NBS implementation. The indicators were selected to measure the expected outcomes and outputs related to the strategic objectives of the project. The association of NBS objectives, NBS actions and the expected impact with the selected indicators was made through a review of literature and co-production process. The selected indicators form a coherent framework where social, economic, and environmental areas of impact are inter-connected.

First of all, PMM (Pavlos Melas Municipality) made a priority ranking to differentiate between indicators that are critical to evaluating all NBS (core) and indicators that align closely with city strategic priorities but are not relevant to all NBS (feature). Through this process the result was the creation of a list of indicators (core and feature).

The indicators are classified in the following categories: a) primary indicators (PIs), b) outcome indicators (Environmental, Health and Wellbeing, Social Cohesion, Economic) and c) Participatory planning and governance indicators (PPGs).

Primary indicators:

Primary indicators (PIs) refer to the uses that citizens give to the NBS. PIs measure the uses and indicate the spatial influence of intervention (pointing out the group of individuals who may be directly or indirectly involved).

Outcome indicators:

Outcome indicators are classified in four categories. They are used to help understand and measure the expected results in each category, after the implementation of NBS.

Participatory planning and governance indicators:

These are indicators that measure the results (outputs and outcomes) from the NBS design and implementation processes.

The table below presents the PMM’s selected indicators (core and feature) for each category while indicating the reasoning of the selection (based on PMM’s implementation of NBS expected results).

| CODE | NAME | NBS expected result (previous sub-building block) | Selection reasoning |
|---------------------------------|--|--|--|
| PRIMARY INDICATORS | | | |
| PI1 | Type of interaction with NBS | Increased & “Inclusive” use of the park | Know the actual usage of PMMP |
| PI2 | Frequency of interaction with NBS | Increased & “Inclusive” use of the park | Know the actual usage of PMMP |
| PI3 | Duration of interaction with NBS | Increased & “Inclusive” use of the park | Know the actual usage of PMMP |
| PI4 | Perceived quality of space | Increased & “Inclusive” use of the park | Know the perceived quality of the new park |
| ENVIRONMENTAL INDICATORS | | | |
| CORE | | | |
| Env03 | Air temperature reduction | Improved micro-climate | Know the cooling effect of NBS |
| Env08 | Rainfall storage (water absorption capacity of NBS) | co-benefit of Increased green/capita | Know the stormwater performance of NbS |
| Env23 | Public green space distribution | Increased green capita | Measure green area in relation to population |
| Env24 | Recreational value of blue-green spaces | Increased & “Inclusive” use of the park | Measure of the recreational benefits of PMMP |
| Env25 | Cultural value of blue-green spaces | Promoted culture heritage identity | Measure of the cultural benefits of PMMP |
| Env29 | Supporting/increasing biodiversity conservation | Enhanced biodiversity | Find out if there are more efforts to improve biodiversity |
| Env35 | Species diversity | Enhanced biodiversity | Know the number of species currently in the park |
| Env81 | Soil sealing | Enhanced biodiversity & improved microclimate | Mapping impermeable surfaces |
| ENV89 | Community garden area per capita and in a defined distance | Increased green capita | Measure green area in relation to population |
| FEATURE | | | |
| Env01 | Carbon storage OR carbon sequestration in vegetation/soil | Increased green/capita | Measure the carbon removed by NBS in soil and vegetation |
| Env17 | Air Temperature reduction | Improved microclimate | Measure the peak air temperatures reduction |
| Env26 | Community accessibility | Increased & “Inclusive” use of the park | Evaluate the accessibility of PMMP |
| Env55 | Green space area | Increased green/capita | Measure green area in relation to population |
| Env66 | Air quality improvement | Co-benefit of increased green/capita | Know the change in air quality |

| | | | |
|--|---|--|--|
| ENV88 | Tree shade for local heat change | Improved microclimate | Know the cooling effect of NBS |
| HEALTH AND WELLBEING INDICATORS | | | |
| CORE | | | |
| HW3 | General wellbeing and happiness | Improved quality of life | Know the state of wellbeing and happiness |
| HW11 | Mental health and wellbeing | Improved health | Estimate the impact on the mental health of the park users |
| HW12 | Enhanced Physical Activity | Improved health | Establish the amount of physical activity that the visitors of the park do |
| SOCIAL COHESION INDICATORS | | | |
| CORE | | | |
| SC1 | Bonding social capital | Improved community bonds | Know how are the social relations between different social groups |
| SC2 | Bridging social capital | Improved community bonds | Know how are the social relations between different social groups |
| SC5.1 | Perceived safety | Increased & "Inclusive" use of the park Vulnerable groups integration | Know the perceived safety of the park |
| SC5.2 | Actual safety | Increased & "Inclusive" use of the park Vulnerable groups integration | Know the actual safety of the park |
| SC6 | Place attachment | Promoted cultural heritage identity | Estimate the link between people and park |
| SC11 | Positive environmental attitudes motivated by contact with NBS | Enhanced environmental awareness | Estimate resources for environmentally responsible behaviors and impact of environmental education initiatives |
| FEATURE | | | |
| SC3 | Linking social capital | Improved community bonds | Find out if there is a relationship between neighbours and power groups |
| SC10 | Environmental education opportunities | Enhanced environmental awareness | Measure environmental education opportunities |
| ECONOMIC INDICATORS | | | |
| CORE | | | |
| ECO1 | New Businesses 'attracted' or started and additional rates received | Decreased unemployment-job creation Entrepreneurship opportunities | Establish if there are new businesses since the implementation of the park |
| ECO3 | Net additional jobs created/enabled by NBS | Decreased unemployment-job creation | Establish if there are new jobs created/enabled by NB |
| ECO7 | Increase in tourism | Local economy growth | Increase in tourism could be a co-benefit, not of strategic priority |
| FEATURE | | | |

| ECO2 | New customers attracted to businesses in the area | Local economy growth | Estimate any increased footfall in the area |
|--|---|--|--|
| ECO9 | Upskilling & related earning increase | New skills development | Estimate the new skills related to the NBS (ideally) |
| ECO11 | Overall economic, social and health wellbeing | Improved quality of life | Estimate the quality of life in the vicinity of the NBS |
| PARTICIPATORY PLANNING AND GOVERNANCE INDICATORS | | | |
| CORE | | | |
| PPG5 | Activation of public-private collaboration | Innovative governance model | Know the degree of collaboration and co-production among stakeholders |
| PPG7 | Reflexivity: identified learning outcomes | Improved municipal capacity | Improved administrative & operational capacity of the Municipality - Silos degradation -Transparency |
| PPG11 | Collaboration between organizational members | Improved administrative & operational capacity of the Municipality - Silos degradation -Transparency | Establish the interactions between individuals from the same departments or different departments |
| FEATURE | | | |
| PPG13 | Facilitation skills for co-production | Co-production culture & skills | Know the skills of collaboration and coproduction among stakeholders |
| PPG17 | Reflexivity: time for reflection | Improved municipal capacity | Improved administrative & operational capacity of the Municipality - Silos degradation -Transparency |

Table 13: Building Block 2 choosing appropriate indicators

STEP 3 Develop a data plan for impact evaluation

Pavlos Melas does not have an available baseline for the selected indicators. The main reason that Pavlos Melas does not have the appropriate baseline data is the fact that until now there was no necessity to collect all the data that are essential for measuring the selected indicators. In addition, there is a lack of means and equipment for the collection of the data. For the above reasons, the information that was required for the baseline data was not available to use. So, there is no use describing the data's sources or the methods that were used for the collection of these data for the simple reason that the data do not exist. The data plan will consist of the new data collections, specified in Building Block 4.

STEP 4 Implement the data plan

The following table describes the methods selected for measuring each indicator. Every chosen method for each indicator is included in the Connecting Nature indicator methodologies. The relationship between every indicator and its measurement method is determined by specific

criteria such as data quality, temporal adequacy and cost-benefit ratio assessment. As we can see in the following table, some of the methods that are selected in order to measure the indicators include GIS analysis (computer-based administration), observational studies (survey procedures and paper-and-pencil administration), questionnaires, satellite images, sensors and thermal cameras, data from the local weather-stations, aerial photography.

| CODE | NAME | Connecting Nature method |
|-------|--|--|
| PI1 | Type of interaction with NBS | Observational study-GIS |
| PI2 | Frequency of interaction with NBS | Observational study-GIS |
| PI3 | Duration of interaction with NBS | Observational study-GIS |
| PI4 | Perceived quality of space | Questionnaire (ad hoc) |
| Env03 | Air temperature change | Blackbody flux (Landsat 8) |
| Env08 | Rainfall storage (water absorption capacity of NBS) | Soil moisture sensors and pressure sensors |
| Env23 | Public green space distribution | Aerial photography combined with census data |
| Env24 | Recreational value of blue-green spaces | Register of available facilities |
| Env25 | Cultural value of blue-green spaces | Registration of cultural events in close proximity to NBS |
| Env29 | Supporting/increasing biodiversity conservation | Biodiversity monitoring programme Pocock et al. (2015) |
| Env35 | Species diversity | Urban Biodiversity Inventory Framework (UBIF 2017) |
| Env81 | Soil sealing | Satellite images from Landsat and Normalised Difference Built-up Index (NDBI) |
| Env89 | Community garden area per capita and in a defined distance | GIS distance to greenspace (mapping buffer areas of 330 and 660m) |
| Env01 | Carbon storage OR carbon sequestration in vegetation/soil | i-Tree Eco (2019) |
| Env17 | Air temperature - Energy demand | On-site temperatures from the local weather-station |
| Env26 | Community accessibility | ArcGIS ModelBuilder environment: actual proximity to green spaces |
| Env55 | Green space area | Satellite images from Landsat |
| Env66 | Air quality change | On-site data from the local weather-station |
| Env88 | Tree shade for local heat change | Thermal cameras |
| Env90 | Community garden area per child capita and in a defined distance | GIS distance to greenspace (mapping buffer areas of 330 and 660m) in relation to census data |
| HW3 | General wellbeing and happiness | Satisfaction with Life Scale (Diener et al., 1985) |
| HW11 | Mental health and wellbeing | General Health Questionnaire (GHQ-12) (Goldberg, Gater, Sartorius, Ustun, Piccinelli, Gureje, & Rutter, 1997) |
| HW12 | Enhanced Physical Activity | International Physical Activity Questionnaire (IPAQ) |
| SC1 | Bonding social capital | 2 items measuring the presence type of connections, and respondent's perception of quality of interactions (Anucha et al., 2006) |
| SC2 | Bridging social capital | 2 items measuring the presence type of connections, and respondent's perception of quality of interactions (Anucha et al., 2006) |
| SC5.1 | Perceived safety | Criminal Victimization and Perceptions of Community Safety Survey (Smith et al., 1999) |
| SC5.2 | Actual safety | Crime rate per area (i.e., in and around NBS) for time frame (i.e., before and after NBS implementation) |
| SC6 | Place attachment | Place Identity Scale (Williams & Vaske, 2003) |

| | | |
|-------|---|---|
| SC11 | Positive environmental attitudes motivated by contact with NBS | Environmental Attitudes Inventory (EAI Milfont & Duckitt, 2010) |
| SC3 | Linking social capital | 2 items measuring the presence type of connections, and respondent's perception of quality of interactions (Anucha et al., 2006) |
| SC10 | Environmental education opportunities | Ethnographic case study & No. of educational activities in 'close proximity' to NBS |
| ECO1 | New Businesses 'attracted' or started and additional rates received | No. of new start-ups in 'close proximity' to NBS |
| ECO3 | Net additional jobs created/enabled by NBS | Number change in Full Time Employment (FTEs) or the number of 'decent' jobs or jobs providing 'adequate livelihood' |
| ECO7 | Increase in tourism | Number change in visitors to the area |
| ECO2 | New customers to business in proximity to NBS | Asking businesses to report the number of total customers per period (month / year / quarter) |
| ECO9 | Upskilling & related earning increase | "21 st Century Skills" or 'competencies' (Soland et al 2013) |
| ECO11 | Overall economic, social and health wellbeing | Human Development Index |
| PPG5 | Activation of public-private collaboration | Measurement or count data for number of collaborations activated |
| PPG7 | Reflexivity - identified learning outcomes | Number of identified reflexive learning outcomes per month or year that can be specified in number of changes in the context based on reflexivity type (rules, and/or relations, and/or practices and/or discourse) |
| PPG11 | Collaboration between organizational members | Team Boosting behavior scale (Fortuin, van Mierlo, Bakker, Petrou & Demerouti, 2021) |
| PPG13 | Facilitation skills for co-production | Items aimed at assessing facilitator's skills (Weyers and Rankin 2007; Bens 2009) |
| PPG17 | Reflexivity - time for reflection | Counting number of hours spent on reflection per week/month |

Table 14: New data collection on the exemplar scale from the methods proposed in the Connecting Nature Indicator Reviews

Specifically, for the primary indicators PI1, PI2 and PI3 we chose the quantitative procedure with questionnaires as the selected method to measure indicators. The tool for the measurement procedure is the observational study along with GIS analysis. Data will be gathered on site, in scale 1:1. For the indicator PI1 the attributes that will be collected are the number of users, gender, type of activity, age referenced data, location and dimension of occupancy, backgrounded by circumstantial data such as observation day (i.e., date, time of a day, weather conditions of a day). For the indicator PI2, frequency and intensity of use will be addressed by collecting data such as the number of users participating in the activity, number of days of the participated activity, location and dimension of occupancy, and backgrounded circumstantial data such as weather conditions of a day. For the indicator PI3, the key attributes to address duration of interaction with NBS are minutes of stay in a place. Last but not least, for the indicator PI4, ad-hoc questions were selected as a tool for indicator measurement. Users of the park will be asked to answer (using a scale from 1 to 5) how they rate the quality of elements such as aesthetics, accessibility, distance to their home, safety, upkeep and maintenance, events organized and attractiveness in terms of smell, sound and microclimatic conditions in the PMMP.

Moving to the environmental indicators, we have a plethora of measurement procedures and tools. Beginning with core environmental indicators, for the indicator ENV03, a combination of high-resolution satellite images and thermal infrared data will be used. For the indicator ENV08, we will use remote sensing and GIS technologies for water monitoring and management. These tools are useful because they can provide a solution for the planning and management of future water resources. ENV23 will be measured through satellite images combined with census data in order to determine demographics in relation to distribution. For the indicator ENV24, direct feedback from users and local communities in the form of questionnaires was chosen as a measurement procedure combined with a modelling approach (GIS, earth observation/remote sensing metrics) in order to register the available facilities. For the indicator ENV25, the number of events/visitor metrics and the demographics of attendees through questionnaires can generate useful data and will help to register the cultural events in close proximity to NBS. In addition, remote sensing/earth observation tools and spatial data will be used to measure ENV25 indicator. About ENV29, we will follow the biodiversity monitoring programme that was developed by Pocock et al. (2015). Pocock et al. (2015) have developed a checklist of priority attributes that includes 25 attributes with a range from elemental to aspirational. As it is referred to the indicator's factsheet, this can be used as a checklist to clarify objectives and justify investment in resources and provides an excellent resource for local authorities or city stakeholders wanting to establish monitoring programmes. For measuring indicator ENV35, we will use the Urban Biodiversity Inventory Framework (UBIF 2017) that offers an alternative 3 track methodology to collect species diversity information. For ENV81, the measurement procedure and tools that will be used for sensing and measuring soil sealing, are satellite images from Landsat. The identification, analysis, measurement and evaluation of soil loss through sealing can then be obtained from NDBI (remote sensing technique). Finally, for the last core environmental indicator that we chose, ENV89, the measurement procedure for the identification of community garden areas is to gather data from land use plans on location, extent and characteristics and to use them in a GIS database for digitization (Senes et al., 2016).

For the indicator ENV01 that belongs to feature environmental indicators, i-Tree eco tool was chosen for basic calculation of carbon dioxide storage estimates for vegetation in urban areas. For ENV03, on-site temperatures and date from the local weather stations will be gathered to measure the air temperature reduction. For the indicator ENV26 a model for greenspace (GS) accessibility can be developed in the ModelBuilder environment of ArcGIS, where (according to Stessens et al., 2017) the actual proximity of GS can be calculated. For ENV55, satellite images from Landsat will help us to measure green space areas in relation to population. For ENV66, we will use the on-site data from the local weather stations for the measurement of air quality change. For ENV88, we chose temperature sensors, thermal cameras, globe thermometers in combination with weather station data and tree species morphology to measure tree shade for local heat change. Last but not least, the ENV90 will be measured with collated data that will be used in a GIS database and will be digitized.

Moving to the human and well-being indicators, for the core indicator HW3 we chose to use as measurement tool Satisfaction with Life Scale (Diener et al., 1985), a 7-point scale comprising 5 items that measure individual's general satisfaction with own life as a cognitive-judgmental process (i.e., based on a comparison with a standard that individual had set for him/herself). For the measurement of HW11, we will use the General Health Questionnaire (GHQ-12) (Goldberg,

Gater, Sartorius, Ustun, Piccinelli, Gureje, & Rutter, 1997), which consists of 12 items, each one assessing the severity of a mental problem over the past few weeks using a 4-point Likert-type scale (from 0 to 3). Finally, for the HW12, the International Physical Activity Questionnaire (IPAQ) (International Physical Activity Questionnaires, n.d.) will be used, which assesses physical activity undertaken across a comprehensive set of domains.

For the social cohesion indicator SC1, we will use a scale that consists of 2 items measuring the presence of bonding social capital (BoSC) type of connections, and respondent's perception of quality of interactions within BoSC type of connections (Anucha et al., 2006). For SC2, we will use the same method as SC1 but for bridging social capital. For SC5.1, 7-items from Criminal Victimization and Perceptions of Community Safety Survey (Smith et al., 1999) adapted to the purposes of NBS research will be used for measuring perceived safety. For SC5.2, crime rate per area (i.e., in and around NBS) for time frame will be measured for actual safety. For SC6, Place Identity Scale (Williams & Vaske, 2003) will be used, which consists of 6 items that measure place dependence and place identity as dimensions of place attachment. For SC11.1, Environmental Attitudes Inventory (EAI – Milfont & Duckitt, 2010, includes 24 items) will be used, which assesses broad evaluating perceptions of or beliefs regarding the natural environment, including factors affecting its quality. For the indicator SC3, we will use a scale that consists of 2 items that will measure the presence of linking social capital (LSC) type of connections, and respondent's perception of quality of interactions within LSC type of connections. For SC10, we will use the Ethnographic case study and we will count the number of educational activities in 'close proximity' to NBS.

Moving to the economic indicators, for ECO1, we will measure all the new start-ups in 'close proximity' to NBS. 'Close proximity' may be in relation to spatial chain or network. For the indicator ECO3, we will measure the number in Full Time Employment (FTEs) or the number of 'decent' jobs or jobs that provide 'adequate livelihood'. For ECO7, we will measure the number of visitors to NBS. For ECO2, we will measure all the new customers to existing businesses. For ECO9, we will measure the revenues and profits of NBS companies. For ECO11, Human Development Index will be used in close proximity to NBS.

Finally, for the indicator PPG5, we will count the number of collaborations activated. For PPG7, we will count the number of learning outcomes identified per month or year. For PPG11, Team Boosting behavior scale (Fortuin, van Mierlo, Bakker, Petrou & Demerouti, 2021, includes 18 items) will be used that assesses individual interpersonal behaviors in teams, characterized by dominance and energy, positive expressivity, and a social focus. For the indicator PPG13, we will use 8 items for measuring respondents' perception of their/the facilitator's facilitation skills for co-production. A questionnaire of facilitation (self-)assessment is essential. Last but not least, for PPG17, we will count the number of hours spent in reflection per week/month. Timesheets of total amount of time spent on reflection are essential.

Unfortunately, Pavlos Melas is not in the place to perform causality analysis for any of the indicators. The lack of available data, equipment and personnel are a major obstacle for the conduct of any analysis.

After the selection of the appropriate indicators and their measurement methods, it is necessary to outline the plan design process. The plan for the collection of new data must include some aspects. First of all, we have to determine the procedure that will be followed. We have to describe when we will collect all the essential data for the measurement of each indicator. In

addition, it is important to determine our sample such as citizens, satellite images, species etc. Furthermore, for the data planning, we must define who will collect and analyze the data such as the city council staff, the Data department of the regional government, a local university or a local company. Finally, we have to estimate the budget for collecting data, buying equipment, collaborations or hiring.

STEP 5 Integrate evidence into the policy process

Depending on the data collection method that we have chosen, the data analyses will be quantitative or qualitative. This information is given to us in the indicators' factsheets. In the table below, we describe the type of data analyses.

| CODE | NAME | Connecting Nature method | Quantitative | Qualitative | Geolocation |
|-------|--|---|--------------|-------------|-------------|
| PI1 | Type of interaction with NBS | Observational study-GIS | X | | no |
| PI2 | Frequency of interaction with NBS | Observational study-GIS | X | | no |
| PI3 | Duration of interaction with NBS | Observational study-GIS | X | | no |
| PI4 | Perceived quality of space | Questionnaire (ad hoc) | X | | no |
| Env03 | Air temperature change | Blackbody flux (Landsat 8) | X | | no |
| Env08 | Rainfall storage (water absorption capacity of NBS) | Soil moisture sensors and pressure sensors | X | | no |
| Env23 | Public green space distribution | Aerial photography combined with census data | X | | no |
| Env24 | Recreational value of blue-green spaces | Register of available facilities | X | X | no |
| Env25 | Cultural value of blue-green spaces | Registration of cultural events in close proximity to NBS | X | X | no |
| Env29 | Supporting/increasing biodiversity conservation | Biodiversity monitoring programme Pocock et al. (2015) | X | X | no |
| Env35 | Species diversity | Urban Biodiversity Inventory Framework (UBIF 2017) | X | X | no |
| Env81 | Soil sealing | Satellite images from Landsat and Normalised Difference Built-up Index (NDBI) | X | | no |
| Env89 | Community garden area per capita and in a defined distance | GIS distance to greenspace (mapping buffer areas of 330 and 660m) | X | X | no |
| Env01 | Carbon storage OR carbon sequestration in vegetation/soil | i-Tree Eco (2019) | X | | no |
| Env17 | Air temperature - Energy demand | On-site temperatures from the local weather-station | X | | no |

| | | | | | |
|-------|--|--|---|---|----|
| Env26 | Community accessibility | ArcGIS ModelBuilder environment: actual proximity to green spaces | X | | no |
| Env55 | Green space area | Satellite images from Landsat | X | | no |
| Env66 | Air quality change | On-site data from the local weather-station | X | | no |
| Env88 | Tree shade for local heat change | Thermal cameras | X | | no |
| Env90 | Community garden area per child capita and in a defined distance | GIS distance to greenspace (mapping buffer areas of 330 and 660m) in relation to census data | X | X | no |
| HW3 | General wellbeing and happiness | Satisfaction with Life Scale (Diener et al., 1985) | X | | no |
| HW11 | Mental health and wellbeing | General Health Questionnaire (GHQ-12) (Goldberg, Gater, Sartorius, Ustun, Piccinelli, Gureje, & Rutter, 1997) | X | | no |
| HW12 | Enhanced Physical Activity | International Physical Activity Questionnaire (IPAQ) | X | | no |
| SC1 | Bonding social capital | 2 items measuring the presence type of connections, and respondent's perception of quality of interactions (Anucha et al., 2006) | X | X | no |
| SC2 | Bridging social capital | 2 items measuring the presence type of connections, and respondent's perception of quality of interactions (Anucha et al., 2006) | X | X | no |
| SC5.1 | Perceived safety | Criminal Victimization and Perceptions of Community Safety Survey (Smith et al., 1999) | X | | no |
| SC5.2 | Actual safety | Crime rate per area (i.e., in and around NBS) for time frame (i.e., before and after NBS implementation) | X | | no |
| SC6 | Place attachment | Place Identity Scale (Williams & Vaske, 2003) | X | | no |
| SC11 | Positive environmental attitudes motivated by contact with NBS | Environmental Attitudes Inventory (EAI Milfont & Duckitt, 2010) | X | | no |
| SC3 | Linking social capital | 2 items measuring the presence type of connections, and respondent's perception of | X | X | no |

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|-------|---|---|---|---|----|
| | | quality of interactions (Anucha et al., 2006) | | | |
| SC10 | Environmental education opportunities | Ethnographic case study & No. of educational activities in 'close proximity' to NBS | X | X | no |
| ECO1 | New Businesses 'attracted' or started and additional rates received | No. of new start-ups in 'close proximity' to NBS | X | | no |
| ECO3 | Net additional jobs created/enabled by NBS | Number change in Full Time Employment (FTEs) or the number of 'decent' jobs or jobs providing 'adequate livelihood' | X | | no |
| ECO7 | Increase in tourism | Number change in visitors to the area | X | | no |
| ECO2 | New customers to business in proximity to NBS | Asking businesses to report the number of total customers per period (month / year / quarter) | X | | no |
| ECO9 | Upskilling & related earning increase | "21 st Century Skills" or 'competencies' (Soland et al 2013) | X | | no |
| ECO11 | Overall economic, social and health wellbeing | Human Development Index | X | | no |
| PPG5 | Activation of public-private collaboration | Measurement or count data for number of collaborations activated | X | | no |
| PPG7 | Reflexivity - identified learning outcomes | Number of identified reflexive learning outcomes per month or year that can be specified in number of changes in the context based on reflexivity type (rules, and/or relations, and/or practices and/or discourse) | X | | no |
| PPG11 | Collaboration between organizational members | Team Boosting behavior scale (Fortuin, van Mierlo, Bakker, Petrou & Demerouti, 2021) | X | X | no |
| PPG13 | Facilitation skills for co-production | Items aimed at assessing facilitator's skills (Weyers and Rankin 2007; Bens 2009) | X | | no |
| PPG17 | Reflexivity - time for reflection | Counting number of hours spent on reflection per week/month | X | | no |

Table 15: Type of indicators (quantitative-qualitative)

Unfortunately, Pavlos Melas will not be able to geolocate the indicators' data because there are neither the essential equipment for the geolocation nor educated personnel having the knowledge for the exact subject

In the following table, we describe the way that we want to represent the evaluation results of the indicators that we selected. Moreover, we indicate to which stakeholders we would want to communicate our impact assessment results.

As we can see from the table, all the results will be represented with visual charts. In addition, we want all the results to be disseminated to citizens and to higher political levels. Then most of the results will be represented to the economic sector and scientific partners. And finally, we want only a few results to be disseminated to the media.

| CODE | NAME | Visual chart | Scientific partners | Economic sector | Higher political levels | Media | Citizens |
|-------|--|--------------|---------------------|-----------------|-------------------------|-------|----------|
| PI1 | Type of interaction with NBS | ● | | ● | ● | ● | ● |
| PI2 | Frequency of interaction with NBS | ● | | ● | ● | ● | ● |
| PI3 | Duration of interaction with NBS | ● | | ● | ● | ● | ● |
| PI4 | Perceived quality of space | ● | | ● | ● | ● | ● |
| ENV3 | Air temperature change | ● | ● | ● | ● | | ● |
| ENV8 | Rainfall storage (water absorption capacity of NBS) | ● | ● | ● | ● | | ● |
| ENV23 | Public green space distribution | ● | ● | ● | ● | | ● |
| ENV24 | Recreational value of blue-green spaces | ● | ● | ● | ● | | ● |
| ENV25 | Cultural value of blue-green spaces | ● | ● | ● | ● | | ● |
| ENV29 | Supporting/increasing biodiversity conservation | ● | ● | ● | ● | | ● |
| ENV35 | Species diversity | ● | | ● | ● | | ● |
| ENV81 | Soil sealing | ● | ● | ● | ● | | ● |
| ENV89 | Community garden area per capita and in a defined distance | ● | ● | ● | ● | | ● |
| ENV1 | Carbon storage OR carbon sequestration in vegetation/soil | ● | ● | ● | ● | | ● |
| ENV17 | Air temperature - Energy demand | ● | ● | ● | ● | | ● |
| ENV26 | Community accessibility | ● | ● | ● | ● | | ● |
| ENV55 | Green space area | ● | ● | ● | ● | | ● |
| ENV66 | Air quality change | ● | ● | ● | ● | | ● |
| ENV88 | Tree shade for local heat change | ● | ● | ● | ● | | ● |
| ENV90 | Community garden area per child capita | ● | ● | ● | ● | | ● |

| | | | | | | |
|-------|---|---|---|---|---|---|
| | and in a defined distance | | | | | |
| HW3 | General wellbeing and happiness | ● | ● | ● | ● | ● |
| HW11 | Mental health and wellbeing | ● | ● | ● | ● | ● |
| HW12 | Enhanced physical activity | ● | ● | ● | ● | ● |
| SC1 | Bonding social capital | ● | ● | ● | ● | ● |
| SC2 | Bridging social capital | ● | ● | ● | ● | ● |
| SC5.1 | Perceived safety | ● | ● | ● | ● | ● |
| SC5.2 | Actual safety | ● | ● | ● | ● | ● |
| SC6 | Place attachment | ● | ● | ● | ● | ● |
| SC11 | Positive environmental attitudes motivated by contact with NBS | ● | ● | ● | ● | ● |
| SC3 | Linking social capital | ● | ● | ● | ● | ● |
| SC10 | Environmental education opportunities | ● | ● | ● | ● | ● |
| ECO1 | New Businesses 'attracted' or started and additional rates received | ● | ● | ● | ● | ● |
| ECO3 | Net additional jobs created/enabled by NBS | ● | ● | ● | ● | ● |
| ECO7 | Increase in tourism | ● | ● | ● | ● | ● |
| ECO2 | New customers to business in proximity to NBS | ● | ● | ● | ● | ● |
| ECO9 | Upskilling & related earning increase | ● | ● | ● | ● | ● |
| ECO11 | Overall economic, social and health wellbeing | ● | ● | ● | ● | ● |
| PPG5 | Activation of public-private collaboration | ● | | | ● | ● |
| PPG7 | Reflexivity - identified learning outcomes | ● | | | ● | ● |
| PPG11 | Collaboration between organizational members | ● | | | ● | ● |
| PPG13 | Facilitation skills for co-production | ● | | | ● | ● |
| PPG17 | Reflexivity - time for reflection | ● | | | ● | ● |

Table 16: building block 5. integrating evidence into the policy process