



Nature-based Solutions: A New Urban Planning Process for Implementation

The Poznań Experience



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Coordinated by Trinity College Dublin, Connecting Nature is a partnership of 31 organisations co-working with local authorities, communities, industry partners, NGOs and academics. Our partnership will work with 16 European countries, Brazil, China, Korea & The Caucasus (Georgia and Armenia) who are investing in a multi-million euro large scale implementation of nature-based projects in urban settings. We are measuring the impact of these initiatives on climate change adaptation, health and well-being, social cohesion and sustainable economic development in these cities. Innovative actions to foster the start-up and growth of commercial and social enterprises active in producing nature-based solutions and products is an integral part of our work.

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1 Introduction

Nature-based solutions can directly address urban challenges while providing co-benefits. Yet, the development and implementation of nature-based solutions has been slow and uneven. It is a complex task, requiring collaborations across different city departments, regional and national governance levels and diverse urban actors. **A collaborative approach to nature-based solutions through co-design and co-creation of ideas** can foster innovation, facilitate cross-sectoral input, support social cohesion and tackle the knowledge deficits that exist around nature-based solutions. **The city of Poznań (Poland) has been experimenting with novel processes to innovate nature-based solutions on a large scale** and the city's approach has already had an impact on the design, management and use of its urban areas. Through learning how Poznań seized opportunities and overcame challenges, other cities can be inspired on their own path towards nature-based development.

What are nature-based solutions and how can they benefit cities?

The European Commission¹ defines nature-based solutions as solutions that are “inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience”.

¹ <https://ec.europa.eu/research/environment/index.cfm?pg=nbs>

Nature-based solutions provide multiple benefits for dealing with urban challenges and making cities greener and more resilient, including the sustainable management and restoration of ecosystems, flood protection, air quality improvement, social cohesion and local business opportunities. Nature-based solutions are quite a new concept and the phrase is not yet widely used. This is changing, however, as the need for interconnected approaches to environmental, social and economic issues is increasingly recognised. Effective examples of nature-based solutions provide co-benefits such as intercepting dust, toxins and noise, sheltering and cooling, capturing carbon and buffering flooding. They can produce energy, manage waste, generate business opportunities, provide spaces for recreation and ultimately lead to more resilient and sustainable urban living.

Recommendations from Poznań for successful nature-based interventions

Create a common vision: This can help define actions and align diverse actors. Poznań's long-term vision is of a city with interconnected green spaces, high quality of life, resilient infrastructures and a sustainable path for the city's rapid economic development. Integrating diverse small-scale nature-based solutions into dense neighbourhoods will help make this vision a reality.

Identify differentiated benefits deriving from nature-based solutions: It is very important to identify and then promote benefits generated from up scaling of nature-based solutions – not only ecological benefits, but also those that serve the needs of local communities, boost social involvement and entrepreneurship, increase quality of education and citizens' awareness, help to make savings to public budgets, and other benefits.

Identify and involve diverse urban actors from the start and create mechanisms for cooperation: Many different people are involved in designing, financing, maintaining and using public green space. It is important to reach out to and establish collaborations with diverse actors to open up new business models, create ownership and design fit-to-context solutions.

Ensure flexibility, reflexivity and openness to new ideas and opportunities: Up-scaling nature-based solutions in different locations will mean different challenges and needs. Approaches must be adaptable to the needs and goals of the involved actors and stakeholders.

Identify allies and make use of experts and intermediaries: Especially when introducing new approaches and ideas, it is important to engage experts such as facilitation experts or business developers who can help with new methods like co-production or facilitating nature-based entrepreneurship.

Don't forget about branding and promotion: While the promotion of projects often tends to be forgot amidst the daily work, good pictures and stories and promotional activities like conferences for teachers really work get people interested. It is important to anticipate potential fears and propose checked solutions of potential beneficiaries.

2 Poznań: The city of green adventure

Poznań (population approx. 540.000) is located in central-western Poland, in the central part of the Wielkopolska province. Poznań is a major business and academic centre as well as a place rich in historical heritage, varied cultural life and leisure opportunities. The city is rich in green spaces, but they are not equally distributed. Despite a well-developed green infrastructure system based on the Warta river valley (called “green wedges”), this is threatened by development pressures and the densely build-up districts in the dense city core lacks green spaces.

Why are nature-based solutions beneficial for Poznań?

Nature-based solutions provide an answer for many strategic priorities and challenges in Poznań, in particular improving quality of life while responding to the impacts of climate change. The high rate of soil sealing in the city centre’s densely built-up residential areas has resulted in unfavourable thermic and moisture conditions and limits the potential for water retention.

In order to address environmental, social and economic goals, it is necessary to approach the city as a whole. The areas along the Warta River can constitute a buffer zone for controlling flooding in the city, mitigate the considerable heat island effect, and control point-source and diffuse pollution runoff. At the same time, they offer recreation zones for citizens.

For example, Poznań has regenerated its beach front and put in place urban furniture, giving access to the waterfront and benefitting from the cooling effect of the river. The recreational facilities’ close proximity to housing has reduced the volume of car travel to the other recreational areas. In addition, bicycle paths along the river support and enable environmentally-friendly active mobility and reduce CO₂ emissions.

Open gardens and nature-oriented playgrounds in kindergartens

The Poznań nature-based solution focus is on two types of actions that contribute to materialising the long-term vision of Poznań as a city of interconnected green spaces that reconcile high quality of life with sustainable infrastructure and economic development:

- **Open gardens** in kindergartens and other public institutions that provide publicly accessible green space and therefore increases access to previously restricted green space. The institution responsible for the functioning of the greenspace ensures that users follow safety rules that are co-designed by the interested stakeholders.
- **Nature-oriented playgrounds** that promote nature-based solutions in the architectural design and modernisation of playgrounds for children. This is complemented by ecological education programmes to change the relation of Poznań’s (youngest) citizens with nature and empower citizens to set-up their own nature-based solution initiatives.

Poznań seeks to multiply small-scale nature-based interventions with a special focus on those areas that are densely urbanised and inhabited by citizens who currently have limited access to greenery. Such an “up-scaling approach”



Image 1: Kindergarten No 42 in Poznan, before work commenced on the NBS (March /April 2017). Source: City of Poznań; [Ogrody Odnowa](#)

allows to extend the network of green infrastructure in Poznań and also complements the green

wedges which run through the city, from north to south and from east to west. In this way, a natural system is created, building a stepping-stone for increasing connectivity between them.

To initiate the up-scaling process, Poznań has implemented an open garden and nature-oriented playground in one of the city's kindergartens in the densely urbanised district of Wilda, where neighbours used to have limited access to green space. The Project Coordination and Urban Regeneration Office at Poznań City Hall is responsible for the implementation.



Image 2: The open garden at kindergarten No 42 after the modernization work (July, 2018). Source: [City of Poznań](#)

3 Nature-based Solutions Framework

A new approach for innovating nature-based solutions in cities

The Nature-based Solutions Framework is a new urban planning process for facilitating the multiple innovations needed for nature-based solutions in cities. The aim of the framework is to enable technological innovations in the design of ecologically sound solutions, but also governance innovations to collaboratively design and learn about solutions that address local needs, new relationships between different urban actors and market innovation for novel financing opportunities. **The Nature-based Solutions Framework consists of seven building blocks that provide a 360° picture to support urban planning and policy practice.** It encompasses the holistic technical design, financing, monitoring and governance steps and processes for the collaborative, multi-functional and fit-to-context design of nature-based solutions in cities.



Image 3: Nature-Based Solutions Framework

4 Realising nature-based solutions at a city scale

Poznań implemented an open garden and nature-oriented playground as a pilot project in kindergarten No. 42 at Wilda district. The open garden in the kindergarten remains in the care of the kindergarten management, but it allows residents of the densely built-up Wilda District to enjoy its attractions and relax. The garden has its own regulations, which was based on consultations with kindergarten management, parents of pre-schoolers, and residents of the Wilda District, and – importantly from a security point of view – also with the police. Currently, the Project Coordination and Urban Regeneration Office plans to up-scale the open garden concept and is seeking other kindergartens that would be interested in replicating the intervention.

Timeline

January 2017	The concept for urban gardens is developed
January 2018	The concept for preschool gardens as nature-oriented playgrounds is developed

The idea of creating an open garden in one of Poznań's kindergartens emerged from collaboration between three kindergartens and Poznań City Hall that concentrated on innovative ways of educating pre-schoolers. As a result, the creation of nature-oriented playgrounds in all three kindergartens was completed in 2018. The process also started the collaboration between the Urban Regeneration Office and the Department of Education as part of the "Program for the modernization and extension of playgrounds in kindergartens in 2016-2020" of the latter department.

May – June 2017 Consultation workshops to design the open garden in kindergarten No. 42 at Wilda District

Several consultation workshops were organised with the kindergarten management-, civil servants from the Project Coordination and Urban Regeneration Office at Poznań City Hall, specialists, experts and enthusiasts including designers, teachers, landscape architects, ecologists and contractors. The workshop resulted in the creation of a conceptual design and safety rules for the open garden.

June 2017 – February 2018 Implementation of the open garden and nature-oriented playground in kindergarten No. 42 at Wilda District

21st March 2018 Official opening of the open garden

Firstly, the new interior design in the kindergarten was implemented. As a second step, the playground in front of the kindergarten was renovated and a social garden created next to it.

May – September 2018 Organisation of workshops for families and children in the open garden in kindergarten No. 42 at Wilda District

In 2018, workshops for families with children were organised in the open garden. The main aim was to create a place where citizens could be engaged in developing the garden, and in this way to encourage them to work together and undertake different activities with children and neighbours.



Images 4 and 5: Impressions from the series of workshop in the open garden that were organized between May and September 2018. This workshop was also intended to create a house for insects. Source: City of Poznań.

13th & 14th November 2018 Conference on natural playgrounds for youth education

The city of Poznań organised a conference for the directors of kindergartens, and also for primary and secondary schools directors in Poznań. The main aim of the conference was to further discuss the idea of how to educate children and youth on public space as common good. A related aim was to promote the ideas of open gardens and nature-oriented playground in kindergartens.

January – May 2019 Identifying opportunities in kindergartens for up-scaling

Kindergartens with a large area around them and with the interest to create an open garden for residents were identified in order to up-scale the idea of nature-oriented playgrounds and open gardens in kindergartens. Ten kindergartens were chosen that will collaborate with a landscape architect to transform their garden into nature-oriented playgrounds by the end of 2019.

May – December 2019 Strengthening collaborations with kindergartens

The Project Coordination and Urban Regeneration Office of Poznań City Hall started to cooperate with four kindergartens that are willing to create open gardens. The consultation process is currently in progress, the final conceptual projects will be finished at the beginning of 2020.

5 The Nature-Based Solutions Framework Building Blocks – how Poznań realised their solution step by step

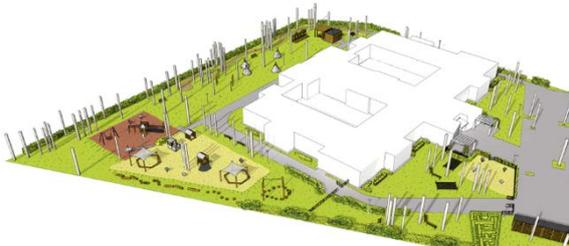
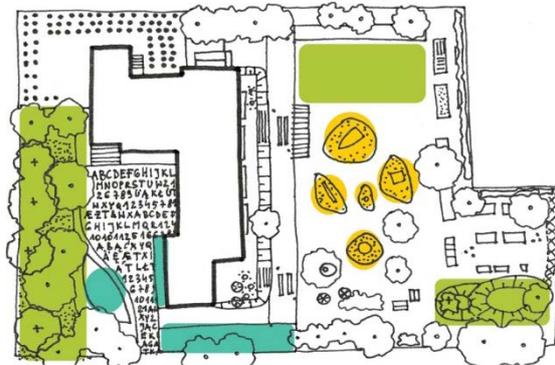
5.1 Technical solutions

What is the nature-based solution design?

The technical design of a nature-based solution needs to ensure that the desired outcomes are achieved and sustained in the long-term, and that trade-offs are avoided where possible. This includes both the practical construction aspects in relation to questions such as: ‘what kind? where? how big? what plants? what additional infrastructure is needed?’, and the broader contextualisation in relation to the character and needs of the locality, region, and landscape into which it is being introduced.

How do open gardens and nature-oriented playgrounds fit into Poznań’s urban environment?

Nature-oriented playgrounds and open gardens at kindergartens represent a “small-scale” approach to nature-based solutions, which – when multiplied – bring substantial change in the overall urban fabric. This is because kindergarten playgrounds are often the largest green spaces in neighbourhoods. Their ecological condition including quality of greenery, scope of biodiversity, permeability of surfaces must be constantly improved. Bringing in nature-oriented ideas into their modernisation has positive physical and ecological impacts, changes users’ (especially children’s) perception of nature and can open up green spaces to citizens close to where they live.



Images 6 and 7: The conceptual projects of natural playgrounds – the particular areas are presented in different colours (education area, relaxation area, recreation area).

What are the multiple benefits of open gardens and nature-oriented playgrounds?

Rainwater management and microclimate mitigation: increasing the biologically active area and permeable surfaces, storing rainwater, mitigating the urban heat island effect and introducing plant species adapted to climate change.

Biodiversity regeneration: introducing native and multi-species greenery with diverse vertical and horizontal structure, providing convenient living conditions for urban fauna (e.g. hotels for insects).

Social benefits: strengthening social cohesion and providing a place for social activities, improving health and well-being of children and adults, increasing ecological awareness and nature education.

Economic benefits: promoting entrepreneurship and professional development for design and implementation of nature-based solutions.

New social relations: increasing cooperation between different actors in the city “on the ground”.

How can technical design help to mobilise social, health and wellbeing benefits?



It was important to implement eco-demonstrators in the nature-oriented playground that complement and enhance their educational benefits. Eco-demonstrators provide empirical tools for educating children on how the nature works through observation, experiment and fun. They are included in the design of the playgrounds during the process.



Images 8, 9, 10: Pictures of eco-demonstrators installed in preschools in Poznań. Source: Piotr Bedliński and Made in Art Foundation.

How can soundness, replicability and flexibility be balanced in the technical design?

To facilitate up-scaling of the idea of open gardens and nature-oriented playgrounds, the city of Poznań has created a nature-based solutions catalogue in collaboration with the local University of Adam Mickiewicz. Architects, teachers and practitioners can use this catalogue as part of the development of open gardens and nature-oriented playgrounds.

Despite the need to create verifiable and replicable standards, flexibility and openness for new ideas and opportunities are important to allow different design approaches of both managers of the

kindergartens and other local stakeholders. This closely links to the co-production of nature-based solutions, which involves multiple actors in the design and implementation but especially also in the identification of financing opportunities. It also means that the active promotion among stakeholders and institutions who might be able to support the funding of the idea is needed.

How can the need for trade-offs between different user interests be dealt with?

Conflict can arise from differing user interests, such as increased noise levels during events in the open gardens or conflicting opinions and visions of the best solutions for area development.

During a family event in the kindergarten, a neighbour complained about the high noise levels. The solution was to better inform the neighbours living in the vicinity of the kindergarten about upcoming events and to organise workshops and events targeted at different neighbour groups to involve them in the garden activities.

Gentrification might become a risk for neighbourhoods with open gardens, leading to dramatic changes in the population structure. Therefore, urban regeneration should be supported by community-led regeneration, focused on building social and relational capital, strong involvement of non-governmental organizations and bottom-up initiatives, in order to counteract the exclusion of low-income groups.

5.2 Indicators

Assessing the baseline and the transformation achieved

Nature-based solutions have the potential to simultaneously provide social, environmental and economic benefits. However, the evidence for their multiple benefits is rather scarce and highly fragmented, and more robust frameworks for the monitoring and assessment of their impacts are needed to guide urban policy-making. The development of a robust impact evaluation framework for nature-based solutions entails the choice of appropriate indicators to capture impacts across multiple categories, and robust, flexible and cost-effective methods for their monitoring and evaluation. Choosing and/or developing robust indicators to assess impacts of nature-based solutions allows cities to assess the strengths and weaknesses of specific interventions in achieving strategic city goals and provide an essential tool to make adaptations in real time, thus increasing their performance. Robust indicators also support cities in building the case for investments in nature-based solutions, by providing evidence regarding the types of impacts they are able to deliver. Finally, evaluation is necessary for a change in mainstream ways of planning for urban resilience and regeneration, still dominated by silo-thinking and the understanding of ecological, social and economic objectives as separate.

Why use indicators to monitor the impact of the open gardens and nature-oriented playgrounds?

Assessing the impacts of the nature-based solutions in Poznań through the use of indicators can evaluate the effectiveness of the interventions' contribution to Poznań's strategic city goals and provide the means to adapt design and implementation features in real time, thus improving their performance. The gathering of evidence over time can inform decision-making and choices when designing and implementing interventions for urban regeneration and resilience, as well as building the case for investments in nature-based solutions. It helps to convince investors that nature-based solutions can deliver on the multiple objectives and interests their stakeholders have. Finally, the evaluation process helps to innovate how to plan for urban resilience and regeneration by presenting ecological, social and economic objectives in an integrative way and linking it to the different departments that can benefit from the intervention(s) in Poznań.

How will the indicators be used?

The processes of co-creation, implementation and maintenance of Poznań will be monitored and evaluated in order to understand and capture those elements that contribute to their success, and build the evidence-base regarding benefits, synergies between these, as well as trade-offs, and thus inform knowledge-based practice in the future.

A first step was to select indicators for different impact categories – health and wellbeing, social cohesion, environmental, economic. It was important to identify indicators that are already used as well as indicators that could be used for evaluating the impact on the objectives of the open garden and nature-oriented playground. Based on this information, the first preliminary set of most important indicators were selected. After the final selection of indicators is made, existing data gathering methods were defined and possible data gaps where new data collection would be needed were identified.

Is analysis necessary for identifying and prioritising indicators?

Thorough analysis is key. Linking *city strategic objectives to expected outcomes* is very demanding due to the diversity of the objectives, but it is also a valuable exercise because it generates insights into the complexity. It helped to thoroughly analyse model case studies in terms of environmental, social and economic aspects and therefore to systematise the knowledge about city's strategic documents and priorities Poznań is achieving.

Firstly, the task required the analysis of strategic documents at the city level and priorities. In the next step, it was necessary to check whether the given case affects these priorities in a positive or negative way. This also provided the opportunity to think over potential co-benefits and multiplier effect or potential trade-offs between objectives.

How can data gaps be recognised and dealt with?

A real lack of specific and directed indicators for specific examples, as well as significant data gaps necessitates the collection of new data. This requires cooperation across different city departments to identify the departments responsible or interested in gathering the data and indicators.

Moreover, the solutions implemented in Poznań are of local character: pre-school gardens, open garden and pocket parks. As such, the effects of this type of intervention are difficult to capture in the scale of the whole city. This means that the monitoring of the impact of small green interventions on the environment, wellbeing and social cohesion in dynamic terms can only be implemented on a site scale. Thus, it is important to adapt the indicators to the scale of nature-based solutions implemented in Poznań.

5.3 Governance

Creating conditions for collaboration and coordination for multifunctional nature-based solutions

Because of the multifunctional benefits that can be achieved from nature-based solutions, their delivery is often aligned with broader social, political and business priorities and goals of a city and of city-regions. This requires cross-sectoral, multi-scale and inclusive approaches in terms of who is best placed to ensure development, delivery and ongoing sustainability of the nature-based solution and thus the creation of new conditions for how effective coordination and collaboration can be fostered.

Which collaborations and partnerships were put in place to deliver the open gardens and nature-oriented playgrounds?

The implementation of the nature-oriented playgrounds and open gardens is led by the Project Coordination and Urban Regeneration Office at Poznań City Hall. The Office established strong collaborations with other partners. The Department of Education manages the budget for the implementation of the nature-oriented playgrounds. The kindergarten management is critical for obtaining support especially for the open garden.

In addition, a variety of other stakeholders needed to be involved in different stages of the design and implementation. A landscape architect supported the design processes, a non-governmental organisation facilitated workshops in the open gardens, and environmental experts underpinned the provision of ecological education.

It is important to clearly assign roles and responsibilities between these different actor groups. For example, the open garden remains in the care of the kindergarten management. The kindergarten management in cooperation with chosen NGOs very actively work for the garden, encouraging residents to visit and use it. Numerous meetings and creative workshops are planned for the summer period. The city of Poznań is responsible for monitoring and evaluation, but also for enforcement – verifying and controlling the compliance of activities with local law, applicable rules and regulations.

Which strategic city goals does the nature-based solution help to deliver?

The overall city policies are very much greenery-oriented. The creation of open gardens and nature-oriented playgrounds have a meaningful potential for other city development goals and are included into strategic objectives like developing a green city, supporting ecological education for citizens and influencing on the quality of the city and the health and wellbeing of its residents. This shows how nature-based solutions can offer creative, innovative and effective ways to deliver on many city strategic goals, and how nature-based solutions can be embedded across a range of policies.

There are also strong linkages between Poznań's strategic goals and nature-based solution goals formulated and pursued at European level. This supports the planning of nature-based solutions and the evaluation of their multifunctional benefits.

How can collaboration across different city departments be facilitated?

The organisational structure of the city government is hierarchical and complex, with competencies being distributed within and across different departments and rigid work procedures. The key to the successful implementation of open gardens and nature-oriented playgrounds is the smooth cooperation and transfer of information between different departments engaged in the process.

It is important to facilitate collaboration and sharing of information, knowledge and experience across different departments. To overcome existing barriers, it is important to communicate often, inform about the projects and goals and arrange meetings and brainstorming towards common goals, evaluate and monitor plans and actions, and create the unified vision which will be led by competent and informed management.

Which framework conditions are put in place to ensure financing and maintenance?

For the operation of the open garden at kindergarten no. 42, it was important to put in place new regulations and safety rules. There are currently no legally binding instruments for the implementation

of open gardens and natural playgrounds. Embedding such instruments or financing processes into the investment planning for the municipal kindergarten budget could support further up-scaling of these solutions. To ensure financing, it is also important to clarify long-term visions, strategies and goals in order to identify the activities that will help achieve these goals and diagnose the financial possibilities and opportunities for leading future projects.

Identifying responsibilities to take upscaling forward could safeguard against loss of momentum. While the local government is important for the initiation of new projects, the kindergarten management will be responsible for maintaining their preschool garden. Therefore, to ensure delivery, it is recommended to create a financial and management “map” as a tool to support directors and managers of kindergartens.

5.4 Financing and business models

Mobilising resources for implementation and long-term sustainability

Planning for up-front financing of nature-based solutions and long-term sustainability are a critical element of nature-based solution implementation. Rather than relying on public sector funding alone, there are several support tools to help cities put together a long-term business model for their nature-based solution, which includes assessing the potential of alternative sources of financing such as philanthropic or crowd-funding.

The Business Model Canvas: stimulating innovative financing and business models

Working through the Business Model Canvas tool¹ has allowed Poznań to elaborate the wider value proposition of their nature-based solution and to clarify how this will be delivered through key activities and key partners.

¹ <https://connectingnature.eu/financing-and-business-models>



Poznan, Kindergarten: Nature-based Solutions Business Model Canvas

<p>Key activities</p> <p>Surface desealing, improvement of soil and environment New planting Equipping the garden with natural elements Creating natural playgrounds for children Making the green area better available for residents/children Cooperation with the preschool's management Activities involving and engaging residents Activities promoting health and outdoor playing Job creation Creating a market for new services and products Exchange of knowledge and experience Adjusting the market and law to emerging services and products Looking for sponsors</p>	<p>Key resources</p> <p>Kindergarten area Organizational assistance Technical advice Money supply Garden maintenance programme Organisational assistance Administrative and content related support Money supply Human resources Financial resources Incentives (job creation) Adjustment of public procurement Human resources Financial resources transport programme Incentives for public institutions</p>	<p>Value proposition</p> <p>Access to high quality nature/environment in the city Biodiversity (including biodiversity) Free access to nature Decrease of temperature during summer Desealing of the surface Bigger area of greenery Conservation of the kindergarten's infrastructure linked with education Social inclusion Meeting place Space adopted to different needs of children and adults Education – eco-education Improved health and well-being of users free of charge Direct economic: Free of charge but generating other services - Interest in kindergarten with higher green standards - Job creation (maintaining) - Increased property values Indirect economic: - Transfer of skills, knowledge and expertise - Increase of attractiveness of area Increased quality of neighbourhood Small architecture for users Decreasing "fencing" across the city</p>	<p>Key Partners</p> <p>Designers (experts and preschoolers) NGOs Green and clean services providers Poznań City Hall Experts Environmental Protection National Fund / Environmental Protection Voivodship Fund Councilors Media Kindergartens Housing & cooperatives (institution) Housing community group organized by residents Local activities Land owners Higher education providers Sponsors (including CSR) Information providers</p>	<p>Key Beneficiaries</p> <p>Residents Children, parents and seniors Teachers Kindergarten management Pollinators and local fauna & flora Green enthusiasts City as a whole Visitors from other preschools Neighbours Service providers Safety auditors Local small business Politicians Tourists Scientists</p>			
<p>Cost Structure</p> <p>ERDF Urban Innovative Actions Non-EU funds planning Environmental Protection National Fund / Environmental Protection Voivodship Fund Adaptation to climate change programmes Strategy of rainwater management Department of education EU funds (cm) Crowdfunding Alternatives sources (for foundations, artists, philanthropists) Cooperation with universities</p>	<p>Cost Reduction</p> <ol style="list-style-type: none"> 1. Shared coordination 2. Negotiation price 3. Social economy operator 4. Funding programmes 5. Volunteers 6. Contributions in-kind/time-banking 	<p>Capturing value</p> <table border="0"> <tr> <td data-bbox="619 853 847 1021"> <p>Environmental value</p> <p>A. Direct - New fundings sources/opportunities - District councils, banks, firms B. Indirect - Decreasing heat - Ecological effect indicators - Rain water tax Other value - Urban agriculture - Zero waste economy - Preferential rate for local children</p> </td> <td data-bbox="866 853 1054 1021"> <p>Economic value</p> <p>A. Direct - Esf - Department of education - District councils - Crowdfunding B. Indirect - Positive opinions in media (social) - Increase the local identity - Number of users/visitors - Other social indicators</p> </td> <td data-bbox="1074 853 1262 1021"> <p>Social value</p> <p>A. Direct - Esf - Department of education - District councils - Crowdfunding B. Indirect - Positive opinions in media (social) - Increase the local identity - Number of users/visitors - Other social indicators</p> </td> </tr> </table>			<p>Environmental value</p> <p>A. Direct - New fundings sources/opportunities - District councils, banks, firms B. Indirect - Decreasing heat - Ecological effect indicators - Rain water tax Other value - Urban agriculture - Zero waste economy - Preferential rate for local children</p>	<p>Economic value</p> <p>A. Direct - Esf - Department of education - District councils - Crowdfunding B. Indirect - Positive opinions in media (social) - Increase the local identity - Number of users/visitors - Other social indicators</p>	<p>Social value</p> <p>A. Direct - Esf - Department of education - District councils - Crowdfunding B. Indirect - Positive opinions in media (social) - Increase the local identity - Number of users/visitors - Other social indicators</p>
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<p>Governance</p> <p>The best model for Poznań-Societal Resilience NGO/other actors+pre-schools=social enterprise</p>							

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Image 11: The Business Model Canvas for nature-oriented playgrounds

Identifying new financing and business model opportunities

Currently, Poznań is facing severe budget cuts, which makes the financing situation very challenging. It is therefore important to identify and mobilise new sources of financing. European Union programmes and initiatives such as the URBACT and LIFE programmes, and Structural Funds cannot be overestimated as sources of financing for nature-based solutions and innovations in the financing, governance and business models. The Multiannual Financial Framework of the EU starting in 2021 seems to be well matched to respond to Poznań challenges in terms of both capital expenditures and operational costs of nature-based solutions.

The diversification of financing sources will remain a priority to further develop the open garden model. This requires match-making and supporting beneficiaries and stakeholders, as well as opening up to alternative financing of from other types of institutions and private organisations.

Which model is best to finance the open garden and nature-oriented playground?

The "societal resilience" nature-based solution governance model is characterised by a high level of community leadership in governance with local government playing a responsive, supporting and low-level role. Thus, in this case, the lead actor would be community organisations with support from the public sector. The assumption is that the city's engagement will decrease and at the same time the role of non-governmental organisations or other community organisations or operators will increase. In this way, the maintenance of an open garden would be financed from the kindergarten budget, and

workshops or classes, or organised events would be taken over by the operator or an entity that will take care of this garden. Their task would be to look for other sources of financing so that the garden could continue to function. The city hall gives initial capital to start the initiative, and in the next stages, it should function alone, without the help of the government and the money from the city budget.

Knowing financing partners and “knocking doors” to mobilise other streams of financing

To mobilise financing and create opportunities for new business models, it is important to identify and collaborate with diverse actors. Approaching other city departments has proven a successful strategy for identifying new financing opportunities. For example, in this way it was possible to agree with the Department of Education on the scheme for financial collaboration for nature-based renovation of preschool garden. Through informal cooperation mechanisms, the Project Coordination and Urban Regeneration Office complements the Department of Education’s multi-annual programme for the modernisation of playgrounds.

However, it is challenging to establish contact and collaboration with the private sector. A first step is to make a list of potential companies, but there is not yet a well-developed market for green services, offering flexible and innovative nature-based solutions. The joint creation of new financing opportunities and business models is therefore closely linked to co-production: involving diverse actors in the joint design and implementation will be crucial.

What are the most important services or activities which need to happen to deliver the environmental, social, economic value?

To ensure implementation on environmental, social and economic aspects, it was important to conduct co-production workshops, initiating the planning and implementation of open gardens and nature-oriented playgrounds and enabling the inclusion of stakeholders representing various aspects. In addition, it was critical to involve experts in the design and implementation to ensure the high quality of the solutions. This is necessary especially in the first pilot activities, where some standards of actions are settled down and could be multiplied during up-scaling.

How can costs be reduced?

Multiplication Replication of once implemented standards and solutions usually is often linked with possibilities opportunities to reduce costs. However cost reduction can be done at earlier stages as well. One basic tool is to undertake market research ahead of price the negotiations, preceded with market research. Negotiations can refer to market offers, innovative approaches or the CSR policy of the service/products contractors. Other possibilities include shared coordination of tasks, enabling partners to be included and thus strengthening their sense of agency. A social economy operator can provide public services and will use the potential of local communities. Including volunteers will not only help reduce costs but additionally could be a tool for better integration of neighbours or support the development of mentioned CSR policies of local companies. One of the most recognisable means of cost reduction is however using funding programme opportunities. Such programmes can operate on local, regional, national or European levels, offering different percentage of co-financing. Climate change adaptation and mitigation, social participation and inclusion, activation on local labour market could be topics relevant to find nature-based oriented financial support.

5.5 Nature-based Entrepreneurship (NBE)

Engaging community and commercial enterprises in the design, implementation and long-term delivery of nature-based solutions

Nature-based solutions can provide opportunities to support nature-based enterprises. Nature-based enterprises can leverage nature-based solutions directly in their offer of products and services. These could include e.g. providers of green walls and roofs, markets and producers of food from allotment gardens and eco-tourism provider. Nature-based enterprises may also indirectly contribute to the planning, design, financing and sustainability of nature-based solutions e.g. landscape architects, specialist nature-based solutions equipment manufacturers, Community Interest Companies (CICs) managing nature-based solutions, crowdfunding platforms for nature-based solutions.

Identifying and prioritising innovation and entrepreneurship opportunities

Integrating nature-based solution development with the economic priorities of a city can create new opportunities for entrepreneurship. For example, Poznań identified a link between food and nature and suggested the need for more restaurants and facilities in parks. The city also identified that businesses were attracted to pleasant and appealing locations, and therefore suggested that businesses may want to associate nature-based solutions with their corporate image. Along these lines, there are many different types of nature-based enterprises that could contribute to Poznań nature-based solutions objectives. In the design sector, landscape architects can contribute to environmental and economic goals. Furniture designers may also contribute to landscape architecture.

Linking to Innovation Ecosystem Actors to create opportunities for nature-based entrepreneurship

An innovation ecosystem can support nature-based enterprises. The innovation ecosystem in Poznań is composed of technology parks and research institutions, incubators, knowledge transfer centres, start-ups, clusters, creative sectors, urban projects, and social innovation support providers. The local government and regional government (Wielkopolska Region) play particularly important roles. However, there are still gaps in establishing collaborations between these actors and those responsible for planning nature-based solutions development. The identification of nature-based entrepreneurs needs to be followed by match-making initiatives to match city administration demands with relevant market offers.

Sustaining nature-based entrepreneurship

Some of the main barriers to sustaining nature-based entrepreneurship are: a lack of critical mass to sustain SMEs, lack of awareness and demand for nature-based solutions and resistance from competing industries, e.g. the car lobby. Opportunities to address these gaps are eco-education and awareness raising related to the wider challenge of 'branding nature-based solutions'. Another opportunity is to tap into the increasing support from citizens for the retention and development of green areas. Citizens in Poznań are becoming increasingly engaged in 'ownership' and contributing to green development in Poznań. They vote for nature-based solutions in the Participatory Budget, organise community gardens and food cooperatives, take part in public debates on the creation of public space and the importance of nature in such spaces. Public procurement and incentives can facilitate entrepreneurship building on this public interest.

Example: Eco-garden equipment

When the city of Poznań engaged a landscape architect to design eco-demonstrators for their natural playgrounds, they accidentally discovered a gap in the market – this type of equipment didn't already exist! Through public procurement, the city of Poznań supported a local manufacturer to design and develop new equipment to meet this gap. Now with more than 10 kindergarten playgrounds already supplied with this equipment and with interest from many more in installing similar equipment in the coming years, the city of Poznań has directly contributed to the emergence of a new product line and market opportunity for this local manufacturer. The success of the Poznan natural playground has sparked a lot of interest around the world creating potential international scale-up opportunities for this Polish company.

5.6 Co-production

Engaging and mobilising diverse actors in searching for and implementing joint solutions

Co-production facilitates collaborative knowledge sharing between diverse actors in cities – such as local policymakers, researchers, citizens, entrepreneurs. In this way, co-production generates shared problem definitions, visions or solutions fit to local needs, fosters new relationships, and mobilises and empowers actors to actively engage in creating better, and greener cities.

Why co-produce open gardens and nature-oriented playgrounds?

Co-production was important because it helped to generate new and more complete knowledge, especially about the users' needs, to ensure co-ownership and establish new partnerships. The main goal was to involve as many people as possible, who could present their point of view and contribute to the project. Co-production brought more opportunities in terms of ideas and money resources to develop and maintain the place when the project is already there.

It was specifically important to collaborate with diverse stakeholders (e.g. teachers, architects, parents, police). As for the open garden, the main stakeholder is the kindergarten administration (director). As such, the success of such a solution depends mainly on her/his flexibility and openness. Opening kindergarten premises to the public is not always perceived as a low-risk solution. It demanded certain restrictions and cooperation with other stakeholders like – neighbours, police and the district council. For example, it was particularly important to have the police as part of advisory board, in order to bring in their knowledge of safety rules, methods of countering vandalism, theft, help in maintaining and monitoring the open garden.

How to structure the co-production process?

A first important step is to identify the relevant stakeholders and invited to participate at the earliest stage of the process. Employing multiple formats to involve diverse group of actors such as workshops

with the architect, kindergarten management, civil servants, teachers and children allowed the integration of their knowledge and needs throughout the initiation, consultation, implementation and operation.



Image 12: Consultation workshop with civil servants, architects, contractors and residents at PreSchool No 42, Wilda District in Poznań (May/June 2017). Source: City of Poznań.

Workshops were based mainly on discussions and exchange of ideas related to the design and functioning of an open garden. Some workshops were held between the kindergarten management, employees of the Project Coordination and Urban Regeneration Office and landscape architects. Only when the design of an open garden was finalised, a series of workshops with citizens were organised – parents of pre-schoolers, residents from the nearest neighbourhood, councillors from the housing estate council from Wilda District, who could express their visions and opinions on the open gardens.

During the continuous operation phase, it is important to constantly debate how to proceed (with director of preschool, teachers and parents), but also discuss about finding new governance models which will help to determine who can be responsible for the management.

Ensure trust and openness in the process by providing legitimate knowledge and addressing conflicting interests

Challenges can arise when parents have ideas that cannot be implemented in the garden due to certain conditions or regulations, e.g. the water and sewage system under the surface of the garden. In some cases, educational workshops could help overcome these challenges: first with teachers and management, who then passed the acquired knowledge about the benefits and limitations of the open garden and design possibilities to parents of pre-schoolers. For example, many parents initially disagreed with designing insect houses in the garden, fearing stings from the insects, but when they were made aware that the houses are inhabited by mason bees, which do not sting, and at the same benefit the environment in a number of ways, they agreed that this solution is very positive.

Such discussions facilitated openness on all sides, and everyone involved learned to listen to different ideas and view them not as threats but as opportunities and possibilities to create an attractive space for rest and recreation for children, parents and grandparents, or local residents.

Ensuring usable knowledge for co-ownership and empowerment

The goal was to create a place for fun, relax and experiencing nature, so it was important to design a garden suited to children's' needs. Usable knowledge was generated in terms of smart, trustworthy and useful information for creating an open garden, including expert and environmental knowledge from architects, teachers, contractors, environmentalists (evaluating the environmental conditions in the garden and possibilities of its development), and the knowledge and experience of kindergarten management, who knows what 'works' and what 'does not work', but also the knowledge about the methods, how to get to children with knowledge – learning by playing in garden – so that children learn how to use the open garden.

Creating institutional space and skills for co-production

Co-production was a novel process in Poznań, and the organisational structure of the city of Poznań is hierarchical and compartmentalised. Many departments work according to traditional methods and maintain a rigid structure that does not go beyond the established frame of the work. Space for co-production was created by establishing different collaborations, such as with the Education Department for the support of the open garden. It is important to invest time in informing people about the co-production process and encourage them to take part in consultation meetings. To ensure this it is necessary to involve someone with facilitation skills, who knows how to mobilise and involve future users in the design and creation process.

Using diverse communication and information channels to reach 'unusual suspects'

It was a challenge to inform all residents about the open garden and encourage them to participate in workshops and consultation meetings. Despite many efforts to promote this place, to invite to workshops, sometimes this information did not reach more people. It is therefore important to use more possible information channels.

Example method visioning: children draw their dream open garden in Poznań



In Poznań a series of informational and consultation meetings were held with residents, who could express their opinion on the open garden, its concept and the form in which it would function in the future and what attractions it would provide to children, parents and all visitors. During the organised workshops two methods were used: brainstorming, during which parents, children and teachers exchanged ideas, how an open garden could look, what elements could appear in it, how they will spend free time and how they can play and have fun

there. The next step was to visualise the thoughts and prepare pictures/drawings that represented the envisioned open garden – plants, flowers and other elements. This task was special for children who were outdoing themselves in ideas for an ideal open garden. These methods helped in identifying the needs of residents and its future users, especially children and parents. As a result, it gave a lot of inspiration to the designer and architect who used the presented ideas to create a conceptual project of garden.



Images 13 & 14: Children's' inspirations – their dreams how the open garden would look like (June, 2017). Source: City of Poznań/Preschool No. 42 at Wilda District in Poznań

5.7 Reflexive monitoring

Systematic and real time learning about and for effectively implementing nature-based solutions

Reflexive monitoring is a novel monitoring and evaluation methodology that gives insight into the progress and direction of the nature-based solution implementation process in real time. Reflexive monitoring activities stimulate learning, allow to identify barriers and opportunities and enable flexible responses to changing circumstances and objectives. Reflexive monitoring therefore enables recognising and influencing the context in which nature-based solutions are implemented, and the

emergence of innovations that might steer away from previous goals and plans when they are not fit anymore.

How does reflexive monitoring contribute to the implementation of open gardens and nature-oriented playgrounds?

Employing reflexive monitoring has helped to reflect on the process and become more aware of existing barriers, as well as able to embrace failures as learning opportunities. It allowed to identify lessons for how to move forward with the implementation of open gardens and nature-oriented playgrounds. For example, through reflexive monitoring, it became clear that even small changes – like micro-installations (eco-demonstrators) that equip gardens with green elements in ten kindergartens – can be a simple way to show how nature works while educating and entertaining children, teachers and parents. In addition, the method allows to recognise small developments, to identify barriers that are hindering implementation and prompts a more pro-active search for solutions. Finally, it is easier to “remember” some activities that are planned or started in the process, lessons learned or ideas that need to be followed-up but are put aside during project implementation. In this way it was easier to prioritise which actions are needed to be taken to help the scaling of nature-based solutions.

How to set up and do reflexive monitoring?

Reflexive monitoring was a new method. The first step was to identify a reflexive monitor who is in charge of preparing an overall timeline of all important events related to the implementation of the open gardens and nature-oriented playgrounds using the bullet journaling method. The timeline was used to structure the regular team meetings among those involved in the project, which was an important source of information for further discussion and planning. After these meetings, a Dynamic Learning Agenda was created, which identifies the critical turning points that brought about change in how certain situation were handled, for instance in the communication with other actors or in the internal and external collaboration. This helped to formulate learning questions and follow-up actions.

Critical turning points	Learning questions	Follow up actions	Status
Meeting and discussion with specialist who is in charge of green solutions in preschools - natural playgrounds in preschools using natural and green elements (30.10.2018)	How to ensure that kindergartens selected by Department of Education for investment will implement nature oriented playgrounds?	Influencing management of kindergartens selected by the Department of Education to follow the mechanism of support offered by Project Coordination and Urban Regeneration Office (support of "natural playgrounds designer for investments paid by the Department of Education budget)	Complete - informational meeting in February (14/02/2019)
		Organising set of consultation meetings of kindergarten management with the contracted landscape designer to design playgrounds of selected kindergartens in line with their individual needs and enable them to understand the concept of NB playgrounds better.	Ongoing - more workshops, consultations in the frame of natural playgrounds designing process
	How can we financially support the development of pre-	Developing appropriate financial support tools with the help of experts/ professionals	ongoing - analysis

	school gardens? How can we properly work out a well-functioning financial model?		
	How to find other sources of financing for individual activities?	Diagnosis of other sources of financing in the city that can be allocated to the development of NBS in Poznań	ongoing analysis -
	How to maintain cooperation between the various stakeholders: Departments, companies, contractors, preschools (directors, children and parents)?	Initiate meetings (formal and informal), discuss, share ideas, organize workshops	ongoing analysis -

Table 1: Example from dynamic learning agenda

Embracing reflexivity as a new working principle

As it is a new methodology, reflexive monitoring challenges existing ways of working. Especially in the beginning, it demands time until reflexivity has been adopted as a way of thinking. It needed time and patience to realise the benefits of the method for the daily work. It was therefore difficult follow the discipline of regular reflexive monitoring meetings that was perceived more as a burden in addition to the high amount of administrative work associated with daily project tasks. A moment of change came with the failure of one of the activities (the temporary summer garden). This was quite hard to admit, but the methodology allowed to identify the reasons for failure, which made it much easier to explain to draw positive lessons for our future activities. Reflexive monitoring therefore also showed that something is not necessarily a failure if it creates learning opportunities that are taken on board for the future.