

Poznań. The city of green adventure

1. Introduction: Green Poznań – barriers, challenges and opportunities

Nature-based solutions, which are inspired and supported by nature, provide multiple benefits for improving climate adaptation, social, economic and environmental wellbeing in Poznań. The design, implementation, operation and maintenance of nature-based solutions requires us to learn about and experiment with new planning approaches and methods.

Here, we give an account of how we have developed the open garden at kindergarten no. 42 in Poznań. We present the diversity of activities undertaken by the City of Poznań and a model example of an open garden, which will be scaled-up and implemented also in other places in the city of Poznań. Specifically, we describe the different planning processes and steps we have taken to design and implement the open garden as a nature-based solution that generates multiple innovations and contributes to climate adaptation, biodiversity regeneration, social cohesion and environmental awareness.

This document was written by the city for cities: for other front-runner cities and fast-follower cities taking part in the CONNECTING Nature project, for the future colleagues in City Hall's Departments who will continue to work on nature-based solution projects, for people who are interested in innovative projects in the city, for new-joiners who would like to collaborate with in the scope of nature-based solution projects. The document aims to serve as an inspiration and showing the knowledge, experiences and lessons learnt.

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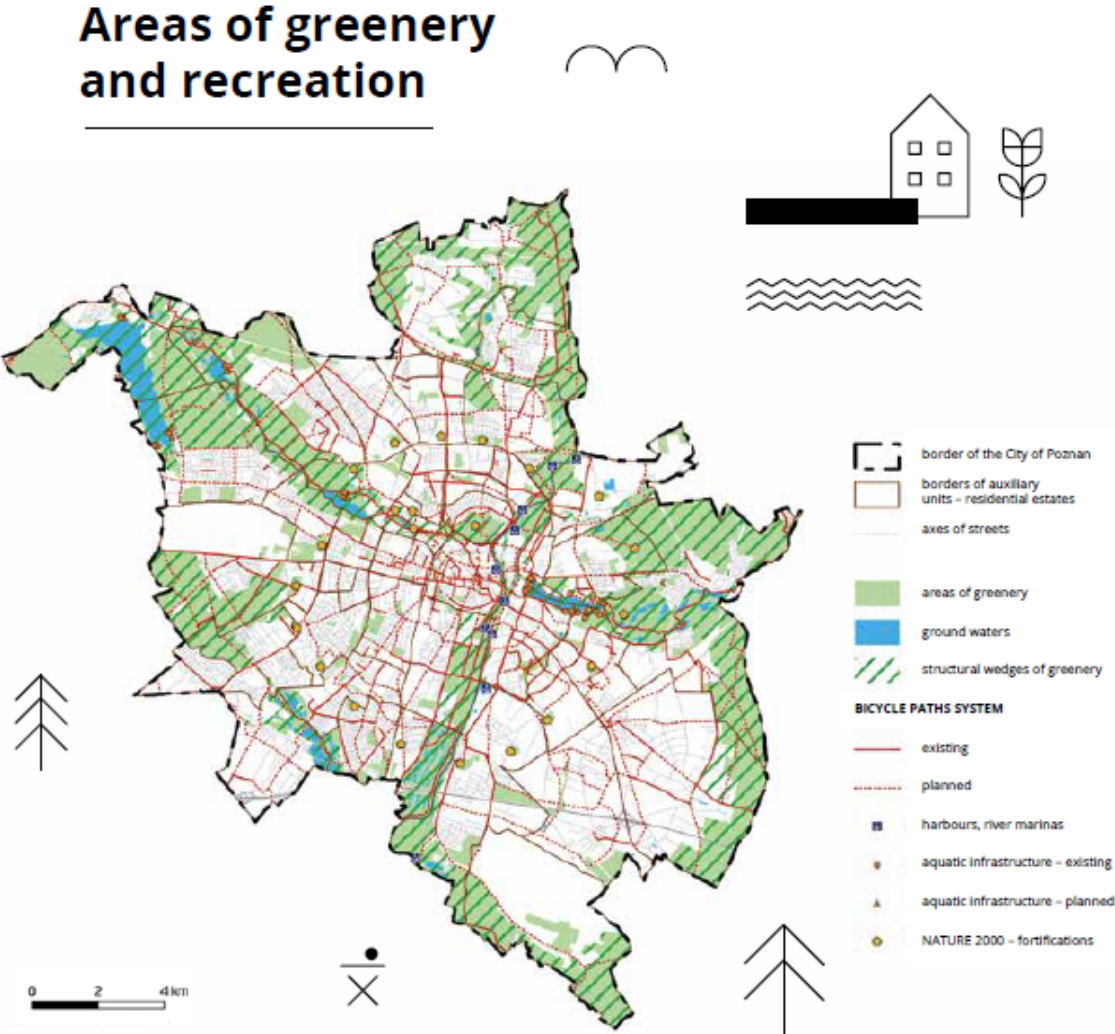
In this chapter we describe the current status of the open garden at kindergarten no. 42 in Poznań. We also outline the dynamics and diversity of activities undertaken by the Project Coordination and Urban Regeneration Office (Poznań City Hall). All projects presented in the document, but also these new ones, will evolve and change their scope depending on emerging opportunities, barriers and challenges. The Project Coordination and Urban Regeneration Office plans to scale-up the idea of open garden and looks for other interested kindergartens in this concept in the year of 2019 and 2020.

1.1 Nature-based solutions in the City of Poznań, Poland

Greenery in the city, due to the characteristic relief of the terrain with a cross-shaped system of river valleys, historical conditions and natural features of the landscape create a "green ring-wedge" system. The city is located on the axis of river valleys running north-south and east-west. On the suburbs of the city, the green ring-wedge system has a forest character and connects with regional forests in a larger scale. In the city centre, however, green wedges are

narrower and supplemented with fragmented green rings surrounding the centre. These rings (belts) are mostly fragmented due the pressure of built-up areas.

Poznań is a city rich in green spaces, however green spaces are not equally distributed in the city (pic. no. 1). Despite well-developed green infrastructure system (called “green wedges”), the densely build-up districts in the historical areas are not sufficiently green compared to districts outside the city center and city periphery. Therefore, the challenge for Poznań is to improve the quality of life in those areas, that at the same time are highly populated. Poznań also faces the challenges of climate change effects, especially heat waves and episodic flooding from intense rainfall (especially flash floods). The high rate of soil sealing in the city centre’s densely built-up residential areas has resulted in an unfavourable thermal and moisture condition and limits the potential for water retention. The creation of pocket parks and urban gardens on abandoned, brownfield and vacant or neglected land contribute to a more equal distribution of green in the city, mitigate heat island stress within residential areas and improve the water retention potential of the area. These pocket parks and urban gardens increase water retention and minimise the pressure on drainage infrastructure.



Pic. no. 1 Areas of greenery and recreation in Poznań
Source: Development Strategy for the City of Poznań 2020+

Poznań has already several other initiatives that have been co-created and are drawing on nature-based solutions. These include:

- ‘Municipal River Beach’: the temporary/seasonal development of the flood plain of the Warta River in Poznań. A few years ago, the areas along the Warta River were abandoned and neglected. For that reason, the city authorities began to act and introduced a new approach in politics called ‘return to the river’. The first beach was established in 2012 in the Chwaliszewo district. With the growing interest of residents, the number of activities, workshops and events were systematically increased, which in turn gave the impulse to the city's further activities and the opening of new beaches along the Warta River. In 2015, two additional beaches were established – in the Rataje and Szeląg District. In 2016 and 2017, there were already 4 municipal beaches of different character, with different programs, providing residents with various services – depending on the age of a given social group. Every beach has the basic infrastructure – sand, deckchairs, chairs, tables, umbrellas and sandy playground. Year by year more new facilities like jacuzzi and showers were added. Until now, beaches were financed from the city budget of Poznań, and the management of the beach was on the operator's side, who every year was selected in a public tender. Today in Poznań, there is only one Municipal River Beach financed from city budget – at Wilda District.
- The project of ‘ecological demonstrators’: the city of Poznań also supports ecological education, especially among the youngest residents. In 2018, in 10 pre-school gardens, micro-installations were installed, showing children how different mechanisms of nature work. Educational materials for teachers were prepared that enable to teach children how they affect nature. The action was met with great enthusiasm of kindergartens’ management and will be continued in 2019 as part of an investment support mechanism in gardens financed from the city budget.
- The ‘floating gardens’ on Warta River in Poznań: in the frame of the CONNECTING Nature project and together with the OnWater Foundation from Wrocław, three floating gardens were completed, which in July 2018 were moored on the Warta river. The idea of floating gardens is to improve natural ecosystems and to introduce biodiversity in cities. Floating gardens create conditions for the emergence of unique ecosystems in the city. The vegetation cover consists mainly of native species, but birds and wind bring new seeds, which means that new plants can grow there, and thus the area of the aquatic garden becomes more abundant and richer in terms of species. The concept of floating gardens, created and implemented in Poland by the OnWater Foundation, is also an innovative method of introducing greenery to cities, improving the aesthetics of river banks, and also has an impact on improving water quality (filtration function/water purification) and air. The gardens also have a breeding function – they constitute an oasis for ducks, swans and other waterfowl, as well as for amphibians and insects, while under

the surface of the water depth – for other aquatic organisms. The term of floating gardens can be included in the definition of green infrastructure. They can be hubs connecting biologically diverse islands with natural ecosystems, but they can also be ecological corridors, thanks to which they provide a wide range of ecosystem services in the city.

1.2 Aim to ‘up-scale’ nature-based solutions: the idea of open gardens and nature-oriented playgrounds in kindergartens

In Poznań, we seek to multiply our 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” allows the extension of 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.

A nature-based urban green network will ensure accessibility and availability of green and blue spaces to citizens across the city and contribute to the protection from flooding by a cumulative water retention capacity. **This ‘up-scaling’ of nature-based solutions is challenging for Poznań** given its large scale. We need to strike a balance between nature-based solutions that provide multiple benefits and their integration with existing urban structures and functions of the city.

We seek to upscale nature-based solutions by developing and implementing open gardens and natural playgrounds in kindergartens in the city. To start with this process, we have developed the open garden at kindergarten No. 42 in Poznań.

We seek to implement our aim to integrate a diversity of small-scale nature-based solutions (such as pocket parks or social gardens) into dense neighbourhoods by focusing on **two types of actions carried out with kindergartens** in Poznań:

- **upscaling of nature-oriented playgrounds (natural playgrounds), and**
- **“open gardens” at pre-schools or other public institutions.**

Both nature-oriented playgrounds and open gardens have proven by now to be very successful. **We are presenting both ideas as Poznań’s main “up-scaling” CONNECTING Nature exemplars that fulfil the objective prepared at the beginning of this project:**

“Integrating a diversity of small-scale nature-based solutions (such as pocket parks or social gardens) into dense neighbourhoods will contribute to materialize a long-term vision of Poznań as a city of interconnected green spaces that reconcile high quality of life with sustainable infrastructures and the city’s rapid economic development.” (source: CONNECTING Nature – Synthesis of exploratory research in Poznań, Osmos and AMU, 2018)

Integrating a diversity of small-scale will contribute to materialize a long-term vision of Poznań as a city of interconnected green spaces that reconcile high quality of life with sustainable infrastructures and the city’s rapid economic development.

The **nature-based playgrounds** promote nature-based solutions in architectural design and the modernisation of playgrounds. It also enhances ecological knowledge of children and teachers and brings more biodiversity into green spaces of kindergarten premises. In the frame of the CONNECTING Nature project we complement regular modernisation of kindergarten playgrounds in Poznań. We provide kindergartens that receive city money for modernisation works with a dedicated service for professional, nature-oriented architectural design of their playgrounds. Simultaneously, we are testing the pilot project of an **open garden in one of the selected kindergartens** located in the densely urbanised district of Wilda. We have noticed that many public institutions in our city have very attractive green spaces that are not accessible to “usual users” – residents of Poznań. We assume that the (at least) partial opening of such spaces to citizens who are usually restricted from coming to these premises is an innovative way of providing residents with access to green spaces. However, such an “open garden” project is a challenge from the very beginning. One of the very basic requirements is a certain openness and flexibility of a public institution for cooperation with other partners, institutions, NGOs and residents. This means being open to new solutions and willing to take a risk that something will not work, as well as a respect for rules of conduct defined by the users in the frame of a co-creation process.

The city of Poznań aims to create good quality and accessible green spaces in the city, which will bring multifunctional benefits. The creation and scaling of natural playgrounds and other kinds of nature-based solutions can provide many potential health and well-being benefits, including social and health aspects. The open garden has the potential to improve social inclusion and social participation, as well as place attachment. The project of natural playgrounds at preschools focuses also on mental health and well-being of pre-schoolers and ecological education and the quality of life of children in the city. The other social and health aims are described in chapter 3 of the present document.

1.3 Aims for nature-based solutions in Poznań

Climate change adaption and sustainable use of resources

Urban green infrastructure is likely to play an increasingly important role within climate proofing of the city of Poznań. Green infrastructure supports the adaptation of citizens to a changing climate.

The areas along the Warta River are a valuable natural area, and can constitute a buffer zone for controlling flooding events in the city, mitigate the considerable heat island effect in Poznań, and act as an interception and sink for point-source and diffuse pollution runoff. At the same time, areas along the Warta river have been excluded from grey infrastructure and building development. Legal limitation in development results from the high flooding risk, especially in winter and spring season. The law only permits the temporary development of floodplains (during the summer). Next to these initiatives, Poznań has also regenerated its beach front and put in place urban furniture giving access to the waterfront and in this way,

exploiting the cooling effect of the river. The provision of recreational facilities in the close vicinity of housing areas has reduced the amount of travel by car to the other recreational areas. In addition, the building of bicycle paths along the river supports and enables environmentally friendly transport and reduces CO₂ emissions.

In Poznań's idea of nature-oriented playgrounds and open gardens the issues of climate adaptation and sustainable use of resources are very much visible. We design an open garden and the modernisation of kindergarten playgrounds according to "nature-oriented" rules that involve unsealing of tarmac and introducing more diverse greenery. This enriches biodiversity and mitigates heat islands especially in densely urbanised areas of the city. Secondly, providing citizens with access to – to date – restricted green spaces enable them to use it in their neighbourhood and saving on transportation to distant green locations.

Health, wellbeing, and place-making

Four new beaches along the river have been created to provide accessible, open areas for community recreation and the obvious beneficial knock-on effects on quality of life. The collaborative process has devised several community recreational programmes, many in particular targeting children, youth and senior citizens. These activities were commissioned by the City of Poznań (City Hall) in collaboration with diverse stakeholder groups and aim to improve physical fitness in all age groups. The co-creation of common meeting spots for locals also increases the sense of place and strengthens social connection and social capital networks.

The introduction of open gardens at preschools or other public institutions has an important role in the place-making process. Cooperation between different stakeholders is necessary in the process of designing new ways to use these green premises that are owned by public institutions (like kindergartens) and are to be partly opened for "unusual users".

Currently, the creation of aesthetic as well as functional spaces attracts a high degree of activity, daily interactions and social gatherings – these are important factors in community wellbeing.

Social cohesion and community empowerment

Free, open access to the recreational areas improves social cohesion by providing opportunities especially for children and youth from low-income families, and low-income retired people. Organised sporting activities have the potential to reduce anti-social behaviour among young people.

The introduction of open gardens at preschools or other public institutions has an important role in strengthening the social integration and empowerment of communities as they participate in the co-creation of common rules of conduct in such semi-open places and they become involved in garden activities. All mentioned solutions are designed with a process of co-creation with local communities (including co-design, co-management, and decoration/furnishing, etc.).

Modern entrepreneurship

Creating attractive nature-based solutions in the city centre (close to the historical centre of the city) is expected to increase tourist attractiveness. Regenerating centrally located green spaces (Warta river valley) have shown to increase the flow of people in these areas and prompts an interest in neighbouring areas that result in a collaborative desire to regenerate old, abandoned or neglected spaces. This is a vital factor in place-making. These improvements can also attract new inhabitants. Improved districts are now becoming fashionable and many new business endeavours of local collaboration are emerging.

1.4 The development of the open garden and nature-oriented playgrounds in kindergartens to date (September 2019)

The idea for open gardens and preschool gardens as natural playgrounds is born:

The idea of creating an open garden in one of Poznań kindergartens emerged from the previous collaboration between three kindergartens and Poznań City Hall that concentrated on innovative ways of educating pre-schoolers.

The project ("*Active Methods of Preschool Education*") concentrated on innovative arrangement of inner-space in three public preschools, including didactic rooms and preschool gardens. The main aim of the project was to implement the innovative solutions in pre-school spaces, which ensure optimal use and functional division of the space to meet children's and teachers' needs.

One of the guiding motives of the cooperation was the development of preschool gardens as **natural (nature-oriented) playgrounds** and satisfying various needs of children through appropriate organization of space in the classrooms. The three kindergartens participating in the project decided to design their gardens in the spirit of natural playgrounds and find resources for renovation. As a result, the renovation in the gardens of all three kindergartens was completed in 2018. A decision was also made to start cooperating with the Department of Education (Poznań City Hall) as part of the "*Program for the modernization and extension of playgrounds in kindergartens in 2016-2020*" carried out by this department. Additionally, as part of the CONNECTING Nature project, which is carried out in the Project Coordination and Urban Regeneration Office (Poznań City Hall), in 2019 the kindergartens will be offered comprehensive support including a landscape architect's assistance in the development of a garden project, garden equipment for ecological education and workshops for staff about natural playgrounds.

Creating the open garden in kindergarten No. 42 at Wilda District:

During the implementation of the project on “*Active Methods of Preschool Education*”, the partners involved in its implementation developed an idea based on preschool education, but also in-line with urban regeneration issues and nature-based solution ideas. In the result they created an open garden in the Kindergarten No. 42 at Wilda District (Poznań). The aim of the project was to develop an open small green area and make this place available for the residents of Wilda District. The garden was created with the support of the Project Coordination and the Urban Regeneration Office (Poznań City Hall) and was officially inaugurated in March 2018.

In 2018, as part of the Open Garden, workshops for families with children were organized. The main aim was to create a place where citizens will be engaged in developing it, to encourage them to work together for one place and enable them to take different activities with children and neighbours. Currently, the open garden 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. The open garden has also its own opening rules: it’s open at a certain times during the day and seasons. This is the first open garden at a preschool in Poznań and as a pilot project it offered many lessons. Now, the Project Coordination and Urban Regeneration Office plans to scale-up the idea of open garden and looks for other interested kindergartens in this concept. The idea of “opening” public, restricted green spaces to citizens seems to be also very interesting and the model linked with kindergartens might be very useful.

This action is very citizen-friendly. According to such activities we achieve the goals included in local strategic documents like Development Strategy for City of Poznań or the Municipal Revitalization Program for the city of Poznań.

Preschool open garden – the short history of the concept:

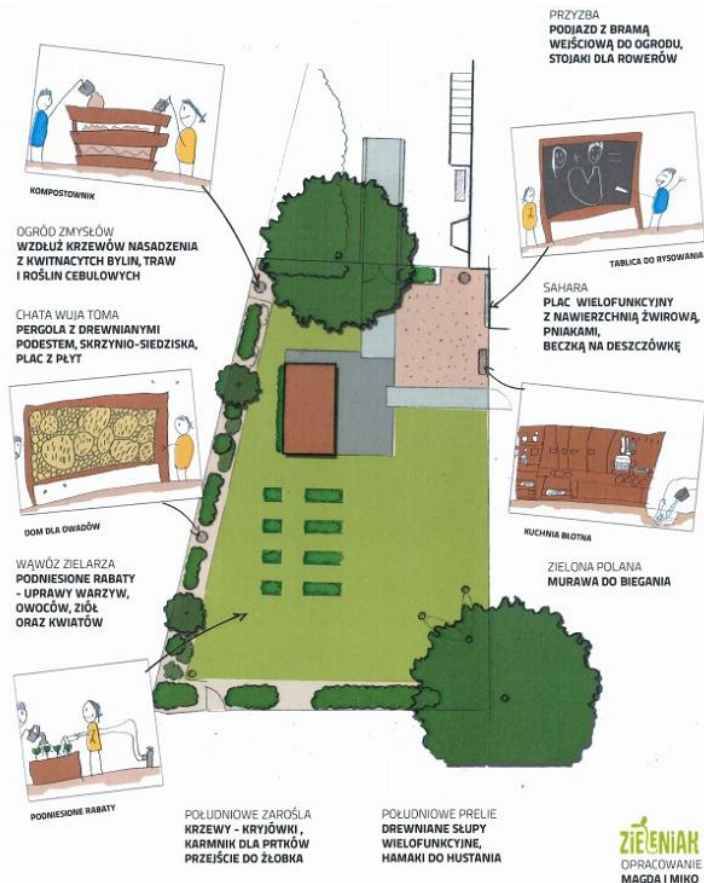
1. Initiating stage for garden – the genesis (2013-2015): YALE project with Berlin - international project with Berlin, which involved exchanging experiences between kindergartens in Germany and Poland;
2. Consultation stage (2017): consultation workshops with preschool’s leadership, civil servants from Project Coordination and Urban Regeneration Office (Poznań City Hall) and specialists, experts, enthusiasts (designers, teachers, landscape architects, ecologists, contractor); in result the conceptual project of open garden was created;
3. Implementation stage (2017): the first stage of implementing the experiences from Berlin was a new interior design in a kindergarten, the second stage included the

renovation of the playground in front of the kindergarten and the social garden being created just next to it;

4. Opening (21st of March 2018): the day of official opening – the garden kick-off;
5. Functioning of the open garden at preschool no. 42 (May to the end of September 2018): regular workshops/ series of workshops for children and parents, older people;
6. Conference on natural playgrounds for youth education (13th and 14th November 2018): the city of Poznań organized a conference for the directors of kindergartens, and also for primary and secondary schools directors in Poznań. The conference centred on the education of children and youth with regards to the subject of public space as a common good. On 13th November, on the first day of the conference, we presented the theme of natural playgrounds in pre-school gardens and the activities undertaken as part of the CONNECTING Nature project, especially the set of ecological demonstrators designed with the Foundation, which were installed in 10 selected kindergartens in Poznań. Another aim of the conference was to promote the idea of pre-school gardens as a natural playground to enhance children's contact with nature and the idea of an open garden. During the conference the publication was presented – a guidebook/catalogue of good practices, which will present green/wooden/vegetal/plant-based elements and structures to be installed in kindergartens. The conference gave the chance to summarize the results of functioning the open garden;
7. Upscaling pre-school garden design and diagnosis of the preschool gardens (January – May 2019): continuation of the pre-school garden design and looking for willing kindergartens (which have a large area around the kindergarten and are interested in creating an open garden for residents); ten preschools was chosen for cooperation with landscape architect to transform their gardens into nature-based playgrounds; the finalization of the project is planned at the end of the year 2019;
8. The cycle of meetings with preschools directors (May – December 2019): we have started the cooperation with four new preschools, where is the willingness to divided the area of preschool garden and to create the open garden; the consultation process is in progress, the final conceptual projects will be finished at the beginning of next year 2020; work on the model of open garden (internally in Poznań City Hall);
9. Functioning of the open garden at preschool no. 42 (June to the end of September 2019): regular workshops/ series of workshops for children and parents, older people;
10. Evaluation of open garden at preschool no. 42 (October 2019): the evaluation of the project is planned in October 2019, assessment of the functioning of the place.

The open garden at Kindergarten no. 42 in Poznań in pictures

The pictures show the whole area of the garden at Kindergarten no. 42 in Poznań. They reveal the big area covered with asphalt before the work. In the creation of the open garden, the whole garden in the preschool was divided into two parts – one part is only for pre-schoolers, and the second part was intended for establishing an open garden for residents (picture no. 4 presents the place, where currently the open garden functions).



Pic. no. 2 The concept of open garden at kindergarten no. 42 in Poznań

Source: City of Poznań; Magdalena Garczarczyk – Zieleniak Project



Pic. no. 3 The open garden before the work (April, 2017).

Source: City of Poznań; Ogrody Odnowa <https://www.facebook.com/OgrodyOdnowaPoznan/>



Pic. no. 4 The area of the whole garden at the Kindergarten no. 42 before the work (March/April, 2017)

Source: City of Poznań; Ogrody Odnowa <https://www.facebook.com/OgrodyOdnowaPoznan/>



Pic. no. 5 The area of the whole garden at the Kindergarten no. 42 before the work (March, 2017).

Source: City of Poznań; Ogrody Odnowa <https://www.facebook.com/OgrodyOdnowaPoznan/>



Pic. no. 6 The area of the whole garden at the Kindergarten no. 42 before the work (April, 2017).

Source: City of Poznań; Ogrody Odnowa <https://www.facebook.com/OgrodyOdnowaPoznan/>



Pic. no. 7 Work in the garden required the use of heavy construction equipment (May/June, 2017).

Source: City of Poznań; Ogrody Odnowa <https://www.facebook.com/OgrodyOdnowaPoznan/>



Pic. no. 8 The surface in the garden for 60 years was covered by asphalt which was demolished during our modernization work (May/June, 2017).

Source: City of Poznań; Ogrody Odnowa <https://www.facebook.com/OgrodyOdnowaPoznan/>



Pic. no. 9 A separate part for an open garden – modernization and garden work (September/October, 2017).

Source: City of Poznań; Ogrody Odnowa <https://www.facebook.com/OgrodyOdnowaPoznan/>



Pic. no. 10 A separate part for an open garden – created zones with diversified ground (March, 2018).

Source: City of Poznań; Ogrody Odnowa <https://www.facebook.com/OgrodyOdnowaPoznan/>



Pic. no. 11 A separate part for an open garden – created zones with diversified ground (March, 2018).

Source: City of Poznań; Ogrody Odnowa <https://www.facebook.com/OgrodyOdnowaPoznan/>



Pic. no. 12 A separate part for an open garden – entrance gate to the open garden and a driveway adapted to people with disabilities and mothers with baby carriages (March, 2018).

Source: City of Poznań; Ogrody Odnowa <https://www.facebook.com/OgrodyOdnowaPoznan/>



Pic. no. 13 The day of official opening – the garden kick-off and jointly planted flowers (21st March 2018).

Source: <http://www.poznan.pl/mim/info/news/ogrod-otwarty-na-wildzie,116564.html>



Pic. no. 14 The open garden after the modernization work (July, 2018).

Source: City of Poznań; <https://www.facebook.com/events/1356307341179286/>



Pic. no. 15 Impression from the series of workshops in the open garden that were organised from May to end of September, 2018.

Source: City of Poznań; <https://www.facebook.com/events/1356307341179286/>



Pic. no. 16 The rules of the open garden and opening hours (May, 2018).

Source: City of Poznań; <https://www.facebook.com/events/1356307341179286/>



Pic. no. 17 Impressions from the series of workshop in the open garden that were organized from May to end of September, 2018.

Source: City of Poznań; <https://www.facebook.com/events/1356307341179286/>



Pics. no. 18 and 19 The workshop to jointly create a house for insects (September, 2018).

Source: City of Poznań; <https://www.facebook.com/events/1356307341179286/>

1.5 How does the open garden connect and deliver on existing urban agendas?

The open gardens and natural playgrounds in pre-school kindergartens will contribute to materialize a long-term vision of Poznań as a city of interconnected green spaces that reconcile high quality of life with sustainable infrastructures and the city's rapid economic development.

As such, preschool gardens in the city have a meaningful potential for other city development goals. Additionally, the concept of creating open gardens at preschools is written into such strategic objectives like developing green city, supporting ecological education for citizens and influencing on the quality of the city and the health and wellbeing of its residents.

The diagram below presents comprehensively the goals, sub-goals and processes in the city of Poznań. The diagram shows 'what' we would like to do to make Poznań friendly and green place to live (focusing on different possibilities and aspects), and what we should mainly focus on for upscaling nature-based solutions in Poznań. The 'how' refers to methods we use to achieve our goals, to make Poznań friendly and more green for citizen. Engaging diverse group of stakeholders in activities for city is our business-as-usual practice. However, the co-production method is a novel. It is described in detail in chapter 5.

DEVELOPMENT OF THE SMALL – SCALE INTERVENTIONS IN POZNAŃ AND EXTENDING GREEN INFRASTRUCTURE – PROJECT GOALS

Main goal

To develop and up-scale “green” solutions in different parts of the city of Poznań and extend green infrastructure across the city



1 - small scale interventions (like open gardens, pocket parks, mobile greenery, greening backyards and etc.)

2 - community-building and social innovation, citizen involvement, activities which raise the ecological awareness: meetings and workshops with teachers, parents and lessons with children (fieldworks in gardens, explore the world), consultancy

3 – “Toolbox” for city dwellers, which will help and support them, step by step, on how to start with some bottom-up initiatives connected with green solutions – organizational and administrative support for citizens from government

What?

1. Improvement of the natural environment: increase climate resilience, increase biodiversity in the city, mitigate climate change

2. active inclusion of residents in the creation of social gardens and open gardens in the urban space
3. Social integration
4. creating open spaces, friendly to the inhabitants = a place of rest, spending free time, outdoor activities
5. Creating places where cultural and entertainment events can take place
6. Revitalization actions aimed at improving neglected and degraded areas, and thus - improving the quality of life of residents in the city
7. Improving the aesthetics of the places
8. Emphasize on ecological education raising ecological awareness especially among children

HOW?

- through the **co-creation of city making**
- through **the involvement** of various group of **stakeholders** of different age and social groups, encouraging especially **private entrepreneurs** to cooperate and improve the city
- through "**replenishing/refilling/complementing**" **green wedges** created in 1930s in Poznań

All connections between the exemplar and existing urban agendas are described in detail in the chapter concerning governance.

1.6 The role of the CONNECTING Nature project for the city of Poznań

Invitation and participation in the CONNECTING Nature project can be considered as one of the ways to look more broadly at the implementation of nature-based solutions in the Poznań, as well as the chance to promote nature-based solutions in the city. It was noticed that the residents do not understand what a nature-based solution is – they do not know the definition, do not know examples, and even if they mention examples of such natural solutions or activities, they do not link them with the term. The problem concerns not only citizens, but also other entities, stakeholders and companies. Therefore, through the CONNECTING Nature project, the City of Poznań intends to disseminate such solutions and show the inhabitants that thanks to nature-based solutions, the city will develop in a sustainable way, and the quality of their lives, despite the progressing negative effects of climate change, will grow. According to the project, the economy will develop on the basis of well-conceived, effective models of intersectoral cooperation. Thanks to the CONNECTING Nature project, the activities and services in the scope of green infrastructure will develop. The participation of Poznań in the project is all the more prestigious, that Polish partners, especially cities, are rarely take part in the Horizon 2020 Program. The CONNECTING Nature project and undertaken activities are the chance of implementation innovative nature-based solutions through the city and raising the ecological awareness among residents.

2. Technical Solutions: What is the nature-based solutions exemplar for Poznań city

2.1 Choice of nature-based solution to up-scale in Poznań

The City of Poznań, represented by the Project Coordination and Urban Regeneration Office, presents in this chapter “Technical solutions” the small-scale nature-based interventions that we have been implementing in our city for several years now (since 2017). We refer to **nature-oriented playgrounds and open gardens at preschools**. Both represent a “small-scale” approach to nature-based solutions, which – when it is multiplied – might bring substantial change in the urban fabric. The two abovementioned nature-based solutions were chosen because we found that promoting nature-oriented playgrounds and opening of kindergartens’ green spaces to neighbours is the most efficient way of up scaling of nature-based solutions in Poznań.

First of all, preschool playgrounds are very often the biggest green spaces in the neighbourhoods – their ecological condition including quality of greenery, scope of biodiversity, permeability of surfaces must be constantly improved. Designing their modernization with respect to natural ideas has both physical and ecological impact. It also changes users’ perception of nature and brings nature-based solutions closer to their awareness, which is especially important when it comes to young children. Kindergarten and school are the main places where children have contact with nature and where they can develop their positive attitude towards it.

Some of the playgrounds may also play important roles for the local community – we call them open gardens. This concept is derived from the idea of nature-oriented playgrounds in one of the kindergartens, that decided to separate a part of its green premises and provide it to wider use of neighbours. The open garden relates to the needs of local residents who need access to greenery as close to their locations as possible. In the case of our first open garden these residents are neighbours of the kindergarten, where green space is used only by children and only during functioning hours of the educational unit. Separating a delineated space from the kindergarten playground, and opening it to “unusual users” who must obey rules set in co-design process by the kindergarten administration and stakeholders, is a way of providing neighbours with access to greenery that is much closer to their houses than faraway parks.

Such solution seems to gain popularity – we are designing more open gardens in kindergarten green spaces now. Each time such project derives from needs of local community.

2.2 Stakeholders

The identification of diverse group of stakeholders became absolutely crucial in process of implementing and up-scaling open gardens and natural playgrounds at preschools.

The key stakeholders are directors and teachers from kindergartens who are always the main decision-makers about whether to follow the nature-oriented architectural design or not. We are not forcing them but present the idea and benefits and thus try to influence their decision in a positive way. As the money from the city budget is not enough for all modernization processes, we provide them with the entire project divided into subsequent parts. Such an approach enables them to acquire financing for subsequent modernization in a step-by-step manner, starting with the money acquired from the Department of Education.

When it comes to this mechanism colleagues from the Department of Education are also key stakeholders as they manage the city budget for modernization works and select kindergartens to be modernized. They are of course involved from the very beginning.

As for the open garden the main stakeholder is the kindergarten administration (director) – the success of such solution depends mainly on her/his flexibility and openness to social innovation. Opening of kindergarten premises is not always perceived as a safe solution. It demands certain restrictions and cooperation with other stakeholders like – neighbours, police, district council.

Stakeholders must be well identified and invited to cooperate at the most early stage of the design process. Such attitude builds co-ownership of the place. It also brings more opportunities in terms of ideas and money resources to develop and maintain the place when the project is already there.

2.3 The planning of Poznan's open garden and natural playground

The planning phase was not very structured at the beginning. We used the experience from another project in which three Poznań preschools collaborated with the city of Berlin on the subject of innovative teaching methods. The experience of German colleagues who presented how spatial conditions – including interior and exterior of the kindergarten building – influences children's behaviour and education led to pilot projects in Poznań pre-schools. Three managers decided to implement nature-oriented playgrounds in their premises. Additionally, one of them decided to share the garden with local community and thus create an open garden.

In the meantime, Poznań joined the CONNECTING Nature project. We identified nature-oriented playgrounds and open garden as our nature-based solution exemplar that we would like to upscale, monitor and improve.

The experience of three kindergartens influenced others. In November 2018, already in the frame of the CONNECTING Nature project, we organized a conference for all public kindergartens in Poznań to present them with the idea and show good practices. We ensured participation of the professional spatial designer experienced in “nature-oriented design”. Previous experiences showed us also that safety of playgrounds is crucial for the teachers to follow the idea, so we also invited the safety certification company involved in previous cooperation. Then we showed films from the kindergartens and teachers presented their experiences.

It turned out to be an effective way to promote the idea. Many teachers looked enchanted and discussed the possibilities of introducing nature-based solutions in their kindergartens.

The conference was organized by our department (Project Coordination and Urban Regeneration Office) together with the Department of Education. We deliberately invited to this cooperation our “education colleagues” as we knew that their department manages the programme that from 2016 – 2020 finances modernization of 10 kindergarten playgrounds per year. As we did not have any influence on the criteria of choice of kindergartens (the list is selected by Department of Education) we wanted to promote nature – oriented playgrounds among potential beneficiaries and influence their choice of future design.

Before the conference we agreed with our colleagues from the Department of Education on the scheme of financial cooperation, which links city budget money with the CONNECTING Nature aims and financial support. We agreed that our Office would complement their multi-annual programme of modernization of playgrounds. We proposed to finance a dedicated service of professional, nature-oriented architecture designer for kindergartens selected in 2020 for modernization works. Therefore, we created an informal “Mechanism of cooperation in modernization of preschool nature-oriented playgrounds” (called further “Mechanism of cooperation”).

2.4 Identification of benefits

On the basis of our experiences with nature-oriented playgrounds and open gardens we created a list of benefits resulting from their implementation. They are “approved” by the collaborating scientists so they might be measured and provide trustful data for decision-makers, citizens, potential sponsors etc. The following benefits were identified:

1. In the field of rainwater management and microclimate mitigation:
 - increasing the biologically active area,
 - unsealing the paved surface,

- introducing the water-permeable surfaces with bright colours, which reflect the sun's rays and make them heat up less (first made of natural materials),
- storage of rainwater through introducing the solutions enabling the retention of rainwater in situ, for example rain gardens in pots or in open spaces, drainage of rainwater directly to the ground, rain gardens or absorptive hollows with bio-retention (bio-retention cells),
- mitigating the urban heat island effect and cleaning and humidifying the air through introducing a large number of shading deciduous species with a large area of leaf blades,
- adapting the city to climate changes by introducing plant species with low water requirements that are resistant to periodic droughts.

2. In the field of biodiversity:

- introduction of native and multi-species greenery with diverse vertical and horizontal structure,
- putting pressure on melliferous plant species, that are friendly to pollinating insects,
- providing convenient living conditions for urban fauna, e.g. hotels for insects.

3. Social benefits:

- strengthening social cohesion,
- providing a place for social activities,
- improving the health and well-being of children and adults by staying outdoors,
- improving the health and well-being of children and adults by outdoor activities,
- increasing the ecological awareness and the effects of climate changes among children and adults,
- nature education for children and adults.

4. Additional “intangible” benefits not previewed at the beginning of the process:

- certain economic benefits became more visible especially in terms of promoting entrepreneurship in nature-based solutions. Professionals who design and implement playgrounds with nature-based solutions are still scarce – it seems to be a “niche” that might be developed. We will also develop social economy services in terms of maintenance in Poznań,
- increase of cooperation between different municipal actors and with the stakeholders “on the ground”.

2.5 Planning the up-scaling of open gardens and natural playgrounds at preschools in Poznań

The up-scaling refers to plans and actions necessary to fully establish the innovation small scale interventions included open gardens and natural playgrounds at preschools in Poznań. Planning the up-scaling is based on five steps which we analyse.

1. **Experimental (pilot) projects** – implementation of pilot projects enables to collect enough experience for the future up-scaling. However, it is necessary to analyse, monitor and evaluate the process – identify potentials and difficulties that it encountered.
2. **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 positively complete needs of local communities, boost social involvement and entrepreneurship, increase quality of education and citizens’ awareness, help to save money for public services etc.
3. **Identify “allies” in the organization** – implementation of experimental (pilot) project is a good opportunity to identify department in our organization that might help in up scaling both with financial resources and professional knowledge and experience. Identification of differentiated benefits widens the scope of possible partners and financial contributors dealing with different aspects of nature-based solutions.
4. **Promote good practices to involve future beneficiaries and set their minds for nature-based solutions** – before the up scaling started we promoted nature-oriented playgrounds among potential beneficiaries. It is important to anticipate their potential fears and propose checked solutions. It was especially important as we had no other possibilities to influence their choice whether to follow the “Mechanism of cooperation” or choose the “classical” way of designing their playgrounds only with the available money from the Department of Education.
5. **Create mechanisms of cooperation and co-financing** – identification of differentiated cooperation partners and involving their expertise and financial resources in the phase of pilot project enables creation of mechanisms established on previous collaborations. Mechanisms aim at increase of efficiency and broadening of scope of up scaling.

Basing on experiences of experimental projects from 2017 – 2018 we were able to identify different phases and necessary elements of up scaling projects.

When it comes to “**Mechanism of cooperation in modernization of kindergarten nature-oriented playgrounds**” we based delivery process on one-year timeline – as 10 kindergartens selected for modernization of their playgrounds only have one year to spend the money.

The process is divided in the following phases:

1. First half of the year
 - selection of 10 kindergartens which playgrounds to be modernized (by Department of Education)
 - selection of those kindergartens who want to participate in the cooperation mechanism within CONNECTING Nature
 - design phase – including visit of architect in each of the kindergartens and diagnosis of individual needs and physical conditions of each place

- dividing the project into phases according to available financial resources (the money within the modernization programme is limited)

2. Second half of the year

- implementation of the selected part of the project
- identification of potential financing of further works

It is also important that we linked the “Mechanism of cooperation” with a project of **eco-demonstrators** that complement and enhance educational benefits of such natural playgrounds. It provides empirical tools for educating children on how the nature works through observation, experiment and fun. The eco-demonstrators are included in the design of the playgrounds along the process.

When it comes to the **open garden** the timeline is more flexible and depends mostly on the creation of partnership around the idea of each open garden. Instead of a concrete timeline we may define subsequent steps of the process:

- gathering of all necessary stakeholders based on potential beneficiaries
- delivering frames for “openness” of the garden
- defining financial resources to finance delivery

2.6 Designing the open garden and natural playgrounds

When it comes to the introduction of selected nature-based solutions in the designed playgrounds and open gardens – from the very beginning we were not able to influence their scope. The architect that we are collaborating with has her individual solutions that are nature-oriented in principle. She was already involved in pilot projects that we identified as our up-scaling exemplars.

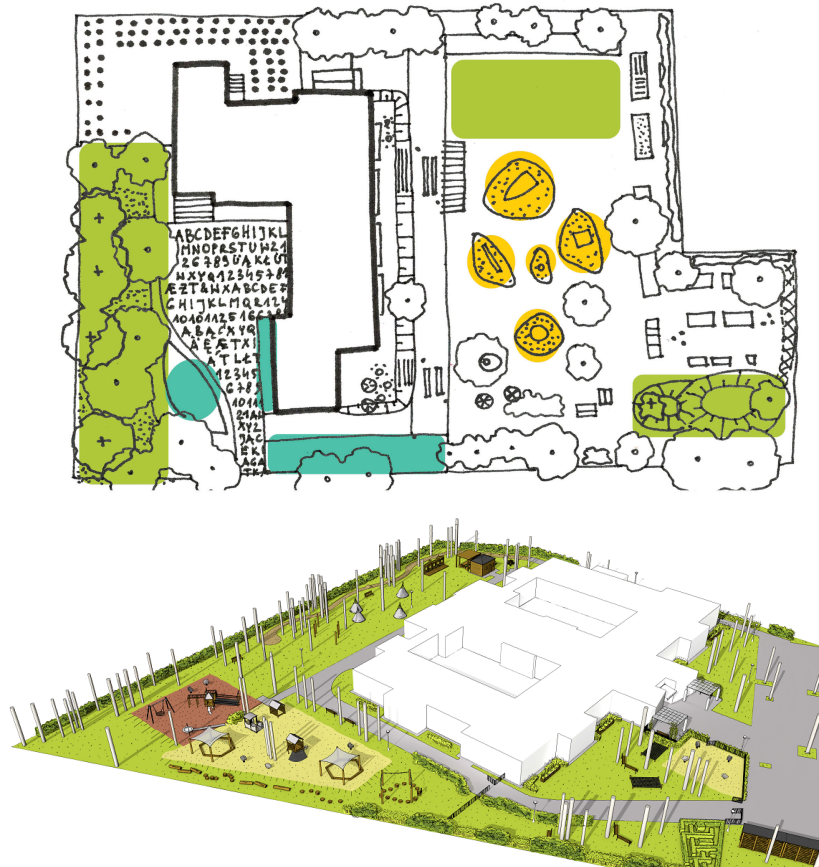
The process of designing the open garden at preschool no. 42 (as an experimental project) is described in chapter 5 and it is presented from the co-production point of view.

For a natural playground, the design process is as follows:

1. consultation meetings with directors and landscape architect – discussions about the scope of conceptual projects of nature-oriented playgrounds,
2. landscape architect, according to agreements and environmental conditions in garden, indicate different areas – area for education, where teachers can run lessons, area for relax, where children can sit or lie on the grass and chill, area for fun and sport, where the most elements are like slides, swings etc. Based on areas the architect proposes the natural elements (wooden and natural elements, plants) ,
3. the conceptual and detailed designed of natural playgrounds is created,
4. according to the detailed project the contractor can modernize and create the natural playground.

However, in view of up scaling and in collaboration with our local University of Adam Mickiewicz we created the nature-based solutions catalogue that might be used in nature-

oriented playgrounds and that are verified by scientists as a nature-based solution. They also verified already prepared designs and defined the nature-based solution to be used. This gives us the possibility to verify them according to selected indicators and measure their impact. The catalogue of nature-based solutions that will be used for designing natural playgrounds and open gardens is being prepared and will be promoted in future up-scaling activities. It may become an important tool for future architects, teachers and others who would like to up-scale them in their playgrounds/gardens.



Pics. no. 20 and 21 The conceptual projects of natural playgrounds – the particular areas are presented in different colours (education area, relax area, fun and sport area).

Source: Anna Komorowska, pracownia k.

2.8 Learning from our experience

The implementation of open garden and natural playgrounds became an important lesson for the team collaborating in the frame of our department. First implemented by one team member in their experimental (pilot) phase they became a mechanism for at least 10 kindergartens. Many more kindergartens are interested and we are trying to possibly enlarge the scope of the “Mechanism of cooperation” with the Department of Education. Additionally, the experimental (pilot) idea of open garden became more and more popular. At the moment we have already 4 projects with the “opening” idea – each is different. We divided our team into pairs that are responsible for each case. We also decided to create an internal “universal

template” for each case as we want to capitalize our knowledge and we think that such model might be useful for the future cases.

We found it very useful to capitalize our knowledge through such internal instruments that may be later promoted and showed to other colleagues.

Promotion

In our daily work we tend to forget about the promotion of our projects. In the case of natural playgrounds we experienced the power of good pictures and promotional activities like conferences for teachers. It really works! People get interested and catch the idea of nature-based solution much easier than through notes and scientific articles.

2.9 Practical conclusions

With the experience of experimental (pilot) projects implemented in 2017 – 2018, we will implement other open gardens and nature-oriented playgrounds at preschools all along the year 2019 and 2020.

By now it is possible to draw some conclusions from the process that should be important for the legacy of the process and influence future up-scaling.

Practical conclusions – convincing institutions

- It is essential to start convincing the kindergartens’ management to follow the “natural path” of modernization of their playgrounds at the very beginning of the selection process.
- It is inadvisable to force kindergartens’ managers to follow the nature-based solution ideas – it is much better to convince them through “testimonies” of their fellow colleagues and visual presentations of successful nature oriented playgrounds.
- The creation of “common ground” for exchange of opinions and fears is essential.

Practical conclusions – people involved in the process

- One nature-oriented designer is not enough for 10 kindergartens and many more are interested in nature-oriented playgrounds. It is therefore necessary to influence more local designers to follow the nature-based solution ideas in their work, provide them with necessary knowledge and details on checked solution in such kind of designing.
- The process of designing modernization involves not only architects with specific nature-oriented professional skills but also specialists who know how to work with stakeholders in order to verify their expectations against available resources and local conditions.
- In the process of creating of the open garden it is also necessary to involve someone with “workshop skills”, who knows how to mobilize and involve future users in the design and creation process.
- Such interdisciplinary approach in design of places might be an interesting niche for professionals.

Nature-based solutions in architectural design

- It is necessary to be flexible and open for new ideas and opportunities, for different approaches of both managers of the kindergartens and stakeholders.
- It is advisable to educate kindergartens' management, architects and designers and city hall officials on what nature-based solutions are – creating a catalogue of nature-based solutions in playgrounds, verified against differentiated indicators and completed with practical advises. This may be very useful to show that we do not reinvent the wheel but use nature to make life easier and eco-friendly.

Finances and co-creation

- in our “Mechanism of cooperation” we offered to provide kindergarten with nature-oriented architectural design of the entire playground. However, the money for modernization from the Department of Education is not enough – therefore the entire design is divided into phases. The first is financed from the available money, the following with the money that kindergartens would receive from other sources.
- Kindergartens must be assisted also in providing them with information on where to find lacking money for further modernizations – most of them know already where to find it but some need support
- maintenance is costly – kindergartens must be aware about the costs and need advice on how to secure it – we also try to keep nature-based solutions used for playgrounds cost-effective
- social economy might be useful for reducing cost of maintenance
- involving different stakeholders in the process of design (especially in case of “Open gardens”) brings more opportunities to create a “financial assembly” for the implementation – as different institutions, private persons or representatives of business may participate financially or apply to different sources
- very often volunteering and in-kind contribution is “forgotten” while sometimes it is the easiest way to implement some elements of the project and involve end-users

Future of the up-scaling – summary

As for the future of up-scaling of natural playgrounds and open gardens, we need to be very flexible and keep observing the opportunities.

We are trying to introduce the nature-based solution design services to the modernization scheme as a common part of the city budget in 2020. Unfortunately, due to cuts on city budget there might be a situation that we have to look for the money elsewhere. The multi-annual programme managed by the Department of Education concludes next year – together with our colleagues from this department and the kindergartens we will try to convince the City Council to prolong it for the next multiannual phase. It should be already complemented with the “natural design” service that we provide now in the frame of CONNECTING Nature.

Hopefully, building on the experiences and scientific indicators it will be well grounded to convince the councillors that it is worth it.

We are also hoping for the upcoming EU structural funds financial framework that will prioritize climate change and adaptation. As the city we were interrogated by the Regional Authority to propose key projects for the 2021 – 2026. We proposed modernization of educational premises in line with the nature-based solution ideas for the wide range of educational units. Additionally, we joined another international project under the URBACT Programme – we would like to further promote the idea of opening of “restricted” green spaces to wide range of citizens. As we are now focusing on kindergartens we also notice that many solutions might be used also in planning of public spaces, so the message should be also promoted among municipal units that might be interested in following the “natural path” of design. The URBACT project might help to create a working group for such stakeholders.

A very important part of our maintenance strategy is promotion of good practices among institutions that have money. We are focusing now on district council, we are also approached by the private education units that just want to get information and inspirations. We also identified new stakeholders – we started very positive collaboration with the museum Brama Poznania (Porta Posnania) that is located by the river and apart from its regular museum activities focused on promotion of the surrounding green spaces. Another “target” are the allotment gardens in Poznań, that might be a great space to promote small-scale nature-based solutions among owners. Involving different stakeholders is a way of “collecting money” for each case. However, co-creation process is needed for them to decide on bringing in financial resources.

Promotion seems to be the key of finding followers and contributors. This is a big challenge for us as the “regular” city hall officials who mainly work in the content and procedures. We started collaborating with magazines that promote city issues and agreed to write series of articles. We noticed that well-prepared promotion addressed to the outside enhances also interest of decision makers which make our regular work more visible also internally in our organization.

To summarise our future plans we can use one word – flexibility. We created a lot of solid knowledge and experience that enables us to up-scale the selected nature-based solutions. We identified possible collaborators and stakeholders who bring ideas and resources. It is crucial to have a well-prepared and checked models based on indicators and procedures. However, each case of our nature-based solution and its impact are slightly different. Benefits may vary in each case and also unexpected benefits may appear. Financial situation also changes but it also brings new opportunities. The process must be monitored by the project team and flexibility becomes an inherent base of the up-scaling success.

3. Indicators: Assessing the baseline and the transformation achieved with the nature-based solutions exemplar

3.1 The multi-functional benefits of open garden in Poznań – overview

The example of open garden is very innovative at the city-scale of Poznań. At the moment, in Poznań there is only one such garden near the preschool, open not only for preschoolers and their parents, but also local residents. As such, the open garden can provide many benefits to enhance the quality of life in Poznań. Apart from that we would like to look for possibilities on how measure open garden's benefits for city dweller. In this chapter, we identify and discuss the benefits and existing indicators to measure these in relation to the strategic objectives.

Green spaces and their accessibility are very important factor in the city. The open garden, representing a type of urban green area, is a great benefit to the public and environment. In the environmental context this green area with trees and bushes can provide shade and lower temperatures in urban areas, the greenery filter some pollutants and dust from the air, releasing oxygen and provide clean place for children. It enables forming the basis for the conservation of fauna and flora at micro-scale, directly it can also improve the urban climate.

The open garden is also the essential for urban quality of life. Firstly, the crucial and the most meaningful fact is that this place, which belongs to preschool, was opened for local residents, so it was made accessible for public use. In the social context the open garden is important for the physical and mental health and wellbeing of society. It can boost wellbeing of city dwellers, especially children and pre-schoolers. Open gardens and natural playgrounds can promote mental and physical health providing psychological relaxation and stress alleviation. Such places can stimulate social cohesion, social inclusion and social participation or social interaction. Spending time outdoors, especially in terms of children, influences the children development and gives them the opportunity to explore the nature, which is at hand.

On the other hand, such solution like open garden (or natural playgrounds at preschools) can enhance attractiveness of the neighbourhood, improve the aesthetic of the district and influence the living, studying and working conditions.

What is special in this case is that we specifically consider the open garden in relation to children and focus on their quality of life. We believe that this is a very elastic group of residents in the city and that they are the most sensitive in terms of environment and social aspects. Through activities, meeting and workshops in the open garden we can shape and increase their ecological awareness.

3.2 Main objectives of the open garden

The **main objectives** of creating open gardens at kindergartens and transforming pre-school playgrounds into natural gardens have been defined:

- improvement of the aesthetics of gardens at kindergartens in the city,
- improvement of the quality of the environment at the micro-scale/neighbourhood (meso-) scale (improvement of air quality and soil, improvement of biodiversity),
- ecological education among preschoolers and in the group of teachers and parents and increasing ecological awareness,
- creating new green spaces in the city, open and accessible to residents,
- improving the quality of life, health and wellbeing, especially among children, encouraging outdoor activities,
- social inclusion and social cohesion - by organizing various workshops in the garden for children and their parents/grandparents, neighbours, focus on social participation in decision-making, encouraging people to take part in consultation and creative meetings, activities integrating diverse social group and diverse group of stakeholders, etc.
- creating a new market for companies and entrepreneurs. This action has not been so obvious and noticed yet, but the subject of open gardens and natural playgrounds is developing very dynamically in Poland. At the moment, one expert in this field is known - a contractor who deals professionally with the subject of open gardens and natural playgrounds. However, it was noticed that it is worth to expand the market and shape it according to the needs of residents. There was even an idea from one of the stakeholders to create something similar to IKEA, but for such natural solutions (garden furniture, but also custom-made ones, the possibility of buying wooden, plant-type elements like tree trunk seats, treillages, etc.),
- transformation of study fields at Universities - adapting profiles to market needs, for example landscape architect with specialization of natural pre-school gardens.

3.3 Improving quality of place for living: green, accessible and citizen-friendly Poznań

One of the most important strategic goal is **to make Poznań a green, eco-mobile city (easily accessible green areas and an environmentally friendly, sustainable transport)** – the goal included in The Development Strategy for the city of Poznan 2020+. The main direction of this action is to make Poznań a green, eco-mobile city, to improve the quality of life of all residents, to make a city with high quality green areas that are easily accessible to all residents, to create green spaces for residents (parks, squares, but also open gardens at preschools in the city). In this case there are a lot of undertaken activities, such as diagnosis of potential locations for creating green spaces in city, for example open gardens at preschools, diagnosis of needs of preschoolers and interest of preschools if they really want to transform their garden into more

natural place open for citizens. It is also linked to the improvement of quality of human life in city. It is also about creating new urban green spaces in Poznań. Another strategic objective is *creation of such conditions for managing the environmental resources that will ensure **sustainable development of the city, higher quality of life for residents, and increase the tourist attractiveness of Poznań.*** This objective is included in the Study of Conditions and Directions of Spatial Development of the City of Poznań.

In the case of open gardens, particular attention is paid to the creation a high quality, multifunctional green public spaces in some parts of the city. This serves to strengthen city's green infrastructure and the role of green wedge system in the city, protect against development on the existing natural potential (natural capital) and stop the expansion of urbanization processes on green areas, and to restore the continuity of green wedges system in the city. Thanks to this, we improve the quality of human life in the city, creating new urban green spaces in Poznań. Apart from that we influence the number of users, visitors, tourists using/visiting green areas and promote such solutions like open and natural garden or playgrounds in the city. To fulfil this objective we also involve society in the process through community consultations and informing about what activities are undertaken in the city. We also involve society in horizontal decision-making processes using e.g. co-creation methods or organized workshops where the brainstorming or design thinking methods are used (see Chapter 5 on Co-production).

Another objective, thematically associated with the previous ones, is to ***improve the quality of life of all residents and friendly settlements – to provide residents with high quality of life within housing estates that have their own unique character.*** The goal is included in the Municipal Revitalization Program for the City of Poznań. General activities are linked with creating friendly settlements, thanks to comprehensive revitalization (urban regeneration activities) – care for infrastructure, culture and social capital - each housing estate builds its own "microclimate", which is created by a community. This facilitates creating new open public spaces, including green areas: parks, squares, but also social and open gardens, which strengthen social cohesion and support community and social dialogue. Through revitalization actions and investment in the city, new green spaces and public open spaces are created, especially open gardens at preschools, which attract and encourage users, visitors, tourists to spend their time in green areas and open gardens.

Here, we also highlight the strategic objective also included in the Municipal Revitalization Program for the City, which is linked with ***improving the health level of children, taking care of social ties and increasing the attractiveness of living in the area of revitalization.***

Through this goal and through the creation of a new green places (open gardens at preschools), where various events, workshops and educational lessons take place, we create a place where residents can go out and meet people, improve interpersonal relations and improve the quality of social life in the city. The educational and **health goals are fulfilled too.** It is about creating new green spaces accessible for children and residents and improve their quality of life in the revitalized areas in the city.

These activities can be referred not only to the micro- and meso-scale, but also macro-scale, because in the long term we plan to create a network of open gardens at kindergartens in various areas of the city. The time spent between the action and its effect will be determined and visible in long term. For instance, it results from the fact of a long consultation process and the creation of such gardens, adaptation of institutional and social space to create an open garden and making it available to residents. We also plan and try to involve the public in the processes: residents and other stakeholders through community consultations, which will help in the identification of the children and residents needs and visions of open garden through dialogue with different stakeholders (members of associations, representatives of the city Hall, other NGOs, activists). It will also help to conduct a participatory analysis of the issues and the needs of local society in the districts, where open garden will be created.

In the frame of these goals we identified many potential co-benefits and we expect some **multiplier effects**:

- aesthetic – preschool's area became attractive for children and residents,
- increase of multi-functionality - created areas can provide regulating ecosystem services and diverse cultural services,
- newly created greenspaces serve as a meeting, rest and recreation place for the residents, but also tourists,
- increased landscape aesthetic of the districts,
- environmental - more open gardens = more greenery, trees added to decrease heat and provide cleaner air, introducing vegetation for pollinators = crucial values for urban ecosystems and biodiversity (beediversity), as a part of green infrastructure - improve the air quality, influence on climate change and resilience,
- increased ecological connectivity at macro-scale,
- enhanced recreation,
- social - involvement in local initiatives; attachment to neighbourhood, educational aspect especially for children (lessons and workshops in garden) – exchange of knowledge and experience, building ecological awareness, influence on health and wellbeing, social interaction, social inclusion and community cohesion, community engagement.

Unfortunately, in these cases we could also identify some **trade-offs** which can potentially appear between objectives and actions, for example negative impact on the surrounding area – increased noise level during the events in open garden or conflict of interests – different opinions and visions of the best solutions for area development. In the long-term perspective the gentrification may appear.

Here the question is appearing what activities can be done to prevent or minimize trade-offs. It is very difficult to reconcile conflicting interests between different users. One situation was described by the one preschool director in Poznań. During the last summer this kindergarten organized a family event in preschool garden. It was held at afternoon hours. The problem occurred when one of neighbour, living in the block near the preschool, called the Police

explaining that there was a big noise. This is one of the conflict that can appear. What should be done? It is a big challenge. The solution is to inform better the neighbours living in the vicinity of preschool, that there will be organized the event for families with children, there will be music and workshops and other activities, maybe there should be organized also some workshops during such event for elder people, invite different group of people and inform about activities taking up in the garden. By engaging local residents in a usable space negative perceptions might be reduced. The very crucial action is to strengthen the public engagement in planning and designing processes and discuss with residents what they would like to see in an open garden. It is meaningful and in result the project of place/garden development is very complex due to analysing different visions, ideas and solutions how the e.g. garden should look like and function to provide many benefits for residents.

We also mentioned that the gentrification may appear in the future. How to prevent such situation? The positive effect of gentrification is a significant improvement in the quality of urban space in these areas, while the negative – sometimes dramatic change in the structure of the population, caused by expulsion from the occupied areas of households with lower incomes. The urban regeneration should be supported by the community led regeneration, focused on building social and relational capital, a large role of non-governmental organizations and bottom-up initiatives counteracting exclusion. In concept in the future open gardens will be city-wide, will be accessible for everyone and all communities will able to benefit – there should not get competitive advantages over other areas. Processes should be institutionally supported. Actions should be taken to prevent social degradation, to promote positive ownership attitudes, to support the involvement of residents in the area's problems, and to maintain the social character of the place of residence.

Several indicators have been created, thanks to which it is possible to measure the realization of objectives. In these cases, however, the indicators refer to very wide phenomena taking place in the city (they are not typical / specific for our exemplar). There should be other **indicators** to measure the impact of an open garden on the environment and society.

Indicators existing at the level of local documents:

- Index of life quality (local) - cyclical survey (2017);
- Availability of green areas for residents - cyclical survey (2017);
- Share of green areas in total area of city - Statistics Poland;
- the open garden in 2017 and 2018 were evaluated by the intensity of participation/inclusion of neighbourhood community measured with the frequency of visits in the garden and improvement of public space quality.

3.4 Improving air quality and climate protection in Poznań city

Through the creation of open gardens at preschools and small urban greenspaces (all green and nature-based solutions) within the city, we refer to strategic objective which is **improving air quality and climate protection**. It is linked with achieving good quality of air, and through

that – improving the quality of residents’ lives, their health and wellbeing, it also influences the social cohesion and social inclusion. This strategic objective is included in three different local documents: in the Environmental Protection Program for the city of Poznań, in the Plan of Adaptation to Climate Change for the city to Poznań to 2030, in the Plan for Sustainable Development of Public Transport for the city of Poznań for 2014-2025. It means that the quality of air and improving the climate is really important for the city.

Actions and their effects will mainly influence the air quality in the city on micro- and meso-scale, indirectly on macro-scale if the activities will be linked with other ones realized in the city, like creating the net of open gardens throughout the Poznań. Jointly it can influence the improvement of air quality and climate and the city also in accordance with the sentence “*Think globally, act locally*”. However, the time spent between action and its effect will be visible in very long term. It results from the fact that the air is very labile component. It is needed to undertake the complex and cross-sectoral activities to improve the quality of air and climate.

We also plan and try to involve the public in the processes improving **the quality of air** through community consultation and dialogue with different stakeholders and experts (members of associations, representatives of the city Hall, other NGOs, activists) on how to influence the quality of air and climate in the city. This example of consultation refers to document that was prepared at that time – it is the Municipal Plan of Adaptation to Climate Change for the city of Poznań. When the document has been writing, a series of consultation workshops with public were organized. The Municipal Plan was approved by City Council and Mayor this year. Now it’s the phase of implementation.

In the frame of these goals we identified many **potential co-benefits** and we expect some **multiplier effects**:

- Environmental and as a part of green infrastructure – improving the air quality, influence on climate change and resilience, increased ecological connectivity,
- Social – newly created greenspaces serve as a meeting, rest and recreation place for the children and residents, enhanced recreation, ecological education for children – exchange of knowledge and experience through learning by playing, building ecological awareness about the impact of greenery on the quality of air in the city, social cohesion, improving health and wellbeing, encouraging for outdoor activities.

A lot of **indicators** were created to measure the impact and the quality of air and climate in the city of Poznań:

- some subjective indicators:

1. Are you satisfied with the quality of air in your neighbourhood?
2. Are you satisfied with the quality of air in the city centre? - based on the Quality of Life Indicators Program in Poznań (study made by AMU),

- Regular monitoring of the quality of air – average annual and daily concentration of air pollutants/ the number of days with over-normative concentrations of PM10 (particulate matter) - number of days,

- Index of life quality (local) – cyclical survey (data from 2017),
- Share of green areas in total area of city - Statistics Poland.

3.5 The quality of soil in the city

In very indirect way we also achieve the objective set out in the Environmental Protection Program for the city of Poznań, which is improving the **quality of soil**. Through revitalization (urban regeneration) and recultivation activities involving the development of land and their allocation to greenery, for the creation of parks, squares and other green areas and planting vegetation in the city, the quality of soils is improving. In this case the open garden is a place where residents can grow plants: vegetables, fruits, herbs using fertile soil adapted to crops, very rich in minerals. So, at micro-scale we can improve the quality of soil in selected part of the city. Additionally, as was mentioned in previous chapters, for 60 years the whole garden's area was covered by asphalt. Thanks to modernization activities the asphalt was removed so in result a biologically active and permeable area have been created. The area of the garden, which was very grey and concrete area before, now is green and improves the aesthetic of the place and district in the near vicinity. It also provides plenty different benefits, like: more greenery in the garden which improves biodiversity (more insects which influence the pollination in the city, more birds), the retention of precipitation water, mitigates climate change in the city and decreases the urban heat island in micro- and meso-scale.

Activities improving the soil quality bring also such benefits like:

- environmental – improvement of the quality of environment and the soil and improving the condition of plants in the city; increased the carbon storage and soil stability; reducing the amount of carbon lost back into the atmosphere; more greenery in open gardens, trees added to decrease heat and provide cleaner air; influence on climate change and resilience; increased landscape aesthetic of the districts; increased ecological connectivity and enhanced recreation; protection against degradation of the area and urban food production for very micro-scale,
- social – improving social cohesion, health and wellbeing, new place for relax and education, growing your own crops - gaining knowledge about species and processes occurring in the environment and in soil, attachment to neighbourhood,
- economic – increase in property prices, more attractive live/work environment.

Unfortunately, in this case any indicators doesn't exist, there isn't an evaluation. Apart from that there is a failure to conduct regular tests of the condition of the earth's surface – no specific regulations concerning the monitoring of the earth's surface (no way to choose points sampling, frequency of sampling and the presentation method).

3.6 Improving ecological education – pro-environmental activities

Another and very key strategic objective is ***Ecological education, pro-environmental activities and raising awareness of shared responsibility for the quality of the environment***, included in the Municipal Revitalization Program for the City of Poznań and the Plan of Adaptation to Climate Change for the city of Poznań to 2030. This objective is present in many areas of the city's development. By creating open gardens at preschools, we improve education activities and increase of ecological awareness among children as well as among adults: teachers, directors, parents or grandparents. Throughout the summer of 2018, numerous educational and natural workshops were organized in the garden. Flowers and shrubs were planted together, and insect houses were built. On the occasion of such actions, pro-ecological activities in the city were promoted, explaining how important for the life and functioning of the city is fauna and flora, how to care for and protect it, and how to live in harmony with nature. We will support such activities also in the next year of functioning of the garden and try to encourage as many people as possible to take part in educational workshops.

In the frame of this objective we identified many **potential co-benefits** and we expect some **multiplier effects**:

- educational – increase of ecological awareness among the inhabitants, especially children and other visitors, create a green place that is jointly organized by residents, a meeting centre, the place where inspiring workshops and classes are organized, exchange of knowledge and experience, building ecological awareness, increasing knowledge about the natural environment and processes occurring in the environment,
- aesthetic – improvement of the quality of the green areas and their purity,
- increase of social values for urban ecosystems and biodiversity, better ecological education is the increase of the quality of the environment and the increase of the quality of human life.

Unfortunately, in these cases we could also identify some **challenges** which can potentially appear between objectives and actions. For instance, we would like to describe the very general situation when there is a little interest of teachers in cooperation in the implementation of ecological projects due to the tight school program and there are no financial mechanisms to conduct ecology training. Apart from that there can occur the situation of an unequal access to ecological education, lack of, or poor quality, education in schools. An important issue is also lack of understanding of the topic and the purpose of creating open gardens and natural playgrounds at preschools, the lack of an idea for conducting classes in ecology and expanding knowledge about the natural environment and ecology.

One of the possible activities are the education programs also for the teaching staff, organization of conferences, workshops, trainings, on which the management and teachers will be able to enhance knowledge and raise awareness on their own, and then transfer this knowledge to children. Despite existing national curriculum including environmental education, such activities should take place on every scale (on a local, regional or national) and such trainings should be cyclical.

Some **indicators** were created concerning measurement of the ecological education level and ecological awareness level. Below some subjective indicators are presented. The data about particular topics are gathered in cyclical research led in Poznań by public institutions. They rather present the environmental education and community's attitudes to the problems linked with the natural environment, the problem of the level of society's ecological awareness (in scope of the cleanliness maintenance in the municipality). The list is general and presents some subjective indicators indirectly links with ecological education – in line with the higher ecological awareness (resulting from ecological education), the greater the awareness of actions taken for the environment (including not littering, cleaning up after themselves, waste sorting).

The list of subjective indicators:

1. Are you satisfied with the cleanliness and order in your neighbourhood?
 2. Are you satisfied with the cleanliness of streets, pavements and squares?
 3. Are you satisfied with the cleanliness of city parks and forests? - based on the Quality of Life Indicators Programme in Poznań (study made by AMU),
- and very general indicators included in strategic documents: generation of municipal wastes (kg per resident a year),
 - amount of budgetary expenditures for tasks in the area of public utilities (including municipal waste management) and environment protection (PLN per resident a year).

3.7 Modern enterprises – job creation and new investments

And the last, but not least is the strategic objective concerning ***modern entrepreneurship*** (*to develop a diverse, strong and modern economy in Poznań*), the priority included in the Development Strategy for the City of Poznań. As a city we try to support and give the opportunity for creating new place for innovative, “green” jobs and “nature-based” enterprises. As was mentioned in previous chapters, creating a new market for enterprises related to natural or green solutions is not yet common in the city. Other companies from many sectors are dynamically developing, but such enterprises are not yet emerging. The theme of open gardens and natural playgrounds is developing in Poland very quickly, but for now we only know one expert - a contractor who deals professionally with this topic. It was noticed that it is worth expanding the market and shape it according to the needs of residents. There was even an idea from one of the stakeholders to create something like IKEA, but for such natural solutions (garden furniture, but also custom-made wooden furniture, the possibility of buying wooden, plant-type elements, bark, trellis, etc.). At the same time, it is also important to create the new fields of study and profiles at Universities according to changing market. We see an increasing demand for this type of services, which is why market adaptation is crucial here. The changes and effects will be visible in very long term and not only at micro-scale, but also meso- and macro-scale in the city. There is a need to change and shape the market for green solutions in the city. However, this approach requires many changes at the level of institutions, law, economics and business. A market diagnosis

(identification of potential contractors, consumer needs, development directions) is needed, as well as encouraging and educating entrepreneurs in relation to newly emerging nature-based solutions that are innovative and can bring environment, social and economic benefits at different scales.

In the frame of this goal we identified many potential **co-benefits** and we expect some **multiplier effects**: creating new jobs for residents, organizational support for residents, economic – increase of the value of land, increase of property prices, attractive jobs creating new products, creating new markets and services, social - improvement of the quality of life in the city, unique jobs, employment growth.

Unfortunately, in this case we could also identify some **trade-offs** like commercialization of sites and services, development of habitation and services – changing the purpose of the area - taking residents away from natural areas, focusing on profit, not on the quality of life, social exclusion, gentrification, deepening of differences in material status - social inequality, social injustice.

Here the question is also appearing how we can minimize these trade-offs. Firstly, some actions should be taken to mitigate occurred conflicts, e.g. to allow commercialization of places, but in return the places should be green, open to residents (easily accessible), and offer facilities for the elderly or mothers with children. Apart from that, greater importance must be given to establishing well-defined property or user rights for public and private resources. Clear rights of access to land can provide economic and social incentives to protect and improve resources, but on the other hand there should be systemically prevented the development of green areas (creation of regulations, records, planning documents in which emphasis will be placed on the protection of urban green areas by developers' pressure, not treating free green spaces as a reserve for the construction of real estate).

In this particular case, the economic indicators are not developed. There are no plans of regular or systemic monitoring or evaluation. However, it was noticed that there's a need to develop economic indicators, thanks to which it will be possible to measure the implementation of objectives and phenomena related to the creating of open gardens and the economic benefits resulting from this activity.

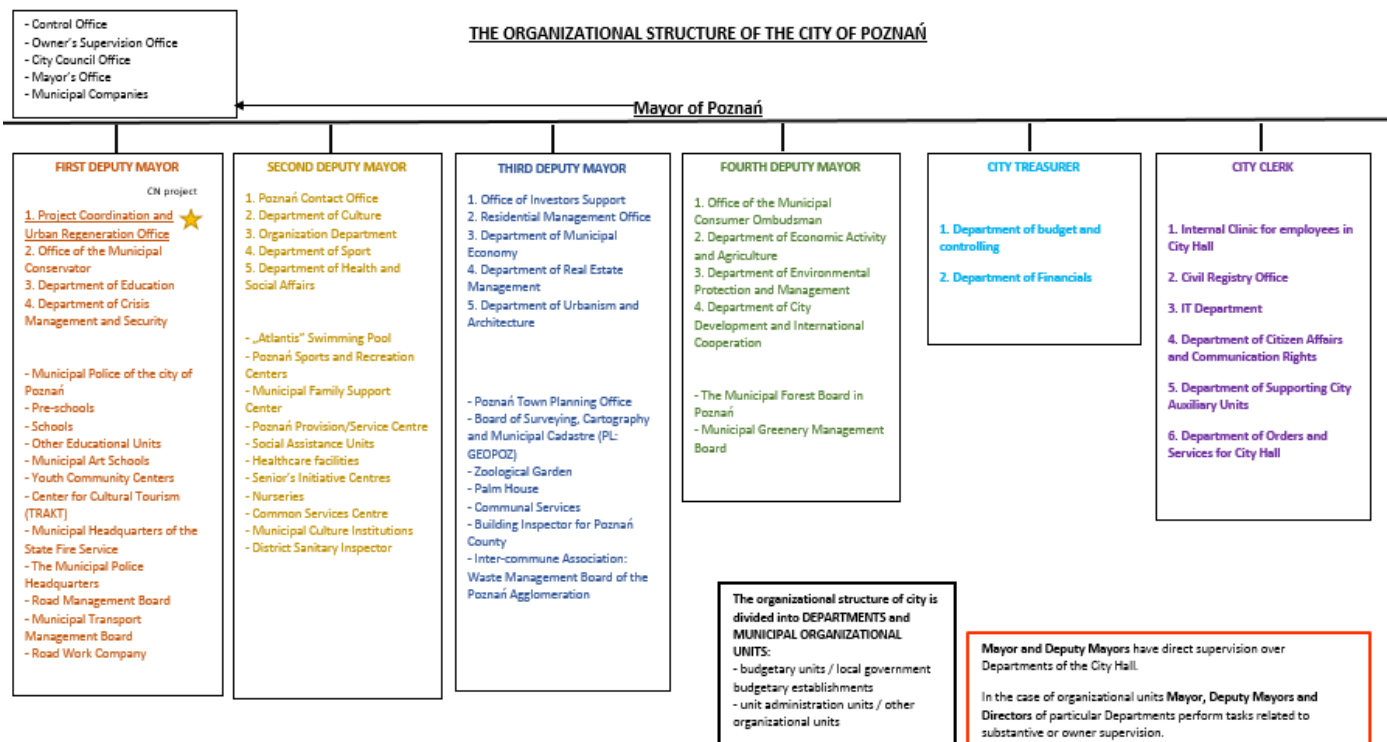
4. Governance of nature-based solutions

Governance supports and underpins the effective development, implementation and legacy of nature-based solutions. Governance includes the diverse actors – including city departments, city-led, partnership, social enterprises, private sector partners – as well as formal and informal structures, processes and rules that influence how these actors collaborate to deliver effective scaled-up nature-based solutions. For the development and up-scaling of the open garden in Poznań, we need to connect the open garden to other city strategies and ensure sufficient organizational resources within the city administration.

4.1 Home of the exemplar and the city's organizational structure

The City of Poznań implements and undertakes many actions concerning nature-based solutions or in the scope of greenery and environment. However, the city's departmental/organizational structure is hierarchical and really complex, and what is more, there's a visible diversification of competencies within and across different city's departments and boards. The key to successful implementation of open gardens is the smooth cooperation and transfer of information between different departments engaged in the process.

The team responsible for implementing the open gardens is a part of the Project Coordination and Urban Regeneration Office (Poznań City Hall). In the organizational structure our supervisor is the First Deputy Mayor of Poznań, who controls our activities and indicates the directions of work. Our project of nature-oriented playgrounds and open gardens is carried out in cooperation with different departments – in particular the Education Department, which is also under the supervision of First Deputy Mayor of Poznań. The form of the cooperation with Education Department is described in details below in this chapter.



Pic. no. 22 The organizational structure of City of Poznań – CONNECTING Nature project is leading by Project Coordination and Urban Regeneration Office (Poznań City Hall)

Source: Agnieszka Dziubala

In our work we focus on two types of actions carried in Poznań kindergartens:

- upscaling of nature-oriented playgrounds (natural playgrounds) and
- so-called “open gardens” at pre-schools or other public institutions.

The first action (nature-oriented playgrounds) is led by Poznań City Hall through Project Coordination and Urban Regeneration Office (design part in the frame of CN) and Department Of Education (managing budget earmarked for investments in kindergartens on the basis of multiannual programme created by Poznań City Council).

The second action (open garden) is led by Poznań City Hall through Project Coordination and Urban Regeneration Office responsible for coordination, implementation and arranging financing for consultations and investment. There are two strong partners without which the project could not be implemented – the kindergarten management (especially its director Ms Ilona Żurawska) and local “green” NGO “Projekt Zieleniak” which was also a contractor for implementation of process of consultations (surveys, workshops, promotion) and for designing the garden space. In the project of open garden, the Project Coordination and Urban Regeneration Office (Poznań City Hall) has the leader role for. In each new case of “opening “ of public institution premises to wider group of users the institution as a leader is always necessary, as well as any other department or unit in the city structure.

4.2 How to deliver the open garden – identification and cooperation with diverse actors (Quintuple Helix approach)

To successfully implement and deliver the open garden, the city team needed to reflect on the spheres of agency and the groups of different stakeholders/beneficiaries within which it will be operating. The team needed to identify the networks and crucial partners. For the purposes of the project, such groups were identified:

- GROUP OF PARTNERS: partners co-operating with each other, responsible for the project: City Hall (Project Coordination and Urban Regeneration Office) and kindergarten management, landscape architect / designer and garden contractor;
- GROUP OF STAKEHOLDERS: involved in the project, interested in results: Poznań City Hall (Department of Education), District Councils, contractors, designers, landscape architects, NGOs (organizers who would like to run some workshops in the open garden), experts – ecologists/environmentalists, preschools, media, local activists, safety auditors, land owners, higher education providers, scientists, sponsors;
- GROUP OF BENEFICIARIES: beneficiaries, persons or entities which will benefit from using the open garden: residents and neighbours, preschoolers and their parents or grandparents, teachers and employees / kindergarten management, the city as a whole.

Tab. 1 Identification of diverse actors for open garden and nature-oriented playgrounds

EXEMPLAR DELIVERY – MAP OF STAKEHOLDERS	PLANNING	DESIGN	IMPLEMENTATION	MANAGEMENT	MAINTENANCE
OPEN GARDEN AT PRESCHOOL	PARTNERS	PARTNERS, STAKEHOLDERS, BENEFICIARIES	PARTNERS AND SELECTED STAKEHOLDERS	MAINLY PARTNERS – AT THE BEGINNING	PARTNERS, ESPECIALLY KINDERGARTEN

				OF THE PROCESS AND DURING IMPLEMENTATION PHASE	MANAGEMENT OR SELECTED OPERATOR WHO WILL BE RESPONSIBLE FOR MAINTAINING THE OPEN GARDEN
NATURE-ORIENTED PLAYGROUNDS AT PRESCHOOLS	PARTNERS	PARTNERS, BENEFICIARIES (CHILDREN = PRESCHOOLERS)	PARTNERS AND CONTRACTOR	PARTNERS	KINDERGARTEN MANAGEMENT

Source: Agnieszka Dziubala

In both processes (open garden and nature-oriented playgrounds) the city of Poznań (especially our team from Project Coordination and Urban Regeneration Office, Poznań City Hall) is responsible for monitoring and evaluation, but also for enforcement – verifying and controlling the compliance of activities with local law, applicable rules and regulations. It results from the role as the coordinating body but on the other hand, it will use also the support of selected contractors and partners from Academia and Universities (Adam Mickiewicz University from Poznań).

Poznań City Hall:

- Project Coordination and Urban Regeneration Office responsible for providing service of nature – oriented landscape architect to support investments in kindergartens;
- Department of Education – to manage and distribute money from the municipal budget earmarked by the City Council for modernization (investments) in Poznań kindergartens (10 per year from 2016 till 2020).

Kindergartens:

- responsible for: applying to Department of Education for the grant for investment, choosing the way of designing their investments (CN support for nature-oriented design is not obligatory), once they choose CN support they are obliged to participate in workshops and individual consultations with the selected landscape architect, they are responsible for selecting the investment contractor, responsible form of maintaining the garden after the investment;
- in case of “open garden” the management of the kindergarten is crucial to take decision, to participate in consultations and creation of rules of conduct in “open garden”, to ensure safety of the open and closed part of the garden, to ensure accessibility for “outsiders”, to promote the space among stakeholders.

To scale the idea of open gardens and natural playgrounds, we had the opportunity to control each stage: planning and coordination of activities, organization of workshops for various

entities, the design stage, implementation of the open garden project, and management, but only in the initial phase. The kindergarten, which is also the initiator of activities in the open garden, is responsible for maintenance. Unfortunately, some obstacles appear at some stages, which sometimes have to be simply accepted or adapted to the existing conditions, such as legal regulations, binding security rules, land ownership form, which very often forces specific management of it, environmental conditions, which enforces a specific form of land development.

Tab. 2 Quintuple Helix actors – Education System

Quintuple Helix actors	Who	Why you have chosen them	How have you/will you engage with them? Name the building block(s) you will engage with them for?
Academia	X	Selection of stakeholders in the field of education: they are usually researchers, scientists who can support the process in the scientific aspect, provide scientific support and scientific point of view, they are also specialists with higher education, designers, architects, but also teachers and directors with their broad knowledge and experience, which complement the entire process and implementation of a given activity. In addition, there are also kindergartens - not only teachers, educators, but also children as actors for whom the preschool garden is designed.	A detailed description of the involvement of individual actors is described in the chapter on co-production. In the case of the open garden described, experts from universities are not included, but in the planning of further pre-school gardens they will be included (creating recommendations and directions for the development and design of pre-school gardens in terms of climatic changes and natural processes taking place)
Higher Education	X		
Kindergartens	X		

Source: Agnieszka Dziubala

Tab. 3 Quintuple Helix actors – Civil Society and Media

Quintuple Helix actors	Who	Why you have chosen them	How have you/will you engage with them? Name the building block(s) you will engage with them for?
Social Media	X	Identification actors from this field is crucial because it is linked with promotion and dissemination site of such activities like opening garden near preschools. We define it as a special channel for communication with resident and telling them what we do and what we would like to implement in the city in cooperation with different groups of stakeholders. We use diverse types of media for communication and giving information about action undertaken in the city.	We link civil society and media with openness. The co-creation process is described in details in the co-production section. In the example of the open garden described in the document, cooperation with such media entities was established to a certain extent. However, this openness and fluency in the
Local communities	X		
Community groups	X		

			flow of information was disturbed and we consider this field as an area for improvement and development. For sure in the future, when planning and opening more gardens, more attention and emphasis will be placed on informing residents and providing information on activities undertaken in the city.
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Source: Agnieszka Dziubala

Tab. 4 Quintuple Helix actors – Natural environments of society and NBS Experts

Quintuple Helix actors	Who	Why you have chosen them	How have you/will you engage with them? Name the building block(s) you will engage with them for?
NGO's	X	Identification of actors representative the Foundations or NGOs are crucial because very often they are experts from environmental fields as well as social aspects. The one of the architect of open garden was a NGO representative and also was an expert in the field of natural environment, but also ecological education and children development (a pedagogue). The knowledge and experience of people representing NGOs is wide and comprehensive, thanks to which the open garden has been designed in such a way as to be a multifunctional place for preschoolers.	A detailed description of the involvement of individual actors is described in the chapter on co-production. It is also about the multiple formats using in the process. Experts should be present at every stage of co-production process: consultation, implementation, delivery. In the case of the open garden described, experts from universities are not included, but in the planning of further pre-school gardens they will be included (creating recommendations and directions for the development and design of pre-school gardens in terms of climatic changes and natural processes taking place).
Opinion Leaders	X	Identification of the group of opinion leaders is very important especially in the field of the natural environment and creating the open garden in preschool. Therefore, the opinions of officials, the Police, architects and contractors who know the law and precise regulations - they are able to interpret and adapt to the conditions in the garden, is crucial for the functioning of the place.	
Other: NBS expert from Universities	X	Invitation NBS experts from Universities to the process is very important – they are	

	<p>experts with a broad knowledge of the natural environment, the knowledge and experience of people representing such groups is wide and comprehensive, thanks to which the open garden can be designed as a multifunctional place for preschoolers, but also the place with high quality of environment.</p>	
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Source: Agnieszka Dziubala

4.3 Legal framework for implementation

The policy of the city is perceived to be very much greenery-oriented, but what needs to be done is to increase the awareness about nature-based solutions and explain to residents the usefulness of such green solutions through the city. Therefore, the Project Coordination and Urban Regeneration Office (the Department of the Poznań City Hall, where the CONNECTING Nature project is realized) has focused on creating open gardens at public preschools in Poznań, as a one of innovative nature-based solution. Through such solutions civil servants show residents, what nature-based solutions are and what benefits they provide. Apart from that, the open garden and other listed activities undertaken by the City of Poznań are realized in accordance with revitalization issues, which are the most important and which are in the competences of Project Coordination and Urban Regeneration Office.

As was mentioned before, all activities (also nature-based solutions) realized in Poznań are compatible with the objectives and priorities included in local strategic documents. The most significant strategic and spatial documents are:

- **Development Strategy for the City of Poznań 2020+** with five objectives (to make Poznań a green, eco-mobile city (easily accessible green areas); improving the quality of life of all residents; improving the importance of Poznań on the international arena (Strong Metropolis); modern entrepreneurship (modern economy in Poznań), community and social dialogue);
- **Development Strategy of the Warta River in Poznań** with seven objectives (restoring the river to the city; landscape and nature (maintaining the natural qualities of the “green cross” in Poznań); river safety; connections – slow traffic and car traffic (facilitate walking and cycling on the Warta zone); living and working – build-up areas and open spaces (revitalizing neglected built-up areas, attract people to the river zone); tourism and recreation; historical heritage (protect the valuable historical elements within the Warta area));
- **Study of Conditions and Directions of Spatial Development of the City of Poznań** with four directions of development (a compact city with a framework communication system and a wedge-ring system of greenery; ensuring a proper standard of living for residents (high-quality development parameters – spatial and environmental, network of technical infrastructure); modern city (metropolitan centre); European city with a high culture of everyday life and

space (spatial conditions for improving the quality of life, improving the attractiveness of public spaces and the investment attractiveness of the city));

- **Environmental Protection Program for the City of Poznań** with eleven objectives (improving air quality and climate protection; water management; geological resources protection; soil protection; waste management and waste prevention, natural resources (protection of biodiversity, creating protected areas); water and sewage management; reducing the risk of major industrial and transport accidents; electromagnetic fields; noise pollution; ecological education and pro-environmental activities);

- **Municipal Revitalization Program for the City of Poznań** – third edition with ten objectives (eco-mobility (increasing mobility of residents and spatial accessibility of the revitalization area and improvement of environmental conditions); living conditions (improvement of housing conditions); improving the acoustic climate and air quality; restoration of the continuity of urban structures and the aesthetics of urban space; public spaces and cultural heritage; green space and recreation; social and cultural activity; public services (strengthening social cohesion and increasing the attractiveness of living in the area of revitalization); stopping the depopulation process; strengthening the economic, cultural and social activities);

- **Plan for Sustainable Development of Public Transport for the City of Poznań for 2014-2025** with nine objectives (nature protection; quality and access to public transport; supporting people with disabilities; reduction of pollutant emissions; reduction of noise emission; countering the exclusion of poor people; reducing transport costs; attractiveness of industrial and service areas (increasing access by public transport to these areas); planning public transport to ensure sustainable development (planning public transport in the Poznań Agglomeration for achieving ecological, social and economic objectives));

- **Plan of Adaptation to Climate Change for the city of Poznań to 2030** with four objectives (mitigation of the negative impact of extreme thermal phenomena, including concentration of pollutants; limiting the effects of heavy rainfalls, urban floods, droughts, storms and strong winds; informing and raising awareness of the community regarding the effects of climate change; institutional and organizational strengthening of the city's resilience to climate change or extreme climatic events).

There are strong linkages between Poznań's strategic goals and nature-based solution goals formulated and pursued at European level. This fact also allows us to evaluate the multifunctional benefits coming from nature-based solutions developing in the city space. It helps complementing city plan, and inform the exemplar implementation process, helps civil servants and policy-makers in processes for planning effective exemplars to scale them in the city. The undertaken and implemented open garden addresses the city goal at local level and, in the same time, addresses to the nature-based solution goals and international, UE-level. It confirms that actions are taken appropriately, in line with the objectives not only at the city level, but also at the level of the European Union. It also shows how nature-based solutions can offer creative, innovative and effective ways to deliver on many city strategic goals by

highlighting complementarity between them and the evolving nature-based solution criteria and frameworks. On the other hand, it gives the opportunity for city administrations to provide multiple benefits for citizens and business in an integrated way and it help to understand how nature-based solutions can be embedded across a range of policies.



Pic. no. 23 Linkages to strategic city policies – infographics for Poznań
 Source: Gerardo González – BIOAZUL (CONNECTING Nature project partner)

4.4 Financial framework for implementing the open gardens

At the moment there are no legally binding instruments for the implementation of open gardens and natural playgrounds. Of course, as the City Hall departments we are acting under certain documents and have to follow administrative obligations but there is no separate legislation in this case. This is why we are a bit worried whether putting it into certain frames would not make the implementation more “stiff”. However, in case of natural playgrounds we are planning to use the experience from this pilot phase in which we use two sources of financing:

- municipal budget money to finance the investments in 10 kindergartens per year

- CONNECTING Nature money for designing the investments by the landscape, architect specialized in “natural playgrounds” design (for those kindergartens which decide to follow – not obligatory).

We’d like to use the experience and introduce this CONNECTING Nature part to the municipal budget as the embedded part of the investment planning for kindergartens. Then the instrument would become more “official”.

Finance is an integral part of decision-making. It is strongly linked with governance and management. What is more, since most decisions are complex and realistic, any finances are likely to have some limitations. Similarly, the monitoring of past decisions is critical to ensure that future opportunities for implementing new projects are not missed and adequate resources are directed to these projects.

In both cases the governance influences financing strongly – the financing is only “secured” for investments for 10 kindergartens per year within the multiannual program of the City Council (2016 – 2020). The rest (money for design, workshops, consultations and activities for users, money for eco-demonstrators) must be secured from other, different sources. Applying to “outside” financing sources different stakeholders might take leading role. Now, our department is facing new challenges concerning project financing, therefore it forces us to clarify our long-term vision, strategy and goals, identify the activities that will help achieve these goals and diagnose the financial possibilities and opportunities for leading future projects. The financial issues are described in details in chapter concerning financing, business and governance model.

There is also the question about whether, if there is no authority, the exemplar delivery will be ensured. Focusing on the example of open gardens at preschools, the authority will be always necessary, especially at the beginning of the process of the implementing. The crucial question is also how long our role as an authority will be useful. The assumption is that the kindergarten management will be responsible for maintaining their preschool garden. To ensure the delivery it is worth to create a financial and management “map”, which will be a kind of tool for directors and managers of preschools and will help them in governance of the place. Until now, the city of Poznań has financed and coordinated all activities in the garden (in cooperation with the management, teachers and kindergartens), but the City (Project Coordination and Urban Regeneration Office, Poznań City Hall) leads a leading role in these activities, including administrative, organizational and financial support.

We looked for the best model to finance the nature-based solution. The best one is the “societal resilience” nature-based solution governance model, which is characterized by a high level of community leadership in governance with a responsive, supporting and low-level role played by government (Siobhan McQuaid, Trinity College Dublin and Horizon Nua). Thus, the lead actor would be community organizations and the public sector would play a responsive, supporting, low-level role. This model seems to be the best fitted to presented Poznań exemplar. The assumption is that the city’s engagement will decrease and in the same time the role of NGO or other community organization or operator will increase. Selected

organization will take the leading role, became the coordinator of the place and undertake the activities linked with searching for other financing sources. Such coordinator will be responsible for equipping and modernization of preschool garden. And so an open or preschool garden would be financed from the kindergarten budget (its maintenance), and workshops or classes, or organized events (which we have organized and financed as City of Poznań all the time), would be taken over by the operator or an entity that will take care of this garden, and Poznań will be back away in stages. Their task will 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.

4.5 Opportunities and barriers for (maintaining) effective collaborations

As described in the following chapter concerning the co-creation process (Chapter 5), we identified many barriers like very official and stiff organizational structure in city hall and strong departmentalization which is linked with vertical work and rigid schemes and processes. These blocks results from the structure of city hall and departmentalization: no informal means of communication, no smooth flow of information between different departments and units within city hall, on the other hand there's a situation of informational overloads which forces on employees prioritizing tasks. The question is how to open up the silo and start working with our colleagues from diverse units within city hall without hindrance. However, such situation may also result from the lack of personal qualities, which are needed to work effectively in group. Although, the literature review showed that silos occur naturally because of the way organizations are structured, but all the same some mindset changes are needed. It is the kind of isolation which should be broken down to facilitate undistorted and efficient cooperation. Certain departments or sectors should start working and sharing information, knowledge and experience with others in the same organization, in our case – in city hall. Silos can result in a variety of problems, such as duplication of effort, lack of synergy and missed opportunities. To avoid or solve such difficulties, some steps should be undertaken: communicate often, educate and work together – discuss together, arrange meetings and brainstorming toward common goals, using and implementing collaborations tools and “software”, evaluate and monitor plans and actions, create the unified vision which will be led by competent and informed management. City of Poznań is learning about co-creation process and try to use this knowledge to implement and undertaking activities in the city. Thanks to the knowledge and increasing experience in this field, our team try to work to overcome the silos and collaborate with colleagues from other departments and units.

5. Co-production of the open gardens

Co-production is a new mode of governance to collaborate with diverse types of actors in the development and implementation of nature-based solutions. This is important because it helps to generate new and more complete knowledge, especially about the users' needs, and it promotes new partnerships. This section introduces how we have engaged with diverse actors in the design and implementation of the open garden at kindergarten no. 42 at Wilda District. By employing multiple formats such as workshops with teachers and children, we were able to integrate their knowledge and needs into the design and enhance ownerships over the use of the garden.

We identified goals of the co-production process which are:

- openness to cooperation and involvement (e.g. the Education Department as well as teachers and kindergartens) – drawing attention to the essence of openness in cooperation with various entities,
- stimulating our development and expanding knowledge (using new multiple formats),
- improving the organization of our work system (co-production as a novel tool) and better quality of our work.

In co-production process we used different types of formats to involve diverse group of actors. We can distinguish internal co-production within the city hall, and the external co-production in terms of workshops in preschool.

- internal co-production: extending institutions in terms of cooperation with different departments and units, it's also based on openness - information and promotion of the activities linked with open garden, sharing the knowledge and experience, focusing on inclusivity and legitimacy,
- external co-production: using multiple formats – design, consultation and construction workshop with architect and contractor, with preschoolers, parents, kindergarten management, civil servants, advisory boards and other invited people to the process, it's also based on openness – information and promotion of the activities linked with open garden.

These two divisions allowed the involvement of several different groups of interested people, and in result the development project of open garden was created.

The different formats used by us in co-production process are described in details later in the document.

5.1 The co-production process of open garden at preschool

At the beginning, the city of Poznań, despite a long list of ideas and implemented design activities concerning open garden, and while the goals of the project were set, did not have specific and clearly defined actions and experiences for co-production.

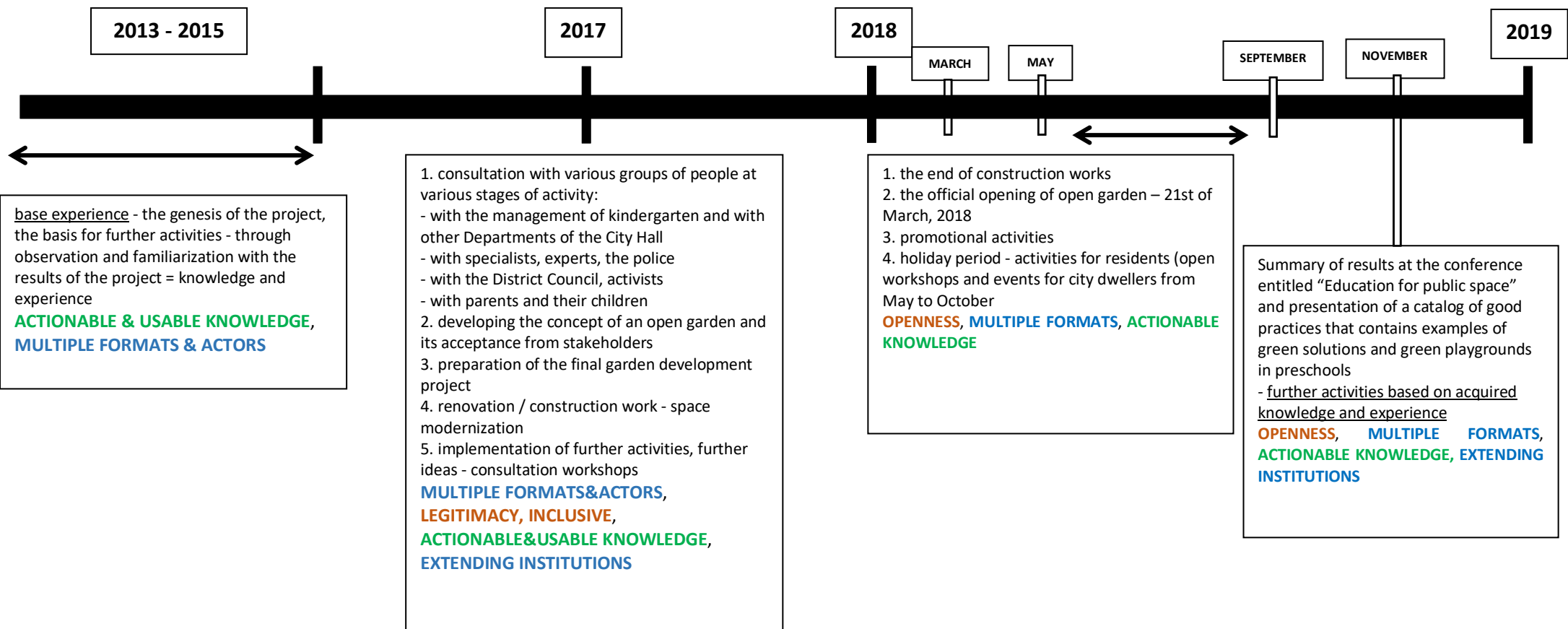
In the mid of 2017 the concept of open garden at one of the kindergarten in Poznań was created. The idea was directed to the residents and it focused on opening a small part of the preschool's area for city dwellers, make new green space available for other people. The idea

seemed to have a big potential. At the beginning of the year 2018 we started our project based on support the development of the open garden at the kindergarten no. 42 at Wilda District in Poznań. Therefore, the entire co-production process is based exactly on this open garden. The interest in the concept of open garden is very large, so the project will be continued in 2019 and will be implemented and scaled-up through Poznań.

We describe how we co-produced the open garden in the kindergarten no. 42 at Wilda District. The genesis of the project is known, the entire consultation and implementation process was experienced. In this case, the team has knowledge of what worked out, where there failures and disappointments, and where there was a lot of joy when success was achieved. It is known how hard the process of getting information is and how all work look like because of the diverse organizational structure of other entities and their working methods.

Co-production is a new mode of governance in Poznań – it hasn't been used before. It was a new experience and a huge learning process. In that regard, it gave us many interesting lessons and now there is already a change in the Poznań due to that knowledge. The process wasn't explicitly designed with the co-production principles and design steps. Although, these helped us to understand what was done with hindsight. We notice that successful co-production can introduce changes to systems that will lead to the ongoing review, development and delivery of new forms of support. Co-production therefore benefits from a culture of continuous learning about what has worked and what has not worked.

Overall, it is important to collaborate with other stakeholders who can be included in the process and to involve diverse actors (teachers, architects, parents) in the design of the open garden. The group of stakeholders is diagnosed in chapters 2 and 4. The co-production process gave us the knowledge how to integrate the knowledge of experts and other stakeholders and create co-ownership so that the garden is used effectively.



Pic. no. 24 Timeline of the co-creation activities from the start of the project of open garden at preschool no. 42 at Wilda District in Poznań.

Source: Agnieszka Dziubala

5.2 The co-production steps and activities using the co-production principles

The example of the open garden at kindergarten No. 42 is a pilot project. It is a lesson for us, thanks to which we have learned how the process of involving many stakeholders could look like and how important their knowledge is in planning activities and creating conceptual designs and projects. The truth is that the process of co-production is so far not a commonly used method in our project work. This is a very innovative method that we would like to learn because we consider it as a very useful procedure for accomplishing and approaching new actions in future projects.

For a better understanding of the co-production process and how to think of co-production, four main stages were distinguished (pic. no. 24 above): initiating, consultation, implementation and a continuous process, which should in principle appear all the time and should be constantly repeated – a never ending process to maintain the continuity of the activities (informational, promotional, etc.)

The initiating stage included the identification of interested stakeholders, who want to be involved in the idea of developing an open garden at preschools (basically at the beginning there were kindergarten management and the Project Coordination and Urban Regeneration Office in Poznań City Hall). The more the project evolved, the more people came into the process. During the initiating phase there were already several discussions between actors from different institutions.

When the management of kindergarten no. 42 decided to divide the entire preschool garden into two parts and to designate a smaller area to create an open garden, a consultation cycle began. The consultation meetings were based mainly on discussions and exchange of ideas related to the design and functioning of an open garden. The first consultations were held in small groups. These were the meetings of the kindergarten management, employees of the Project Coordination and Urban Regeneration Office, who were responsible for coordination of the open garden project and landscape architects, who created the conceptual design of the garden. Only when the design of an open garden was created and the idea became a real activity, we started to inform the residents about the idea. We sought to include them in the further process of designing the open garden space, so that they could also suggest their vision and ideas. At the beginning, there were small groups of citizens: parents of pre-schoolers, residents from the nearest neighbourhood, councillors from the housing estate council from Wilda District. The kindergarten management and the entire teaching staff were slowly making sure that the idea of an open garden has potential and that it is worth taking action. Throughout the project, the employees of the Project Coordination and Urban Regeneration Office and architects watched over organizational and administrative work.

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.

The main goal was to involve as many people as possible, who could present their point of view and contribute to the project. We organized meetings in which different groups of people with diverse knowledge and experience participated. We wanted to recognize the opinion from different perspectives and carry out a diagnosis of needs, to confirm that the idea of an open garden is very popular. However, the process of including various entities was very difficult – it was a challenge to provide information about the action and encourage residents to participate in workshops and consultation meetings.

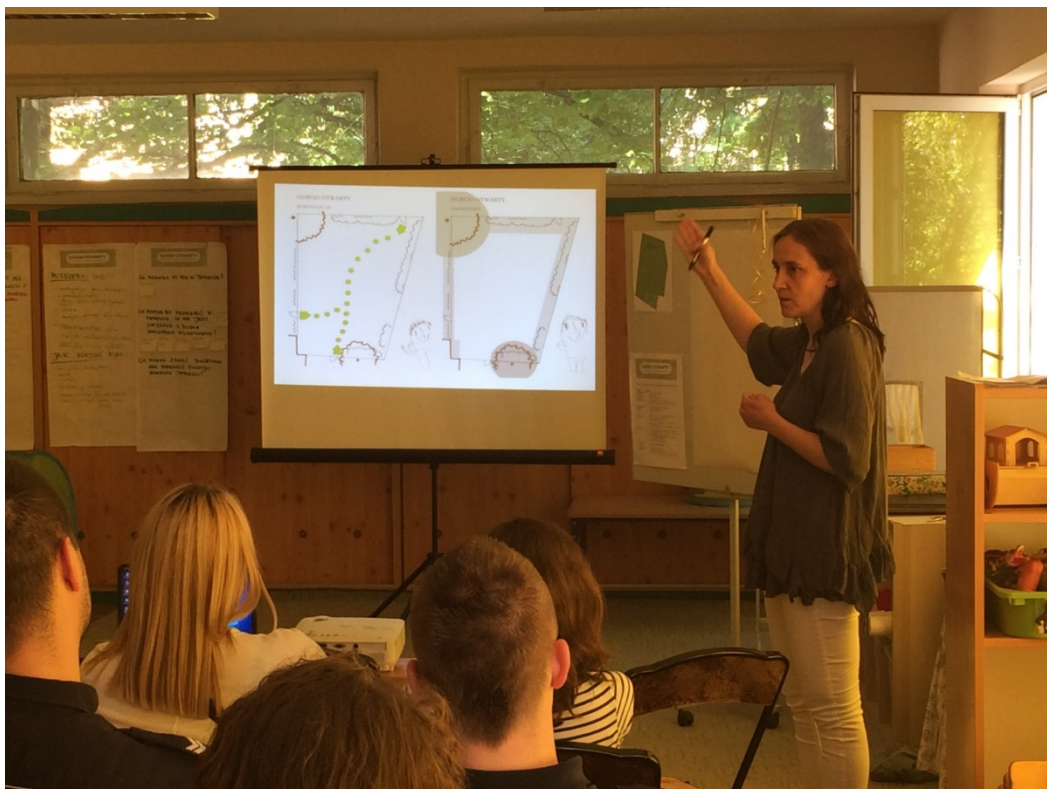
During the continuous (ongoing) phase it is important to constantly debate how to proceed (with director of preschool, teachers and parents), but also discuss about finding new governance models which will help us determine who can be responsible for the managing like some NGOs or kindergarten management).

This step was treated as a lesson learned. It points out that it is very crucial to start discussions about long-term roles, responsibilities, opportunities as well as needs in terms of institutional structure and financing at very early stage. Apart from that, there's an issue of how to organize the long-term management of the open garden, which is also relating to governance structure as well as need for the monitoring). The continuous phase also relates to follow-up activities. For example, last summer (in 2018) a lot of workshops were held which were still ongoing. Now, that the garden has turned green again after the winter, the first workshops started, which attracted many people, especially parents with children. 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.



Pic. no. 25 Consultation workshop with civil servants, architect, contractor and residents in Preschool No. 42 at Wilda District in Poznań (May/June, 2017).

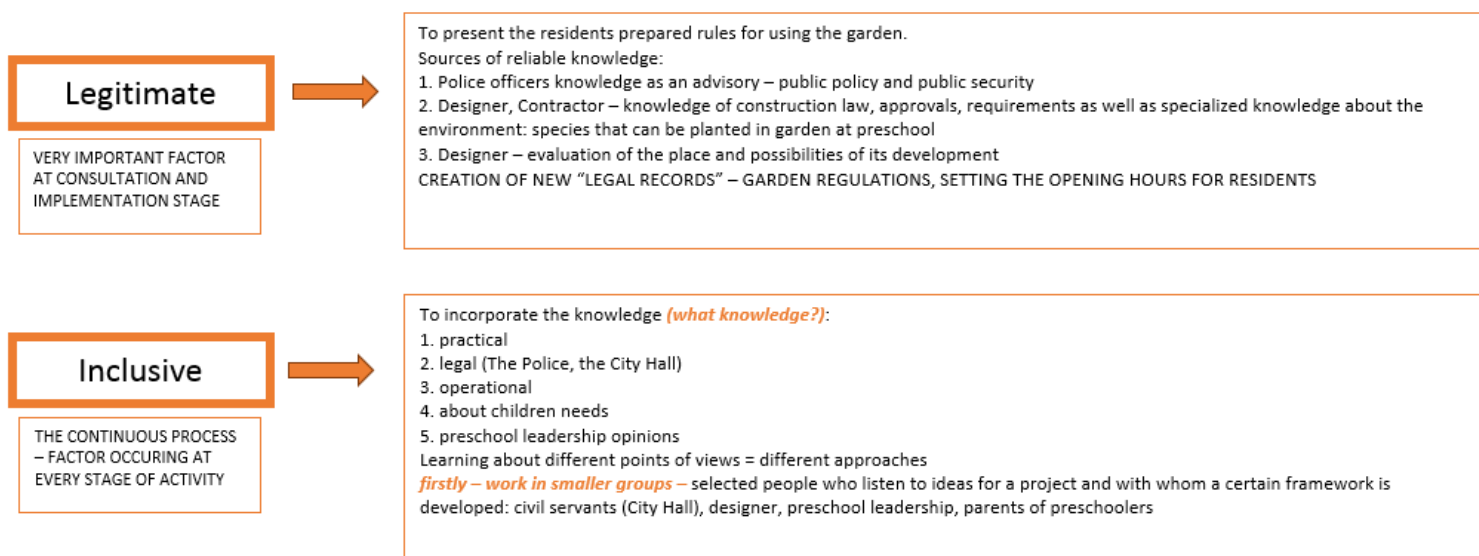
Source: City of Poznań/Preschool No. 42 at Wilda District in Poznań

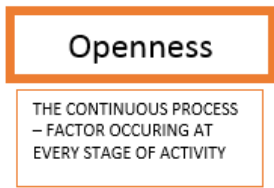


Pic. no. 26 Consultation workshop with civil servants, architect, contractor and residents in Preschool No. 42 at Wilda District in Poznań (May/June, 2017).

Source: City of Poznań/Preschool No. 42 at Wilda District in Poznań

We can relate how we have designed the activities to the **principles of co-production**. While these principles are already implicitly known, they are not used on a daily basis and as operating practice.





To inform and share the information:

1. informing society what we do – promotional issues
2. promotion of activities at every stage (*where?*): media, Facebook, newspapers, leaflets

CHECK, IF THERE'S A FEEDBACK!



1. knowledge and experience of **employees – civil servants** (Project Coordination and Urban Regeneration Office, Poznań City Hall) and **employees from preschool**
2. workshop **organizers** (teachers, environmentalists)
3. Knowledge and experience, **what 'works' and what 'does not work'** (+ methods, how to get to children with knowledge – learning through playing in garden)
4. **Designer/architect** as a specialist familiar with environmental conditions + evaluation of the place and possibilities of development of this place



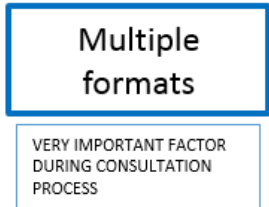
The example is **the knowledge that the Police have** as an **advisory board**:

- safety rules
- methods of countering vandalism, theft
- help in maintaining and monitoring the open garden

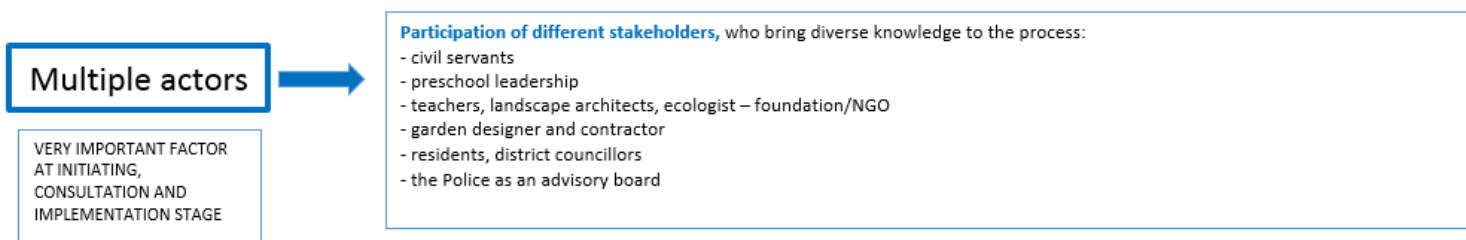


The examples:

1. Opening to new ideas
2. Citizen-oriented approach
3. Developing horizontal cooperation
4. Making this official, vertical and rigid organizational structure in city hall **more flexible!**



Process which will fit local situation:
→ design/consultation workshop → researching the needs, resident's expectations, visions and concepts → matching solutions implemented in garden to the resident's needs



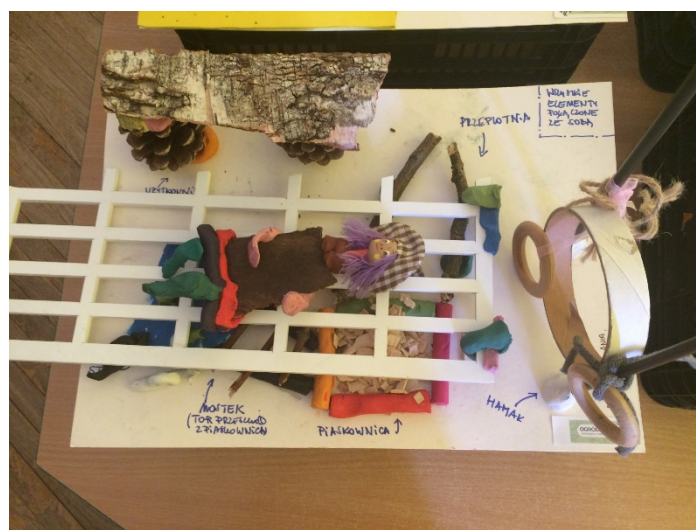
Pic. 27 The principles of co-production

Source: Agnieszka Dziubata

In addition to issues related to guiding principles for co-production, like the inclusivity which is the involvement of multiple actors at the beginning of the whole co-creation process, legitimacy was also really important and ensure that the knowledge used in the co-production process is legitimate. This is a very important and critical principle, and it is provided by actors involved in the process, such as contractors and designers who are experts and who are responsible for the place being created. The legitimate knowledge to us is really about involving experts and thus ensuring for example viable designs and rules.

We understand the *legitimacy* as a principle involving knowledge, which results from the law, legal rules and regulations – such knowledge was represented by civil servants who participated in this process, but also contractors who know, for example, the construction law, work safety regulations etc.

Workshops and consultation meetings were conducted by experts in spatial planning, landscape architecture, pre-school education and ecological education. Among the people involved in the process of creating the garden was also the Police. Inviting police officers was a very innovative approach to the subject. They acted as an advisory board, who know the law and safety and order rules. They shared knowledge related to the protection and monitoring of the place in order to avoid theft or devastation.



Pics. no. 28 and 29 Children inspirations – their dreams how the open garden would look like (June, 2017).

Source: City of Poznań/Preschool No. 42 at Wilda District in Poznań

The knowledge and information passed on were very qualitative. It was reliable and legitimate knowledge. The knowledge presented by experts participating in the process, who are specialists in a given field, is a guarantee of truthfulness. The meetings guaranteed that the information provided and the input to the project can be trusted.

In addition, the *inclusivity* guiding principle was considered important to engage multiple actors in the design of the open garden. We understood inclusivity as the process of including many sources and types of knowledge: practical and operational knowledge, but also theory and scientific knowledge. All tacit and expert knowledge was equally appreciated and considered throughout the works on the open garden. The meetings allowed for the exchange of knowledge and experiences between various participants from different spheres. Each of the invited people presented a different type of knowledge, and by combining this we have received a comprehensive conceptual project for the development of the garden area.

During numerous meetings and consultations, the attention was also paid to such factors as actionable and usable knowledge, which were an additional, very valuable contribution to the creation of the garden space.

Usable knowledge, understood as knowledge that is valuable to the multiple participating actors, has allowed for the further exchange of knowledge and experience of designing a garden and what factors should be taken into account to make it a user-friendly place and, above all, children-friendly place. The goal was to create a space for fun, relax and experiencing nature, so it was important to design a garden to suit the needs of children. Usable knowledge was generated in terms of smart, trustworthy and useful information for creating an open garden:

- administrative and official knowledge was generated from civil servants (Project Coordination and Urban Regeneration Office, Poznań City Hall) and employees from preschool,
- expert and environmental knowledge was generated from architect, teachers, contractor, environmentalists (evaluating the environmental conditions in garden and possibilities of its development),
- design and legal knowledge was generated from architect, contractor and civil servants,
- the knowledge and experience of kindergarten management was generated from the teaching staff, 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 - children learn how to use the open garden.

In contrast, *actionable knowledge* was generated in terms of new standards and also in terms of maintenance and safety. Hereby, it was particularly important to have the Police as an 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. They shared their suggestions on how to maintain security and how to monitor the area of open garden. Co-produced actionable knowledge is relevant and translated to planning and policy. It informs about good designs and new standards for open garden and safety rules (e.g. knowledge of

how to prevent vandalism and theft, what to do to create a friendly and safe place for children and visitors).

An important factor for the co-creation process was also the principle related to the extending of institutions, which depends on the institutional space in which co-production happens. In the case of the open garden project this pertains to the organizational structure of the city hall (Project Coordination and Urban Regeneration Office, Poznań City Hall). The organizational structure of the city of Poznań is hierarchical and compartmentalized. Starting with the City Mayor, who has four deputy Mayors, and each of them is responsible for the various departments. Each department has its own tasks and competences. Often the competences of some departments overlap with the competences of the others, which often causes misunderstandings. The design of the open garden and the whole idea was created in the Project Coordination and Urban Regeneration Office. Our department (office) tries to introduce innovative working methods, i.e broadly understood co-creation / co-production. Many departments, however, work according to traditional methods and maintain a rigid structure that does not go beyond the established frame of the work. Therefore, the possibility of introducing such methods depends on the institutional space and the extent to which the particular department is open to such methods. However, we have successfully achieved the extending of institutions because we managed to establish cooperation with the Education Department through supporting the creation of open garden and financial support from their side for preschool. By using the principles of co-production we maintained the important conditions for extending institutions and we've achieved many goals to the open garden.

The openness factor was also key in the whole process. This factor has shown that particularly institutions such as the City Hall should be open to new knowledge, information and actors. We found the lack of openness in cooperation with diverse institutions. Officials are often limited by rules and law that must be followed compulsorily, hence the lack of this openness and certain fear of being flexible and open to new knowledge and cooperation with various groups of stakeholders may result. Apart from that it is meaningful to inform residents of what we do and why and show them a relevant purposes. We promote our activities and inform about it at every stage of the process. The undertaken activities should be related to the openness to new ideas and a larger citizen-oriented approach.



Pic. no. 30 Classes in the garden - planting flowers (October, 2018).

Source: City of Poznań/Preschool No. 42 at Wilda District in Poznań

5.3 Barriers and challenges in co-producing

The description of the co-production process based on the example of the open garden at kindergarten No. 42 at Wilda District in Poznań has given us many new experiences and insights.

During the co-production process, plenty of barriers and challenges were diagnosed.

Unfortunately, one of the problems is the lack of time for good promotion and allowing free/unhampered flow of information. Here, we can also diagnose many barriers that are related to the lack of flexibility of official's work caused by the very stiff organizational structure of the city hall. Maybe in the future we will be able to minimize the barriers and get more benefits from implementing the co-creation process in our work. This is a very useful process that will allow to take further steps on a more reflective view of the problem and objective determination of further actions.

With this example we were able to draw a few lessons:

- we should be more flexible and open to different formats of knowledge and we should learn to listen to the needs and opinions of others,

- we should put more work in informing people about what we do and encourage them to take part in consultation meetings, promote our activities on a city scale,
- learn to work and think horizontally, not vertically,
- focus on constant organizational and operational support from specialists/experts/stakeholders involved in the project is needed, because their actionable and usable knowledge is important, thanks to which the design was well-prepared.

We diagnosed diverse barriers, which related to the work within city hall, like very official and rigid organizational structure in city hall and strong departmentalization which is linked with vertical work and rigid schemes and processes. Some of diagnosed barriers blocks co-production and very often results from this stiff organizational structure and departmentalization, like no informal means of communication or no smooth flow of information between different departments and units within city hall, on the other hand there's a situation of informational overloads which forces on employees prioritizing tasks. The co-production is also impeded by lack of proper openness for ideas and new concepts (situation described in section 2.3) or becoming the leader/initiator of the co-production process which is very challenging because co-production method is often new also for the initiator. This is a new method of work that we did not undertake earlier, because the most time is taken by administrative work, preparation of documents, current tasks – everything is important and necessary, everything is a priority, there is no time to gather and discuss methods of work and implementation of the co-production process for everyday design. The lack of flexibility of official's work is mainly caused by the very stiff organizational structure of the city hall, and this is a challenge we need to face so we intend to foster the co-production process in project work and encourage officials to use this method in daily work.



Pic. no. 31 Open garden at Preschool No. 42 in Poznań (August, 2018).

Source: City of Poznań/Preschool No. 42 at Wilda District in Poznań

5.4 How will the co-production process look like in the future? Lessons learnt







As was mentioned earlier, the process of co-production in the project work was something new, therefore the use of this method in the open garden was a challenge, but also an interesting experience and lesson. Despite the rigid organizational structure of the city and the need to stick to administrative procedures and a certain frame of administrative work, we noticed that residents (as users of urban space) have many great and attractive ideas, worth implementing - this was the case with ideas for designing an open garden.

Sometimes, it can be problematic when parents have ideas that are not in line with the initial project or concepts that cannot be implemented in the garden due to certain conditions (environmental) or regulation (the water and sewerage system under the surface of garden). Some solutions to such situations were the organized educational workshops – first with teachers and management, who then passed the acquired knowledge to parents of pre-schoolers. In this way, we were able to respond to objection of parents. For example, in the case of designing insect houses in the garden, many parents initially disagreed with this idea fearing of sting, but when they were made aware that the houses are inhabited by mason bees, which do not sting, and at the same time bring many benefits to the environment, they agreed that this solution is very positive. Such discussions made us more open: we learned to listen to different ideas and see them not as threats but as opportunities and possibilities to create a nice place of rest and recreation for children, parents and grandparents, or local residents. We have learned to make decisions that are a compromise.

We also pointed out that there were not enough methods to inform residents about the open garden. Despite many efforts to promote this place, to invite to workshops, sometimes this information did not reach more people. We should use more possible information channels and reach more inhabitants. Sometimes we hear voices that as public administration we are not willing to cooperate. So, we would really like to change this image and show residents that we operate for them and the places we create are for use by them. The co-production process opened us to cooperation with diverse group of actors and made us realize that *the more ideas, the more attractive design*. Of course, thanks to the support of specialists and experts, the project is not chaotic, but presents a functionally designed space in which everyone will find a place for themselves.

We also prepared a plan of how the co-production process for future activities, like open gardens, would look like. The first step will certainly be the organization of consultation workshops. The basic and key to further work are open workshops, consultations, meetings with residents, specialists, foundations, and officials: civil servants, police officers. Bringing together multiple types of knowledge will allow to create a comprehensive project. Thanks to this principle, we get to know many opinions, perspectives, and are able to involve as many people and stakeholders as possible in creating a given place. It is associated with many types of knowledge that involved people represent in the project. We will also try to put emphasis on the openness of the process and the principle of extending institutions. Unfortunately,

vertical cooperation still dominates, which sometimes causes the lack of smooth operations, the problem with obtaining information or permits for further work.

1. **General meeting** - informing residents about our activities, intentions, ideas and encouraging them to cooperate in creating a new place 
2. organization of a series of **consultation workshops** (which will last for a longer period of time, according to the prepared schedule):
 - a. *What needs residents have? What are they missing? (in the context of greenery, urban green areas, ecological education)* 
 - b. *Share of knowledge and experience between residents and specialists*
 - c. *Share of ideas, concepts - our dreams, how to create a common green space* 
3. Joint preparation of the **final open garden project** 
4. **Selection of contractors** (according to criteria and legal rules, controlled by civil servants)
5. **Modernization works** in the garden (started and finished according to a set schedule) 
6. **Kick-off** meeting – Opening the garden at preschool
7. Test - collecting **opinions**, **assessing** the satisfaction of residents - users, **assessment** of the functioning of the garden 

Pic. no. 32 How do we plan to organize it? – the future plan for a co-creation process

Source: Agnieszka Dziubala

6. Financing, Business and Governance Models: Mobilising and committing resources for the implementation of the nature-based solution exemplar

Finding the right financing is critical for nature-based solution implementation. Specific financing is required for the planning phase, the capital investment phase and the operational phase of nature-based solutions. We therefore sought to identify sources of financing required for the up-front capital investment costs and the development of a sustainable business model to identify how the ongoing operational costs of nature-based solutions.

6.1 Lessons learned from how nature-based solutions have been financed to date in Poznań

Historic nature-based solutions financing:

Maintenance of the historical, ambitious Poznań ring-and-wedge urban greenery system, high quality street greenery and recreation places such as municipal beaches on the banks of the Warta River, were in last years mainly financed from municipal target funds dedicated respectively to maintaining parks, roads and revitalization of public space.

Financing of the open garden and natural playgrounds that are to be up-scaled:

Capital expenditure: The natural playgrounds and open gardens paid attention to a hybrid model of financing the nature-based solutions capital expenditure costs. It uses in an effective way varied assets of the public institutions combined with external funding.

Scaling-up of green solutions in pre-schools and making them sustainable in long-term, required longer, more complex and active engagement of the City of Poznań, which is the management authority for Poznań preschools. Combination of owned ground directed by public institution, public money dedicated to maintenance of local educational sector infrastructure, additional money acquired for development of nature-based spaces and ecological education-all of them create the public assets model - beam of education and green oriented services.

Mentioned above additionally acquired financing sources refer to Horizon 2020 Programme, financing CONNECTING NATURE project.

Ongoing operational costs of the natural playgrounds exemplar, were incurred by Poznań City Hall, Department of Education and preschools. Open garden instead generated some concepts concerning including additionally non-profit partners to the scheme of operational costs. Activities undertaken by non-profit organizations in the Open Garden in Pre-school no. 42 in Poznań could partly contribute to Open Garden budget by direct support, also in-kind. However, so far concept was not fully implemented. The planned evaluation of the open garden Process in 2019 will be a great occasion to summarize our experience with sharing operational costs. Such internal evaluation will be organized by the Project Coordination and Urban Regeneration Office in Poznań City Hall.

Governance & key stakeholders: In the management structure for natural playgrounds and open gardens, the Project Coordination and Urban Regeneration Office plays specific roles: an initiator of nature-oriented oriented playgrounds and co-initiator for open gardens, organizer and administrator for both processes, match-maker and mediator for different stakeholders, and so far internal evaluator, as well as supplier (ordering party) of architectural designs and innovative ecological, nature-based micro-installations.

The role of the Department of Education is crucial for ensuring capital expenditure costs. In applied mechanism of re-orientation of playground towards nature-based solutions, described in details in Chapter 4 Governance, the Department of Education ensures in five-year programme each year sources for 10 pre-schools, in equal constant value, to renovate their spaces. Preschools interested in external reconstructions in gardens gain unique opportunity to received additionally from Project Coordination and Urban Regeneration Office complex, tailor-made project of garden arrangements prepared by professional landscape architecture, enriched with ecological micro-installations. However, without capital investment in basic infrastructure (for example: unsealing concrete surface of playgrounds)

additional nature-based solution activities would not have such impact. The Department of Education is also a right channel to spread information increasing awareness on benefits of natural playgrounds and climate change consequences. Support of the Educational Department concerns also the systematic approach that could be applied for the future scaling of the open gardens.

Last but not least is a role of the preschools themselves. Heads of preschools presented readiness to carry burdens of serious reconstructions continuing the same time educational and nursery tasks in case of natural playground and had to face up pioneer solutions and new challenges in case of opening gardens. Without strong conviction about benefits of these concepts and openness to new educational approach changes in pre-schools would not be possible. One of new challenges is openness for mixed financing and active role in raising funds not only through Department of Education. Important financial support to Preschool no.42 goals demonstrated local District Wilda Council, which also participated in process of garden opening. The example of the open garden shows above and beyond that initiative must come from preschool. The City Hall can co-initiate process, but dealing with open garden requirements needs firm confidence person in charge and teachers in the sense and benefits of the process. Opening gardens process required also confidence and engagement of parents. Parents of preschool and nursery in neighbourhood were target beneficiary group around which community of neighbours using Open Garden started establishing. Active parents, engaged in process social activities in garden of their children more eagerly and voluntarily participate in co-financing of green space.

Financing issue can be relevant also when we are analysing contractors.

Among mentioned stakeholders ensuring financing of the two processes in Poznań:

- Poznań City Hall: Project Coordination and Urban Regeneration with CONNECTING NATURE team and Department of Education should be also listed services providers, which role in processes exceeded regular service delivery:

- for designing garden space for natural playgrounds and co-creation process with teachers and children: landscape architect – pracownia k. from Krakow,

- for designing ecological micro-installations (eco-demonstrators): Fundacja Made in Art from Poznań, collaborating with local architect and designer, engaged in green-oriented projects

-for co-creation and practical application of Open Garden-expert from Kolektyw Kąpielisko (social garden organizer)

- for child development and education-experts from Astrid Lindgren Institute for Early Childhood Development in Poznań.

What we could recommend as a city is starting cooperation with contractors who can deliver added value to the activities and would like to treat their contract not only in financial dimension but also as a part of their Corporate Social Responsibility. In Poznań case cooperation with City Hall in natural playground and open gardens cases influenced knowledge and gave new visibility to involved companies and organisations.

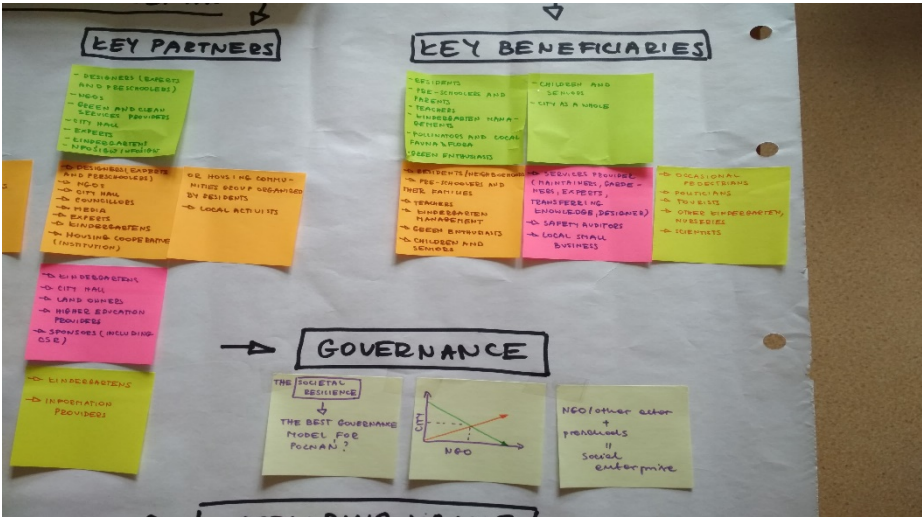
Challenges: Financing of natural playgrounds and Open Garden was a great challenge for the Project Coordination and Urban Regeneration Office. Main difficulties were as follow:

- necessity of creation a pilot mechanism of financing preschools basing on two different budgets of two Poznań City Hall units
- HORIZON 2020 Programme and CONNECTING NATURE project expectations
- need of further cross-financing of the concepts
- creation framework for sustainability of the mechanism supporting green-oriented investments in preschools.

Overcoming barriers and challenges required many meetings, conversations, accounting and legal consultancies.

Enablers: Great enablers were people engaged in the processes, step by step looking for some solutions and increasing awareness of significance of the nature-based solution for the children and city residents.

Knowledge and Skills: One of the challenges was also acquiring new competences on financing and business models of nature-based solutions. Such approach was not applied in City Hall to date. Some solution was diversification of the team working on the open garden and constant upgrading of knowledge and skills by participation in CONNECTING Nature’s workshops and webinars on financing greener cities. Alternative sources of financing greenery in the city are interesting topic for national and international conferences and workshops organized in last months.



Pic. no. 33 Business Model Canvas or Poznań preschools’ gardens.
Source: Agnieszka Dziubala

6.2 Exploring opportunities for innovation in financing, governance and business model

In Poznań, in school year 2017/2018 there were 123 public kindergartens managed by the City and 120 managed by other institutions subsidized by the City (105 non-public and 15 public). Both flagship projects have great potential to be scale up and to positively impact on nature, social and economic aspects.

However, the situation in the coming years seems to be very challenging. Local authorities in Polish bigger cities will have to face up significant increase of educational cost. It will have direct impact on new investments in the city, not only in educational branch. On the other hand adaptation to climate changes will enforce new expenditures.

New sources of financing: European Union programmes and initiatives such as Horizon Europe Framework, new versions of URBACT and LIFE programmes, and Structural Funds cannot be overestimated as sources of financing nature-based solutions and innovations in the financing, governance and business models.

Although cities should work on more balanced models of external financing sources, cannot overlook changes that will come in financing structures in coming EU financial perspectives. The Multiannual Financial Framework of EU starting in 2021 seems to perfectly match and respond to Poznań challenges in both capital expenditures and operational costs of nature-based solutions.

Diversification of financing sources however will stay as one of the priorities for the Poznań City Hall. The role of the project team is match-making and supporting beneficiaries and stakeholders of present project. It means opening for financing of other types of institutions and organizations then local authority.

Some alternative sources of financing can be also regional and national funds dedicated environment improvement, such as Environmental Protection Voivodship Fund or Environmental Protection National Fund for centralized, national projects.

Climate change adaptation topic seems to be more and more popular among different granting institution and organisations. Ongoing monitoring of them could help identify new financing possibilities.

New sources of financing operational costs: Poznań project team is exploring methods of higher engagement of local non-profit organizations participation in operational costs in the frame of upscaling open gardens. In second part of 2019 we would like to further develop pre-school open garden model and test it in new conditions. We will start organising open gardens in two or three new locations. Each of them, what we can observe already at the very beginning of the process, has different requirements. Modified, varied concepts of open gardens will be needed. Suitable governance models, that include structures, stakeholders, role and financing models will be prepared. We assume that open gardens even more then natural playgrounds could be subject of cooperation with business sector. We see potential in: greenery services, housing, designing or even IT. Corporate Social Responsibility provides

opportunities for broader engagement these market sectors and experiment with sponsoring in green spaces establishing.

Another possibility creates newly received by Project Coordination and Urban Regeneration Office grant from URBACT III Programme on international exchange of good practices in the field of Heath & Greenspaces. Focusing on health dimension of nature-based solutions can be key opening new sources of financing.

6.3 Planning the financing and business model for upscaling natural playgrounds and open gardens

Preparation of a business model approach to plan financing and sustainability of natural playgrounds and open gardens had started already during the first meetings of stakeholders of both processes. Capital expenditures and operational costs were crucial to determine if the projects should be developed or not. Presented Business Model Canvas (BMC) summarizes the already applied approach to natural playgrounds in Poznań but also potential approach, especially to the open gardens,.

6.4 Business Model Canvas for Sustainability for natural playgrounds in Poznań

Tab. 5 Business Model Canvas for natural playground

KEY ACTIVITIES	KEY RESOURCES	VALUE PROPOSITION	KEY PARTNERS	KEY BENEFICIARIES
<p>ENVIRONMENTAL</p> <ul style="list-style-type: none"> • unsealing of the surface-improvement of the natural soil • new plantings • equipping the garden with natural elements • creating a natural playgrounds for children • making this green area better available for residents/children <p>SOCIAL</p> <ul style="list-style-type: none"> • cooperation with the preschool’s management department (Department of Education) results in joint development of activities for the green space • activities involving and engaging children • activities promoting health and outdoor playing <p>ECONOMIC</p> <ul style="list-style-type: none"> • job creation (gardener, a technician for minor repairs, potential service contactors) • creating the market new services and products aimed at preschool gardens and green elements • transfer program=exchange of knowledge and experience • adjusting the market and law to emerging services and products • looking for sponsors <p>OTHER</p> <ul style="list-style-type: none"> • sustainable transport programme 	<p>ENVIRONMENTAL</p> <ul style="list-style-type: none"> • kindergarten’s area, which requires modernization and redevelopment=re-landscape of area into a functional green space for children • organizational assistance • technical advice • money supply =investment resources of the unit responsible for renovations in preschools • garden maintenance programme <p>SOCIAL</p> <ul style="list-style-type: none"> • organisational assistance • administrative and content related support • money supply <p>ECONOMIC</p> <ul style="list-style-type: none"> • human resources • financial resources • incentives (job creation) • adjustment of public procurement <p>OTHER</p> <ul style="list-style-type: none"> • human resources • financial resources for transport programme • incentives for public institutions 	<p>ENVIRONMENTAL</p> <ul style="list-style-type: none"> • access to high quality nature/environment in the city • biodiversity (including beediversity) • free access to nature • “clean” and natural • decrease of temperature during summer • unsealing of the surface • bigger area of greenery • conservation of the preschool’s infrastructure linked with education (eco-education in preschools supported by the City) <p>SOCIAL</p> <ul style="list-style-type: none"> • space adopted to different needs of children and adults (play, exploration, rest, common actions) • education – eco-education, learning by playing outdoor • growing-up process • children/adults “unplugged” • improved health and well-being of users • free access to nature <p>ECONOMIC</p> <ul style="list-style-type: none"> • direct economic: <ul style="list-style-type: none"> - job creation (maintaining) - increased property values • indirect economic: <ul style="list-style-type: none"> - transfer of skills, knowledge and expertise - increase of attractiveness of area - free access to nature <p>OTHER</p> <ul style="list-style-type: none"> • increased quality of neighbourhood (cleaner air, better view, access to nature oriented education institution) 	<p>ENVIRONMENTAL</p> <ul style="list-style-type: none"> • designers (experts and preschoolers) • NGOs • green and clean services providers • Poznań City Hall • experts • preschools(kindergartens) • Environmental Protection National Fund / Environmental Protection Voivodship Fund <p>SOCIAL</p> <ul style="list-style-type: none"> • designers (experts and preschoolers) • NGOs • Poznań City Hall • councilors • media • experts • preschools(kindergartens) • local activities <p>ECONOMIC</p> <ul style="list-style-type: none"> • preschools(kindergartens) • Poznań City Hall • Land owners • Higher education providers • Sponsors (including CSR) <p>OTHER</p> <ul style="list-style-type: none"> • information providers 	<p>ENVIRONMENTAL</p> <ul style="list-style-type: none"> • preschoolers and parents • teachers • preschool management • residents • pollinators and local fauna&flora • green enthusiasts • city as a whole <p>SOCIAL</p> <ul style="list-style-type: none"> • preschoolers and their families • teachers • visitors from other pre-schools • kindergarten management • neighbours • green enthusiasts • children and seniors <p>ECONOMIC</p> <ul style="list-style-type: none"> • service provider(maintainers, gardeners, experts, transferring knowledge, designer) • safety auditors • local small business <p>OTHER</p> <ul style="list-style-type: none"> • politicians • other preschools, nurseries • scientists and experts
<p style="text-align: center;">GOVERNANCE</p> <p style="text-align: center;"><i>The best model for Poznań – The Societal Resilience</i></p> <p style="text-align: center;"><i>NGO/other actors + preschools = social enterprise</i></p>				

COST STRUCTURE	COST REDUCTION	CAPTURING VALUE
<p>A. operating expenditures=opex</p> <ul style="list-style-type: none"> - gardening - cleaning - events - evaluation & expertise - any taxes - minor upgrade - animator & coordinator - maintenance (personal cost, equipment) <p>B. Capital investment costs = capex</p> <ul style="list-style-type: none"> - mayor upgrade - decapitalization of infrastructure/equipment - removal asphalt <p>Sources of financing for environment</p> <ul style="list-style-type: none"> - ERDF (for education, for adaptation to climate change) - Urban Innovative Actions (for big scale concepts) - URBACT III (sustainable cities) - non-EU funds planning - Environmental Protection National Fund / Environmental Protection Voivodship Fund - adaptation to climate change programmes - strategy of rainwater management <p>Sources of financing for social</p> <ul style="list-style-type: none"> - department of education - EU funds (CN) - Crowdfunding Alternatives sources (for foundations, artists, philanthropists) - cooperation with universities <p>Sources of financing for economic</p> <ul style="list-style-type: none"> - seal/reused of asphalt 	<p>How we can reduce the costs?</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>ENVIRONMENTAL VALUE</p> <p>a. direct</p> <ul style="list-style-type: none"> - new funding sources/opportunities like Environmental Protection National Fund / Environmental Protection Voivodship Fund, adaptation to climate changes programmes, Urban Innovative Actions, URBACT III, Horizon 2020 - district councils, banks, firms <p>b. indirect</p> <ul style="list-style-type: none"> - decreasing heat - ecological effect indicators - rain water tax <p>ECONOMIC VALUE</p> <p>a. direct</p> <ul style="list-style-type: none"> - ESF - Department of Education - District Councils - crowdfunding <p>b. indirect</p> <ul style="list-style-type: none"> - positive opinions in media (social) - increase the local identity - number of users/visitors - other social indicators <p>SOCIAL VALUE</p> <p>a. direct</p> <ul style="list-style-type: none"> - ESF - Department of Education - District Councils - crowdfunding <p>b. indirect</p> <ul style="list-style-type: none"> - positive opinions in media (social) - increase the local identity - number of users/visitors - other social indicators <p>OTHER VALUE</p> <ul style="list-style-type: none"> - zero waste economy - preferential rate for local children

Source: Agnieszka Osipiuk basing on Poznań BMC workshop results

Financing up-front costs – natural playgrounds

Tab. 6 Financing up-front costs for open garden

<p>Capital Expenditure Cost</p> <ul style="list-style-type: none"> • unsealing • architectural design • planting • equipment and micro-installations 	<p>Sources of Capital Investment:</p> <ul style="list-style-type: none"> • municipal budget for renovations in preschools • Horizon 2020 Programme, Connecting Nature project • potential: Environmental Protection Voivodship Fund, Environmental Protection National Fund, new funds/priorities from new EU perspective, economic system industries
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Source: Agnieszka Osipiuk basing on Poznań BMC workshop results

6.5 Business Model Canvas for Sustainability for Open Garden in Poznań

Tab. 7 Business Model Canvas for open garden (below)

KEY ACTIVITIES	KEY RESOURCES	VALUE PROPOSITION	KEY PARTNERS	KEY BENEFICIARIES
<p>ENVIRONMENTAL</p> <ul style="list-style-type: none"> • unsealing of the surface-improvement of the natural soil /environment • new plantings • equipping the garden with natural elements • creating a natural playgrounds for children • making this green area better available for residents/children <p>SOCIAL</p> <ul style="list-style-type: none"> • make the garden better available for citizens • cooperation with the preschool's management=joint development of activities for the green space • activities involving and engaging residents caring for common spaces(planting flowers, trees, raking leaves) • activities promoting health and outdoor playing <p>ECONOMIC</p> <ul style="list-style-type: none"> • job creation (gardener, a technician who will understand minor repairs, potential service contactors) • creating the market new services and products aimed at preschool gardens and green elements 	<p>ENVIRONMENTAL</p> <ul style="list-style-type: none"> • preschool's area, which requires modernization and redevelopment=re-landscape of area into a <u>functional green space</u> for children and adults • organizational assistance • technical advice • money supply =investment resources of the unit responsible for renovations in preschools • garden maintenance programme <p>SOCIAL</p> <ul style="list-style-type: none"> • organisational assistance • administrative and content related support • money supply <p>ECONOMIC</p> <ul style="list-style-type: none"> • human resources 	<p>ENVIRONMENTAL</p> <ul style="list-style-type: none"> • access to high quality nature/environment in the city • biodiversity (including beediversity) • free access to nature • "clean' and natural • decrease of temperature during summer • unsealing of the surface • bigger area of greenery • conservation of the preschool's infrastructure linked with education (eco-education in preschools supported by the City) <p>SOCIAL</p> <ul style="list-style-type: none"> • social inclusion • meeting place • space adopted to different needs of children and adults (play, exploration, rest, common actions) • education – eco-education, learning by playing outdoor • growing-up process • children/adults "unplugged" • improved health and well-being of users • free of charge • free access to nature <p>ECONOMIC</p> <ul style="list-style-type: none"> • direct economic: free of charge but generating other services - interest in preschool with 	<p>ENVIRONMENTAL</p> <ul style="list-style-type: none"> • designers (experts and preschoolers) • NGOs • green and clean services providers • Poznań City Hall • experts • preschools • Environmental Protection National Fund / Environmental Protection Voivodship Fund <p>SOCIAL</p> <ul style="list-style-type: none"> • designers(experts and preschoolers) • NGOs • Poznań City Hall • councilors • media • experts • preschools • housing & cooperatives(institution) • housing communities group organized by residents • local activities <p>ECONOMIC</p> <ul style="list-style-type: none"> • preschools • Poznań City Hall • land owners • higher education providers • sponsors (including CSR) 	<p>ENVIRONMENTAL</p> <ul style="list-style-type: none"> • residents • pre-schoolers and parents • teachers • kindergarten management • pollinators and local fauna & flora • green enthusiasts • children and seniors • city as a whole • residents <p>SOCIAL</p> <ul style="list-style-type: none"> • preschoolers and their families • teachers • visitors from other pre-schools • kindergarten management • neighbours • green enthusiasts • children and seniors <p>ECONOMIC</p> <ul style="list-style-type: none"> • service provider(maintainers, gardeners, experts, transferring

<ul style="list-style-type: none"> • transfer program=exchange of knowledge and experience • adjusting the market and law to emerging services and products • looking for sponsors <p>OTHER</p> <ul style="list-style-type: none"> • sustainable transport programme • the garden near institution better accessible for residents (also because of the promotion) 	<ul style="list-style-type: none"> • financial resources • incentives (job creation) • adjustment of public procurement <p>OTHER</p> <ul style="list-style-type: none"> • human resources • financial resources • transport programme • incentives for public institutions 	<p>higher green standards</p> <ul style="list-style-type: none"> - job creation (maintaining) - increased property values <ul style="list-style-type: none"> • b. indirect economic: <ul style="list-style-type: none"> - transfer of skills, knowledge and expertise - increase of attractiveness of area - free access to nature <p>OTHER</p> <ul style="list-style-type: none"> • increased quality of neighbourhood (cleaner air, better view, access to nature-oriented education institution) • small architecture for users <p>decreasing “fencing” in the city</p>	<p>OTHER</p> <ul style="list-style-type: none"> • preschools • information providers 	<p>knowledge, designers)</p> <ul style="list-style-type: none"> • safety auditors • local small business <p>OTHER</p> <ul style="list-style-type: none"> • occasional pedestrians • politicians • tourists <p>other preschools, nurseries</p> <ul style="list-style-type: none"> • scientists
<p>GOVERNANCE</p> <p><i>The best model for Poznań – The Societal Resilience</i></p> <p><i>NGO/other actors + preschools = social enterprise</i></p>				

COST STRUCTURE

<p>A. operating expenditures=opex</p> <ul style="list-style-type: none"> - gardening - cleaning - events workshops, programmes for residents - promotion & servicing & replacement <p>evaluation & expertise</p> <ul style="list-style-type: none"> - any taxes - minor upgrade - animator & coordinator - maintenance (personal cost, equipment) <p>Sources of financing for environment</p> <ul style="list-style-type: none"> - ERDF (for education, for adaptation to climate change) - Urban Innovative Actions (for big scale concepts) -URBACT III - non-EU funds planning - Environmental Protection National Fund / Environmental Protection Voivodship Fund - adaptation to climate change programmes - strategy of rainwater management 	<p>B. Capital investment costs = capex</p> <ul style="list-style-type: none"> - mayor upgrade - decapitalization of infrastructure/equipment - removal asphalt <p>Sources of financing for economic</p> <ul style="list-style-type: none"> -seal/reused of asphalt <p>Sources of financing for social</p> <ul style="list-style-type: none"> -department of education EU funds(CN) Crowdfunding Alternatives sources(for foundations, artists, philanthropists) -cooperation with universities
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COST REDUCTION

How we can reduce the costs?

- 1.shared coordination**
- 2.negotiation price**
- 3.social economy operator**
- 4.funding programmes**
- 5.volunteers**
- 6.contributions in-kind/time-banking**

CAPTURING VALUE

ENVIRONMENTAL VALUE

- a. direct
 - new funding sources/opportunities like Environmental Protection National Fund / Environmental Protection Voivodship Fund, adaptation to climate changes programmes, Urban Innovative Actions, URBACT III, Horizon 2020
 - district councils, banks, firms
- b. indirect
 - decreasing heat
 - ecological effect indicators
 - rain water tax

ECONOMIC VALUE

- 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

SOCIAL VALUE

- 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

OTHER VALUE

- urban agriculture
- zero waste economy
- preferential rate for local children

Source: Agnieszka Osipiuk basing on Poznań BMC workshop results

Financing up-front costs – open garden

Tab. 8 Financing up-front costs for open garden

Source: Agnieszka Osipiuk basing on Poznań BMC workshop results

Capital Expenditure Cost -unsealing -architectural design -planting -small architecture and equipment	Sources of Capital Investment: -municipal budget for renovation in preschools -Horizon 2020 Programme, Connecting Nature potential: Environmental Protection Voivodship Fund, Environmental Protection National Fund, new funds/priorities from new EU perspective, economic system industries
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Developing business opportunities according to Business Model Canvas and financing plan needs engagement of quintuple helix actors. The Table below focuses on the Economic System Industries and Political System, while Education System is explored in parts concerning co-creation, governance and technical blocks.

Economic System

Tab. 9 Quintuple Helix actors for economic systems for natural playgrounds and open gardens

Quintuple Helix actors	Who	Why you have chosen them	How have you/will you engage with them? Name the building block(s) you will engage with them for?
Firms	x	Firms can be interested in sponsoring agreements for CSR reasons but also engagement employees as volunteers in Open Gardens and promotion.	F, T
Services	x	Increasing quality of green services by sharing with services suppliers experience in nature-based solutions will increase quality of urban greenery.	F, T
Banks	x	Banks can be interested in sponsoring agreements for CSR reasons but also engagement employees as volunteers in Open Gardens. Some of banks already have foundations dedicated to local projects.	F, T
Entrepreneurs	x	Entrepreneurs can be interested in offering product or services for which is unmet demand and promotion.	F, T

Source: Agnieszka Osipiuk

Political System

Tab. 10 Quintuple Helix actors for political systems for natural playgrounds and open gardens

Quintuple Helix actors	Who	Why you have chosen them	How have you/will you engage with them? Name the building block(s) you will engage with them for?
National government	x	On that level will be distributed new funds for climate change adaptation	G,F
Local government	x	Varied fields of cooperation(greenery, education-programmes and renovations, social inclusion, citizen participation)	G, F, C
Policy makers	x	Varied fields of cooperation(greenery, education-programmes and renovations, social inclusion, citizen participation). Co-creation possibilities depends on style of governance.	G, F, (C)
Law makers	x	Some aspects of acting in preschools needs some change or new interpretation of regulation.	T, C
Politicians	x	Influence on importance of nature-based solutions and shape of financing possibilities on different levels. In case of local politicians possible co-creation.	G, F, (C)

Source: Agnieszka Osipiuk

Legend for blocks:

[T] Technical

[G] Governance

[C] Co-creation

[F] Financing

6.6 Implementation of financing plans for the open garden

Tab. 11 Action plan for natural playgrounds and open gardens

Name of nature-based solution	Action to be undertaken (arising from BMC & financing plan)	Responsible person	Timeframe for implementation
Natural playgrounds in preschools	Creation of a map of alternatives subjects who can co-finance playgrounds, beyond aspects regulated by law, where Department of Education is obliged to act.	CN Poznań team	January 2019-December 2019
Natural playgrounds in preschools	Preparing offer for business sector due to engage with investors and other stakeholders for alternative sources of financing	CN Poznań team	September 2019-June 2020

Natural playgrounds in preschools	Educating local policy-makers (local councillors) and	CN Poznań team	Ongoing process
Natural playgrounds in preschools	Educating business sector (including students approaching labour market) on value of natural playgrounds	CN Poznań team	January 2020- July 2020
Natural playgrounds in preschools	Preparing information for policy-makers and politicians	CN Poznań team	Ongoing process
Natural playgrounds in preschools	Monitoring of new funds possibilities from 2021	CN Poznań team	Ongoing process
Natural playgrounds in preschools	Finding links with new project concerning green spaces Health&Greenspace (URBACT III)	CN Poznań team	September 2019-February 2020
Open gardens	Creation of a map of alternatives subjects who can co-finance Open Garden	CN Poznań team	Ongoing process
Open gardens	Inform and engage residents and land/house owners	CN Poznań team	Ongoing process
Open gardens	Preparing offer for business sector due to engage with investors and other stakeholders for alternative sources of financing	CN Poznań team	January-July 2020
Open gardens	Educating local policy-makers (local councilors)	CN Poznań team	January-July 2020
Open gardens	Educating business sector (including students approaching labour market) on value of open green spaces	CN Poznań team	January -July 2020
Open gardens	Preparing information for policy-makers and politicians	CN Poznań team	Ongoing process
Open gardens	Monitoring of new funds possibilities from 2021	CN Poznań team	Ongoing process
Open gardens	Finding links with new project concerning green spaces Health&Greenspace (URBACT III)	CN Poznań team	September 2019-February 2020

Source: Agnieszka Osipiuk

6.7 Reflection: opportunities and barriers

Preparation of the financing and business models for Poznań exemplars paid attention of Poznań project team to the following aspects:

1. Two exemplars: natural playgrounds and open garden are different cases, even if they are linked territorially and have a lot of similarities and determinants.

However, where the barrier for natural playgrounds is closed target group, there linked with it open garden is opportunity to open place for other beneficiaries

2. The barrier is a not well-developed market for green services aiming at nature-based solutions. On the other hand this is opportunity to interest market in this aspect.
3. Sponsoring system for municipal activities (for example planting trees on municipal grounds in the frame of CSR of firms) is not developed and barrier can be legislative regulations or lack of interest. Opportunity in this case is introducing innovations(also social ones) in collaboration with market in the frame of programme promoting cooperation of administration and market.
4. Division of competences did not encourage to date to combine establishing green spaces with transport accessibility. It could be subsequent direction to develop green spaces.

Mentioned above insights will be valuable for planning entrepreneurship activities in the city.

7. Entrepreneurship

“Poznań in 2030 is a multigenerational community of people living in a green, friendly and well-connected residential estate. (...) The favourable business climate and the social coherence policy enable all the residents to fully engage in the city life.”

City Vision, Development Strategy for the City of Poznań 2020+

Supporting a culture of entrepreneurship and the emergence and growth of enterprises related to nature-based solutions contributes to planning, delivering and sustaining the solutions in cities. We therefore seek to support the emergence and growth of such nature-based entrepreneurship in order to create local business opportunities and thereby facilitate the scaling of open gardens and natural playgrounds.

7.1 Identifying how nature-based entrepreneurship fits with the goals of the City of Poznań

Priorities of economic development

Poznań belongs to one of the most economically strong cities in Poland. It is characterized by high potential for economic growth, low unemployment and the growing importance of small and medium-sized enterprises. The city of Poznań is open for innovations on business. The city is conducting policy stimulating the economic activity and promoting Poznań as a convenient and attractive place for undertaking business and investment activities. The city of Poznań realizes its economic-development opportunities, and promote business success with beneficial outcomes for society, the environment and human health. However, as was noted in the Development Strategy for the City of Poznań 2020+ document, Poznań does not make sufficient use of its economic strengths to build modern and innovative entrepreneurship

based on local resources, including nature-based businesses in Poznań, which are rare or have not been precisely diagnosed yet.

As was mentioned in chapter concerning governance, all nature-based solution activities undertaken and realized in Poznań are compatible with the objectives and priorities included in local strategic documents. The city authorities systematically pursue Poznań's goals and maintain sustainable development of the city. Many local strategic documents also focus on priorities related to economic development in the city such as: Development Strategy for the City of Poznań 2020+, Study of Conditions and Directions of Spatial Development of the City of Poznań and Municipal Revitalization Program for the City of Poznań.

One of the most significant strategic document is Development Strategy for the City of Poznań 2020+. There are five crucial priorities and one, which directly refers to modern entrepreneurship – development of modern economy in city of Poznań. The main aim is to develop in the city a diverse, strong and innovative economy and entrepreneurship. Poznań is one of the most economically strong cities in Poland. It is characterized by a very high potential for economic growth on a national scale, however – like other Polish urban centres and regions – it does not stand out at an European scale. Poznań is one of the main centres for locating foreign investments in Poland. In the city there are conditions for the development of already operating enterprises and their transition to innovative business models. The city supports the creation of new enterprises, especially those with high innovative potential like, for example, the creative industries. Poznań carries out activities supporting social and business innovation and innovation in human resources management, as well as develop enterprises in the area of smart regional specializations, based on innovations and start-ups. In addition, the city supports vocational education and put the emphasis on the adaptation of education to the needs of entrepreneurship.

The second important local document is the Study of Conditions and Directions of Spatial Development of the City of Poznań with four priorities, but only one is focusing on the issue of economy: European city with a high culture of everyday life and space – spatial conditions for improving the quality of life, improving the attractiveness of public spaces and the investment attractiveness of the city. This document is mainly related to spatial management and quality of development and has a direct reference to the spatial policy of the city of Poznań. Thus, it is only indirectly connected with the issue of the economic development in Poznań – rather in the context of investment attractiveness for business development in the city. The records of the document are intended to indicate the areas for the development of investments strengthening and enriching the metropolitan character of the city like universities, cultural objects (high culture), sports and recreational facilities, financial and business-related institutions, congress and hotel facilities, science and technology parks, incubators of entrepreneurship and inventiveness, investments from technologically advanced sectors and the creative industries.

The very relevant document for the city development is the Municipal Revitalization Program for the City of Poznań. The one objective included in this Program is focusing on the strengthening the economic, cultural and social activities. The main assumption is the

development of a competitive economy in the sense of improving spatial, infrastructural and legal-administrative conditions for the development of enterprises in the city, with particular emphasis on high technology industries, creative industries, small and medium enterprises sector as well as supporting the development and promotion of local start-ups. The Program counts the comprehensive urban regeneration of the neglected areas, in order to revive it and improve socio-economic development, increase the attractiveness for residents, entrepreneurs and tourists, develop services, as well as create conditions and encourage residents and entrepreneurs to establish co-working space in the city. The Program also aims to encourage and involve residents, public institutions, non-governmental organizations and representatives of science to solve real city problems, especially social and business problems. The Program puts the emphasis on enabling and strengthening cooperation between education, science and business in the implementation of innovative solutions in the city. What is more, the Program also assumes supporting activities aimed at improving the quality of education at all levels of education, with particular emphasis on vocational education tailored to the needs of the local labour market, which is particularly relevant from the point of view of implementing innovative nature-based solutions and opening the city to such problems. Thereby, the city creates potential conditions for the development of so-called nature-based businesses, which hopefully, will begin to develop dynamically also in the city of Poznań.

Nature-based solutions correspond with economic sector importance in Poznań. The natural playgrounds and process of opening preschool gardens contribute to economic development in similar but different ways.

Natural playgrounds reflect to spatial conditions for improving the quality of life, improving the attractiveness of public spaces and the investment attractiveness of the city. Already in mentioned above City Vision, in Development Strategy for the City of Poznań 2020+in is written that Poznan in 2030 planning to be a multigenerational community of people living in a green, friendly and well-connected residential estates.

Moreover, increased level of well-being, green areas in the City, access children to healthy and developing environment, are factors important not only for local residents. They are also interesting for potential investors (national or foreign) planning attracting valuable employees to come to Poznań.

Open gardens contribute additionally to development social and economic activities mentioned in Municipal Revitalisation Plan, as well as entrepreneurship and inventiveness in Study of Conditions and Directions of Spatial Development of the City of Poznań.

It was observed in Poznań that local restaurants and hotels, the same as housing estates, close to parks do better business. Crowds in restaurants, coffee points placed in parks or green surroundings, as well as popularity of events such as "Breakfast Fair"- food fair in open air-shows a strong connection between food and nature. This is a great potential that can be developed also with the Open Gardens.

Furthermore, fact that businesses are attracted to nicer, greener locations and may want to associate nature-based solutions with their corporate image e.g. green, energy saving etc. can benefit also for Open Gardens (present and future ones).

Emerging of new Nature-based Enterprises or new directions of already existing business activities could develop delivery, maintenance and sustainability of both Poznań exemplars.

Moreover, the need of creation new, innovative concepts of functioning nature-based solutions in Poznań, requires participation of nature-based entrepreneurship already in planning phase. Especially, in situation where development of exemplars requires specific knowledge and innovative approach.

Nature-based entrepreneurship can be settled down in the design sector, as creative sector can help reach the social and economic goals. A good example will be landscape architects and furniture designers. Landscape or garden contractors and maintenance workers can generate economic benefits. Whereas in the SME business sector – equipment manufacturers can contribute to economic goals. These examples will fit to both the scaling of open gardens and natural playgrounds. However, social enterprises can seem to be the optimal solution for open gardens. Cooperation with subjects of social economy concerning for example urban farming in the frame of Occupational Therapy Training Programme is very perspective concept.

7.2 Challenges and enablers in involving nature-based enterprises in the implementation of nature-based solutions

Challenges: Awareness of the significance of nature-based entrepreneurship in development of nature-based solutions still requires raising awareness. Identification of nature-based entrepreneurs should be followed by match-making initiatives to meet city administration demand with relevant market offers.

The implementation process for natural playgrounds and open garden pointed to the clearly very narrow group of requested innovative service suppliers in Poznań like landscape architects designing natural playgrounds with ability to co-creation or moderator for opening of gardens, with gardener competences. Challenge was in fact not only finding the right contractors, sometimes outside of Poznań, but also ensuring ability to continue actions in a bigger scale. For example programme of eco-investments in preschools, resulting in natural playgrounds, required conducting work in 10 preschools almost in the same time, considering also vegetation limitation. Taking into account the fact that different units of the City of Poznań also use green services the challenge was even more considerable.

As a reaction, the City of Poznań decided to organise process of transferring new experiences and competences to stakeholders and potential suppliers, by organizing conference, preparing publications, sharing knowledge and showing possibilities of cooperation to potential service contractors.

This is a long term process, although first results can come soon. The work itself with natural playground or Open Garden increased already competences of local service suppliers.

The challenge was also finding mixed sources of capital investments and as a result creation of the mechanism of cooperation with Department of Education and establishing legal and children security framework for exemplars. Programme of financing eco-investments and this way will be finished in 2020. Moreover, in 2020 are planned strict savings for the whole City of Poznań, what will make financial aspects even more challenging. It will concern also finding operating costs for maintenance of Open Gardens.

Enablers: Fortunately, there are some enablers for development of NBEs. First of all this is a pressure from citizens to keep and develop green areas in the City.

Citizens in Poznań are more and more actively involved in creating green ecosystem in Poznań. They vote for nature-based solutions in Participatory Budget, organised community garden and food cooperatives, take part in public debate on creation public space and presence of nature there. They took part numerously in cultural events which have „green” dimension: Poznań Design Festival, Malta Festival. Citizens’ voice in green issues is taken into consideration by their representatives in city and district councils.

Secondly, bottom-up initiatives are eager to join green activities and they can be experienced and developing nature-based entrepreneurship. The same way developed some of contractors for example building natural playgrounds. Openness of some heads of preschools in Poznań also counts as an enabler. They are actively looking for possibilities of improving green spaces, not only in the frame of administration activities, systematically encouraging new companies to be interest in the nature-based oriented services.

7.3 Understanding how to support nature-based entrepreneurship

Innovation Ecosystem Actors: At the national level, Poznań is characterized by a high scientific and institutional potential focused on innovation and activities for the benefit of the knowledge-based economy.

The innovation ecosystem in Poznań is composed of technologies parks and research institutions, incubators, knowledge transfer centres, start-ups, clusters, creative sectors, urban projects, social innovations. Specific roles play administrations on local (City of Poznań) and regional level (Wielkopolska Region): principals, supporters, initiators, members of consortium, beneficiaries. Among activities and projects of actors of innovation ecosystem nature-based solutions are not priorities.

The growth of entrepreneurship is one of the priorities of the Poznań authorities who have undertaken various activities aimed at assisting the owners of small and medium enterprises in operating their businesses. These activities include the establishing of the Poznań Fund of Loan Guarantees³³, to provide professional training to prospective and active businesspeople as well as to promote successful enterprises from the SME sector The city authorities have also created a Business Information Point and support Wielkopolska Centre of Advanced Technologies. In 2003, Poznań institutions which support entrepreneurs agreed to cooperate in the field of developing the local network of entrepreneurship-related services within the Entrepreneurship and Employment Support Network.

Basing on reports for "Badam. Baza Danych Miasta" (I explore. City Database) Poznań has such innovation institutions as:

- technology parks, constituting a platform for cooperation between the economy and science and creating a friendly environment for the development of innovation: the Poznań Technology and Industry Park established by the City of Poznań, the Poznań Science and Technology Park affiliated with the Adam Mickiewicz University Foundation, the Nobel Tower private science and technology park with a business incubator, as well as the private Business and Science Incubator
- multidisciplinary research centres for modern technologies, such as: High Technology Incubators Complex, Wielkopolska Centre for Advanced Technologies, the NanoBioMedical Centre, Mechatronics, Biomechanics and Nanoengineering Centre, BioCentre, Krajowe Centrum Innowacji w Logistyce i e-Gospodarce ("National Innovation Centre in Logistics and e-Economy"), Medical Biology Centre, The Research Centre of Polish Optical Internet, PSNC-Huawei Innovation Centre
- business incubators and technology transfer centres.
- Poznań universities and R&D centres, in cooperation with local governments and enterprises, implemented joint projects aimed at the development of innovation.

Very dynamically are developing in Poznań also institutions for social innovations:

- Inkubator Wielkopolskie Innowacje Społeczne – implementing innovative solutions dedicated to people at risk of exclusion
- Centrum Inkubowania Innowacji Społecznych Po-po-jutrze – aimed at lifelong learning of adults
- Great Tomorrow's Incubator for Social Innovation – supporting the preparation for implementation of innovative projects in the field of care services for dependent persons
- Laboratorium Innowacji Społecznych, dedicated to students in order to facilitate their entry into the labour market through the development of competences expected by employers.
- Ładne rzeczy – Pracownia Ekonomii Społecznej – dedicated to support social economy, by sharing a space in the City Centre, offering products and organise dissemination events.

Social innovations in Poznan City Hall are generated by three channels:

- implementation of EU projects aiming at identifying, exchange experience and dissemination of social innovation. For example project REFILL – REuse of vacant spaces as Driving Force for Innovation on Local Level
- reacting on bottom-up initiatives and mainstreaming them in municipal activities- for example establishing Culture Incubator 'Pireus', basing on cooperation of three stakeholders: activists from neglected district Lazarus, city hall, district councillors
- cooperation with NGOs in fulfilling municipal tasks in new ways: e.x. Instytut Małego Dziecka im. Astrid Lindgren.

At the local level, the City of Poznań develops concept of smart city by six key areas: Smart Economy, Smart Mobility, Smart Environment, Smart People, Smart Living, Smart Governance. Shares open data on which base external programmers create useful applications for Poznań, mainly related to urban mobility and access, but also to cleanliness in the city and visiting, for example, green recreational areas, like ZOO park.

What is very important is fact that, academic sector conduct on regular basis research on nature-based solutions. The bridge for strong cooperation in this field are EU projects, for example Connecting Nature, where City of Poznań cooperates closely with Adam Mickiewicz University.

At the regional level, Wielkopolska Agency for Enterprise Development Ltd (WARP) operates, which is a company that has been providing support to entrepreneurs for 15 years now. The primary aim of this activity is to develop the sector of small and medium-sized enterprises by providing loans. Many enterprises took advantage of the services provided by WARP Consultation/Information Points. WARP provides free advice on doing business in Wielkopolska. It would valuable to monitor WARP activity from NBS perspective: for example possibilities for support landscape architects or specialist in outdoor furniture makers or social enterprise platforms.

Innovation ecosystem creates also companies. In fact international companies like IKEA inspired by nature and adjusting products to less waste use or Sweco Consulting working on engineering aspects in water management.

Connecting Nature team in Poznań would like to use internal experience in match-making and cooperation with different stakeholders to build interest of companies and other mentioned potential Nature-based Enterprises to act in nature-based solutions direction. Poznań team employed new person deriving from business sector to deal with new tasks in more effective way.

7.4 Planning the strategy for nature-based entrepreneurship

The City of Poznań sees a great potential in developing nature-based entrepreneurship and thereby channelling innovations for nature-based solutions. Necessary steps to take are:

- identification of nature-based entrepreneurship in Poznań (market diagnosis combine with raising awareness about ecosystem actors)
- starting consultations with representatives of Poznań companies and organisations on common activities, possible enterprises. Sponsoring concept for green areas could be one of the first actions to be tested.
- invitation directed to Poznań companies and NGOs to represent their activities during EXPO 2020 in Poznań.

- working with ecosystem actors to ensure that they are aware about NBEs and put in place strategies to support them e.g. skills development programmes for new architects, hackathons leading to new ideas and start-ups

7.5 Implementation

Tab. 12 Action plan for NBE for natural playgrounds and open gardens

Name of nature-based solution	Action to be undertaken relating NBE	Responsible person	Timeframe for implementation
Natural playgrounds	Awareness actions	CN team	Ongoing process
Natural playgrounds	Identification of potential NBE	CN team	September 2019- July 2020
Natural playgrounds	Plan of measuring impact of NBE (indicators)	CN team	September 2019 July 2021
Natural playgrounds	Contact with Business Activity and Agriculture Department	CN team	November 2019
Natural playgrounds	Direct contact with NBE with aim to start new activities and invite for Expo 2020	CN team	September 2019 - July 2020
Open gardens	Awareness actions	CN team	Ongoing process
Open gardens	Identification of potential NBE	CN team	September 2019- July 2020
Open gardens	Plan of measuring impact of NBE (indicators)	CN team	September 2019 July 2021
Open gardens	Contact with Business Activity and Agriculture Department	CN team	November 2019
Open gardens	Direct contact with NBE with aim to start new activities	CN team	September 2019 - July 2020

Source: Agnieszka Osipiuk

7.6 Reflections: opportunities and barriers

The Strategy for nature-based entrepreneurship at this moment is focused on the barriers and enablers to start-up and grow nature-based entrepreneurship, as well to identify the impact indicators which could be used to set performance targets for the strategy.

The main barriers identified were lack of critical mass to sustain SMEs and lack of awareness/demand for nature-based solutions, e.g. Poznan identified resistance from the 'car' lobby, which could potentially reduce demand for nature-based solutions in the future. Another important barrier is the lack of specific support for nature-based entrepreneurship/social enterprises. The principal enablers identified were eco-education and awareness related to a wider challenge identified in Poznan related to the 'branding of nature-based solution'. Public procurement was also identified as an enabler along with incentives. Cooperation with department understanding of economic potential of nature-based solutions would be crucial enabler for external and internal activities promoting NBE.

8. Reflexive learning outcomes of implementing the nature-based solutions framework

Reflexive monitoring is a dynamic process for facilitating the interrelated processes of learning-by-doing and doing-by-learning in real time. This process stimulates learning amongst the different actors involved in the implementation of nature-based solutions and the design and adjustment of actions targeted towards addressing barriers and opportunities for the successful implementation and stewardship of nature-based solutions. This chapter presents how the Poznan-team monitors and evaluates the implementation of their nature-based solution exemplar and present the reflexive learning outcomes of implementing the nature-based solutions framework.

8.1 Set-up and positioning of reflexive monitoring for the co-production and scaling of nature-based solutions

The notion of reflexive monitoring (RM) was a new method for our team. We are working in Poznań City Hall, in the Project Coordination and Urban Regeneration Office. As a small unit (6 persons) we usually have internal meetings and so-called "brainstorms". We analyse problems and difficulties in different aspects of our regular work, we plan our tasks, discuss ideas, but we don't use any tools to monitor the effect of these meetings and reflect upon these effects. Participation in the CONNECTING Nature project was the first occasion to use reflexive monitoring in our work.

Organization of reflexive monitoring activities

At the beginning of the reflexive monitoring activities in Poznań, the overall responsibility was delegated to one person: our reflexive monitor who is the project officer responsible for the coordination of the international level of the CONNECTING Nature project. She prepared an overall timeline of all important events for reflexive monitoring related to the implementation of our nature-based solutions. She introduced the CONNECTING Nature project team (Agnieszka Dziubała, Agnieszka Osipiuk and Natalia Madajczyk) with a method for tracking these events called bullet journaling. She prepared a timeline (calendar) of different project-related activities that influenced our work for each month.

During the regular meetings of our Unit (6 persons, not all of them involved specifically in CONNECTING Nature project but working on issues linked with nature-based solutions) we used the overview created by the reflexive monitoring tools described above to structure our team meeting. These regular team meetings were a necessary source of information for further discussion between the project officer and the head of unit.

After these team meetings our reflexive monitor organised a meeting with our CONNECTING Nature project team (Agnieszka Dziubała, Agnieszka Osipiuk and Natalia Madajczyk) to discuss the important moments in time and describe them into our dynamic learning agenda (DLA). This includes describing the critical turning points (CTP) that brought about change in how we handle with certain situation for instance in our communication with other actors or in the way we collaborate internally and externally or in how we think of the actions we need to take. Last, our team formulates learning questions (LQ) and define follow-up actions (FUA).

During the monthly calls with the DRIFT-team we received feedback on how to formulate our critical turning points and learning questions to enhance their reflexivity. After several months – once we understood what the purpose is of reflexive monitoring, we decided to divide the tasks between the project officer who took up the role of monitor initially and the head of unit. The project officer decided to keep the responsibility of preparing a monthly timeline and “collecting” our bullet journals. The head of unit took over the preparation and update of the DLAs, as it was especially useful for her, as head of unit, to have the overall perspective of the project and to see how its links with other unit activities. This approach enabled to formulate more operational follow-up actions, focus on interrelations between them and plan actions on different project activities more effectively.

In the upcoming months we will continue with monthly CONNECTING Nature project team meetings (Agnieszka Dziubała, Agnieszka Osipiuk and Natalia Madajczyk) as the basis for the reflexive monitoring of our activities.

The reflexive monitoring process for our exemplar consists out of the following key elements:

1. The identification of main events (**critical turning points**) that influence (positively and/or negatively) our work within the project.

2. The analysis of the background of these events and questioning how to benefit from certain opportunities to enhance upscaling of our nature-based solution or how to overcome actual and future difficulties. This analysis is captured in the form of **learning questions** and concrete **follow-up actions** to address those.
3. The formulation of a “diary”, or so-called **dynamic learning agenda**, of our project, consisting of the critical turning points, learning questions and follow-up actions. The dynamic learning agenda captures our learning process and hence enables us to, for example, maintain the focus on certain key topics that might be forgotten once we go ahead with our daily work.
4. The monitoring of developments of our work during the team meetings and our own activities.
5. The coaching sessions with the DRIFT-team were we discuss our dynamic learning agenda to enhance the reflexivity of the topics described.
6. The learning experience webinar were we evaluate the reflexive monitoring method with the other front-runner cities and share our learning insights.

Tab. 13 Example from dynamic learning agenda

Critical turning points	Learning questions	Follow up actions	Status
<i>Meeting and discussion with specialist who is in charge of green solutions in preschools - natural playgrounds in preschools using natural and green elements</i> <u>(30.10.2018)</u>	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)	completed - informational meeting in February (14/02/2019)
		Organising set of consultation meetings of kindergartens 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-school gardens? How to properly work out a well-functioning financial model?	Developing appropriate financial support tools with the help of experts/ professionals	ongoing - analysis
	How to find other sources of financing for individual activities?	Diagnosis of other sources of financing in the city that can be	ongoing - analysis

		allocated to the development of NBS in Poznań	
	How to maintain the willingness of various stakeholders to cooperate: Departments, companies, contractors and preschools (directors, children and parents)?	Initiate meetings (formal and informal), discuss, share ideas, organize workshops	ongoing - analysis

Source: Natalia Madajczyk

Overview and explanation of the reflexive monitoring tools used in CONNECTING Nature with comments from the City of Poznań CONNECTING Nature team.

Tab. 14 Methods and explanation of the reflexive monitoring tools

Method	Description how tools were used and experienced
Timeline of events - <i>A monthly overview of main events that influenced the exemplar (e.g. via bullet journaling).</i>	We used this to “memorize” our work. It is a useful tool to sum up past months and see how much we had done. It is also useful when several people from our team add their activities and we can see the complexity of our separate tasks that complement each other.
Critical turning points - <i>Important moments in time (e.g. challenges, positive outcomes, negative experiences) for the FRC-team because at these moments something changed in the process that helped or hindered to achieve the exemplar goals.</i>	During the month there are events that at once might not appear a CTP. Only when we analysed them afterwards we can see that for example one small meeting had a very important influence on further steps of implementation. However - it is not an easy task to identify the actual meaning of each event of our work, so team analysis helps.
Timeline workshop - <i>A tool to facilitate the monthly meetings of the FRC-teams to analyse the timeline of events and abstract challenges, successes and learning experiences and agree on critical turning points.</i>	Timeline workshops were a useful exercise to see how the subsequent events (CTP) of our project implementation process are intertwined, how they might complement each other or to formulate future steps.
Dynamic learning agenda (DLA) - <i>A brief document to encourage participants to continue working on change. It contains the challenges that the project is facing at that moment summarised in learning questions. It is used as a tool for commencing and supporting the dialogue about the challenges faced by</i>	The DLA was not an easy tool for us from the very beginning. Working with an Excel document and analysing separate questions might sometimes feel too time-consuming. It requires a certain discipline and focus on the substance of the problem which is not easy when you have a lot of operational work and administrative burden is huge. However, we learnt how to do it. It is a good idea to monitor project activities and

<i>the project. The agenda is dynamic because it is modified over the course of the project.</i>	see the links between certain actions – this may make our work more efficient.
Eye-opener workshop - <i>The eye-opener workshop is an additional tool for turning outsiders into project insiders. The experiences and results of the project are shared and participants then reflect on the events, each from their own perspective to extract the lessons from the project experiences that are significant for their own situations.</i>	Up till now we have not organized an eye-opener workshop. However, we can see that the need for organizing such event for our colleagues from different municipal units becomes more and more urgent. During our work we identified many “allies” within our organization whose work, experience and budget might enhance the up scaling process of NBS in Poznań. Such event could be an unofficial and NBS – focused opening of working cooperation. Therefore we plan to organise this workshop after the summer 2019.
Learning History Narratives - <i>Narratives written by the FRC-team members that summarises the learning journeys in a short story. This captures the ‘personal’ history of the project which most of the times is lost, because it is not captured in scientific publications or management reports.</i>	As the city hall administration employees we are not used to write down “personal” histories of our work. Of course we do talk about it with our colleagues but writing it down was a new practice. It is like a diary but as other people read it – it’s not easy to express some personal opinions.

Source: DRIFT and Natalia Madajczyk

8.2 Lessons learned from reflexive monitoring in the first half year

For all critical turning point recorded between September 2018 and December 2018 we defined our lessons learned. Below you will find them described shortly with personal commentary.

The closure of temporary summer garden at Wilda district in Poznań (evaluation of its functioning).

During summer holidays 2018 we created a temporary summer garden by the Wilda river beach. All activities programmed by the contractor in her offer (workshops for interested citizens) were conducted without any default. However, we envisaged some difficulties linked with management of the place by the contractor and unclear rules concerning operational issues, which in result put a lot of work burden on our team.

In this particular aspect the temporary summer garden project was not successful, because of not having communicated clear roles and responsibilities concerning management and operational issues (water supply etc). Even though we had the contract signed it appeared that the process was prepared too fast and we lacked co-preparation with the contractor. Another key learning was that once such project is planned it is necessary to engage neighbouring initiatives from the very beginning to create links and explain reciprocal expectations and obligations.

Meeting with private company – creating a new garden in Poznań (new opportunity for innovative cooperation).

The purpose of the meeting was to discuss the potential development of the yard at the back of the office building of the private company. This concerns an internal courtyard between the office building and neighbouring municipal tenement houses.

The lesson learnt was that opportunities for practicing co-creation process can also derive from private companies. Before – as the City Hall we only cooperated with public / non-profit organizations. This calls for creation of different co-production models or tools which is a challenge but also innovation and is included as follow-up action for 2019.

Setting regular cooperation with landscape architect specialized in designing of nature-oriented playgrounds – meeting and discussion with specialist who is in charge of green solutions in preschools (natural playgrounds in preschools using natural and green elements).

The meeting was a starting point of planning the implementation of Poznań Connecting Nature exemplars nature-oriented playgrounds in kindergartens. We discussed the organizational and procedural issues but also designed the entire programme. Investments designed by the architect along the idea of natural playgrounds are financed by the Department of Education from its investments budget. The process is accompanied by educational activities – organization of local seminar on the topic addressed to Poznań kindergarten teachers, further organization of series of interactive workshops and designing and installing in kindergartens series of eco-educational demonstrators that are the best way of educating and entertaining children.

We learned that one activity can be complemented with others that create complex programme. Such approach enables us to implement more effective instruments that not only refurbish playgrounds but brings also “intangible” results as raising awareness and educating both older and younger citizens of Poznań. It is crucial to take such approach to ensure effectiveness and long-term change from grey and plastic playgrounds to green playgrounds that are co-produced locally and enable ecological education of children and their carers.

Organizing and participation in local conference entitled “Education for the public space” and discussion about natural playgrounds in preschools (13-14 November 2018).

Participation in the conference shown us that promoting good practices really bring change. We presented the 3 kindergartens that refurbished their playgrounds along with the idea of nature-oriented design and provided the audience with examples of micro-installations for eco – education of children.

We were prepared to be able to answer their questions on safety issues so that this would not take away the attention from the added value of the playgrounds. The conference has been a great way of promoting the idea among the people who are in charge of kindergartens. The reactions of directors of these educational units and their interest were very positive and we could also plan specific workshops for selected kindergartens and the follow-up action in 2019.

Successful finalizing the project of designing and installing the eco-demonstrators in 10 selected preschools in Poznań and planning next edition of the project for 2019.

Implementation of micro-installations (eco-demonstrators) aims at support the development of pre-school gardens, equipping gardens in "green and natural" elements and promotion of ecology among pre-schoolers. In 2018, the equipment was completed in 10 selected kindergartens of Poznań.

Our lesson learn was that even small changes – like installing equipment that present in a simple way how nature works might be a very attractive way of educating and entertaining children but also their teachers and parents. Again, we learned that education is a key for up-scaling NBS in the city – we decided to continue this project in 2020 and (after evaluation) combined it with the investments in natural playgrounds.

Workshops in Rotterdam – discussion with Siobhan Mc Quaid (Trinity College Dublin) about connecting our exemplars with business opportunities.

We had a brief but fruitful discussion about plans how we can connect the project of open gardens and micro-installations in preschools with business opportunities. This was first talking about what we will discuss during our next workshop in Poznań, which will be held on 13-14th December. The discussion about Nature-Based Enterprises was crucial for us to “get a grip” on what these enterprises are.

Before we rarely thought that our activities linked with kindergartens might be an opportunity for business and entrepreneurship. It seems that when implementing projects financed with public budget we may stimulate commercial activities and it should be taken in consideration as part of each project at the planning and monitoring stage.

Organizing and participating in workshop in Poznań – implementation planning and capacity building workshop (Trinity College Dublin, University of East London, Adam Mickiewicz University and City of Poznań)

On 13th and 14th December the city of Poznań together with teams from Trinity College Dublin, University of East London and Adam Mickiewicz University, organized a workshop concerning implementation planning and capacity building in the city.

The lesson learnt was that it is very useful to engage colleagues from other cities and universities to analyse local situations. Very often we lose wider perspective of our local scope

when we concentrate on it too much. The workshops were very intense but enabled us to understand the complexity of nature-based solutions in our city.

8.3 Personal learning from applying reflexive monitoring methodology

Reflexive monitoring was a new methodology for us – that is why at the beginning we perceived it more as a new, additional exercise in the frame of the CONNECTING Nature project and not as a tool to improve our work in terms of planning project local activities. That is why our dynamic learning agenda and the follow-up actions were more general and long-term – and in consequence less „actionable“. During the first year we worked with the method we started to realize the benefits for our work and in the collaboration with our colleagues, other departments and other actors in the city. Both difficulties and benefits deriving from the method are described below.

Difficulties:

It was difficult follow the discipline of regular reflexive monitoring meetings for us as the entire project team – even though we have regular team meetings and we discuss project actions. As we have a lot of administrative work with implementation of our daily project tasks it seemed that analysing it with reflexive monitoring method is more a burden than a benefit sometimes.

As we included more general points to our dynamic learning agenda sometimes it was hard to set actionable follow-up actions and we didn't see any progress month after month. Sometimes we decide to quit or erase such a critical turning point. We discovered that realizing this is also valuable since we realized it was not a critical turning point.

One of our activities was not successful (temporary summer garden). For us this was quite hard to admit that there was a failure in our work. However, when we analysed the process and identified the reasons for failure which made it much easier to explain and by reflecting upon this we were able to draw good lessons for our future activities.

Sometimes it is difficult to present developments because some activities in our institution – due to its quite strict administrative structure – take much longer than it would for the private organisation. Realizing this is an aspect of our organisational environment makes it easier to deal with. This method allows us to explicate when this is hindering the implementation of our nature-based solutions and start searching for a solution.

Benefits:

Certainly reflexive monitoring proved to be useful especially from the point of view of project coordinator, who has an overview of the work of our unit and knowledge on activities of other departments. Using reflexive monitoring is a useful tool to manage projects, analyse gaps and identify resources and activities to fill them. It gives a strategic overview of the situation in our organisation that reflects the context of implementing a nature-based exemplar as part of the CONNECTING Nature project and attaining its goals through external activities that are

implemented by other city units. Even if they are not participating in the CONNECTING Nature project still their activities can support upscaling. This approach also enables us to define more actionable follow-up actions after we experience a breakthrough in a specific situation.

For us now the reflexivity helps to see the broader picture of nature-based solution activities in our City Hall structures. At the beginning of the project we felt a bit “alone” as it was not easy to define what nature-based solution is. Now, when we ask questions it is easier to formulate actions and identify actions linked with nature-based solutions (or those than can be “completed” with nature-based solutions) in other units. The reflexive monitoring scheme gives broader picture both for the topic of nature-based solutions and the scope of the organisation.

Example:

The Department of Education manages municipal budget money earmarked by the Poznań City Council for investments in kindergartens (multiannual programme 2016 – 2020, 10 kindergartens playgrounds modernized per year). This is the money for investment that we can “leverage” with the money of CONNECTING Nature project as we offered to finance the “nature-oriented” spatial design for each kindergarten that decide to enter our scheme. We provide them also with the set of eco-demonstrators to educate children on how the nature works. This is how we fulfil the CONNECTING Nature goal of up-scaling with regular activities of another department.

The reflexive monitoring was not the direct “tool” that established our cross-departmental collaboration but it helped to define it as one of our main CONNECTING Nature opportunities for nature-based solutions up-scaling. We are now treating the commencement of collaboration as a critical turning point and develop it.

It is also easier to “remember” about 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. By working with the reflexive monitoring tools it was easier to come back to them once you analyse the entire process. This way it makes it easier to prioritise which actions are needed to be taken to help the scaling of nature-based solutions.

8.4 Reflexive learning outcomes

The first year of applying the reflexive monitoring methodology in Poznań has resulted in different reflexive learning outcomes. These learning outcomes are reflexive since they reflect changes between the context and the initiative with regards to one or more of the following categories:

- a. Rules (e.g. official procedures, policy documents, policy processes, political context, regulation/legislation etc.)
- b. Relations (e.g. colleagues, stakeholders, market parties, local initiatives, NGOs, communities, local/regional/national institutions, between initiative and context)
- c. Social practices (e.g. how people speak about the project, events organised, changing perspectives on exemplar)
- d. Discourse (e.g. how people think/write about the project, agenda setting, mayor support)

Below a list of learning outcomes is provided with an indication of the category of reflexivity change to which they belong.

- *Relations*: When local nature-based solutions are being implemented the roles and responsibilities have to be clearly described and discussed with the actors involved.
- *Relations & Practices*: It is a new practice for our team (and the Poznań municipality in general) to collaborate with a private partner in the projects of revitalisation of the communal space. This is the neglected space located by one of the old communal houses near the company's seat. It was a nice surprise because usually we base our co-creation projects on cooperation between public institutions and local citizens and we focus on public financing. Such model showed us that when looking for involvement of "sponsors" it is possible. This might be a very positive example and approach that is also applicable in other projects. It also shows how to create relations between different partners.
- *Relations*: By the new relation with the Department of Education it became possible to finance the natural playgrounds. They influenced the policy of the department of education to implement nature-based solutions. Normally the department of education not involved with NBS-type of projects, they try to influence the department to also set-up these type of NBS projects in the future and embed an ecological focus in their practice.
- *Practices*: By working with an experienced contractor they pushed the pre-school natural playgrounds experiment further and this helps for further upscaling this nature-based playgrounds. We see this as an effective strategy departing from traditional ways of doing.
- *Practices*: The organisation of a local conference is not a normal thing to do for reaching the goal of informing teachers and managers about the benefits of the natural playground. By asking the designers to do this workshop the CONNECTING Nature team developed a novel way of working and since this was effective it can be used in other cases as well. This resulted in building relations with experts, gaining insights in what is important for these schools. We recognised the importance of organising this session because it will be leading to successful adoption of nature-based solutions.

- *Relations*: Because of the conference we presented the idea for the natural playground we deepened the knowledge about the safety of the nature-based playgrounds. We did so by bringing in an expert we now contact more regularly for safety issues. We knew that the issue of safety would be one of the main concerns of kindergartens' managers when it comes to natural playgrounds. Should we neglect this issue, we could lose the "natural playgrounds enthusiasts". This was a successful step – we noticed that anticipating partner's fears and proposing solutions based on experiences of their counterparts is a very effective way to convince them to follow our nature-based solution idea.
- *Relations*: Following the decision of the Department of Education that selects preschools for modernisation (10 per year), as we could not influence their selection, we decided to convince the managers to follow our natural playgrounds scheme offered in the frame of the CONNECTING Nature project. We organised dedicated workshops on natural playgrounds idea. By organising them new relations were formed (between managers of different preschools, with the designer dedicated to this scheme, with our team) – which is beneficial for planning of the next edition of the project for 2020 (the contractor described how the eco-demonstrators work and described the functioning of the installations).
- *Rules*: Proposal for Adam Mickiewicz University to create catalogue of nature-based solutions in designing of preschool playgrounds and enhancing environmental aspects of solutions used by architects and constructors. It taught us that many "regular" actions that we take as the City Hall may strengthen their appeal when completed by the scientific background.

Summary

The CONNECTING Nature project, funded by the Horizon 2020 Research and Innovation Programme of the European Union, is realized by the team from Project Coordination and Urban Regeneration Office of the Poznań City Hall. This project opens up opportunities for cities to implement nature-based solutions – small-scale interventions as well as large-scale nature-based solutions, which affect positive changes in the urban environment.

This CONNECTING Nature Framework document is to be a description of the activities that we implement in the Poznań to meet the challenges that appear in every European city. It is a document in which we described our current knowledge and experience in implementing innovative nature-based solutions. We would like to show what our organizational structure looks like and the resulting cooperation with other entities both within the office structure and with external entities, how the process of co-creation affected our project work, what we started to pay attention to when implementing our activities, what challenges and barriers we need to overcome to ensure that we are able to push through the activities in Poznań. It is not always easy. We would like this document to be an inspiration for our addressees, colleagues from Polish and foreign cities, all interested in our work and the CONNECTING Nature project.

Here we would like to point out that the document presents the current state of our activities and processes taking place in the Poznań. Our city is very dynamic. Many things is changing, new phenomena, processes and models are appearing. At the moment, we know that next year the structure of finance in the city is going to change, our budget for future activities will be lower compared to previous years. It will certainly affect the decisions we will make next year 2020. This document can "evolve and live" depending on changing conditions, both organizational and financial, as well as legal and administrative.

Nevertheless, we are very happy that we can participate actively in CN project and that we have the opportunity to share our knowledge and experience with other partners.