

**Bernard van Leer Foundation Project:  
The effect of nature on early childhood development**

A study of the effects of exposure to nature on the development of young children and  
their caregivers

**Involve Consultancy Project 2021**

**Abstract**

In times of growing urbanization, current generations of children spend significantly less time playing outside compared to former generations. Existing literature suggests that this lack of contact with nature contributes to rising mental and physical issues in the short- as well as the long-term individual development. As part of the Urban95 initiative of the Bernard van Leer Foundation, we processed existing literature on the effects of contact with nature on children aged 0-5 as well as their caregivers' well-being. Deriving from that, three experimental case studies were implemented (community gardens, Leefstraten, animal farms) in the Netherlands to further study the effects of those nature-based interventions on toddlers and their caretakers. In general, the results confirm the positive effects of nature on physical and mental well-being found in the existing literature. This paper provides entry points for further nature-based interventions in the Netherlands, Israel and Brazil in order to improve the health of the urban population by an extensive stakeholder mapping and providing background information on specific challenges in these countries.

Key words:

*Early Childhood Development, Green space, Nature-based interventions, Policy Evaluation, Stakeholder Analysis, Urbanization, Well-being*



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# 1 Introduction

Several decades ago, children spent most of their childhood outside, playing and exploring the world. However, nowadays cities offer little space for children to do so. The current generation of children is playing outside for just over four hours a week, compared to 8.2 hours their parents did when they were younger (The Guardian, 2016). In cities, large buildings and parking lots have taken up the valuable space that once belonged to parks and nature. However, we need those green spaces around us as it has been scientifically proven that contact with nature is incredibly important for children's development. A lack of contact with nature might eventually contribute to both mental and physical problems. Furthermore, children can learn about the world and themselves when interacting with nature. Therefore, it is important that nature is reintroduced to urban life in order to ensure a safe, fair and healthy childhood for children all across the world.

The Bernard van Leer Foundation is committed to improving the health and well-being of babies, toddlers and their caregivers. Their Urban95 initiative is focused on making cities more liveable for young children. By collaborating with city planners, urban designers and other urbanists, Urban95 shows the impact their work has on early child development. One of the important aims of the Urban95 initiative is introducing more nature into the urban areas, in order to improve childhood development.

The Involve Consultancy project will focus on the effects of nature on the development of children between the ages of 0-5, as well as their caregivers' well-being. In addition to this, this research will discover different ways on how nature can be incorporated more in urban areas and which initiatives work best for children.

Main research question of the report is:

*“To what extent does nature affect early childhood development and caregiver well-being, and how can we measure its impact?”*

This report is structured as follows. In the first section we will answer the following sub-question: “Which current literature describes the effectiveness and impact

of nature and environment on early development of children and caregiver well-being?”. This section will be divided into a part that focuses on health and well-being, and a part that focuses on sociocultural and generational phenomena. Hereafter, the second sub-question, “What models and initiatives have been implemented regarding the topic over the last years, and how has their impact on early childhood development been measured?” will be researched. Nature-based interventions as well as methods, metrics and models that will be used for the case studies will be addressed in this part. After this, we will provide an overview of the country-specific contexts of the Netherlands, Israel, and Brazil. Herewith, we will give an answer to the following question: “Does current decision-making regarding policy deployment and financial investments allow room for nature-based interventions at an urban scale?”. Furthermore, for all three aforementioned countries, the policies and stakeholders are mapped and discussed. A comparison between the three countries will be made and transformed into recommendations. With this, we will answer the following question: “Which parties and/or stakeholders are currently involved in the intersection of early childhood and nature?”. At last, the final sub-question “How (potentially) successful are the interventions and the examined case studies?” is researched. Three case studies are taken into account, namely the Leefstraten, animal farms and community gardens to investigate the effect of nature on childhood development in these specific cases. They are described in-depth, the conclusions are presented and further recommendations are provided as well.

# **2 Effects of Nature on Early Childhood Development**

## **2.1 Health and well-being**

It has been proven repeatedly that exposure to nature is associated with both improved physical (e.g., Rook, 2013; Schalwijk et al., 2013; Lopes et al., 2012) and mental (e.g., Schmitz, 2012; Richardson et al., 2017; Lee and Jin, 2018) health. This section will discuss current literature and its most important findings on the effect of nature on both physical and mental well-being. It is important to note that the research is focused on nature in urban areas. Nature will often be referred to as green space, this can be any area of nature such as a park or garden. Furthermore, the research will mainly focus on young children aged zero to five and will address some effects for their caregivers as well.

### **2.1.1. Immune System**

Firstly, we turn towards an important aspect of physical health, namely the immune system. Rook (2013) has found important findings regarding nature and the immune system development of young children. He reasons that children benefit from coming into contact with nature early on, as children develop a better functioning immune system when they are exposed to a greater variety of microbiota. As a result, their immune systems are more adept at distinguishing dangerous molecules from safe ones. This outcome can be reinforced with similar results found for Finnish children by the research of Ruokolainen et al. (2015). They added that the biodiversity of nature is of importance in developing a well-functioning immune system. In conclusion, based on both studies, one should consider using different types of vegetation when developing green space for children, to allow young children to come into contact with a greater variety of microbes

### **2.1.2. BMI**

The weight of children is an important factor in their overall health. Therefore, it is interesting to research the effect of nature on the weight of children aged between zero and five years old. Schalkwijk et al. (2018) found that lack of green space or access to a garden increases the chance that young children are overweight and/or develop obesity later on in their childhood. This research was conducted in the United Kingdom and makes an interesting conclusion on the difference between children raised in higher educated families versus children raised in lower educated families. The research finds that for children with higher educated parents, space to run or play suffices, whereas the availability of green space only affects children with lower educated parents.

This conclusion is in stark contrast with the findings of the Canadian research done by Potestio et al. (2009). They stated that the availability of nature and green space has no significant positive effect on the weight of young children aged, on average, five years old. Multiple potential reasons for this conclusion are carried out by them as well. First of all, they state that the cold climate could play a role. The authors reason that for a significant part of the year it is too cold for children to benefit from the green spaces around their home. Therefore, green spaces are near-empty and unused during winter. The second reason the researchers carry forward is that Calgary is a car-based society, meaning that the city is not liveable without the ownership of a car. This can result in families visiting parks less often as it takes more time and energy to get there.

We can conclude that climate and the overall urban context are important in determining the effect of nature on the prevention of overweight/obesity in young children. Developing green space in cities that have cold winters might not be beneficial and could potentially be considered a waste when it comes to attracting young children. However, due to the relatively warm winters in Israel, the conclusion regarding climate will be less relevant. The conclusion regarding the overall urban context might be more relevant for Israel, and further research needs to be carried to make a conclusion about this claim.

We examined the effect of nature on the BMI of caregivers as well. There is not much literature on caregivers or parents specifically, yet there is extensive literature on

the BMI of adults. In line with the outcomes of the research of Potestio et al. (2009), research done by Cummins et al. (2012) and Mowafi et al. (2012) both found no evidence for fewer overweight adults who live in greener areas for adults living in England and Egypt respectively.

### **2.1.3. Motor Ability**

Subsequently, we are interested in the effect of nature on children's motor ability. There is little literature related to this subject, an interesting link with BMI is however found. Many of the aforementioned researchers discovered that there was a positive link between the accessibility and availability of green space and the weight of children. Lopes et al. (2012) found that there is a negative correlation between a high BMI and the motor ability of young children. Although this is not a direct effect of nature on motor ability, it shows that less green space indirectly impacts the development of motor ability in young children. The research also showed that the motor ability of young children was the worst for the most overweight children.

A positive, direct effect of nature on the motor ability of children is found by the research of Fjortoft (2001). Children who play in a natural environment develop better balance and coordination abilities. With this outcome, Fjortoft adds credibility to his previous research conducted in Norway.

### **2.1.4. Mental Disorders**

Mental disorders are a relatively trending topic nowadays which is gaining more attention as it becomes more debatable in society as well. Researching mental disorders starting at young ages is therefore quite interesting and a lot can be learned from it with regards to prevention by, for instance, more interaction with nature.

That mental disorders are relatively common for young children is proven by the study of Klitzing et al. (2015). They revealed that mental disorders are prevalent in about 17% of all children in early childhood up to six years. Therein, 7% constitute emotional and motor regulation disorders, 25% in feeding problems, whereby 2% can be diagnosed

as having a feeding disorder. Moreover, 1% of the children show a serious mental illness. Thereby, children in situations of increased risk (e.g. foster homes) are more often to be found having these serious mental illnesses. Furthermore, among preschool children from the age of three to six, Attention Deficit Hyperactivity Disorder (ADHD) is developed by 1.5% of children. In addition, affective disorders such as depressive mood, anxiety, or rage are already found in 18-month-old and pre-school children, while the diagnoses of depressive disorders even increase with age.

These numbers and the fact that most of these mental disorders persist into adulthood, consequently lead to the question of how to effectively treat these disorders. One approach is given by Schmitz (2012) considering the nature-deficit disorder found to be growing within children over the last decades (Louv, 2008). The nature-deficit disorder is described as a “diminished use of the senses, attention difficulties, and higher rates of physical and emotional illnesses” (Schmitz, 2012). This missing nature connectedness due to the lack of parks and open green space for people living in cities is reflected in high rates of depression and further mental health problems. This may consequently be expressed in higher crime rates.

Although the nature-deficit disorder is not represented as an official medical diagnosis, scientific research shows that direct exposure to nature is improving physical and emotional health (Schmitz, 2012). Especially in the treatment of ADHD, children who undergo activities in natural settings demonstrate reduced symptoms than those doing similar activities indoors (Kuo and Taylor 2004).

### **2.1.5. Emotional well-being**

It has been found that roughly one-third of children of preschool age have behavioural or emotional difficulties (Costello et al., 2004). One way to improve these emotional difficulties could be exposure to nature. After all, playing outside promotes physical activity, which has been linked to improved mental health (Wells, 2000). Furthermore, children might be affected by their caregivers, who seem to be happier when they have more access to nature (Houlden et al., 2018). In this section we will examine current literature on the association between access to green space, and emotional well-being of children and their caregivers.

Self-regulation in children is their ability to understand and manage their behaviour and feelings regarding things happening around them, and it may impact their emotional problems.

Several studies have examined the relation between emotional difficulties and nature for children. Emotional difficulties were measured with the Strengths and Difficulties Questionnaire (Goodman, 1997). The emotional difficulties for children included: complaining about sickness, worrying, unhappiness, nervousness or clinginess in new situations and being easily scared. Richardson et al. (2017) found that in children aged between four and six, the change in emotional problems over time did not seem to be associated with the presence of parks or total natural space, which led the authors to believe that any beneficial influence of these green spaces had already occurred by age four. Overall, this study indicates that green space has a rather small effect on emotional outcomes for four to six years old.

While this study controlled for the educational level of the mother, Flouri, Midouhas and Joshi (2014) included other factors such as neighbourhood disadvantage, family poverty and adverse life events. It was found that while neighbourhood green space was often unrelated to child adjustment, children from poor families with more green space in their neighbourhood had fewer emotional problems from ages three to five than poor children in a neighbourhood with little green space. They conclude that green space in a neighbourhood might be able to support emotional well-being in the early childhood of children with a poor urban background.

Overall, it might be extra beneficial to develop green space in less affluent neighbourhoods since the children living there benefit the most. Moreover, there should be focus on making the green space suitable for kids under four years old.

Regarding the effect of nature on the emotional well-being of the caregivers, Houlden et al. (2018) claims that the majority of current literature finds an association between green space and hedonic well-being, meaning happiness and satisfaction with life. Their results indicated that having green space in an urban area is associated with higher life satisfaction. However, for this life satisfaction it does not matter which type of green space it is or how many times a week a person visits it. Gascon et al. (2015) found

the same results for adults, but they were unable to find that same correlation for children.

### **2.1.6. Intelligence**

Since research suggests that a huge amount of an individual's personality, which is relatively stable over a lifetime, is formed in early childhood, this is the phase to grow young children into contributors to a healthy society (Lee & Jin, 2018). During this time, "children build peer relations and develop psychological stability and self-esteem, forming a positive self-concept, while also obtaining social skills necessary for them to grow into sound members of the society" (Lee & Jin, 2018).

In order to successfully develop these skills and build healthy relationships with other people, a major ability to be developed is emotional intelligence (EI). EI is used to empathetically "understand one's own or other's feelings and emotions and adequately use them in thinking and actions and is a sub-factor of social intelligence" (Lee & Jin, 2018). Thereby, EI helps children's development since they have higher control over their emotional state and properly react to peers' thinking and actions to build and maintain relationships. Lee and Jin (2018) examined the effects of activities in forests on the EI and playfulness of children aged three to five. During a period of six months, the children carried out free plays, five-sense and physical activities, while the behavioural changes were observed. The authors conclude from the results that by being active in nature, the EI of the children significantly increased. This is reflected by a better differentiation between their children's own and others' emotions.

### **2.1.7. Pollution**

A rising problem in urban areas is pollution, whether it is air or noise pollution, and one of the main causes is the amount of traffic (Goyal et al., 2006). Due to the abundance of cars in cities the air quality deteriorates, leading to respiratory problems, and the amount of noise increases, affecting both physical and mental well-being of people. In this section, we will discuss the effect of noise and air pollution on the physical and mental health of young children in urban areas.

### Noise Pollution

Noise is all around us, especially in urban areas. Think of traffic, industry and people in the streets. Noise pollution is an unwanted environmental sound that affects the health and well-being of a person (Goines and Hagler, 2007). It has been linked to several issues, such as: increased annoyance, lack of sleep and cognitive performance in both adults and children. Additionally, for adults, it has also been linked to increased blood pressure (Stansfeld and Matheson, 2003). In this section, we will be examining the role of noise pollution on the health of young children, aged zero to five.

One reason why children may be more affected by noise than adults is because they are exposed to it in a time of rapid growth and cognitive development. Previous studies indicate that exposure to noise can limit cognitive development in children, affecting their reading comprehension and long-term memory (Stansfeld and Clark, 2015). Furthermore, noise pollution has been linked to increased levels of annoyance in adults (Stansfeld and Matheson, 2003) and children (Van Kempen et al., 2009). Accordingly, children who go to kindergarten in areas with high levels of aircraft- and/or traffic noise were observed to have higher levels of annoyance.

While noise pollution has been associated with poorer mental health and well-being, there have also been connections to physical health. Children who go to kindergarten in areas with a lot of traffic noise were observed to have higher blood pressure and a lower heart rate than children who went to kindergarten in quieter areas (Regecová and Kellerová, 1995). Loud traffic noise may also affect the sleeping pattern of children. Sleep disturbance has been proven to be a result of loud traffic (Gupta et al., 2018). A lack of sleep may affect the mood and behaviour of a child, but it has also been known to be linked to cardio-metabolic problems. Finally, while hearing loss might be one of the most obvious effects of too much noise, Stansfeld and Clark (2015) showed that environmental noise rarely affects the hearing of children. Hearing loss is more likely to be caused by leisure noise, such as listening to loud music.

In urban areas it is likely that there is a lot of environmental noise, due to traffic or a nearby airport. As discussed, noise pollution has negative effects on both mental and physical health in children (Stansfeld and Clark, 2015). Therefore, it is important to ensure that the noise in newly developed green space does not exceed a certain threshold.

This way, small children will not be hindered by noise in their development of the aforementioned EI and well-being

### *Air Pollution*

Researching the effect of exposure to air pollution on childhood development is an important topic nowadays. Braman (2006) showed that worldwide, around 300 million people had asthma in 2006. This number increases every ten years by 50%. Especially amongst children, a large increase occurred in the last 40 years. When being exposed to air pollution, different health effects might occur for children compared to adults. Children's lungs and immune systems are not yet fully developed, as they are only fully-grown around the age of eight years old (Shelledy & Peters, 2019). Also, children might spend a lot of time playing outside and thus get exposed to air pollution more regularly than adults.

Research by Schwartz (2004) focused on differences in the development of immune and respiratory systems between children and adults that could possibly lead to different consequences of being exposed to air pollution for children. According to this study, it is difficult to determine which pollutants increase the risk of causing chronic diseases and death for children, worse pregnancy outcomes and exacerbation of illnesses. The strongest associations were found with ozone and particles. For asthma, especially truck pollution was found to be harmful.

A Swedish study of Nordling et al. (2008) investigated the role of long-term exposure to air pollution for children in urban areas on their lung function, onset of airway diseases and allergic sensitization. The children were followed from two months old up until the age of four. An increase in persistent wheezing, allergic sensitization, especially to pollen, and a lower lung function at the age of four were associated with exposure to traffic-related air pollution in the first year of life. They concluded that the development of airway diseases and sensitization in preschool children may be influenced by exposure to local traffic-related air pollution in early childhood.

According to these studies, the impact found was mostly associated with asthma and some allergies. When children are older, asthma can be more readily diagnosed. This is in line with research of McConnell et al. (2010), who state that the effects of traffic-related pollutants among children under five years old can give a distorted result. Under

five, transient wheeze is difficult to distinguish from asthma. When children grow older, the relationship between pollutants and asthma becomes clearer. Since research on very young children might give distorted results, this literature research also includes children older than the original cohort of under five year-olds, or studies that investigate both in the Appendix A.2.1.

Concluding, it is good practice to not develop green space adjacent to, for instance, busy roads. Green space in the middle of a neighbourhood or in a less densely populated area is beneficial to the physical health of young children.

A limitation of many studies is that the data are gathered via questionnaires filled out by the parents of the children and no objective data from physicians were used.

## **2.2 Sociocultural and Generational Phenomena**

As discussed in the previous section, nature can have different effects on society at the individual level, from children to the elderly. However, people in groups have aggregate effects and therefore can be differently affected by nature or the other way around. This section will focus on the sociocultural effects of nature on different aggregate perspectives. It will also highlight how these effects can be affected intergenerationally. First, a broad overview of the effect of life in the city on nature is discussed, specifically the lifestyle of people, neighbourhoods and city planning. This is followed by investigating how nature affects the interaction between people and between people and nature. This will be examined in the context of contacts with animals/urban biodiversity, view of nature between different cultures, education about nature with children and outside leisure of children. The cultural differences regarding nature are described, as well as the neighbourhood differences in their access to waste-free environments, followed by the importance of city planning.

### **2.2.1. Urban nature**

With expanding urban populations everywhere in the world, nature cannot be taken for granted. Cities differ in how they have implemented elements of nature in people's everyday life. Nature is affected intergenerationally, therefore, conserving nature within these cities is important. Dunn, Gavin, Sanchez & Solomon (2006) state that

people with more exposure to nature are more willing to conserve nature. Thus, exposure to nature for future generations depends on the conservation of urban nature by current generations.

Living in the city has other effects on nature, and this nature can have effects on life in the city. According to Lyytimäki, Petersen, Normander & Bezák (2008) there are negative effects of nature as ecological processes can cause, for example, allergies and waste of leaves, which reduces mobility or recreational possibilities. Since the need for mobility in cities is increasing when doing activities or going to work in everyday life, city planners need to take into account how they implement nature in the city.

A research by Anguelovski (2014) finds that low-income neighbourhoods usually lack open-spaces, green areas and are more polluted than more affluent areas. Simple services such as street cleaning, access to open spaces and nature are reserved by the wealthier communities. This means having a pollution-free environment often depends on your socioeconomic status. As the environment is likely to influence the behaviour of people, there is reason to believe that this might be a potential source for crime and violence.

A degradation of the environment might have an adverse effect on the behaviour of communities and neighbourhoods. The crime rates and violence might be indeed explained, partly, by their polluted public spaces. However, it is unclear if reverse causality is present in this case. A study by Vagi, Stevens, Simon, Basile, Carter & Carter (2017) suggests the environment affects behaviour, not the other way around. The researchers found that the physical maintenance of school facilities had an effect on the violence level of students, after controlling for other differences. Poor facilities led to a more violent behaviour displayed by students. Another study by Keizer (2008) found an effect of the environment in people's behaviour by doing several randomized experiments. One of them found individuals were more prone to litter in an alley with graffiti, in comparison to the same alley without graffiti. Therefore, there is evidence that negative environments push people towards criminal behaviours, not the other way around.

Although it is still a debated topic, green spaces might help reduce crime. Frances Kuo and William Sullivan (2001) have found evidence that citizens living in greener urban areas report lower levels of fear and less violent and inappropriate behaviour. In this experiment, 98 apartment buildings in Chicago with different levels of nature were

compared. It was found that crime rates were around 50% lower in buildings exposed to more vegetation.

Another study in Oregon found trees in the public rights of way were associated with lower crime rates. However, they also found that higher, view-obstructing trees are associated with higher crime rates (Donovan and Prestemon, 2012). When implementing green spaces whilst having the objective of reducing crime rates in mind, attention must be drawn towards the type of vegetation as well as the type of crime since they might have different effects. Nature might have a positive or negative impact, depending on each specific case. No concise conclusions can be drawn yet.

City planning plays a major role in integrating nature into cities and through this, improving the liveability of cities in many different ways, both by improving individual well-being and social cohesion. For example, Sullivan et al. (2004) shows that the use of neighbourhood spaces is largely determined by the presence of nature in the form of trees and grass in public areas. The presence of a green space where people can gather thus promotes neighbourhood cohesion and interaction among residents. This adds to the understanding of the role city planning and including natural spaces has in creating vital neighbourhoods.

When it comes to the effects of urban nature on children, these depend on the type of nature that is present, to a certain extent. The types of nature mentioned above (grass and trees) affect individual well-being, but depending on the form of nature, can have different effects on children. Kahn & Weiss (2017) state that children growing up in urban areas have a lower baseline perception of nature, that is, they perceive parks and trees as 'all there is' to nature and do not have an accurate understanding of biodiversity. In the long run, this leads to environmental generational amnesia as this baseline is lowered with degrading 'wild nature' over the course of several generations. As has been discussed, interacting with nature is key to both the physical and psychological development of children, as well as mental and physical well-being throughout life. Exposure to wild nature at a young age can play a vital role in increased valuation of nature, which in turn leads to more appreciation for it later in life and heightens environmental awareness.

### **2.2.2. Cultivating appreciation of Nature**

Something that is not always mentioned when discussing urban green spaces is the fauna living in it. Due to the increasing level of urbanization, people began to have fewer contacts with wild animals, causing a detachment between humans and the willingness to coexist with other species. To explore the extent of this phenomenon, in 2007 a group of researchers conducted a questionnaire survey involving 1030 urban residents in Japan (Hosaka et al. 2017). The questionnaire assessed citizens' level of likeability towards 29 wild animals, and specifically how much they would have accepted the animals' presence within their neighbourhoods. Overall, respondents liked smaller mammals and birds, even some insects, but near their homes they would have accepted just birds and insects.

From the collected data it has been clear that the level of biodiversity acceptance of each person was greatly affected by his childhood experience with nature. The more interaction they had with wildlife in the past, the higher their willingness to coexist with it. This finding is particularly important for policy implementation purposes. In order to stimulate wider support for the conservation of biodiversity, cities should not only create protected areas for the species at risk, but also conceive green spaces which would allow for children's interaction with animals and plants. A proper orientation should be granted to encourage the use of these spaces while stimulating a proper amount of awareness about the ecosystem importance and its fragile equilibrium.

The extent to which people want to preserve nature and value it as an important part of their lives has a big cultural component. A case study on the Mexican indigenous tribe of Tarahumara by Salmón (2000) examines their view on nature and how native tribes view themselves as part of the whole, or kincentric ecology. The kin (or relatives) are all the natural elements of an ecosystem and the interactions that result from this view on nature preserve and enhance the ecosystem. This is mainly due to the awareness that life is only possible for humans if they regard the nature surrounding them as being on the same level as themselves. In turn, this leads to an inherent need to preserve the nature surrounding them and could be used as part of a nature education curriculum to improve environmental awareness.

In the western world, valuations and perceptions of nature also differ significantly per country, as shown in a case study by Priego, Breuste & Rojas (2008). Here, the authors compare the perceptions of people from different cultures and socioeconomic backgrounds in Spain, Chile and Germany on having a natural space such as a natural or urban park within reach. The study finds differences in perceptions of public versus private nature between the countries, or for example parks compared to backyards. Unlike previous studies have assumed, people of higher socioeconomic backgrounds do not value nature more than those of lower income groups. This research suggests that the type of natural spaces that are under consideration in urban planning might depend on the region, with different forms being optimal depending on the country.

### **2.2.3. Education**

Education plays a fundamental role for children as they are very receptive in their early years. Thus, teaching about nature might have a positive effect on children. Several papers try to find the effect of education on the perception of nature. Dunn, Gavin, Sanchez & Solomon (2006) state that “direct experience with nature, especially during childhood, appears to be the most important source of environmental sensitivity”. Hodson & Sander (2017) found a positive relationship between urban intensity, school reading performance and with tree cover. So, results demonstrate that urban nature is related to academic success. Fisman (2005) examined educational programs about urban environments in public schools and how it affected children’s awareness of their natural environment. She finds a positive effect of the program on children’s environmental awareness and finds that improvements in awareness were uncorrelated with socio-economic status of the children, however, appeared among children living in high socioeconomic neighbourhoods.

### **2.2.4. Leisure**

The importance of playful behaviour and outdoor activities is widely recognized as a pillar in children's development. Nevertheless, changes in our society keep pushing towards a disconnection from the natural world, diminishing the time spent outside and encouraging a sedentary lifestyle. In an attempt to change this trend, as of 2017, a project was started involving pupils in an early childhood education setting in Portugal. The aim

was getting an understanding on how to implement a transition from frequent indoor activities to a more common usage of the external environment (Bento and Dias, 2017).

During this project, three particular dimensions emerged, connected to outdoor play. First, the connection with the natural environment. The richness and diversity of nature provides babies with stimuli that are hardly replicable in a closed setting. Being fascinated by the surrounding outdoor environment and experiencing a sense of discovery within it, creates an emotional bond and a greater sense of affection towards nature. Studies have already demonstrated that if exposure to the natural environment happens from early childhood, it will make people more willing to conserve nature and take greater environmental action throughout life (Chawla, 1998).

A second factor is the importance of risk. In an outdoor setting, children always have the possibility of exceeding their limits by throwing themselves in different kinds of situations, like climbing a tree or using a tool. Even if protective, caregivers should try to understand these moments and provide the child with enough space and eventual support to experience failure and success by applying trial and error processes. This experiment and other studies (Stephenson, 2003; Tovey, 2011) confirmed that experiencing risky situations fosters important skills related to problem-solving, entrepreneurship, persistence and self-knowledge, all things that are considered necessary to build a personality capable of administering herself and maintaining good relationships within a society. Preventing children from experiencing risk would make them unable to react to unpredictable situations, depriving them of the confidence needed to overcome the challenges they may face in an autonomous way.

The final dimension concerns socialization opportunities. The fundamental difference between outdoor and indoor spaces is that in the outdoor environment children can experience activities as they please, playing on their own or connecting with peers when wanted to. An indoor environment is much more constricted and cannot provide the same kind of freedom. This greater independence leads to fewer conflicts and greater cooperation during outdoor play compared to indoor one. The unpredictability and openness of the environment facilitates the establishment of common goals among children, making them teachers and learners at the same moment since they tend to share

their knowledge and abilities in function of accomplishing the task. The cooperative behaviour makes them begin to consider and understand others' needs and feelings, initiating a path towards the development of empathy.

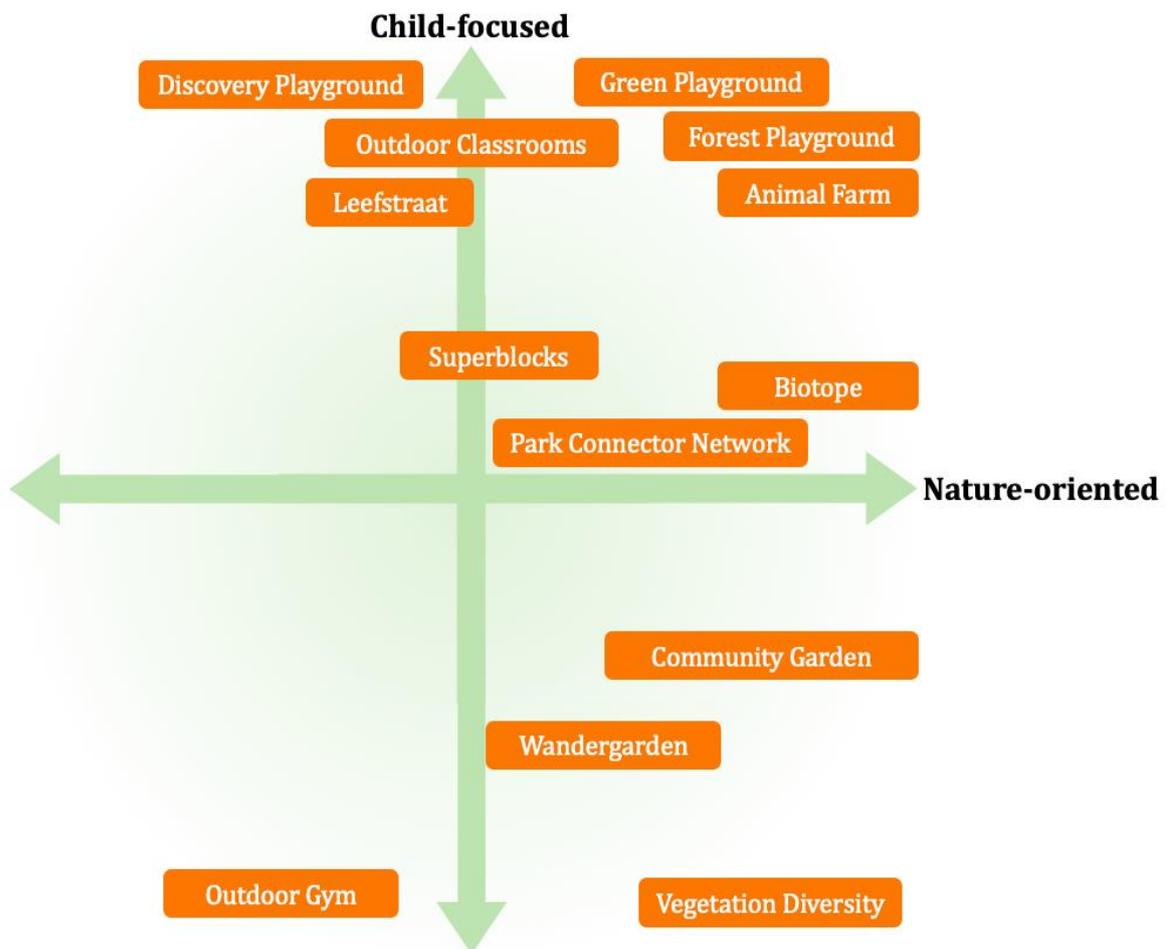
Another positive aspect of outdoor play is that it facilitates the relationship between children and adults. The conditions under which adults and children interact in the outdoor environment are different from the indoor spaces, providing opportunities for both parties to show aspects of their personality which do not usually arise. In this way, children better express themselves and adults can obtain a greater understanding on how it would be best to deliver an educational interaction. As provided in the first section concerning Health and well-being, in outdoor environments, stress and anxiety appear to decline. As a confirmation, adults are more relaxed and prone to assist children when outside. This finding is proposed also in other studies, where adults observed interacting with babies in outdoor environments seemed more ductile to children's needs, and more open to dialogue about children's interests (Stephenson, 2002).

# 3 Initiatives and Impact

## 3.1 Nature-based interventions

Analysing the existing nature-based intervention (NBI) initiatives and their impact is of utmost importance in evaluating the strength of an NBI. The objective is to provide a shortlist of the top NBIs that are the most applicable, plausible and relevant for the Urban95 initiative. Based on this selection criteria, we assess NBIs within the scope of academic literature and examples seen in practice i.e. the built environment. This scope provides a wider reach, which is also up to date with existing trends, as academic literature lags developments in the built environment.

To address the perspective outlined in the Urban95 initiative of questioning how the world looks from an elevation of 95cm, the average height of a healthy 3-year-old, NBIs are grouped based on their focus on children and their integration of nature. This concept map (Figure 3.1) allows us to examine to what extent NBIs incorporate these two components to determine what NBIs could improve their targeting of children through nature. Figure 3.1 highlights our segmentation and gives examples of how we sort NBIs within each category.



**Figure 3.1:** Segmentation of NBIs based on level of child-focus and nature-orientation

Using this concept map, one can see that NBIs in the top right fit the goals of exposing children to nature. The top left and bottom right corner are NBIs of interest, namely NBIs that are promising in terms of promoting child-nature interaction, but are lacking one of the two components. In the following sections we dive into some relevant examples, describing each NBI based on the following points: problem or motivation, real-life examples, target age group, suitable climate, physical size, radius of influence, a cost estimate, stakeholder reach, desired outcome, relevance for the Urban95 initiative, and contrast to existing research. Note that this list is not exhaustive and that an overview of NBIs is seen in the Appendix.

**Table 3.1:** Evaluation of various nature-based interventions

	Supervision			Urban planning	
	Safety	Bonding	Education	Cost	Location
Leefstraat					
Animal Farm					
Community Garden					
Green Playground					
Park Connector Network					
Superblocks					
Discovery Playground					
Wandergarden					
Forest Playground					
Vegetation Diversity					
Outdoor Classrooms					
Outdoor gym					
Biotope					
Symbols ranked from high to low:					

Besides categorising the NBI’s in terms of child-focus and nature-oriented, all the NBI’s are evaluated on a range of supervision and urban planning characteristics. Per characteristic in Table 3.1, a fully filled circle indicates a high level of safety, high level of bonding between child and caregivers, high level of education in terms of learning about nature, social interactions, and a high level of overall costs. A high level of location refers to the good ability to implement the NBI in terms of the size and scale.

### **3.1.1 Child- and Nature-focused NBIs**

There are a few NBIs with promising potential to foster Early Childhood Development (ECD) given their focus on children and nature.

First, we will introduce some NBIs that are exclusively targeted at children and are supervised by adults or caregivers, namely the NBIs located in the top right corner of the concept map.

#### *Forest Playground*

An environment that promotes this interaction between children and nature is a biotope. A biotope can be defined as a habitat housing a community of species, operating together at a particular scale (Connor, Brazier, Hill & Northen, 1997). In other words, a biotope is an environment with plants and animals that form a particular ecosystem and are natural to the region. Including an NBI that makes use of the existing natural environment is important as research shows that indigenous plant diversity offers significant health benefits, for example, by decreasing cases of childhood asthma (Donovan, Gatzolis, Longley, & Douwes, 2018).

A way to enhance children's interaction with a wild, natural environment is by combining it with education, for example by signposted information targeted at children or where caregivers can tell the children something about nature. Children are free to explore in the wild, while caregivers are there to accompany them as well and assist where needed. For example, with small tasks using problem solving skills and discovering new plants or animals.

Furthermore, three examples of NBIs that resemble a forest playground are the North Canyon Nature Play & Learning Area, the Fillmore Discovery Park and the Museum Backyard and Nature Club House (Moore, 2014). These parks offer the potential for children to play in the wild, and thus for the child to experience nature while still being supervised by their caregivers. Play is intertwined with education in these NBIs, as the play element is crucial for children of the ages 0-5 to learn new things and acquire new skills.

The North Canyon Nature Play & Learning Area is located in a state park, where surrounding wild nature is native to the area. Children are encouraged to engage with and discover nature, and to learn about different animals (*Appendix - A.3.1.1. (a)*). The Fillmore Discovery Park combines play and learning areas in a natural environment. Furthermore, the park makes a lot of use of on-site natural resources to create these play and learning spaces. This enables children to construct new play structures with natural tools. (*Appendix - A.3.1.1. (b)*). The Museum Backyard and Nature Club House is attached to a non-formal education institution, where children have the ability to play and learn in nature. Furthermore, Children can work together with a knowledgeable adult and participate in organised programs.

A major benefit of these NBIs is that children are able to rearrange their play spaces and thus use problem solving and creative skills while discovering nature, which Wilson (2018) points out is what children seek. By making use of a variety of natural materials that they select themselves, these NBIs are complex and creative, which increases a child's learning curve in nature.

A point of criticism for these NBIs is that they are rather costly to set up and maintain, and they require a lot of space in existing nature that is not always available. Furthermore, the three proposed examples of NBIs in the wild were located in the US where safety precautions are usually stricter than in Europe or other regions. Therefore, the ability for children to explore and go on an adventure in nature is probably also more limited in these NBIs.

### *Superblocks and Park Connection Network*

Next, the Superblocks of Barcelona and the Park Connection Network in Singapore are promising NBIs that target both children and nature due to their scalability and wide range of benefits. While we still consider these as child and nature-focused, they are not exclusively targeting those elements, unlike forest playgrounds.

Barcelona's implementation of superblocks started in 2016 as a response to heavy congestion alongside one of the worst air qualities in Europe. Superblocks essentially limit the use and speed of vehicles in designated zones or "blocks" in order to reduce air pollution while freeing up public space for vegetation, socializing and playgrounds (Roberts, 2019).

Another NBI addressing similar issues is the Park Connector Network (PCN) in Singapore. It runs over 300km through Singapore to connect different parks through pedestrian and bike paths in order to make them safer and easier to access from anywhere within the city. These are usually surrounded by blue and green space, which has the added benefit of attracting native species, which are attractive for children to observe.

Both of these NBIs address a wide host of issues including increasingly sedentary lifestyles, rising temperatures in cities and high levels of air pollution. This benefits all citizens but is especially relevant for young children in their developmental phase. Superblocks in particular may have a smaller impact on physical activity in terms of distance travelled but instead can facilitate social interaction for those living in and around Superblocks through benches and playgrounds (Roberts, 2019). Furthermore, with more playgrounds scattered around the city, young children with limited range of mobility have easier access to public space designated to them.

Thus, the main beneficiaries are those in and around the NBI. However, young children and their caregivers benefit most when the NBI is in their immediate vicinity as it reduces potentially dangerous travel time. This is because walkable cities make it easier for caregivers to get around, for example with baby strollers. Furthermore, having designated walkable areas can increase safety by reducing the number of cars, thus alleviating some of the stressors caregivers experience when navigating cities with a young child.

While there are currently only six superblocks in Barcelona, the city plans to implement them in 503 locations. The plan will cost €38 million (O'Sullivan, 2020), but it is expected to lead to cost savings in the health sector of an impressive €1.7 billion by reducing the years of life lost and the number of preventable deaths mostly from air pollution (Burgen, 2019). The benefit of Superblocks is their adaptability to different budgets, making them appropriate for any level of development. This is because Superblocks simply make use of existing public space, which is then repurposed. The scale and type of reorganization depends on available budgets, but even in Barcelona, a well-off city, the costs were relatively low compared to other urban planning projects.

The PCN has had a more impressive price tag, where a 62km long new network is expected to cost €195 million (Keng, 2021). However, a similar scheme within cities

would likely cover a smaller area and would therefore have lower cost. Regardless, this NBI can also help reduce health care costs by improving physical health through greater exercise and better air quality.

### **3.1.2 Semi-focused NBI's**

The following subsections discuss semi-focused NBI's which, as the name suggests, involve NBI's that only have one focus in the concept map from Figure 3.1 (i.e. either child focus or a nature-oriented ). The NBI that is highlighted in this section is the community garden.

#### *Community Garden*

A community garden can be defined as an urban public space where crops can be grown by the direct neighbourhood or the wider city. Ownership of this area can be (any combination of) parties like people from the surrounding neighbourhood or the municipality. The space does not need to be restricted by cultivation of crops only as numerous examples show a wide variety of additions such as beehives, a central communal barbecue spot, sandboxes for children to play in and ponds including fish. Hence, a community garden provides ample opportunities for extensions.

Discovering the community garden logically seems to go hand in hand with some form of supervision. Although children can see butterflies flying through the space and vegetables growing in the garden, the act of planting, watering and harvesting can only be experienced accompanied by a supervisor. This whole journey of planting a seed to eating a vegetable can be very beneficial to the consciousness of food and nature.

In large cities, community gardens that include a range of different species of plants and animals like vegetables, fruits, butterflies, bees, birds and possibly chicken and fish, can mitigate the ever increasing pandemic of environmental amnesia (Kahn, 2002). As the number of children growing up in cities increases, people lose connection with nature. Stereotypical misunderstandings such as 'apples are produced in factories' become shockingly more prevalent. The consequence of environmental generational amnesia is that it induces a loss in sensibility and environmental commitment of children when growing up. People that do not know about nature do not care for nature. Experience of nature and its biodiversity from a young age can potentially solve this issue.

Community gardens prove to be helpful in reducing early childhood obesity. In the study of Castro, Samuels, and Harman (2013) community gardens show to have an effect on the consumption of vegetables and fruits in families with 2-5 year olds. This in turn could reduce obesity. Furthermore, a similar positive effect on caregivers can also be observed (Alaimo, Packnett, Miles, & Kruger, 2008).

From a practical perspective, the community gardens are scalable in size and therefore in budgeting. Additionally, some community gardens could be tuned to attract more visits of caregivers and include elements which attract the visit of young children. Contrary, two preconditions of the area where community gardens ought to be implemented are necessary. Firstly, community gardens rely heavily on the climate. In dry desert-like climates irrigation of crops might not be feasible. Secondly, the area should be considered safe to a certain extent as people from the neighbourhood should feel free to go there whenever they want, and the gardens cannot be harmed by any acts of vandalism.

Examples of community gardens can be found in both developing and western countries. In Mali the ECOVA project helps to feed the local community and Wijk tuin De Esch in The Netherlands helps people in a low-income neighbourhood to connect.

## **3.2 Models, Methods and Metrics**

To investigate the effect of a nature based intervention, models, methods and metrics are needed. In this section we provide an overview of general frameworks to evaluate NBI's and some interesting methods to measure both the NBI itself and the outcome on early child development. In the Appendix a list with useful metrics for analysing NBIs is included. Section 3.2.1 describes the models. We divide the models into the categories of the NBI's, so Child- and Nature focused models and semi-focused models. Section 3.2.2 describes the methods. Here we made a distinction between qualitative and quantitative methods.

### **3.2.1 Models**

The following section will outline the chosen models based on the NBI concept map shown in Section 3.1.

### Child- and nature-focused models

The models in this section can be used for NBI's in the upper right quadrant of the NBI framework, because they have both a child development and a nature component.

#### *Connection to nature index*

One example of a model that is focused on both children and nature is the Connection to Nature Index (CNI), which is usually used to evaluate the children's behaviour in nature preschools. However, we will adapt this framework to be used outside the preschool environment. The Connection to Nature Index measures four dimensions of children's relationship with nature and includes items relating to children's feelings when surrounded by nature, their perception of human-nature relationship, and their concern for plants and animals (Sobko & Brown, 2018). The four dimensions are: Enjoyment of Nature, Empathy for Nature, Responsibility toward Nature and Awareness of Nature. These dimensions are elaborated on below. This Connection to Nature (C2N) model uses a survey approach of which the questions asked can be found in the Appendix in Table A.3.2.2..

- **Enjoyment of Nature:** This indicator evaluates how comfortable the children are with the natural elements. One of the aspects that the Enjoyment of Nature measures is the child's ability to create new toys and games with the resources present in the natural environment.
- **Empathy for Nature:** Here, one wants to measure the emotions felt by the child when something happens to the different elements of nature. As an example is the response of the children to the passing away of an animal.
- **Responsibility for Nature:** This indicator measures the level of responsibility that the children have regarding nature. This is demonstrated by the ability of the child to treat nature in its totality with respect and care.
- **Awareness for Nature:** The last indicator wants to show the acquaintance of the child regarding nature and the law that regulates it. At a more granular level, the child can understand the difference between playing indoor or outdoor.

Using the outlined C2N model will allow us to measure the NBIs that maximize the effect on young children while interacting with nature.

### *Nature experiences and routines*

A critical component of nature-based interventions and their effect on children includes how a child's connection with nature can be nurtured. To assess this, Giusti et al. (2018) designed a framework to guide the assessment of where people, and more importantly children, experience significant nature situations and establish nature routines. They employed a mixed-method approach to understand what qualities of nature situations connect children to nature, what constitutes children's human-nature connection (HNC), and how significant nature situations and children's HNC relate to each other over time. This model also clearly fits in the upper-right quadrant of the NBI framework, because it focuses on the connection between children and nature.

To design this framework, Giusti et al. (2018) first interviewed 26 professionals in the field of connecting children to nature and thereafter examined the inductive findings by surveying 275 specialists. They identified 16 qualities of significant nature situations and 10 abilities that constitute children's HNC. A comprehensive explanation of these SNS's and HNCs can be found in the Appendix in Table A.3.2.3. To answer their research questions, the authors have elaborated on three principles. Firstly, significant nature situations are various and with differing consequences for children's HNC. Secondly, children's HNC is a complex embodied ability. Lastly, children's HNC progresses over time through diverse nature routines. Together, these findings form the Assessment framework for Children's Human Nature Situations (ACHUNAS). ACHUNAS is a comprehensive framework that outlines what to quantify or qualify when assessing "child-nature connecting" environments. It guides the assessment of where and how children connect to nature, stimulating both the design of nature-connecting human habitats as well as pedagogical approaches to HNC.

### *Semi-focused models*

The model in this section fits in the upper half of the NBI framework, because it has a clear focus on children.

### *Seven C's of effective play design*

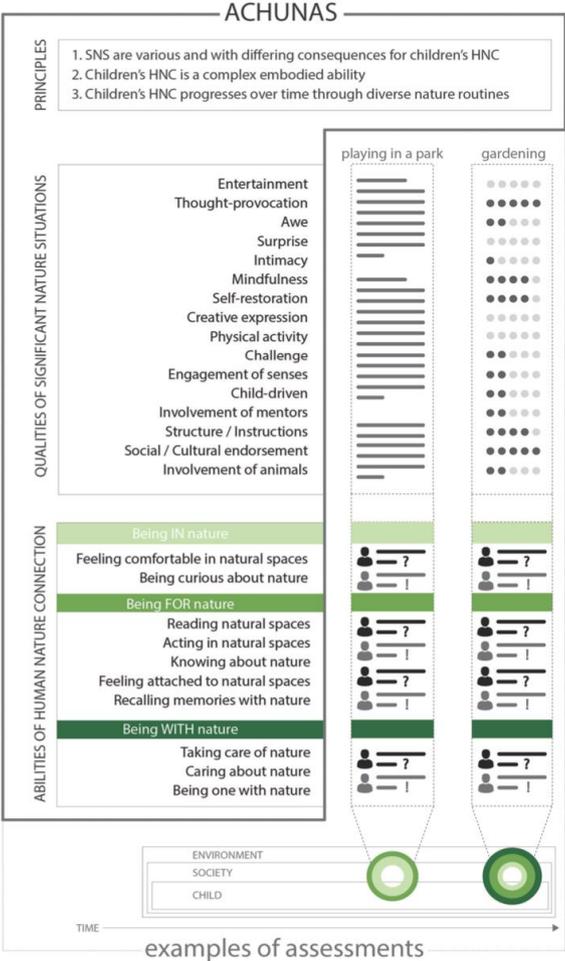
An example of a method that is semi-focused is the Seven Cs Criteria (Brussoni et al., 2017), which can be used as a model for effective play space design. The model evaluates play spaces based on seven categories - character, context, connectivity, clarity, chance,

change and challenge - with further sub questions related to the respective category. The complete list of questions used in Brussoni et al.'s (2017) research can be found in Appendix A.3.2.1. This model is semi-focused, because it clearly focuses on children, but not necessarily on nature. However, this model could be used to evaluate NBI's that are focused on both children and nature. The Seven Cs are listed below.

- **Character** evaluates the build quality, atmosphere, vegetation, surface materials and light quality of a play space. The focus lies on making the space soft and engaging for children, e.g. through a circus theme or an organic design with wooden elements.
- **Context** refers to the health and safety, microclimate, views in and out as well as the boundaries of the space. Important aspects to consider are whether the space is protected from traffic, e.g. a rooftop playground, and how densely occupied it is.
- **Connectivity** evaluates the ease of entering, moving around and exiting the space, as well as the hierarchy of pathways within the space. Integrating complex settings, e.g. for hide-and-seek games, improves the connectivity aspect of play spaces (Herrington & Lesmeister, 2006).
- **Clarity** discusses the design, zones, seating and logistics of the space. Advocating for sufficient comfortable seats, this aspect also accounts for caregivers' needs.
- **Chance** considers the features of mystery, loose material play and messy zones for effective play space design. Adding elements such as watery, sand or mud areas allows the children to take initiative and explore.
- **Change** accounts for differentially sized spaces, range of space types, materials and appropriate accommodations for several ages and developmental stages, e.g. by adding different vegetation to a playground.
- **Challenge** evaluates the opportunities for risky play and other graduated challenges the place provides.

Applying the framework to Barcelona's "superblocks" and the PCN in Singapore, the outlined framework can give useful indications of what has been done right and what could still be improved. Both NBIs, for example, consider connectivity and context, thereby improving the safety of the play zones, while adding more elements of challenge could still be a possible improvement. Different methods can be used for judging the

effectiveness of the implementation of the above outlined criteria for designing play spaces. Compared to the models in the following sections, the 7 Cs Criteria builds a framework for designing play spaces, rather than evaluating how children react to certain NBIs.



**Figure 3.2:** ACHUNAS framework. Reprinted from Giusti et al., 2018.

The lists of abilities in Figure 3.2.1 of HNC and qualities of SNS outline what to quantify or qualify when assessing child-nature-connecting environments. Giusti et al. (2018) give the hypothetical example assessment of a child playing in the park, as shown in the figure above. The evaluator's findings suggest that the natural scenarios offered in this park are generally defined by traits of "child-driven" and "physical" activities with high "engagement of senses." The assessor then decides to interview children in order to learn more about their abilities such as "feeling comfortable in natural places," "being curious about nature," and so forth. The assessment gives the evaluator essential information about what kind of natural encounters are available in the park, as well as

which ones are missing. In this case, the evaluator might come to the conclusion that structured activities and the introduction of animals could help children develop their ability of "knowing about nature" and "feeling attached to natural spaces." In the example above, ACHUNAS specifies a set of criteria that the evaluator should use to analyze the environment, but the evaluator chooses the methods to use. The evaluator might also examine principle 3 of ACHUNAS and analyze how often children visit the park and how long they are exposed to nature activities, or undertake the same assessment for all of the parks in a neighborhood or city for a more comprehensive assessment.

### **3.2.2 Methods**

To measure how the chosen models impact children aged 0-5, we now suggest different methods for evaluation. Some of these methods fit multiple models, while others might be more specific to one model. In general, however, we make a distinction between qualitative and quantitative research and objective and subjective methods.

#### *Qualitative methods*

Qualitative methods are descriptive and cannot be captured in numeric values. These methods are often more in-depth than quantitative methods. This section highlights some qualitative methods for measuring different outcome variables related to early child development.

Children's drawings of their near environment can be used to assess how children perceive the implementation of NBIs (Çubukçu et al., 2018). This method could be used in the following way: the children are asked to draw a certain space pre- and post-NBI, offering the opportunity to judge differences in the drawings. Dominance of certain elements, in the sense that these elements are drawn frequently, or are put into focus by some, would suggest that the children regularly engage with these elements, or that some have built a certain connection to them. When using this method, we need to account for the limited applicability to our target group, as children only start to draw somewhat realistic pictures around the age of 3-4 (Mcilroy, n.d.). It is thus also useful to ask the children for clarifying comments and explanations of their drawings. Explanations can also shed light on whether the children's drawings are depicting reality or whether some elements might indicate children's wishes of what they might like to see in a play space.

As an evaluation method, drawings are especially applicable to child- and nature-focused NBIs, as these allow the children to play freely and based on their own creativity, while the interventionist nature gives the base for pre- and post-evaluations.

Another method specifically applicable to child- and nature-focused NBIs are spatial behaviour maps. This method traces a child's movement within a specific area by following a child's every movement (represented by a line) and pause (represented by a dot) pre- and post-NBI, then comparing the differences in play areas, as well as frequency and location of pauses (Brussoni et al., 2017). The method allows researchers to qualitatively evaluate whether children are engaging in different activities, e.g. risky play or interacting with vegetation, thereby also revealing whether children engage in "clueless" wandering or are engaging with other children. Spatial behaviour maps could be paired with video monitoring to give a more complete picture of children's play interaction, especially in the sense of how they engage with their peers and whether the children use creativity in their play. This also allows researchers to evaluate whether NBIs can help reduce antisocial behaviour, promote integration of minority children, foster physical activity or the like.

Cognitive development is an important aspect of child development and there are several ways to measure the effect of a nature-based intervention on cognitive development. First, play observations of children can be used. These play observations can be categorized in functional, constructive, exploratory, dramatic and imaginative play. An increase in one or more of these play categories would mean a positive effect of a nature-based intervention on cognitive development. Second, learning outcomes can be used to measure cognitive development. One study looked at poetic writing of children in terms of word count, imagery and figurative language to measure the content analysis of the poems children wrote. Learning can also be measured by looking at attention levels, punctuality and concentration in class. The last measurement for cognitive development is creativity. Creativity outcomes are for example, fluency, originality and imagination against an activity protocol (Dankiw et al., 2020). They are not subjective in the sense that the outcome measures are self-reported or reported by parents or caregivers. However, a measure of creativity is subjective in itself and therefore the outcome could depend on the person reviewing the creativity or play type of a child.

### Quantitative methods

Quantitative methods are mostly based on data that can be captured in numeric values. The following section will highlight some quantitative methods that can be used to measure different aspects of early childhood development.

Measures of physical activity can be used to assess whether children become more active when they come into contact with a natural environment. Methods to measure physical activity are, for example, gait cycles, steps per minute and accelerometry (Dankiw et al., 2020). This method can be seen as a quantitative and objective method and can be used for both child- and nature-focused and semi-focused NBIs.

Health-related and motor fitness tests such as EUROFIT can be used to measure flexibility, balance and coordination outcomes of children as a result of contact with nature (Dankiw et al., 2020). These measures are objective, considering there was a third party that measured the result.

Social development of children is another important outcome domain on which nature-based interventions could have an effect. Multiple studies looked at peer interaction of children. This included behaviour, such as bullying and prosocial behaviour, which teachers measured by using a rating scale (Dankiw et al., 2020).

Dankiw et al. (2020) lastly report that there have been studies on emotional outcomes. To measure this effect, a PSBS (Preschool Social Behaviour Scale) can be used to measure aggression and regression. Other studies have reported on mood using a ranking scale ranging from 1 (low) to 5 (excellent). This is qualitative research and can be categorized in both objective and subjective methods because the outcomes are reported by professionals, but could still differ when someone looks at the effect.

Hertz-Picciotto et al. (2007) researched the effect of air pollution on bronchitis among preschool children (3-5 years old). They did this by comparing two districts in the Czech Republic, where one district had high ambient air pollution and the other had lower ambient air pollution. They measured different ambient air pollutants on a daily basis. Children born between May 1994 and March 1999 were followed for 3 or 4.5 years to ascertain illness diagnosis. The mothers completed two surveys, one just after the birth and one a few years later. The survey asked questions about demographics, lifestyle, reproductive, and home environmental factors. They found that ambient polycyclic aromatic hydrocarbons (PAHs) and fine particles are related to early-life susceptibility to bronchitis. Besides, they found that this susceptibility was stronger for longer pollutant-

averaging periods, and among children older than 2 years, for PAHs compared with fine particles.

Scott et al. (2018) used teacher ratings of pre-schoolers' social-emotional and behavioural functioning in relation to the presence of natural elements near the children's homes and schools. Children's socio-emotional and behavioural development was greatest when there were high levels of tree canopy either at school or at home. Besides this, they found that students developed greater independence and social skills when their schools were in neighbourhoods with limited impervious surfaces, such as concrete. This trend was most pronounced for students from neighbourhoods low in impervious surface. Related to this, they concluded that the impact of school nature could also depend on levels of home nature exposure.

# 4 Context

## 4.1 The Netherlands

### 4.1.1 Demographics

The Netherlands is a country with a diverse population, with the majority of people being ethnically Dutch: With a total population of 17.4 million, around 13.2 million people, or 75% of the population in the country has a Dutch ethnic background. Having a migration background is defined as having at least one parent who was born abroad, while this category of people constitutes the remaining 25% of Dutch population. Being a highly urbanized country, 92% of the Dutch population is urban, with an average population density of 517 per km<sup>2</sup>, although this figure varies highly by region, being the highest in the Randstad area (6.620 per km<sup>2</sup>). The Netherlands has an ageing population, due to the high life expectancy of 82 years and a low fertility rate of 1.6 children per woman. The average household size has decreased from 3.93 residents per household in 1950 to 2.15 in 2019, although these patterns differ per area, with smaller household sizes in the cities compared to the countryside. The proportion of children between the ages of 3 and 4 thus constitutes only a small part of the total population: There are around 690 000 children in this age category, or around 4% of the total population (Volksgezondheid en zorg: Bevolking, 2021).

### 4.1.2 Education

Education in The Netherlands is compulsory from the ages 5 to 16, although most children start school at the age of 4. Elementary schools are followed for 8 years by children from the ages of 4 to 12, after which there is an educational split by difficulty and from then on, children either follow a VMBO, HAVO or VWO level school. The first corresponds to preparatory vocational education and is followed for 4 years, after which students can continue on to MBO, or vocational training education. The second level of HAVO has 5 grades and is followed from the ages of 12 to 17, with students subsequently having access to universities of applied sciences. The last level of VWO is followed for 6 years and provides access to universities. Students can switch from one level to another

over the course of their high school careers, but generally have to repeat a year when switching to a level of higher difficulty (Rijksoverheid, 2021).

### **4.1.3 Climate**

Proceeding with perspective on the world from an elevation of 95cm, we investigate the effect of climate and climate change on young children first. We then expand the topic of climate and climate change to a broader perspective with a focus on the Netherlands.

Young children in the Netherlands immediately pick up on the change in seasons, something taken for granted especially when comparing young children who grow up in an equatorial climate (warm and humid all year round). The change in seasons is made apparent through their senses (sense of sight, taste, touch, smell and sound). Rooney (2018) shows that a child's encounter with a specific place and its inhabitants is multisensory, engaging all senses and never 'weather-neutral'. These encounters require children to have a capacity for creative and ethical modes to grasp the known and unknown effects of climate change. Rooney (2018) also finds that taking the time with children to slow down and focus on the 'elemental effects' can reveal complex temporal relationships with nature and lay the foundation for curiosity as well as open attentiveness to climate challenges ahead. Therefore, the environment and encounters with nature that children have, can play a strong role in their perspective and sensitivity towards protecting it.

Davis (2007) takes a similar stance and emphasises the importance of educating young children, as they have the potential to be 'agents for change'. She stresses the importance of advocating for child-friendly cities, touching on how the fields of urban design, transport and architecture/infrastructure can bolster safe, open environments that promote play, health, and well-being. These agents for change are in their early developmental phase and prone to mental health consequences as a result of climate change, which impacts their psychological well-being (Burke, Sanson and Van Hoorn, 2018). Worryingly, these mental health consequences at a young age can lead to adverse adult mental health outcomes. It is thus highly relevant to educate young children on climate change and advocate for child-friendly cities in order to promote psychological well-being.

More broadly, drawing attention to the densely populated areas in the Netherlands, studies have shown these areas have some of the highest standards of flood defence in the world. The dykes (also dikes) being the prime example (Kabat et al., 2005). Dykes are designed to protect delta regions from floods. This is crucial as Kabat et al. (2005) expresses approximately 70% of the world's population and economic resources gather around delta regions. Therefore, emphasising the importance of protecting delta regions all over the world. For the Netherlands, this is of greater importance since 60% of the territory is below sea level with 70% of gross domestic product (GDP) being earned in these flood-prone areas (Kabat et al., 2005). Steering urban planning from these flood-prone areas can trigger follow-on developments in new areas and divert the attention of policymakers towards these new areas.

According to forecasts concerning the Netherlands by van den Hurk et al. (2007), the sea level rise in the North Sea by the year 2100 ranges between 35cm and 85cm. On top of that, their forecasts indicate drier summer scenarios as well as increased intensity of daily precipitation. The vulnerability towards extreme weather has knock-on effects for the insurance sector in the Netherlands, documented by Botzen, van den Bergh, & Bouwer (2009). To tackle this, adapting to climate change is required. One study ranks various climate adaptation options via a cost-benefit analysis and finds that in the Netherlands, integrated nature and water management risk policies rank high, followed by policies that promote climate proof infrastructure (de Bruin et al., 2009). Therefore, for nature-based interventions that require newly built infrastructure and urban planning, these factors are important to consider.

#### **4.1.4 Family, upbringing and playing**

According to a study in the Netherlands by Bucx (2011), most parents believe they have done a good job at parenting. They feel they provide ample assistance as well as adequate structure and routine to their children. Simultaneously, parenting in so-called vulnerable family situations is often of lower quality. Authoritarian control tactics such as punishment, rewarding, and ignoring are used more frequently by single parents, parents with a lower education, and parents with a poor income. They place a lower value

on their child's autonomy and are less consistent and predictable in their actions than other parents.

In the Netherlands in 2005, moms spent slightly under 14 hours a week caring for their children, while fathers spent just over six hours. Parents who have a four-year-old or younger child dedicate significantly more time to their child(ren) than parents who have older children. Today's parents spend more time with their children than in the past. In fact, since 1980, the amount of time working mothers and fathers spend with their children has nearly doubled.

Bucx (2011) observed that the number of Dutch parents with children living at home has dropped dramatically in recent decades, from 44% in 1981 to 28% in 2010. According to the study, this is attributable to an increase in the number of childless couples, as well as the fact that parents have fewer children. Between the ages of 35 and 50, the family remains the most common type of cohabitation: a family with children makes up about two-thirds of all Dutch homes where the head is between the ages of 35 and 50. Although the married couple with children remains by far the most common family unit, the proportion of unmarried parents with children is clearly on the rise: more than half of parents are not married when their first child is born, and an increasing number of parents continue to live together unmarried after the birth of the first child. According to the most recent statistics, more than one out of every four marriages ends in divorce, with children being involved in more than half of these situations. A quarter of all children suffer changes in their family composition while they are still young, most typically as a result of their parents' divorce.

De Vries et al. (2008) notice that from about the age of four, children are increasingly allowed to play outside on their own. Children living in single-family homes or other ground-floor dwellings are usually allowed to go outside at a younger age than children living in stacked buildings. Other factors that determine at what age a child may play outside alone include the view from the home to the playground, having a private yard, traffic safety, the suitability of the outdoor space for play, the presence of strangers, acquaintances and loitering youth, and the presence of crime and drug use. For toddlers and pre-schoolers there is specially adapted gymnastics for their age, the so-called toddler and preschool gymnastics. Around kindergarten time, many children also go to

swimming lessons. Children regularly cycle and cross-country independently on the sidewalk, on the bike path and in low-traffic streets. This form of cycling and running by children can also be considered play.

In the city there is a clear tendency for children's play to shift from outside to inside (Bouw & Karsten, 2004). Whereas in the past children were at most tolerated in the home, the domain of the housewife, nowadays children can go about their business indoors. The opposite can be observed on the street. The former domain for children has now become a domain for adults. Per street, there are now more than twice as many cars as children, while in 1950 there were more than 10 times as many children as cars.

The fact that one finds the street less safe is the main reason that children have started playing in the street less. There is a fear of traffic, drowning or a dangerous man ('stranger danger'), but also of other groups of children, who are not considered safe. In the past, children needed to be able to take a punch and become more resilient as a result; nowadays children need to be protected because of their vulnerability (see also Louv, 2007).

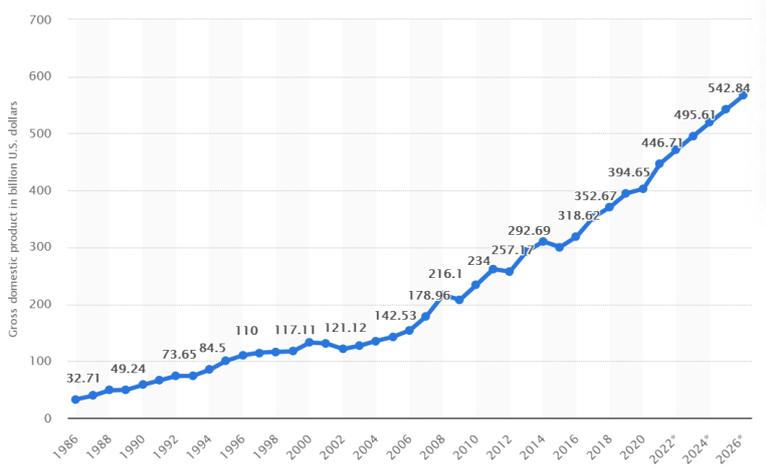
Families today are smaller than they used to be, which results in fewer children living on the street. There is less adventure for the children to experience on the street than there used to be. The chances of meeting other children in the street when you go outside have become smaller. Children also report that they went outside to look but there was no one to play with and they went back inside. When that happens a couple of times, they don't go out and look anymore, and only go out to play when they have agreed with other children. The fact that families are getting smaller also means that there are fewer older siblings (or trusted neighbor children) who can keep an eye on younger children while they play outside.

## **4.2 Israel**

### **4.2.1 Demographics**

Israel is characterized by a very religious population, with a majority of ~74% of the population, or about 6,829,000 individuals, being Jews of all backgrounds. The second largest share embodies Arabs of any religion at ~21%, or around 1,890,000 individuals. The remaining 434,000 individuals (or 5%) are classified as "others", mostly being either

Christians or atheists. Israel showcases the highest fertility rate in the OECD at an average of three children per mother (compared to the OECD average of 1.7 children), resulting in 10% of the current population being under the age of 4. The exact family patterns differ by (sub-)religion, where especially ultra-orthodox (Haredi) families tend to have large families of 7 or more children. 84% of all children live with both parents, whereas 11% live with just one parent, 4% in a step-family and 1% in a different family arrangement (e.g. foster care). Birth rates are very low outside of marriage, which is likely due to the high degree of religious affiliation. 92,5% of the Israeli population is urban, and the country embodies one of the highest population densities in the OECD (O'Neill, 2021). Related to this, concerns about overpopulation and its effect on the environment are voiced frequently. The country's gross domestic product (GDP) levels have steadily increased since 2014 and are expected to continue growing (see Figure 4.1). Approximately 25% of Israeli children live in relative poverty, which compared to the country's relative poverty rate of 20% indicates that particularly children are at risk of living in poor financial conditions.

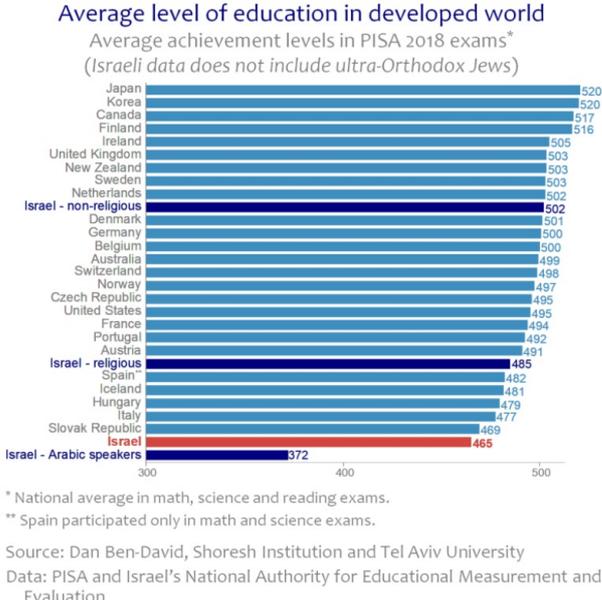


**Figure 4.1:** Past and projected GDP growth in Israel. Reprinted from O'Neill, 2021.

### 4.2.2 Education

Israel's school system is separated by religion into Hebrew- and Arabic-speaking schools for children of Palestine-Arab origin, where educational performance tends to be lower within the Arabic facilities (see Figure 4.2). This can likely be traced back to Arabic schools being overcrowded, understaffed and poorly equipped, thereby lowering the educational opportunities for children of Palestine-Arab origin (Human Rights Watch,

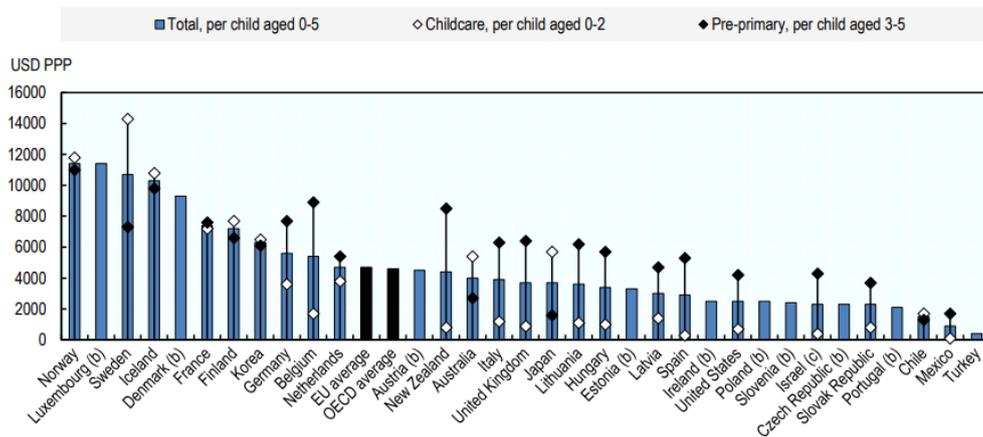
2001). The level of education provided for Arabic-Israeli children and Haredim children resembles third world education, while generally children from the country's geographical and social outskirts also lack good educational opportunities (Shoresh Institution for Socioeconomic Research, n.d.).



**Figure 4.2:** Average level of education in the developed world. Reprinted from Shoresh Institution for Socioeconomic Research, n.d.

The school system is organized into kindergartens, 6-year primary schools, and either 6-year secondary schools or 3-year junior secondary schools followed by 3-year senior secondary schools. In total, children thus attend 12 years of school, which is the norm among developed countries. The enrolment rates in primary education for Israeli children aged 3 to 5 are above 98%, which is the highest number among OECD countries (OECD, 2019). 55% of babies and toddlers up to the age of 2 are already enrolled in early childhood education (OECD, 2019). Nevertheless, public expenditure on pre-school education, especially for the ages 0 to 2, is at the lower end among OECD countries (see Figure 4.3). Generally, the educational system in Israel is highly militarized and strong religious and hostile views against the opposed religion are communicated early on.

**Chart PF3.1.B. Public spending on early childhood education and care per child**  
Public expenditure on childcare per child aged 0-2, public expenditure on pre-primary education per child aged 3-5, and total public expenditure on early childhood education and care per child aged 0-5, in USD PPP, 2015 and latest available

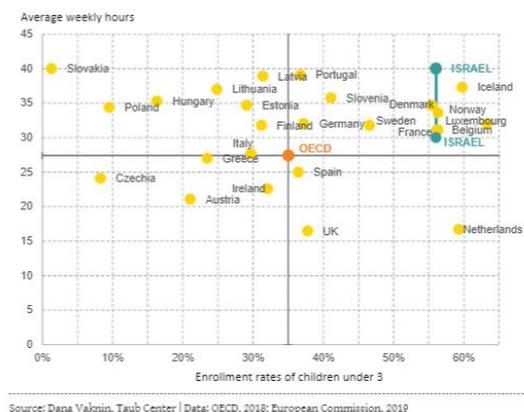


**Figure 4.3:** Public spending on early childhood education and care per child. Reprinted from OECD, 2019.

### 4.2.3 Childcare arrangements

Considering the high enrolment rates in early childhood and pre-school education, as well as the relatively long hours spent in daycare as shown in Figure 4.4 below, it makes sense that employment rates of young children’s mothers are higher than the OECD average. Childcare arrangements thus primarily consist of formal educational daycare opposed to informal arrangements such as nannies or family members taking care of the children.

**Figure 9. Enrollment rates for children under 3 in formal education and the average number of weekly hours spent in daycare, 2017**



**Figure 4.4:** Range of childcare enrolment rates and weekly hours spent in daycare for children aged 0-3. Reprinted from OECD, 2019.

#### **4.2.5 Safety**

The largest threat to safety in Israel originates from the on-going Israel-Palestine conflict, where street violence among Jewish and Israeli Arab is common. In the beginning of May 2021, tensions started to become more severe again and missile firing from both sides occurred, with some people considering the possibility of an erupting civil war (see Section 4.2.7. for more information on the political and historical culture of Israel). According to UNICEF, the Israeli military detention system is under supervision for the poor physical and psychological treatment of young Palestinians, which relates back to the systematic militarization and religious tensions within the country. Moreover, problems with child safety in daycare have come to light, as no formal supervision of daycare centres hosting children below 3 was in place until 2018, where the Daycare Supervision Law was passed. Mortality rates of 0-4 years olds have risen by 22% between 2010-2016, especially in Arab and Bedouin societies. A large share of these fatalities can be attributed to traffic accidents (Beterem, n.d.).

#### **4.2.6 Climate**

Geographically, Israel finds itself squeezed between two seas (Mediterranean and Red) and two deserts (Arabian and Sahara). This leads to a notable transition in the climate. According to the climate classification system of Koppen, the climate of Israel changes from a Mediterranean climate (CSa), which is characterised by long, dry summer and short humid winters to a hot desert climate (BKh), which is characterized by hot and dry conditions throughout the year. This means that during the summer rainfall in any part of the country is exceptional, and during winter, places that find themselves in the Mediterranean climate have rainfall of at most 159 mm in January, and places in the desert climate experience rainfall of at most 4 mm in January. In terms of actual green, Israeli city streets are planted with palm and deciduous trees and occasionally some grass fields in parks. One often sees stray dogs and cats. Regarding wildlife, jackals and swines can be seen crossing the streets. Right now, Israel counts over 200 million trees spread across 300,000 acres of land. Forests can be key for the development of the 'ecocentricity' (i.e. perspective on nature) of young children as demonstrated in Danish forest school (Dean, S. 2019). In developing countries forests can even aid nutritional deficiencies according to Rosalofson (2018).

#### **4.2.7 History and Politics**

The historical background of the state of Modern Israel is indivisible from the ones of the Gaza Strip and of the West Bank for both religious and political motivations. The incipit can be traced back to 1896 when, based on biblical verses, the Austrian journalist Theodor Herzl published an article claiming that Palestine was the Jewish “promised land”, and therefore the place where a Jewish state should have been placed as a political solution for both anti-Semitism and Jewish identity itself. With this statement, Herzl gave life to Zionism, the political ideology with the main objective of funding a Jewish State in Palestine.

With the advent of World War II, extremist Zionist groups started targeting British diplomats and militaries with terrorist attacks, in response London turned the problem to the newborn United Nations (UN). On November 29, 1947, the UN General Assembly defined the “resolution 181”, which called for the partition of the Palestinian territory into two independent states, one Arabic and one Jewish, and for the independent administration of Jerusalem, which would have had to be governed by a special international regime. This decision did not get accepted and instead caused a civil war, where Jewish prevailed.

Talking to the most recent developments, the origin of the ongoing clashes between Israel and Palestine can be traced back to the ruling of an Israeli court in October 2020, in which several Palestinian families living in Sheikh Jarrah, a neighbourhood in East Jerusalem, were to be evicted by May 2021 and their land passed to Jewish families. In February 2021 an appeal was filed to the court ruling, starting a legal battle to avoid the forced displacement of Palestinians from their homes. Protests kept going, with residents and activists organizing nightly sit-ins from April. With the decision in May of proceeding with the eviction, protests expanded, taking the form of daily demonstrations. The Israeli militia responded to the increasing tension using stun grenades, rubber bullets and water cannons against protesters, leaving hundreds wounded. The pick arrived with the celebration of Jerusalem day. In response to a continued violent containment from the Israeli police, Hamas and other militant groups launched hundreds of rockets into Israeli territory. Claiming to target Hamas and its infrastructure, Israel replied by expanding its

aerial campaign by targeting residential buildings, media headquarters, refugee and healthcare facilities.

With the escalation of violence in May 2021, two hundred people have been killed in Palestine and at least ten in Israel, with hundreds more wounded. At a global level there is fear of a third intifada which would escalate into large-scale violence. Nonetheless, regardless of an international call for a ceasefire, the Israeli Prime Minister Benjamin Netanyahu has made clear his intention of continuing with the military operations in Gaza. At the current state of affairs, children under 13 years old on both sides of the conflict had to live through four wars. Even for those who managed to be physically unaffected, the mental trauma will last for a long time. If the situation does not improve rapidly, a whole generation will be destined to irreversible consequences.

#### **4.2.8 Family, upbringing and playing**

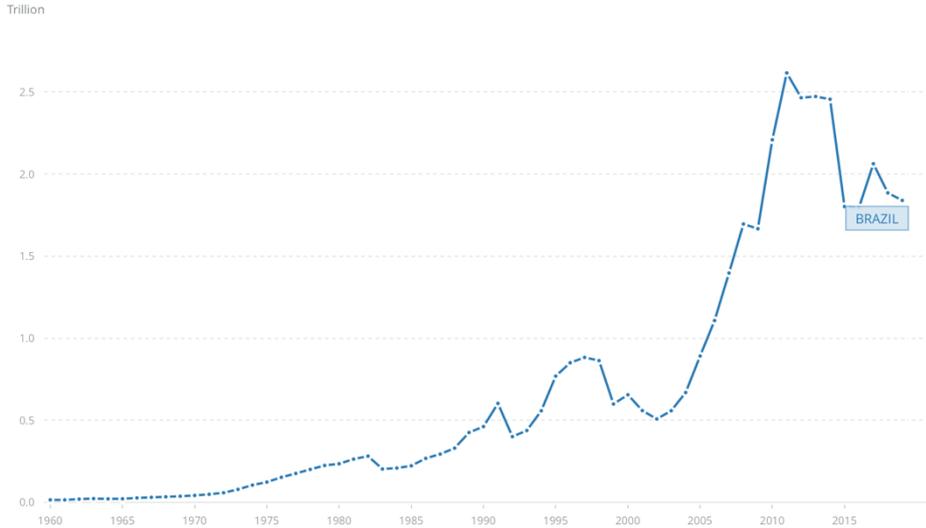
In general, family is considered an important part of the life of an Israeli civil. Hereby, having children is of high value in Israeli society ("Israel - Family Patterns," 2021). For a household with a median income "the cost of raising two young children (under 10 years of age) or of one teenager (aged 10 and higher) amounts to between 14 and 27 percent of the household's net income" (Karlinsky & Sarel, 2020). The mixture between the individualistic and collectivistic culture, however, leaves room for different family structures (Hofstede Insights, 2019). The family structures can be divided into the following categories: the mainstream family, the ultra-orthodox family, the Postmodern and single-parent families, the kibbutz family and the Arab family.

### **4.3 Brazil**

#### **4.3.1 Demographics**

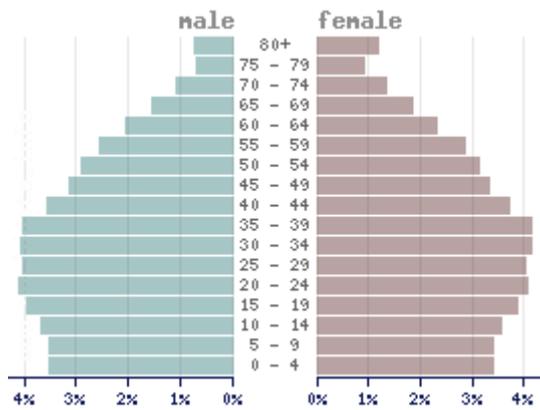
Brazil is a country covering a large portion of the South American continent. Brazil had a population of 211 million in 2019 ("Brazil | Data", 2019). Its economy is underperforming the upper half of OECD countries by a significant margin ("Brazil Economic Snapshot - OECD", 2021). This is in part due to low employment rates, hovering

around 63% as of the end of 2019. The OECD also documents inequality via the Gini-coefficient, yielding Brazil a 53.4 (on the scale where 62.0 is very high inequality). This number is above the median Gini-coefficient of emerging economies who scored 45.9 on the scale. This high inequality results in the poorest 20% of households earning 3.1% of the total income. Lastly, the OECD states that more than three fourths of the population is exposed to harmful levels of air pollution. However, carbon dioxide emissions per capita have remained (relatively) stable over the past few years. Brazil performed better than the OECD average when looking at tonnes of carbon dioxide equivalent per capita.



**Figure 4.5:** GDP of Brazil in Trillion USD (\$), Source: World Bank

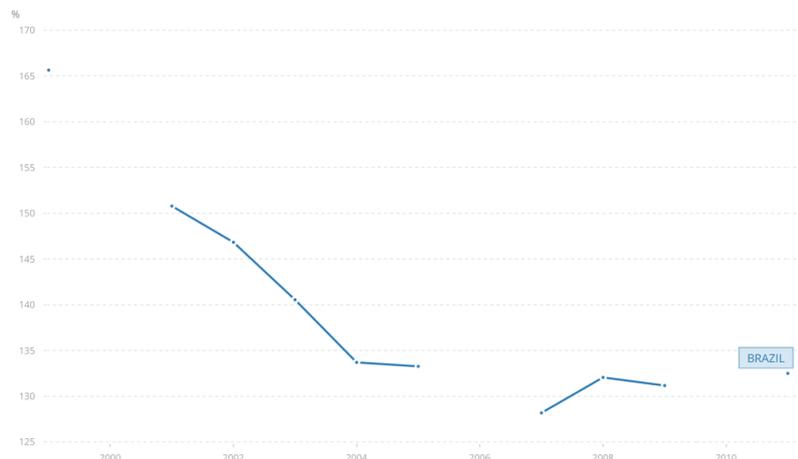
In terms of age distribution, an age pyramid helps to visually represent the proportion of each age group relative to one another presented in Figure 4.6 below. The age pyramid follows a similar shape to that of other developing countries in the world to date, as they characteristically have a lower elderly population and a large working population. This indicates that Brazil may likely face future problems of old age provision ("Population growth in Brazil", 2021). This is caused by the circumstance that in 20-35 years when the current working population retires, the young population is faced with taking care of their elderly. Therefore, it is in the interest of the government to cater to the young population and invest in their education so that they are in a better position to care for the elderly, who then (the elderly) will require less government subsidies and support.



**Figure 4.6:** Brazil's Age Pyramid in 2020, Source: World Data Info

### 4.3.2 Education

The reported quality of education in Brazil has been improving slowly over the past 15 years ("The World Bank In Brazil", 2021). However, despite this progress, actual learning levels lag those of comparable peer countries. The World Bank also reports that 4 out of 10 youths do not finish their secondary education by the age of 19. In addition, children up to 3 years of age do not have access to early childhood education. These two facts are significant challenges that hinder development in Brazil. This is evidenced in the primary school enrolment rates (seen in Figure 4.7), which have been declining over the past years.

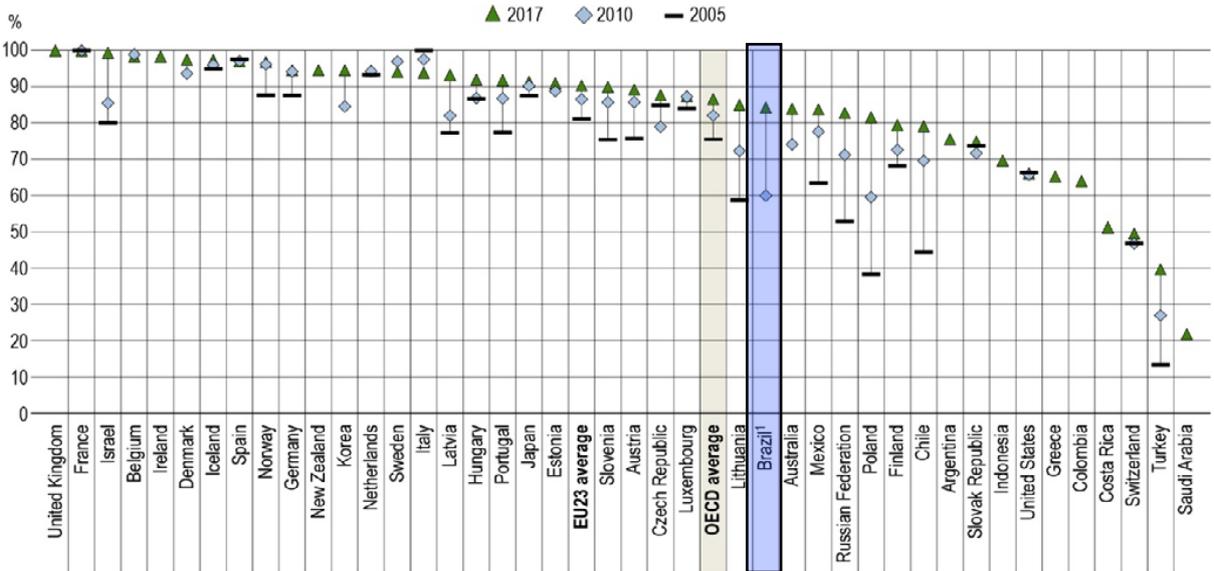


**Figure 4.7:** Primary School Enrolment in Brazil (% Gross); Source: World Bank<sup>1</sup>

<sup>1</sup> N.B. "Gross" enrolment includes students of all ages. In other words, it includes students whose age exceeds the official age group (e.g. repeaters). Thus, if there is late enrolment, early enrolment, or repetition, the total enrolment can exceed the population of the age group that officially corresponds to the level of education – leading to ratios greater than 100 percent. Source: World Bank

There are projects active as of the time of writing (2021), for example the Federal Project led by the Education Global Practice encompassing all 27 subnational governments. One of which, is the Salvador Social project<sup>2</sup> that aims to accelerate acquisition of basic skills and prevent dropouts, among others. The Municipality of Salvador is one of the poorest urban areas of Brazil according to the World Bank. An estimated 50% of its population live below the poverty line.

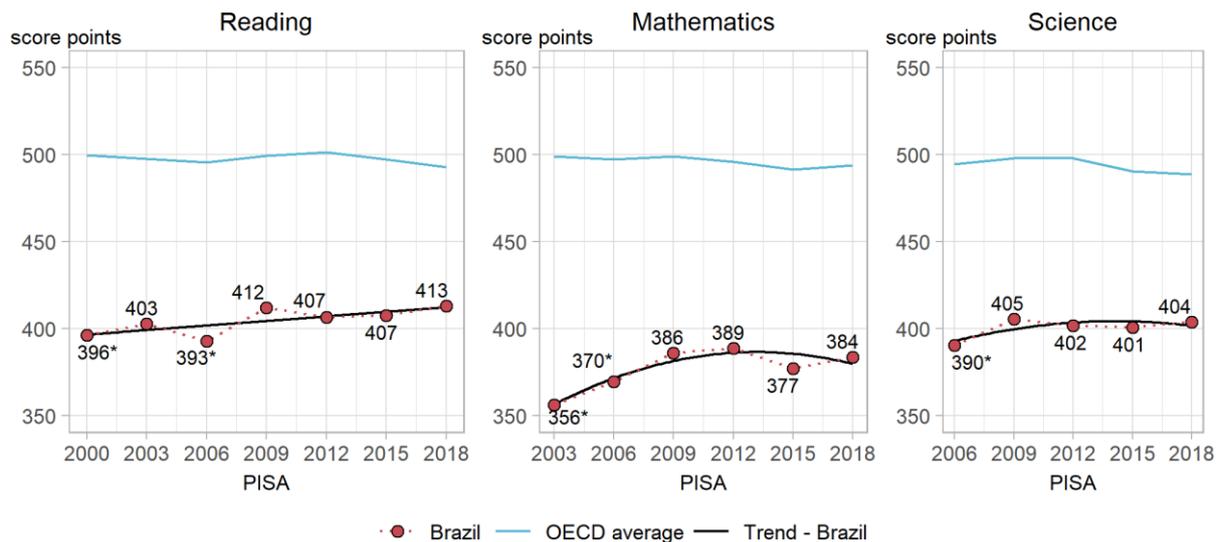
On the flipside, there has been an improvement in the enrolment rates for early childhood education from 2010 to 2017, seen in the figure below. There was a positive increase in the enrolment rate from 60% to approximately 82%.



**Figure 4.8:** Change in Enrolment Rates of Children (Aged 3-5); Source: OECD

Additionally, an upward trend is also seen in educational performance calculated based on the PISA 2018 results. Score points in Brazil improved across the board, in reading, mathematics, and science as seen in the figure below.

<sup>2</sup> For more details see: <https://projects.worldbank.org/en/projects-operations/project-detail/P172605>



**Figure 4.9:** Educational Performance Trends in Brazil versus the OECD Average; Source: OECD

It is noteworthy that Brazil’s spending toward education as a proportion of the country’s GDP has increased over the past years. Government expenditure on education went from 3.9% of GDP (2004) to 6.3% of GDP (2017) ("Brazil | Data", 2019). Allocating more resources and a larger proportion of government expenditures will improve many aspects surrounding education, such as the quantity of education provided (take-up/enrolment rate) as well as the quality of education for the years to come.

### 4.3.3 Health

The life expectancy in Brazil is just 75 years, below the OECD average of 80 years, according to OECD. This ranks Brazil 37th out of 40 OECD countries. Whilst Brazil scores low relative to other OECD countries in many metrics, like percentage that is educated and that have a paid job, its self-reported health metric<sup>3</sup> stands at 70%, placing Brazil at the median with ranking 20th out of 40 OECD countries. Korea reported 32.5% (ranked 40th) and Canada reported 88.4% (ranked 1st).

<sup>3</sup> Percentage of people reporting their health to be i) good or ii) very good, latest available year. For more detail see: <http://www.oecdbetterlifeindex.org/countries/brazil/>

Beyond life expectancy, Silber (1984) documents that the period of youth has continuous demographic growth in developing countries and thus needs to contend with the health needs of the young population (teenagers and young adults). Silber (1984) specifically studies Brazil and finds that there are issues in adolescent morbidity and mortality, as well as the current (at the time of writing) provision of adolescent health care. As the young population represents a large proportion of the population in Brazil, having sufficient and effective adolescent healthcare is crucial. Not only because of the proportion, but health problems in Brazil's adolescents are attributable to economic and cultural underdevelopment (Silber, 1984).

As for infant-care, in Brazil it was found to have improved over time, yielding a lower infant mortality rate (Silber, 1984). It is also important to discuss the parents and especially the mothers of these children. Pregnancy and abortion complications cause high mortality in Brazilian females aged 15-24. On top of high mortality rates in the age group, the majority of Brazilian women marry or live together in unions before the age of 25. As a result of this, less than half of the population was said to have completed high school. Therefore, the issue of proper healthcare and education are of utmost importance in Brazil.

#### **4.3.4 Safety**

OECD outlines safety to be a core element of an individual's well-being. In Brazil, safety is an issue, as only 36% of people reported that they feel safe walking alone at night ("OECD Better Life Index", 2020). Whereas the OECD average stands at 68%. From the same source, the OECD Better Life Index, Brazil's homicide rate is alarming, as there are 26.7 reported homicides per 100,000 people in Brazil as of 2020 versus the United Kingdom (the best ranked country) which has 0.2 homicides per 100,000 people as of the same year.

Road safety is another crucial category within the safety sphere of a country, especially in developing countries. Developing countries typically seek development i.e. the quantity of kilometres of road built at the expense of sustainability and regulation

required to make the newly built roads safe to use for all traffic users. Taking Myanmar as an example (a developing country in Asia), new highways were built where road users, especially those living in nearby towns, were uninformed on how road safety should be managed. For the case of Brazil, Luoma & Sivak (2012) investigate road safety management in the BRIC countries and find that each BRIC country has governmental level organisations with responsibilities for road safety, yet none have a single lead governmental unit responsible for national road safety. Luoma & Sivak (2012) also find that unlike Russia (and China, with some limitations), Brazil does not have any road-safety plan or road-safety targets. However, the silver lining in their findings is that there are select non-governmental units involved in road-safety in Brazil, similar to the other BRIC countries with the exception of China. For early childhood and caretaker safety, road safety and road safety education are crucial for reducing road accidents as well as creating awareness for the perils of road use.

Creating awareness for the perils of road use and by extension road accidents was found to be sufficient, along with fiscalisation, in nudging agents to use child safety devices (like booster seats) when transporting young children (Abib et al., 2014). In 2010, Brazil implemented a law that mandated the use of child safety devices. Abib et al. (2014) references a recent study done in Canada, which found that 96.8% of parents surveyed considered the use of child safety seats in cars as very important. As well as referencing a survey conducted in Brazil done in 2009, which showed only 36.1% of children were in safety seats, and 42.7% of them were using the safety seats incorrectly. While there are many studies outlining the significant reduction in risk of injury from using child safety seats for children, the uptake in Brazil should be improved. As in Brazil, the leading cause of children deaths is trauma and traffic accounts for 41% of mortality (Abib et al., 2014).

There are a handful of issues related to safety in Brazil, as with other developing countries. Eradicating them requires effective legislation (and thereby sufficient penalties) in tandem with proper safety education from a young age and in multiple disciplines (like driving schools) and paternalistic urban architecture geared towards safety and sustainability.

### **4.3.5 History and Politics**

Due to its particular position and climate, Brazil is full of important biological reserves and protected areas that are important for humanity. However, in the last decade the state had a policy oriented through development without taking into consideration the environment and its protection. Moreover, ecological disasters are very common due to the kind of industry present in Brazil (e.g. mines).

### **4.3.6 Family, upbringing and playing**

In the past decades, the national government decided to protect the Brazilian families by putting in place policies guaranteeing the minimal required necessities to ensure their survival.

Nonetheless, the regulations introduced by the Brazilian constitution on child labour were not concretely put into action. More than 2.7 million youngsters between 5 and 17 years of age work in the country, including 79 thousand children between 5 and 9 years old (Nascimento & Pretti, 2018). More than half of the child exploitation in the country is focused on the North and Northeast regions.

Both the social and educational activities that children adhere to are direct influences of the socioeconomic situation of the country. In fact, in 1996, Biasoli-Alves and Zamberlan analysed the demographic data representing 75 low-income families living in urban areas to examine the association among socioeconomic conditions, educational practices and child-rearing strategies. The results showed that children coming from both high socioeconomic and educational levels tend to engage more often in exploration activities compared to children from lower status. Parents who received a higher education, tended to promote their children's academic activities, and pretend less house duties and daily routines. Illiterate parents, on the contrary, asked their children to participate more in those same duties. Additionally, they found that in the higher income group, the child was never left alone. Whilst in the low-income group, very young children (3 to 4 years old) were left alone to take care of themselves.

# 5 Stakeholders

## 5.1 Policies

### 5.1.1 The Netherlands

#### *National level*

On a national level, the Rijksoverheid has the responsibility of implementing international and European nature policy in the Netherlands. When drafting the nature policy in the Netherlands, several social issues are taken into account, e.g., the development of cities and infrastructure. The Ministry of Land, Nature and Food Quality (LNV) and all the separate provinces set up this policy in an ambition called 'Nederland Natuurpositief' (2019) to create a national plan for nature policy. This plan highlights that our biodiversity is threatened by our own doing, meaning that we have to encourage strengthening nature not only in nature reserves but also in cities (Ministerie van Algemene Zaken, 2020).

Rijksoverheid sees nature in cities as necessary, because it helps with the preservation and restoration of biodiversity and against climate changes like water flooding and heat. An example of a plan of LNV to make cities more green is that builders have to account for nature when creating new building plans, which also holds for playgrounds in certain districts. To realise this, the LNV works on a programme called Duurzaamdoor, which is elaborated on in the province-level section.

Furthermore, Rijksoverheid has published their outlook on nature in the Netherlands until 2025 (Rijksoverheid 2021). Central to this policy is that nature should be part of society. Nature should not only be available in designated areas, but should also be present in cities. One of the important points in this policy is the aim to create more green rooftops in cities. Green rooftops can be used for many different purposes, and among them is designating a rooftop to children exploring nature. Here, exploring could mean either playing and/or learning, as is indicated previously in the report.

Building further on the outline of the Dutch educational system of Section 4.1.2, we can also look at the presence of nature education. According to IVN (2021), a stakeholder that will be elaborated more on later, nature education does not have priority in primary schools or in teacher training. In primary schools, only 0.5% of lessons are given outside, while teachers would like this to be 25%. In some primary schools, nature education only consists of showing a television show called 'Nieuws uit de Natuur' every week (Global Environmental Education Partnership n.d.). However, there are initiatives that aim to improve nature education in the Netherlands, for example NatuurWijs. This stakeholder will be elaborated on further in another section.

Regarding mobility in cities, the Rijksoverheid published their policy outlook called 'Mobility to 2040' in 2019 (Rijksoverheid 2019). Point 4 of this plan is to create reachable and livable cities. Children are not explicitly mentioned in this section, as they are included in the group that, according to the government, cannot adequately make use of the mobility system that is available. Therefore, it becomes clear that children are not (yet) central as an exclusive group in the decision-making for mobility in cities.

#### Province level

A lot of responsibilities of nature policies were transferred to provinces in 2011, which are now responsible for the green around cities and villages. Every province in the Netherlands forms a landscape policy. They make their policies based on national and international rules, following the 'Nederland Natuurpositief' (LNV 2019) report as mentioned before. These policies are formed by working together with different stakeholders like landowners and animal or nature organisations. Landowners that are trying to preserve nature or biodiversity may be eligible for subsidies.

#### City and municipal level

Municipalities are responsible for the construction and maintenance of green in public areas of cities and villages. Cities or municipalities can implement their own initiatives around nature in the city and prioritize children and nature on their agenda. They publish reports and policy plans to improve the access to nature in their city, which can either be focused on children or the whole population. In this process, municipalities often work together with private organisations to design and implement interventions.

An example of this is 'a Child Friendly City', initiated by the city of Rotterdam. This initiative focuses on how to make Rotterdam more child-friendly with respect to accessing nature and improving mobility. With this policy plan, the municipality of Rotterdam constitutes an example for other cities in the Netherlands for putting nature and children forward when designing a city for the future (Gemeente Rotterdam 2007).

In the Netherlands, there are no concrete insights regarding top-down management of playgrounds. Although the government motivates municipalities and national organizations to take action, their influence is rather limited because decision-making is not very centralized. The influence can be considered a combination, but is rather top-down than bottom-up. Local policies are stimulated by national institutions, but every municipality has the freedom to design and approve their own playgrounds. The Ministry of Housing, Spatial Planning and the Environment (VROM) sent a letter of policy in 2006 to all municipalities in the Netherlands. They requested them to create a policy regarding play areas for children. Additionally, a goal of dedicating 3% of new living environments to the development of play areas and where possible in existing living environments as well, was proposed. This created an increase in the activities of municipalities. National organizations like Jantje Beton and NUSO supported this policy creation (Lucassen et al., 2020). The municipality can also provide subsidies for this. There are very clear rules and guidelines for the way a playground should be designed, constructed and maintained (NVWA 2021). According to Ian Mostert of IVN, to encourage children to take risks and then learn while playing, it is important to increase the freedom in designing these playgrounds, e.g., by not making prefabricated play elements, but rather letting the children construct something with natural materials themselves. This is difficult with the current clear and strict guidelines for a playground.

### Evaluation

In the Netherlands, a very structured division of tasks can be observed. Responsibilities are distributed on different levels and are not centralized. On a national level, the government mainly focuses on implementing international policies with general goals for the country. The actual responsibility of implementing and designing nature within the country is handed over to the provinces and the cities or municipalities. This is a good way of dividing the responsibilities, because people on different levels have differing views on what might be best for nature policy. People that work on a national

level might focus more on reaching goals for the country, without knowing what would be best for specific regions. This also works the other way around, where municipalities usually focus on what is best for the landscape but disregard the big goal of the country. With the government responsible for general nature goals and provinces and municipalities focusing more on designing the nature around this policy, knowledge is well divided and assigned to the right people. Consequently, more space for responsibility is given to smaller organisations trying to have influence on the policy, making the approach participatory. When the work is divided into smaller groups more information sharing is possible and better decisions can be made.

Children, however, are not central in Dutch nature policy. Many policy plans are aimed at preserving wild nature and creating more green spaces in cities overall, which is not directly linked to child development. This also translates to education, where properly taking children outside to experience and discover nature is not a standard or frequent activity. This trend continues in mobility as well, as mentioned in Section 5.2.1.. Initiatives like the *Kindlint*, which will be introduced in Section 5.2.1., can improve this by incorporating children as a central stakeholder in urban mobility. However, more research has to be done on how to design these initiatives in the most beneficial way.

An important aspect to consider with Dutch policy is its decentralization. The government has separate departments for nature, general well-being and health. Municipalities therefore have a lot of freedom in how to implement nature policies and design green spaces in urban areas. Furthermore, private organisations have a lot of knowledge in different fields or areas of the Netherlands, which complicates centralizing know-how. There is a lack of initiatives that unite stakeholders and organisations to structure and combine knowledge. Some of these relevant stakeholders will be introduced in the next section.

## **5.1.2 Israel**

### **Spatial planning**

Spatial planning is an important part of Israeli policies. A number of National Master Plans have been set up over the years in order to tackle different aspects of spatial planning, such as housing, transport, environmental protection and infrastructure. Currently, Masterplan 35, from now on called Tama 35, is the most important one and

addresses construction, development and conservation. This plan first came into existence in 2005, but was amended in 2016 (OECD, 2017). Through using land more efficiently, the goal of Tama 35 is to “maintain a balance between Israel’s development needs and the wish to preserve open spaces and the environment while taking future generations into consideration” (The Reut Institute, 2021). By increasing housing availability without significantly undermining the natural environment and public space, pollutants are limited while offering sufficient public space to children and caregivers in terms of parks and playgrounds, for example.

Tama 35 is based on three principles:

1. **Concentrated dispersion**, entailing dispersing the population at the national level, but concentrating them into urbanized areas at the regional level,
2. **Metropolitan structure**, in which the plan identifies four metropolitan areas, namely Tel Aviv, Jerusalem, Beersheba and Haifa, and
3. **Spatial structuring of open space**, advocating for a national green area and green buffers for metropolitan areas (OECD, 2017).

To take all of these points into consideration during spatial planning, Tama 35 makes use of so-called textures (The Reut Institute, 2021 Hershovich, n.d.). The different textures serve as a distinction between areas for conservation and areas for development.

The extent to which Tama 35 achieved its objectives varies. From 1995 to 2007, after the initial implementation of Tama, new housing starts more than halved. This prevents Israel from achieving its housing goals, while simultaneously having negative implications for the future availability of public space such as playgrounds (Benchetrit, 2014). This is supported by a report from the OECD (2017), which finds that Tama 35 does not address the necessity for infrastructure and services in urban areas, which includes public space.

Environmental issues have recently seen a greater incorporation in the Tama 35 strategy (Hershovich, n.d.). Environmental protection benefits everyone in society, but, as discussed, children benefit disproportionately as they are in their developmental phase.

Another point included in Tama 35 is limiting urban density on a national level. This prevents the undersupply of public space, as increasing population density without

expanding public space decreases per capita public space. This benefits children as well as caregivers, e.g., by limiting noise pollution alongside other environmental stress factors (Bimkom, n.d.). Going forward, Tama 35 should pay special attention to the provision of public space. With housing becoming more scarce, it is important to limit the number of low-density housing, e.g. those with a garden, and instead make these green spaces available to the entire community. This would reduce developmental inequalities attributed to the green space availability while potentially fostering social cohesion through greater neighbourhood interactions.

### *Air pollution*

In section 2.1.7., the negative impact of air- and noise pollution for the health and well-being of both young children and their caregivers was discussed. There are four important sources of air pollution in Israel (The Reut Institute, 2021). The two main sources of pollution are the energy industry and traffic. Other sources include climate-related air pollution, mainly dust particles due to the geographic location, and energy production. The air pollution from industry has been addressed in the Clean Air Law that was legislated in 2008, and implemented in 2011 (Negev, 2020). The transport sector is the second largest emitter of greenhouse gases in Israel, with increasing emissions due to population growth and the expansion of car ownership (OECD, 2020). Poor public transport requires many people to rely on private cars for mobility, as many people work outside their neighbourhood (OECD, 2020).

### *The National Plan for Transport*

First, a policy regarding pollution from traffic will be discussed. In 2015 the Israeli government designed a National Plan for Transport (OECD, 2020). To reach the goals of the Paris Agreement, this plan aims to have a 20% reduction in vehicle-kilometres travelled compared to business-as-usual. In order to reach this objective, the development of public transport was considered to be most important. This development contained the following tasks: enhance physical accessibility, ensure affordable services, safety and security, reduce air pollution, noise, associated risks and habitat damages, and limit climate change (OECD, 2019). All these targets are relevant to children and

caregivers by reducing pollutants and increasing accessibility of public services, especially to low-income houses who may struggle to afford private transport.

Thus, the National Plan for Transport contained a particular focus on the expansion of public transport in metropolitan areas. In 2017 they launched a 2040 strategy for railway networks, and a strategy targeting public transport in Tel Aviv, Jerusalem, Haifa and Be'er Sheva. For Tel Aviv specifically, the mass transit plan aims to have 40% of motorized trips be with public transport by 2040, leading to a decrease in traffic emissions.

The number of public transport trips in Israel has been increasing, suggesting the effectiveness of the policy so far. In addition to the increased passenger train use, bus use increased by 70% in only 15 years. While all of this shows that the policy was successful in increasing the usage of public transport, usage is still low compared to OECD standards, mainly due to low investment (IMF, 2018). Another shortcoming is that only half of the workplaces are reachable by public transport (Suhoy & Sofer, 2019), thus limiting opportunities of low-income groups to access work.

Another shortcoming is the increased inequality between regions. Suhoy and Sofer (2019) show that access to public transport is specifically low in peripheral areas, where Arab communities are concentrated.

While developing public transport systems, the government focused on mobility demand and increasing speed (OECD, 2019). However, given our evaluation, the Israeli government needs to primarily address accessibility of public transport. In this case improving accessibility means making it easier for people to reach destinations for goods, services, jobs and other activities. This allows children and caregivers to explore natural environments outside their immediate vicinity, such as parks and beaches.

### *Clean Air Law*

As stated in section 4.2.4, the health of children in Israel is very good, partially due to good policy regarding the environment, for example the Clean Air Law. The objectives of the Clean Air Law are improving air quality, as well as preventing and reducing air pollution. The law was implemented in order to protect the health and quality of life and to protect the environment for the public and future generations (Negev, 2020). The main components contain, for example, the consolidation of air quality monitoring systems,

allowing local authorities to take actions to reduce and prevent air pollution, requiring major industrial polluters to obtain emission permits to continue their activities (these permits are based on the best available techniques) and formulating a national plan for the reduction and prevention of air pollution (Ministry of Environmental Protection, 2019).

Negev (2020) provides some critique on the principles of the Clean Air Law. The first critique is that the emissions permits are based on the technology available at the moment of issuance of the permit, not when the pollution occurs, thus limiting their potential in pollution reduction. Negev (2020) also claims that the values are not ambitious enough, as it is still unclear when the target values and reference values will become mandatory.

### *Socioeconomic Inequalities*

The last few decades have seen major improvements in the quality of life of all Israelis, as measured by various outcomes such as health, income and education. However, the Arab minority is still marked by its lower socio-economic status compared to the Jewish Israeli majority, as is demonstrated by its disproportionate poverty rate of 49.2% (National Insurance Institute, 2016), more than double of that of the Jewish population. This significantly affects children given the social determinants of health, leading to worse later life educational and financial outcomes (World Health Organization, n.d.). The negative consequences on, e.g., health outcomes, are amplified by lack of affordable housing, poor quality of public space in minority communities as well as shortage of quality services such as clinics. Historically, even public services such as sewage systems have been underfunded in Arab localities making way for diseases, although this has been improved upon (Tal, 2002). Yossi Sarid, the Minister of Environment in 1992, made efforts to reduce some of the environmental inequalities facing Israeli society. More recently, the Israeli Planning Administration (IPA) laid out its spatial planning policy for Arab localities to the Human Rights Watch (Meril, 2020), which aims to address some of the mentioned spatial planning inadequacies in Arab communities.

To address the socio-economic issues facing Israel's minority Arab population, the government has implemented "master plans" for 119 of 132 Arab communities (Human

Rights Watch, 2020). These planned strategies include new high-density development areas, providing public space and increasing the availability of health services. While the strategy aims to increase the density of housing, it also allows the community to access space in adjacent parts of the locality. This addresses the issues of housing availability without compromising the amount of public space available. This is especially relevant for young children and their caregivers, whose range of mobility might be limited. At the same time, developments are limited by considerations for the natural environment in order to reduce the negative impact of urban infrastructure.

A masterplan has been implemented in various towns, including in Jisr Al-Zarqa, which is located in the Haifa municipal region. Part of Jisr's masterplan to increase the availability of housing included the diversion of a major highway, which has the added benefit of protecting people, including children, from the impact of air and noise pollution which the highway may contribute to. Though there is no mention of public green space, the policy included zoning changes to some of the surrounding green areas in order to make way for housing developments. While this may have negative environmental consequences, which affects public health, the policy outline includes the provision of public space which could compensate for some of the lost surrounding natural environment.

The major benefit of these policies is the greater availability of housing in various Arab communities through the approval of large-scale residential projects (OECD, 2017). Between 2012 and 2019, Israeli authorities have approved 160,000 housing units in these communities. However, the Israeli approach also has its downfalls. Majority Jewish localities surrounding Jisr are much less densely populated, giving way for more public space. Higher density housing in Arab communities has been viewed as a strategy to reduce the living areas of Arab communities, in which the majority of Israeli Arabs live (Human Rights Watch, 2020). These spatial inequalities in terms of density affect children in negative ways by inherently making public space, green or other, more scarce. According to the master plan for Jisr, the availability of public services such as health services would be enhanced, which can reduce stress for caregivers by allowing them to access these services within less time (Meril, 2020). To what extent this has been achieved so far is unclear.

These insights suggest that the policy may be neglecting public space, including green space, at the expense of housing. To prevent this, Israel could transform the natural environment surrounding the locality to an NBI. For example, Jisr is separated from the adjacent locality by a wild plot of land. Investing in walking paths and nature-focused playgrounds could expand the public green space available to both communities, including children from disadvantaged backgrounds, without undermining its environmental targets. Therefore, enhancing the public space available in densely populated areas can offset some of the negative impact of small living space.

### Evaluation

In Israel there is a very centralized system regarding the decision making process, as can be seen by all decisions being taken at the state level without leaving any spaces for provinces or municipalities to express their opinion. However, this process seems to work. Indeed, we can see that the Tama 35 project regarding spatial planning is considering the needs of children in urban settings. This is done by planning the construction of green spaces while creating more affordable houses.

Regarding the other policies we can see that Israel's government is less considerate of the needs of Arabs. For example, the National Plan for Transport does not increase the access to public transport for peripheral areas in Arab communities, creating an increase of inequality for Arabic adults and children compared to Jewish ones. This is an important factor that will be further developed in our recommendations in section 5.4.2.

Summing up, we can say that the state's lower consideration of the needs of Arabic citizens demonstrates inefficiencies of centralized decision making processes. Such a model does not allow for much participation, making the state "deaf" to the needs of people that are not directly involved in the policy processes.

### 5.1.3 Brazil

#### Education

As stated in paragraph 4.3.2, education is a critical factor in Brazil. Being a Federal State includes that the education system comprises all the 26 states and municipalities. All the federal components are given the right to legislate their chosen education systems. This means that both public and private schools are in power to dictate how they want to provide the right services for the community based on their needs. Consequently, this design prevents standards systems or rules from being in action for everyone.

The Federal Constitution has included the right to education by defining it as a social and individual obligation: education is thus a responsibility of the state and has to be provided by all the different federal entities.

Occasionally, the city's municipality itself has the responsibility for the education or its implementation. This was seen in 2013 in the city of Campinas (among the 10 biggest cities of Brazil): here, the minimal standards of basic education, as required by the country constitution for children from 4 to 5 year olds, were not even remotely met. To solve this problem, the municipality increased the funding in this sector by 13% while putting in place a policy that coordinates the different stakeholders. This project made children from 4 to 5 receive an adequate education in 2016.

The project also faced challenges. Infact, Campinas has neighbourhoods with very low public services, especially for early childhood education, with inadequate infrastructure. At the same time, the municipality had a budget limit for the construction of new schools and for hiring new teachers. Nevertheless, the initiative had a positive impact on people's political commitment. During this period, the mayor of Campinas prioritised education in his policy, something that was missing in the prior administrations due to the fact that two mayors were impeached. During our interview with the BvL representative for Brazil it was made clear that political commitment is highly important for the implementation of new policy in Brazil.

The government of Brazil aims to improve education for children by funding several education programmes. In January 2006, the House of Representatives created the *Fund for the Development of Basic Education and Appreciation of the Teaching Profession (Fundo de Manutenção e Desenvolvimento da Educação Básica e de Valorização de Profissionais de Educação (FUNDEB))*. This funding programme focuses on elementary

education with the objective of redistributing resources for the education sector across the country, by taking into account the different regions' situations.

Furthermore, the government of Brazil also focuses on creating social welfare programs. *Bolsa Família* provides financial assistance to poor families in Brazil, however, there are some rules attached to getting this aid. If families have children, they are obliged to make sure their children attend school and get vaccinated. When the total of permitted school absences is exceeded, their help will not be given anymore. The effect of this conditional programme is a decrease of short-term poverty which works as a motivation to attend school. Consequently this will have positive effects on the long-term, since human capital increases with better chances on the job market, which decreases poverty even more.

At last one of the biggest foundations for policy in Brazil was the enactment of the Federal Constitution of 1988, which has provided significant progress over previous periods, especially in the educational area (Prina, Vidoni, & Glenn, n.d.). Given the age of the Federal Constitution, it is no surprise that the reforms are considered incomplete and have room for efficiency and equity improvements.

### Environment

The *National Environmental Policy* (NEP) was installed by the Brazilian Government in 1981. This policy's goal is to make sustainable development possible by using tools who can ensure the protection of the environment.

Moreover, because of the size of the Brazilian territory the NEP created the *National Environmental System (SISNAMA)* with the aim to put together the different Brazilian environmental institutions at all levels. The goal of this institution is to put into action the regulation written in the constitution.

The head of NEP's structure is the National Government Council, which is the top advisory body of the Brazilian president for formulating guidelines and national environmental policies.

However, in the last years the Brazilian government and their representatives found ways to dismantle the nation's environmental regulation.

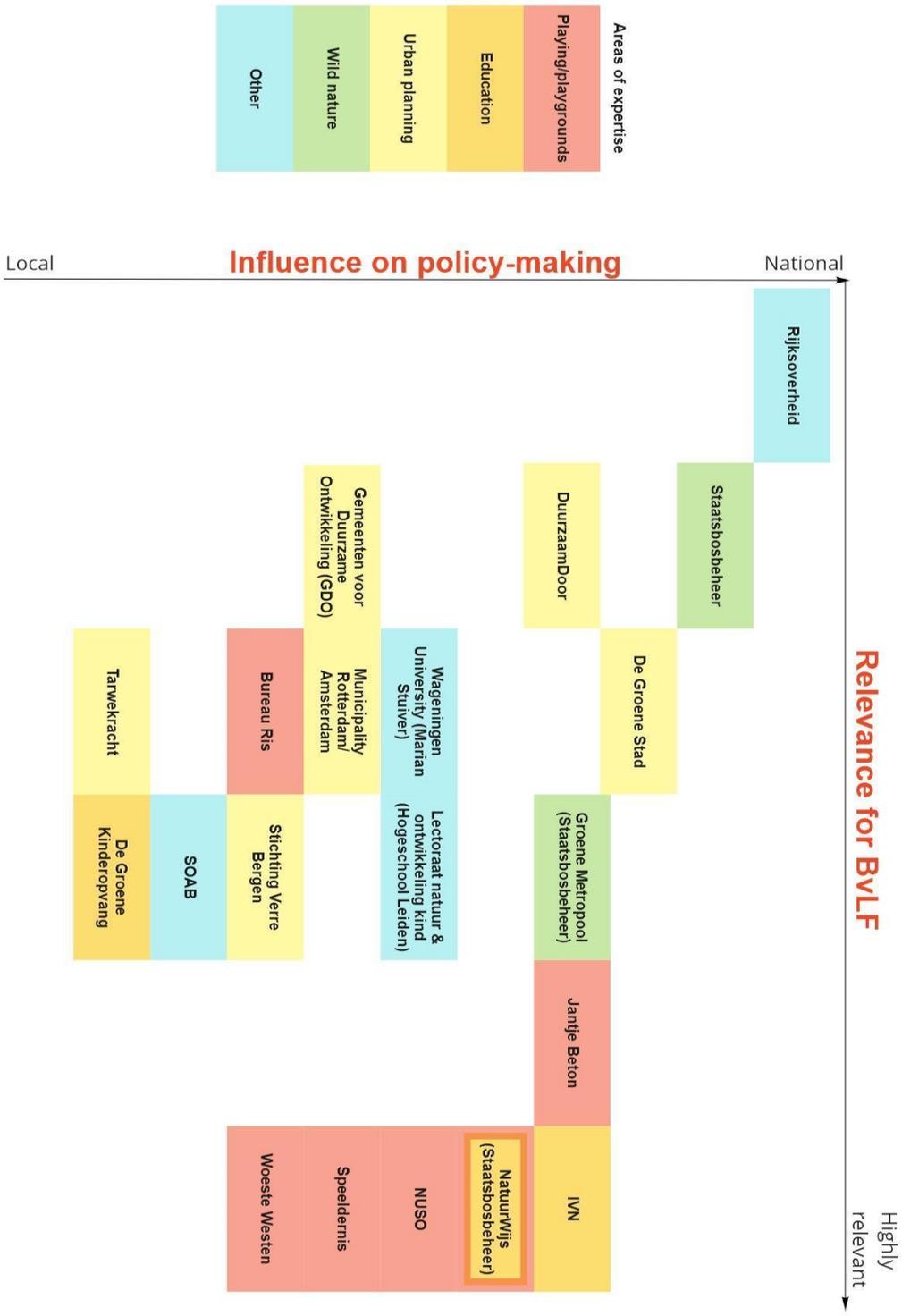
## **5.2 Stakeholder Mapping**

All three countries discussed in the previous section have different stakeholders that might influence a nature policy. A stakeholder mapping for every country is made to show stakeholders in an organised and accurate way where these stakeholders can be easily distinguished in influence, size and type. Since every country has a different structure in policy and decision-making, not one type of stakeholder mapping could apply for all countries. Therefore, three different stakeholder mappings have been constructed to reflect the stakeholders combined with the policy of the country as best as possible. This gives BvL the chance to use a certain stakeholder mapping with a similar type of country in the future.

### **5.2.1 The Netherlands**

Multiple stakeholders have influence on nature policy in the Netherlands. However, they vary in type, size and degree of influence on the policy. To distinguish the stakeholders from each other and identify them, we have made a two-dimensional stakeholder mapping as can be seen in the figure below. On the x-axis we show how relevant an organisation is to BvL with the influence on the nature policy of this organisation on the y-axis. Another distinction is made between the type of organisation by assigning a color to a specific type of organisation.

**Table 5.1:** Stakeholder mapping of The Netherlands



miro

### Governmental organisations

The organisation that is responsible for the management and conservation of Dutch nature is *Staatsbosbeheer*, which aims to strengthen the position of nature in the Netherlands. This organisation is mostly active in wild nature areas, outside of cities. *Staatsbosbeheer* works closely together with the Dutch government and organizations such as *NatuurCollege*, *Stichting BoomFeestdag*, *Jantje Beton* and local governments. It has two branches that focus on nature in cities or children and nature: *Groene Metropool* and *Jeugd & Natuur* (*Staatsbosbeheer 2021*). The latter one includes children as its main focus group and has initiatives like *NatuurWijs* to educate children about nature. Furthermore, *Staatsbosbeheer* organizes different activities and has set up 51 nature playgrounds, of which 24 are play forests (*speelbossen*) around the Netherlands where caregivers can let children play adventurously in nature while being in a safe environment. They believe that nature is something children have to really experience, because they think that is the best way to learn about nature. A television programme like 'Nieuws uit de Natuur', as explained in the section under 5.1.1, would not be sufficient. The *Groene Metropool* (*Staatsbosbeheer 2021*) creates and supports initiatives that make cities in the Netherlands greener. According to *Staatsbosbeheer*, the road to greener cities is to connect, improve and increase the access to nature. For example, adding physical connections between the city and its natural surroundings, making nature in cities more attractive for recreation and adding multifunctional areas.

*NatuurWijs* is an initiative of *Staatsbosbeheer* and *Natuurcollege*. Their slogan is “nature as a classroom”. They organize educational activities in nature for elementary schools with a focus on self-discovering. They also provide a number of nature assignments that teachers/parents/caregivers can download to let children experience nature when they go to a certain area. According to Keelin O'Connor, a team leader at *Staatsbosbeheer* and director of *NatuurWijs*, current policy within the department of education is mainly focused on educating children in Maths, reading and language, while priority in nature education is neglected. This can also be seen in the nature policy of the LNV, which is very generally focusing on nature in cities, without specifically mentioning children as a group. *NatuurWijs* is aiming to reach more children in primary schools every year. In 2015, around 5,500 children from 80 schools participated in programmes of *NatuurWijs* (*Global Environmental Education Partnership n.d.*).

*DuurzaamDoor* is a programme set up by the government to bring government and social initiatives together, with the goal to speed up the process of making a more sustainable society. The programme does not work with a top-down method but aims at creating as many partnerships as possible. Sustainable Development Goals (SDGs) set up by the United Nations help the Netherlands to solve fundamental problems. *DuurzaamDoor* also works with the perspective of these SDGs.

### *Non-Governmental and Non-Profit organisations (NGOs)*

*Jantje Beton* is an organization with the goal of encouraging children to play outside more often. The organization aims to achieve this through different initiatives, e.g., supporting the development of playgrounds. Moreover, they organize outdoor events for children and they stimulate elementary schools to get their students to play outside more. *Jantje Beton* is only active in the Netherlands. This stakeholder could be linked to BvL when it comes to developing green space for young children. This way, *Jantje Beton* could help in realising more and better playgrounds for young children to accelerate their development.

Since 2015, *Jantje Beton* has supported the *Nederlandse Unie van Speeltuinorganisaties* (NUSO), in English the Dutch Union for Playground Organizations. *Jantje Beton* supports NUSO in their activities. The predecessor of NUSO was founded in Amsterdam in 1902 as the first Dutch playground association. The most important goals of the union are general education, physical training, mental training and providing opportunities for relaxation. NUSO designs and supports the maintenance of playgrounds in the neighbourhoods of the Netherlands. They also aim to incorporate children into the decision-making process (NUSO n.d.), in an initiative together with *Jantje Beton*. Furthermore, NUSO also gives advice on which natural elements are safe to incorporate into a playground, to encourage self-discovering while playing.

*Speeldernis* is a playground in Rotterdam whose goal is to let children play in a natural environment. What distinguishes *Speeldernis* from regular playgrounds is its place in nature. Swings and slides are replaced by ponds and trees. The philosophy of *Speeldernis* is to let children come into contact with nature while playing. Through doing this, the organization hopes children improve their motor and social skills. According to

their view, playgrounds can be made more natural instead of the ordered space it now commonly is. Speeldernis collaborates with elementary schools when it comes to teaching children about nature. There are different programs that teach children about nature when they are at school. Another example of such a playground is het *Woeste Westen* in Amsterdam. Similar to Speeldernis, het *Woeste Westen* also collaborates with elementary schools to teach children about nature.

*De Groene Kinderopvang* is a day care for small children. It differs from regular daycares on several points. *De Groene Kinderopvang* offers children healthier food. Moreover, there is more attention on playing outside to teach them about nature. At last, they are a very sustainable daycare when it comes to energy and material usage. This daycare is located in Obdam, Noord-Holland. The vision of *de Groene Kinderopvang* is that outside play is needed for young children to develop social skills and to discover their own personality. Moreover, children learn to give their opinion and to stand up for themselves. The daycare could influence the topic of the research by giving new insights in the effects of green space on the development of young children as they have a lot of experience in this subject.

*Tarwekracht* is an initiative in the Tarwewijk in southern Rotterdam. Its aim is to improve the neighbourhood through improving the physical and social living environment. The project could serve as an example of how policy is implemented. Moreover, it could serve as an example to other neighbourhoods in the Netherlands. BvL can see this initiative as an opportunity to stress the importance of thinking about young children when developing this neighbourhood.

An initiative that takes into account children and mobility is the *Kindlint*. This programme is developed by *SOAB*, a traffic consultancy company (SOAB 2021). It was opened in Amsterdam in 2007, and consists of a safe travel route for children with play spaces. Along the route, other traffic is limited and it is created for children to use without the supervision of caregivers. An evaluation on *Kindlint* reports that many children make use of it when walking to school, and it connects new and existing playing areas for children (Wassenberg, F. & Milder, J. 2008). This organization can be interesting for Bernard van Leer, since it can give them an opportunity to help improve the liveability of cities for young children.

*Stichting de Verre Bergen* is another Rotterdam-based organization. This organization has the goal to make Rotterdam better and stronger. They do this through coming up with, supporting and executing societal projects. This project is not focused on children or nature specifically. However, they work on a project which aims to make neighbourhoods in Rotterdam more green. They especially focus on neighbourhoods which are not green to start with. This organization is probably not of the utmost importance to Bernard van Leer, since *Stichting de Verre Bergen* has a lot of other priorities which are not related to nature or children.

*IVN* is an organization that aims to bring nature closer to children. They organize activities for children in school, in daycare and in their free time. They also facilitate educational resources for pedagogical employees, teachers and parents. An important pillar for *IVN* is food education. They want to improve awareness of food production and consumption by planting “Tiny Forests”, among other things. Right now *IVN* is active in most regions in the Netherlands. *IVN* is an interesting organization for BvL because they are active in many areas and have multiple ‘cases’ that could be implemented in more schools and neighbourhoods. *IVN* also creates network groups for municipalities and private organisations to share knowledge on the topic. Ian Mostert of *IVN* especially highlighted in an interview that it is crucial to incorporate the connection between children and nature in city planning and building new schools at an early point.

*Gemeenten voor Duurzame Ontwikkeling (GDO)* is an organisation that connects local and national policy regarding nature and sustainability. They work together with municipalities and local organisations focused on nature education. *GDO* could therefore be an interesting platform for Bernard van Leer to connect with new (local) stakeholders.

Another organisation that tries to connect children with nature is *Bureau Ris*, based in Gouda. It is a design and consulting agency trying to create a more green and beautiful outdoor space and to make nature a place where people can relax, experience and meet. They have projects all over the country with a big focus on green playgrounds for children.

### Stakeholder Recommendations

Following the stakeholder analysis of the Netherlands as outlined above, there are several key partners that are relevant for different types of NBIs. Regarding the implementation of a specific NBI in a city, the respective municipality is the player that decides where an NBI is placed and if it is approved. Working together with municipalities therefore ensures that there will be more NBIs in urban areas that focus on child development. For education, *NatuurWijs* and *IVN* are key players. They are large organisations with a lot of knowledge on nature education, both outside and inside schools. Their programmes are already implemented across primary schools and for primary school children across the Netherlands, and therefore they also have significant reach. Finally, *Jantje Beton* and *NUSO* are organisations that drive to design playgrounds in the most beneficial way for the development of children. Working together with these players can help change the way in which playgrounds are designed, for example by using more natural elements or making the constructions less pre-fabricated. Furthermore, they can assist in communicating to stakeholders what is actually important in a child's play environment.

For an NBI to be successfully implemented, buy-ins are needed from several players. The most important ones to consider here are municipalities or other governmental actors that can provide subsidies, parents and other relevant stakeholders from the neighbourhood and national or local organisations that manage the intervention. Governmental support is important for an NBI to be initiated, because subsidies are usually a significant part of an NBI's funding, as will be elaborated on in section 6 of this report. Furthermore, if parents and stakeholders from the respective neighbourhood do not perceive the NBI as safe, relevant or fun for their child, there will most likely not be sufficient support. Finally, a national or local organisation that has knowledge on how to structure and implement the NBI should have oversight. Some of the stakeholders introduced above can assist here.

## 5.2.2 Israel

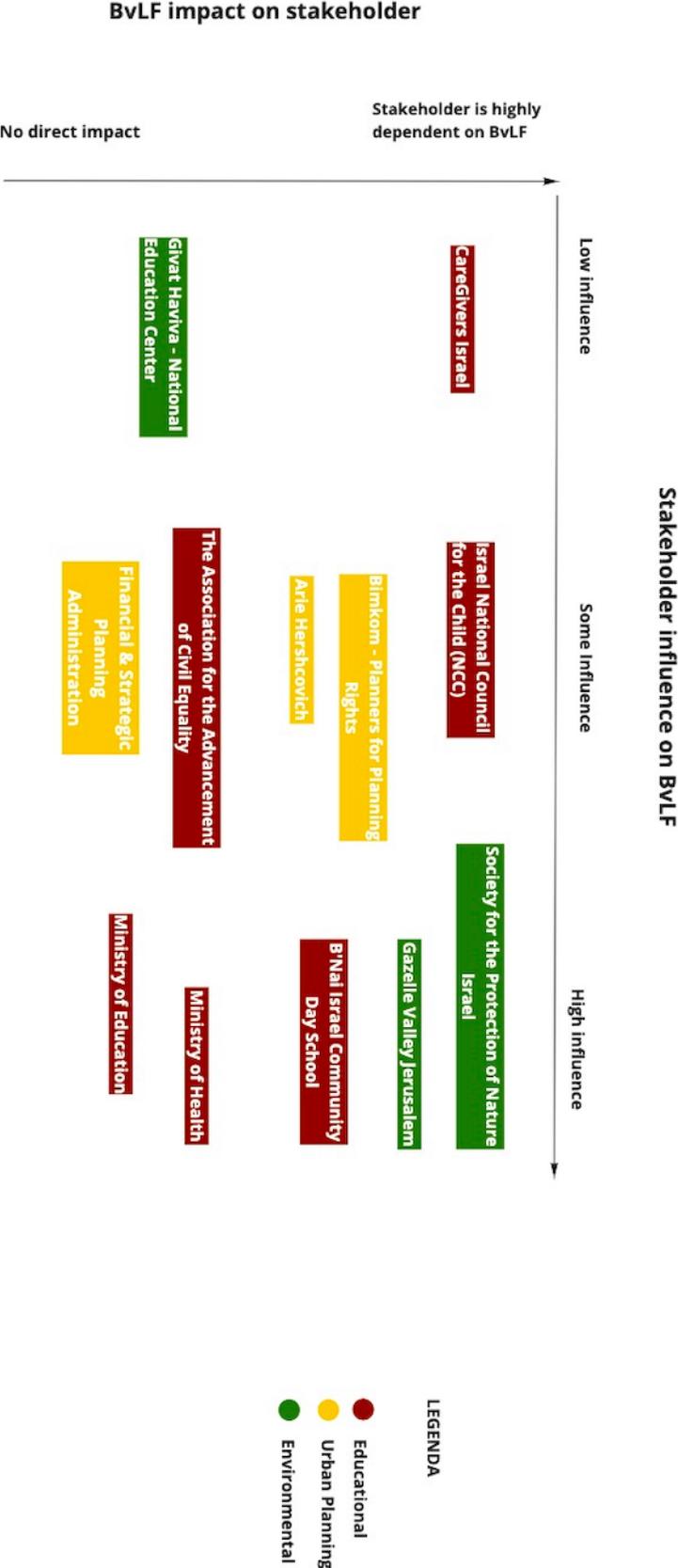
Government organisations, Non-governmental organizations (NGOs), academics and small private enterprises that could be interested in nature, policy planning and child development were also identified for the Israeli context. The stakeholders are mapped in Figure 5.2, focusing on two dimensions:

1. The stakeholder's influence on BvL; and
2. BvL impact on stakeholders.

These two dimensions are plotted using a rating scale. We chose this approach as we see BvLF not only as a receiver of "benefit" from other stakeholders, but also as a trade-union between different stakeholders. The key focus should be the top right quadrant, as it entails the combination of high influence and high dependence. Moreover, the stakeholders were divided based on their function using different colours. The stakeholders for city planning are identified by the yellow colour, the environmental ones with green and the educational ones with the red colour.

It is necessary to disclaim that due to the circumstances of this project (i.e., COVID-19, the Israel-Palestine tensions and being located abroad), it was very difficult to have direct contact with the stakeholders. Thus, the relevance and information on the stakeholders mentioned below are based on the information found on the internet. However, our map will be helpful to implement future projects in Israel, because it makes clear who the essential stakeholders are, facilitating the prioritization of these entities.

**Table 5.2:** Stakeholder mapping of Israel



### Governmental Organisations

Understanding the government organisations is essential to understand the current direction of the country as a whole. The government represents the ideals and steers the country into a particular direction. The history of Israel is also important to take into consideration here, as explained in section 4.2. The government organisations below can help grasp the challenges, the most relevant ongoing projects and policies, and the current status quo of the Israeli landscape regarding children and nature.

*The Financial & Strategic Planning Administration* is part of the Ministry of Health of the State of Israel. They are subclassified into three main areas. The first one is responsible for conducting analyses of economic aspects of the health systems such as assessments of health services and research on health economy issues. The second one is in charge of economic analyses related to the National Health Law, the Health Basket and their costs for funding. The third area is in charge of monitoring trends in service consumption to decide the method of allocating funding sources (State of Israel, Ministry of Health, n.d.)

This administration should be up to date in the research of nature in the health of adults and children. They might be able to provide relevant case studies, the latest literature and the current potential areas still to be researched.

*The Ministry of Education* is responsible for overseeing educational institutions, from kindergartens to higher education. The ministers focus on legislation of education services, licensing professionals and planning the educational system (Ministry of Education, n.d.). This institution might be very valuable as it could help grasp the current education policy landscape of Israel and the direction they are aiming to go in. These can provide us a great insight about the value that the educational system in Israel places on nature. If they are indeed working on policies to foster nature in the educational system, it could be very interesting to know their focus, challenges and goals.

*The Ministry of Health* bears national responsibility for ensuring the health of the population of Israel. The ministry determines the policy on matters of health at a national level. The Ministry of Health has a department that represents the welfare of mother, child and adolescent issues from the public health perspective. This stakeholder might be very

interesting for future projects that study the impact of nature on toddlers and mothers. Indeed, this department could help gain knowledge about the health of toddlers and mothers that can be compared with the level of health of a control group that has used one of our proposed NBIs.

#### *Non-Governmental and Non-Profit organisations (NGOs)*

*Sikkuy: The Association for the Advancement of Civic Equality* intends to fight for peace and equality among the Palestinians and Jewish citizens in Israel. Their main objective is to stand against the discrimination and ongoing inequality between both groups. They are managed and owned by Jewish and Arabs in order to ensure an equal pursuit of interests. Their strategy to achieve this relies on influencing senior decision-makers in the government, public and private sectors through appropriate research and practical recommendations, and to transmit their ideals to society through media and digital spaces. They work in planning and housing, public transportation in Arab towns, infrastructure and employment, among others (Sikkuy - The Association for the Advancement of Civic Equality, n.d.). As explained in previous sections, socioeconomically segregated minorities might suffer from unhealthy environments and might have limited access to parks and urban green spaces. This NGO might have an interest in developing access to urban natural spaces in Arab neighbourhoods to ensure equality among citizens.

*Givat Haviva* was founded in 1949 as the national education centre of the Kibbutz Federation in Israel. This association also aims to build an inclusive and equal society in Israel through education. Their mission is to engage communities to create a sustainable Israeli democracy based on civic equality and responsibility. This is done by facilitating cross-community projects, elaborating training and capacity building activities and using workshops to implement their ideas in society (Givat Haviva, n.d.). This NGO is mainly active in Israel, but they also engage in international programs to foster international education. They host short and long term academic programs for universities, and offer international boarding schools for international and Israeli (both Arab and Jewish) students. They are considered a pivotal educational centre for social justice (Givat Haviva, 2021). This organization might be helpful to provide the most recent trends regarding the inclusion of nature as an educational tool for kids. They could explain the problems and benefits about the inclusion of more natural spaces in school grounds and

neighbourhoods, and whether this could help them achieve a more equal society. Their influence and prestige might prove very useful for the research.

*The Israel National Council for the Child* (NCC) is another NGO recognized for being Israel's foremost and oldest advocate for children's rights and well-being in Israel and worldwide. They protect all children's rights equally, regardless of their religion, ethnicity or socioeconomic status. This is done by providing support to children in need of help, influencing public policy, and raising public awareness of children's rights. This organisation is involved in themes such as "Children and Health", "Children and Education" and "Law and Policy Design for Children and Youth in Israel", which might contain important developments regarding the effect of nature (National Council for the Child, n.d.). Important to note, however, is that they do not explicitly mention the importance of nature in their activities, which might indicate their focus on other issues. This organisation can give a great overview of the current challenges faced by children in Israel, and what actions are taken to solve them. They can give their opinion regarding the inclusion of nature in playgrounds, neighbourhoods, and schools. In case they have experience dealing with the effect of nature on child development, they might be able to provide case studies and research information.

*Bimkom - Planner for Planning Rights* is an Israeli NGO which mainly operates in Israel and in Area C of the Westbank (which is also under Israeli control) in both Israeli and Arab communities. Their objective is to develop planning policies and practices that are more in line with human rights and which attend the needs of local communities. They strive to assist the weakest sectors through research, planning assistance and through raising awareness among planning authorities. Some examples of their actions are helping in issues regarding home demolitions, affordable housing and lack of necessary infrastructure (Bimkom - Planners for Planning Rights, n.d.). This organisation can be helpful with understanding the current problems of spatial planning in Israel. They might provide first-hand experience on environmental discrimination, the lack of open urban spaces for poor neighbourhoods and minorities, and the actions they are taking to solve this.

*CareGivers Israel* is an NGO in charge of spreading awareness and pushing for policy changes regarding caregivers in Israel. Their main objectives are to raise

awareness regarding the caregiving jobs and their importance in society, to make information accessible and to develop new services for family caregivers in the workplace and community. They also provide counselling and guidance for caregivers (CareGivers Israel, n.d.). This association argues that there is a huge lack of recognition for family caregivers in Israel, who have their own lives and careers and look after their elders free of charge. This association claims the problem will be exacerbated in the following years as the population becomes older and life expectancy increases, and, in comparison to other developed countries, Israel still lacks the appropriate policies to relieve the impact on caregivers (CareGivers Israel, n.d.). This NGO may provide relevant policy measures or research regarding the characteristics of the population in Israel. Moreover, as we saw from past research, the health of caregivers has an impact on the health of toddlers, that means that we should look first of all to the health of caregivers and to consider their objectives.

The *Society for the Protection of Nature Israel* is Israel's oldest and largest environmental NGO, whose primary focus is to create a sustainable future for Israel. They mention the biggest problems are their growing population and how this threatens the remaining open spaces in the country. They focus on protecting nature, ecosystems and natural resources (Society for the Protection of Nature Israel, n.d.). It is a relevant stakeholder as they might provide their view regarding the incorporation of nature in the future cities of Israel, and how this will develop. They might share research and case studies regarding green cities and the importance of environmental protection.

#### Academic Organisations

*National Institute for Health Policy and Health Services Research* is an independent organization that has the goal to act as a forum and meeting place for professional and public discussion about the organization, management and health policy in Israel. They encourage interdisciplinary scientific cooperation on a national level between all players (academic and managerial), whose interest is the promotion of the Israeli health system. This organization could help with creating a network of different stakeholders in Israel whose objective is the development of a sustainable system where children can have interaction with nature.

### Small enterprises and others

*B'nai Israel Community Day School* is a school that has been offering a nurturing, learning environment to children and their families in Israel for 45 years. One of their goals is to have an environmental education, meaning the children can work in a large vegetable garden growing, weeding, harvesting and cooking seasonal vegetables. Children can also have other contact with nature, e.g., pick fruits and take care of bunnies and chickens. It would be interesting to look into a network of schools in Israel that have this goal of environmental education. *B'nai Israel Community Day School* could help to create a framework that can be adopted by other schools in different parts of Israel or other countries.

### Stakeholder Recommendations

Following the stakeholder analysis of Israel that is outlined above, there are several key partners that are relevant for different types of NBIs. At the national level, *CareGivers Israel* is a key partner. Its goal to spread awareness on the job of caregivers can be bounded with projects that spread the importance of healthy childhood for toddlers. Indeed, caregivers' health and child's health are two faces of the same medal. Looking to the environment aspect, a key partner is the *Society for the Protection of Nature Israel* that could work with the government to further develop and put in place the project TAMA 35. Indeed, this association could give the government a better outlook on the status quo of nature in Israel, and more precisely how the growing population is impacting the nature around cities.

In reducing the inequality that exists between people of Arabic and Jewish origin, a key partner could be the *Sikkuy: The Association for the Advancement of Civic Equality*. In fact, this association is already a point of contact between these two different communities and can be used to further develop policies at the national level that provide the same opportunities to children coming from either community.

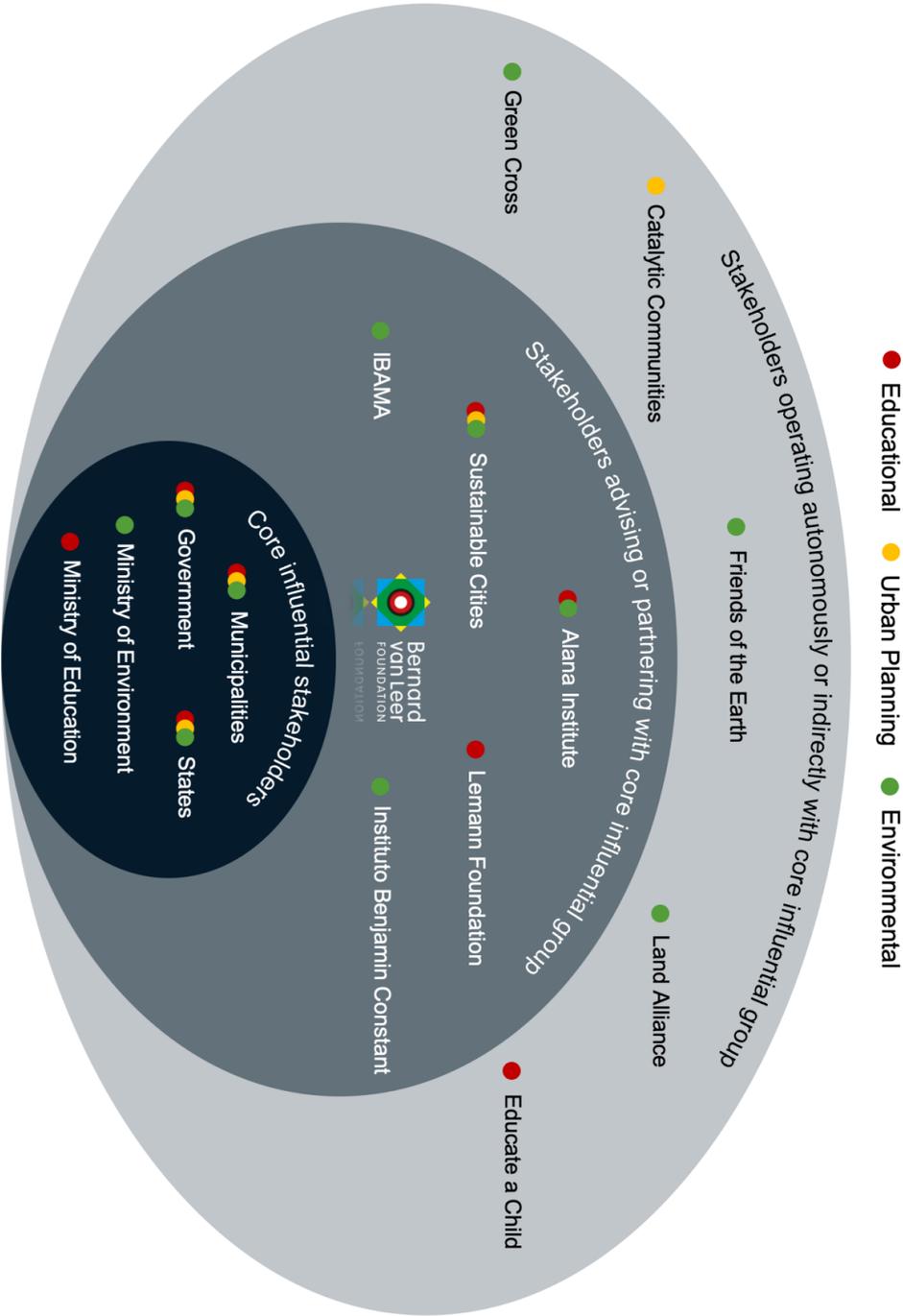
Based on our analysis for an NBI to be successfully implemented, buy-ins are needed from several players. The most important one is the Government. This is due to Israel having a centralized decision process that requires support from the government in the planning and implementation of NBIs. However, as outlined in the

recommendations, we think that the approval and support of the local community is also needed for an NBI to be successful.

### **5.2.3 Brazil**

For Brazil we have chosen to create a map where the importance of stakeholders' influence on decision making is highlighted and where the stakeholders are all equally valuable to BvL. In the core the stakeholders are shown with most influence moving outwards to smaller stakeholders with less influence on decision making. Also like the other stakeholder mappings a colour definition is given for the subject a organisation is focused on.

**Table 5.3 : Stakeholder mapping of Brazil**



### Governmental Organisations

The *Ministry of Education Brazil* (MEC) or 'Ministério da Educação' is a direct federal administration body in Brazil. Its objective is to coordinate national education policy and daily affairs ranging from early childhood to postgraduate level. The Brazilian MECs budget for 2020 was projected to be around US\$30 billion. In aggregate, the total amount of government expenditure on education in Brazil as a percentage of GDP has been on an increasing trend since 2004. In 2004, education spending amounted to 4.0% of GDP and by 2017 this proportion increased to 6.3% of GDP, according to World Bank data (The World Bank in Brazil, 2021).

The *Ministry of the Environment Brazil* (MMA) aims to coordinate and implement national climate change policies, sustainable production and consumption, and projects related to energy efficiency. The MMA has four subordinate bodies that are each responsible for one of the MMA's main areas of expertise, namely, the National Environment Council (CONAMA), National Water Resources Council (CNRH), Genetic Heritage Management Council (CGen), and the Brazilian Forest Service (SFB). In addition to its subordinate bodies, there is the Institute of the Environment and Renewable Natural Resources (IBAMA), which is the Brazilian Ministry of the Environment's administrative arm. The IBAMA has assisted research in the field of mega projects and their effect on climate change, see Iwama et. al. (2013).

The *Benjamin Constant Institute* is an organisation that has limited administrative autonomy, as it is directly linked to the Ministry of Education. Therefore it is classified under governmental organisations and should be labelled a focused stakeholder, as it primarily caters to people with visual impairment. The institute is quite unique from the other stakeholders as it is also committed to producing and disseminating academic research in the field of specialised education.

### Non-Governmental and Non-Profit organisations (NGOs)

*Educate a Child* (EAC) is a program of the global initiative 'Education Above All'. EAC aims to reduce the percentage of children that do not go to school.

It is estimated that around 64 million of children at global level, of which the majority live under the poverty line, didn't have the opportunity to get access to the school. EAC has been active in Brazil since 2013/2014 and works with different stakeholders at different levels. UNICEF is one of its strategic partners, who supports EAC with advice and access to resources. It also has implementing partners who understand the local challenges and helped to implement a strategy to enable access to quality primary education for young children in disadvantaged areas. The first project that they are working on with Aprendiz City School, an NGO, has the aim of building communities that are committed to the development of young children. In this case EAC is helping Aprendiz in ensuring quality basic education for the children of Rio de Janeiro's favelas. This NGO could help BvL by giving them the chance to use their international network of partners, making it easier for BvL to fund new projects in Brazil.

*Alana Institute* is an NGO with the mission to "honor the children". Their goal is to create a shared agenda for a more just, inclusive, equal and diverse world that prioritizes human rights, democracy, social justice, and socio-environmental sustainability. Based on our research, the Alana Institute could help BvL by financing the projects that help to improve the relation between children and nature through the Alana Foundation. Indeed, the Alana Foundation is the philanthropic branch of the Alana Institute that supports initiatives in the areas of environment, inclusive education and health science research. Moreover, the AlanaLab could help to give life to projects that are financially independent in the long term. As an example, the AlanaLab could help to create a network of kindergartens and/or schools across Brazil where a big part of curricula is focused on nature and its importance.

*Green Cross International* is an independent and non-profit non-governmental organisation that partners with civil society organisations, governments, UN organisations and the private sector to fulfil their mission of responding to: combined challenges of security, poverty and environmental degradation to ensure a sustainable and secure future. This is achieved through contributing to the prevention and resolution of conflicts arising from environmental degradation, amongst others. Green Cross International is present in 27 countries and focuses on inspiring the youth, helping those in need, improving security and sustainability, and the provision of water and renewable

energy. Green Cross programmes also correspond to 15 of the 17 Sustainable Development Goals (SDGs) set by the United Nations. Some notable SDGs are quality education, climate action, life on land and sustainable cities and communities.

*The Lemann Foundation* is a family-run, non-profit organisation that collaborates and works for quality public education for all people and organisations that dedicate their lives to tackling Brazil's key social challenges. The aim of the foundation is to “make Brazil a more just and equitable place by guaranteeing access to high-quality public education for Brazilians of all backgrounds...”. Their aim aligns with the UN’s SDG 10, which is the objective of reducing inequality. The foundation is looking to address the learning crisis in Brazil as well as equipping Brazil’s leaders with tools they need to drive social change.

*Friends of the Earth International* (FoEI) is an organisation that is built up of a network of environmental organisations in 74 countries. FoEI unites 73 national member groups and around 5,000 local activist groups globally. It is the parent organisation of multiple subsidiary organisations working autonomously underneath, spread across multiple countries but with a shared objective. The shared objective analyses the root cause of today’s most pressing environmental issues, including climate justice, economics justice, food sovereignty, biodiversity, human rights, gender justice, and sustainability. This decentralised structure allows member groups to participate in decision making.

*Aliança da Terra* (Land Alliance) is a Brazilian non-governmental organization that connects farmers, researchers, environmentalists and entrepreneurs in the agribusiness industry to promote environmental awareness and land management practices in the Amazon region. They work directly in the field with rural producers to promote the balance between production and respect for people and the environment. This direct connection to the producers has garnered large amounts of trust, providing significant efficiency gains. To date, 2.8 million hectares of arable land are produced under the ‘Produzindo Certo’ banner, a banner for best production practices. In addition, 2.2 million hectares of land have been protected as native vegetation. Simultaneously, they also have the Aliança Brigade, which is an experienced and trained team skilled in combating and preventing forest fires. Therefore the Land Alliance in Brazil has a strategic focus on the environment, sustainable production, farmers and air pollution.

*Catalytic Communities* (CatComm) is a Rio de Janeiro-based empowerment, communications, think tank, and advocacy NGO with a US 501[c][3] charitable status. CatComm conducts work in sustainable community development, human rights, communications, and urban planning. CatComm has a thorough and extensive approach that consists of nine elements to successfully implement strategies that align with their mission. Their objective in short is to deploy their resources (which are primarily non-financial) strategically on challenges and solutions to assist communities that are in need of support.

### Academic Organisations

*Sustainable Cities Institute* (SCI) is an academic institute as it is backed by the University of Oregon in the U.S. The institute focuses on sustainability and cities through applied research, teaching, and community partnerships. SCI is a multi-disciplinary organisation that understands the intricacies between municipal budgets and sustainability challenges. SCI focuses on research and teaching through its Sustainable City Year Program (SCYP) and its Urbanism Next Centre. SCYP is relevant in particular, as it has become a large-scale university-community partnership program that “matches the resources of the University with one Oregon community each year to help advance that community's sustainability goals” (“Sustainable Cities Institute”, 2021).

## **5.3 Comparison**

Looking at the policies regarding nature in cities for children and the relevant stakeholders in the Netherlands, Israel and Brazil, both similarities and differences can be found. It is important to take these findings into account, because it means that each country should be approached in a different way when implementing NBIs and working together with stakeholders.

In the Netherlands, as mentioned before, decision making is very decentralised. Municipalities, cities and local organisations have a lot of room for their own initiatives and can allocate subsidies accordingly. This is not monitored by the national government. On the other hand, decision making in Israel is very centralised. This makes it more difficult to make an impact as a smaller organisation and to answer the needs of many

stakeholders. Knowledge is therefore also more concentrated as it is in the Netherlands, where many stakeholders have expertise in different smaller areas.

Compared to the Netherlands, Israel and Brazil have a lower political stability, making it difficult to put in place policies that last more than a tenure. The political instability and the country's history make Brazil the poorest country when compared with Israel and the Netherlands. This again makes it harder to implement a policy, receive (financial) support from the government and hold on to it.

Though Brazil has a complex political landscape, it shares some similarities with the other countries. For example, Brazil is comparable to the Netherlands on the topic of decentralisation, wherein the Netherlands decentralises responsibility for certain tasks and objectives to municipalities, similar to Brazil's federal entities who are entitled to legislate for their own education systems.

Furthermore, comparing Brazil to Israel and the Netherlands, there is a lot of inequality between different cities on safety, average income and policy. Therefore, it is important to have a different strategy for each city and work together with the local government. This also taps into the topic of decentralisation. In addition, Brazil lacks more knowledge and relevant policies regarding early childhood development compared to the Netherlands and Brazil. It could be interesting to therefore take NBIs or other initiatives from these two countries, and introduce them to Brazil. These could for example be an educational initiative like *NatuurWijs* or how the Netherlands introduces nature playing areas close to cities with for example *Speeldernis*. Of course, because safety in cities is more of an issue in Brazil than in the Netherlands, it is important to consider how to design these NBIs to achieve implementation and reach all relevant stakeholders.

## **5.4 Recommendations**

### **5.4.1 The Netherlands**

A possible recommendation in the Netherlands is to work together with academic institutions, either universities or 'hogescholen'. *Hogeschool Leiden* is currently doing

research to enhance the quality of a so-called 'green daycare'. They investigate how pedagogical use of green spaces can enhance the development of children. This research is done with the *Lectoraat Natuur & Ontwikkeling Kind* (2021). They have published many articles about this topic in the past, and therefore this is an interesting stakeholder in terms of academic knowledge. This research is focused on analysing NBIs as well, which could be an opportunity for BvL to work together.

*Wageningen University* (2021) has conducted a lot of research on the topic of nature and health in the city, and is therefore more focused on including nature in urban planning. They could be an interesting stakeholder that can provide more information on how to best merge city planning with nature for children.

Furthermore, since opportunities for green in cities are limited, it could be interesting to look into other locations for nature. The outlook on nature until 2025, published by the Dutch government, shows that the development of more green rooftops is an important point on the agenda. Therefore, an opportunity could be to develop safe rooftops with nature specifically for children, for example green playgrounds, community gardens or other interventions.

Finally, it is important for knowledge on the topic of children and nature to be shared with as many stakeholders as possible. Organising events or conferences with as many governmental and private organisations as possible will enable everyone to learn from each other's experiences and insights. An example of this could be bringing together educational institutions with organisations such as IVN and NatuurWijs, to make outdoor nature education a more important aspect of primary education.

#### **5.4.2 Israel**

A possible recommendation for Israel is to have a more decentralized decision making process regarding policies on children. That would allow the state to answer to the different needs. This goal can be reached by creating departments in each province that have the autonomy to put in place different projects based on the needs of children.

Another strong recommendation is to implement programs that equalize Jewish and Arabic children. That would allow Arabic children to have the same education and the same chances as the Jewish children, making it easier for children from different backgrounds to live and play together.

Furthermore, due to high population density in Israel there is little room to further develop green spaces into parks. Thus, we recommend, similarly as for the Netherlands, to develop new concepts of green spaces that can be used by children to play and interact. As an example, green rooftops could again be considered, while the creation of a mini-forest is another idea. Such a mini-forest would make space for children to play in the shade. Indeed, having the possibilities to play in the shade is a critical factor in Israel due to its climate and the climate changes that have been seen in recent years.

Given the limitations of the policy as outlined in Section 5.1.2, there are several policy recommendations. First of all, the government should set a time for when the target values become mandatory in order to incentivize companies to comply. The second recommendation would be to improve enforcement against polluters through sanctions. For example, in the industrial region around Haifa bay, factories that do not meet the requirements rarely face sanctions.

Addressing these issues can help promote the progress made in improving air quality in Israel, benefiting adults and children alike. This is especially relevant in minority communities, which tend to be located closer to industrial areas.

To conclude and sum-up our ideas, Israel should have a less centralized decision process facilitating responding to different needs in a swift manner and giving smaller organizations the possibility to take a role in the process.

### 5.4.3 Brazil

A possible recommendation for Brazil is to create a national organization that studies the interaction between children and nature. That would make it easier to centralize the information and to have a better view of all the projects that are in place in Brazil as well. Nevertheless, this kind of organization helps to share the knowledge between different stakeholders. At the same time, a permanent national organization focused on the interaction between children and nature will help to overcome the political instability problem that is present in Brazil by making the project longer than a tenure of mayor or governor.

Furthermore, thanks to Brazil's characteristics, it would be interesting to study two different groups of toddlers. One from a big city like San Paulo, where the chance to be in touch with nature is lower, and one from a village close to the Amazon rainforest. That would give an opportunity to study and better understand the impact of nature on children's development. In this case, BvL could help with their knowledge and skills to implement such a program through connecting different stakeholders.

All of this would create knowledge to be further used when developing NBIs that can be implemented in cities.

Formulating who can be a key partner for BvL proves difficult due to the fact that we had a limited number of interviews with Brazil stakeholders, making our advice rather speculative. In addition to that we understood that BvL mainly works with municipalities, we see that enhancements can be made to the policies.

To summarize, we think that Brazil gives a lot of opportunities to further develop studies on the connection between nature and children. At the same time, the nature of a developing country that characterized Brazil makes it easier to influence the decision making on city planning, taking into account the needs of children and their interaction with nature.

# 6 Case studies

## 6.1 Leefstraat

### Executive Summary

This case study aims to research the effect of having a Leefstraat, especially the experience for children between the ages of 0-5, in order to determine whether they play outside more often. The interaction with their caregivers is taken into account as well. In addition, it is investigated whether nature plays a role in the organisation of the Leefstraat. First, three Leefstraten in Ghent, Belgium were investigated. This is where the initiative originated. Next to this, one Leefstraat in Utrecht was investigated. The main take-aways are, first of all, that a case-by-case approach for each street to design a plan is needed. This takes into account specific mobility challenges and also deals with the needs of the inhabitants of a certain street. An opportunity would be for more municipalities to actively encourage the Leefstraat through promoting the initiative since it is now not as easily picked up by every street. Furthermore, the cost structure depends on factors such as the culture of the neighbourhood and city and therefore differentiation between cities is needed. An example of this is that some streets stressed the wish for having a lot of plants in the street.

### Introduction

A Leefstraat, freely translated as 'Living Street', is an experiment that started in Ghent, Belgium in 2013. In the first year, only two streets were participating. This year in the summer of 2021, 43 Leefstraten are involved. In 2015, the project was first organised in the Dutch cities Haarlem and Rotterdam. They were followed by other cities, like Utrecht, years later (Van de Wetering, 2017).

The initiative was exported to the Netherlands because of a link to advocacy against 'child murder' protests resulting from rising road accidents where a lot of children were involved (Voce, 2017). Namely, in 1971, 3000 people died on Dutch roads of which 500 of them were children (16.7%). Safer roads were demanded by parents with a

powerful campaign. This resulted in more attention and priority for road safety. Subsequently, the extensive network of safe cycle paths seen today was created. A Dutch study from 2006 claims that streets are important for the liveability of children (Karsten, & Van Vliet, 2006). This is exactly what the project supports.

The idea of the Leefstraat experiment is that a street will be partially or fully closed for a period between one and four weeks during summer vacation in the Netherlands (Municipality Groningen, 2021). In Belgium it may even stay up to four months. In countries like the Netherlands and Belgium, it is common that people only know their neighbours from greetings when walking by or do not even know them at all. The goal of the Leefstraat is to create more social cohesion. Residents of the street can organise all kinds of nice activities like dinners with neighbours or games to get in touch with each other. They are also free to design the street to their liking. For instance, with benches, picnic tables to eat at and safe play opportunities for children. The latter supports another possible goal of the Leefstraat, namely, to give children a feeling of freedom.

This case study will investigate whether playing outside can be stimulated by creating safer streets. Besides this, it will give an insight into social cohesion between neighbours, caregivers, and children. It also investigates whether safer streets, with little or no traffic, stimulate children to play outside more and reassure parents that their kids can play safely on the street.

The target group of this case study consists mainly of the Leefstraat residents itself, especially children and their caregivers. Nearby neighbours of the Leefstraat are also taken into account, as well as the policy makers and organisers involved. This selection follows from the bigger picture of this research. Children are of utmost importance, since the effect of nature on the development of children is investigated. Furthermore, caregivers are important since they have a large influence on the development of children. Also, their well-being and feelings affect children. The distinction between residents of the Leefstraat and nearby neighbors is made to investigate the impact of social cohesion. Organisers are researched to shed light on the differences in organisation and to come up with further recommendations.

Data is collected through face-to-face interviews in the streets themselves with the residents, nearby neighbours, and some organisers. All other interviews, those with the stakeholders for instance, were held online.

### Ghent

In Ghent, three full-time workers at the municipality are responsible for the design and organisation of the Leefstraat experiment (Leefstraat Belgium, 2021). These Leefstraten are set up yearly from April until October. The organisers of the 43 participating streets and squares are in direct contact with the workers of the municipality. Contrary to the Leefstraten in Utrecht, the Leefstraten in Ghent are mainly organised by the municipality. The municipality provides all the necessary materials and helps with demarcating the Leefstraat. Furthermore, after a particular Leefstraat ends, the municipality collects all the materials and stores them for next year.

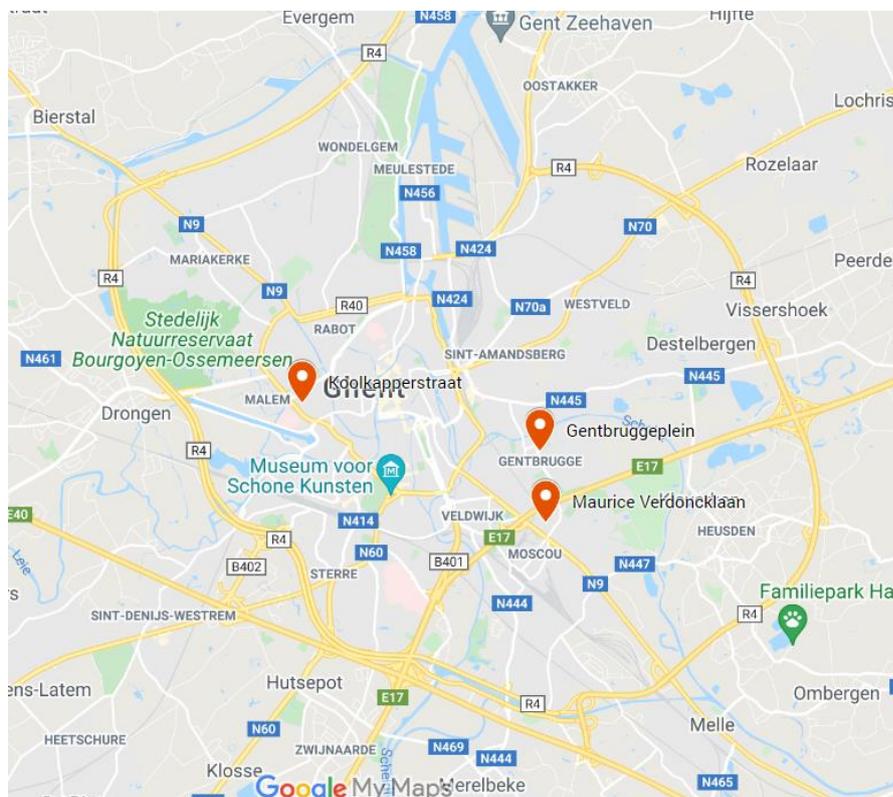
### Utrecht

In contrast with the Belgian organisation, in the Netherlands, residents have to sign up at the municipality with the whole street to organise a Leefstraat themselves. In Utrecht, two workers at the municipality are responsible for the organisation and coordination of the Leefstraten. Currently, there are four Leefstraten in Utrecht, while there were six a few years ago. In contrast to Ghent, the Leefstraten in Utrecht are only set up for approximately six weeks during summer holiday, in the months of July and August. Besides this, the organisers in Utrecht, are not in direct contact with the municipality but do have two contact persons within their neighbourhood. The organisers collect the funds and buy all the needed materials themselves. The inhabitants of the Leefstraten look after the Leefstraat and resolve all issues that might come up. The organisers take care of the materials themselves. This means that they either store the materials or sell them at the end of the Leefstraat period.

Based on all Leefstraten, it becomes clear that it is important that all residents agree with organising a Leefstraat in the starting phase. Moreover, all possible obstacles should be prevented in advance or compromises should be made where necessary. However, this process and the process of informing the neighbourhood is very time-consuming.

**Table 6.1:** Evaluation of Leefstraten

	Supervision			Planning	
	Safety	Bonding	Education	Cost	Location
Leefstraat Maurice Verdoncklaan	◐	●	◑	◑	●
Leefstraat Koolkapperstraat	◑	●	◑	◑	●
Leefstraat Gentbruggeplein	◑	◐	◑	◑	●
Leefstraat Malakkastraat	◑	●	◑	◑	●
Symbols ranked from high to low	●	◑	◐	◑	○



**Figure 6.1:** Map of Ghent Leefstraat locations. (Screenshot Google Maps, 2021)

## Maurice Verdoncklaan

The Leefstraat in Maurice Verdoncklaan is safe as the street is closed off well at both ends with signs. Furthermore, there are big pots with flowers and plants on both sides of the Leefstraat. However, the street is still accessible for bikes. This means that little children should be monitored at all times. Many residents state that the children love to play outside in the Leefstraat. The parents also find the Leefstraat safe enough to let their children, who are a bit older, play there without supervision. Even the residents without children did not have any objections against the Leefstraat. They saw the Leefstraat as a place to meet their neighbours more often and were happy that the children of the street could play outside. This Leefstraat scores high on bonding, since it is a nice combination of benches for people to relax and space for children to play. By designing the Leefstraat this way, children and parents/caregivers can enjoy the street simultaneously. The presence of many flowers and plants was welcomed by the residents since it created a positive atmosphere.



**Figure 6.2:** Impression of the Leefstraat at the Maurice Verdoncklaan (Ghent, 2021)

## Koolkapperstraat

What became immediately apparent in the Koolkapperstraat was the focus on children. Demographically, this street had a lot of young families with small children. This was visible by the number of toys like a slide and balls which provided a lot of incentives

for the children to play by themselves, with each other or with their caregivers. This explains the high ranking on bonding. Before the initiative was introduced in 2014, the street already had tight relationships. Furthermore, this street was also one of the safest. Although, the street was already a 'woonerf' where priority is given to pedestrians in general. This Dutch concept means that cars and other vehicles have to drive at a walking pace. The Leefstraat prevented cars from driving through the street, especially those who wanted a shortcut from traffic lights. There was still a clear path for pedestrians and bikers. Since this was already the eighth time the Leefstraat was taking place, a lot of objects could be reused. Close-by neighbours were overall enthusiastic as well. They experienced little to no disturbances. However, it became clear that among others, local shopkeepers' and pub owners' wishes and interests should be taken into account as well.



**Figure 6.3:** Impression of the Leefstraat at the Koolkapperstraat (Ghent, 2021)

### Gentbruggeplein

This Leefstraat or "Leefplein" is less safe compared to the other Leefstraten visited, since this one is set up on a square in front of a church. On one side there are cars and busses passing by. This makes it potentially dangerous for small children. Residents state that the Leefstraat feels like more of an extension of a cafe terrace than a safe place for children to play. Moreover, there were no toys or playground equipment present, only a couple of child-friendly activities were organised there every now and then. Therefore, this Leefstraat serves more as a meeting place for adults. In order to change this, the residents would like to increase the size of the Leefstraat towards the church. By doing this, a safer area is created for little children to play. Because of the aforementioned reasons, the bonding between children and parents/caregivers is not great.



**Figure 6.4:** Impression of the Leefstraat at the Gentbruggeplein (Ghent, 2021)



**Figure 6.5:** Map of Utrecht Leefstraat locations. (Screenshot Google Maps, 2021)

### Malakkastraat

The Leefstraat in the Malakkastraat in Utrecht is the only one visited in the Netherlands. This Leefstraat was really large compared to the ones visited in Ghent. Similarly to those in Ghent, it also had artificial grass on the street. Besides this, they had two picnic tables, some other pieces of furniture and toys for children to play with from the residents' gardens. Noticeably, this street was well organised, neat, and tidy. The

organisers, of which most were caregivers as well, mentioned that the street was both meant for the caregivers and for the children. The adults were able to meet each other, eat together, and have drinks together. The children mainly played together. In addition to this, the organisers also arranged special activities for the children, for example a pancake lunch, a campsite, and a lemonade tasting. Something that stood out was the children's meeting they organised. Here, the children could share fun activities they created themselves. In practice, most ideas were not feasible due to various (safety) reasons. This street also differed from the Leefstraten in Ghent in terms of its guidelines from the municipality. In Utrecht, there wasn't a mandatory four meter stretch of unobstructed street for cyclists, pedestrians, and emergency vehicles. This made this street safer, especially for young children, because there was less traffic. The residents and organisers organised this Leefstraat for several years, therefore they had a lot of experience and already had a pretty good relationship with each other.



**Figure 6.6:** Impression of the Leefstraat at the Malakkastraat (Utrecht, 2021)

### Education

The Leefstraat does not really have an educational aspect to it. Although there were in previous years some attempts to include small vegetable gardens for instance, this was not the case for this year. The reason for the residents of the Koolkapperstraat was mainly that only the adults paid attention to it and maintained it. The children only

helped with picking the strawberries. This explains the low education ranking in Table 6.1, but there would be room within the initiative to elaborate this aspect. However, a common answer in the interviews was the holiday feeling the Leefstraat provoked such that relaxing, and playing are more at the centre of the Leefstraat.

### Location

The setup of a Leefstraat is easy since they are possible in the middle of a city. The only issue is that the street cannot be too big or too important for the infrastructure. If this is the case, there would be too much disturbance to the flow of traffic in a city. Furthermore, too many parking spaces would be lost. Aside from this, a Leefstraat can be set up practically anywhere, such that the “location” is not an issue.

### Costs

In Ghent, the budgeted costs for the Leefstraten are approximately €10.000. They grant €200 for each Leefstraat for materials and decoration. For the so-called Leefpleinen (squares) there is an additional budget of around €2000 for animation shows. In Utrecht, the budget per street is much higher, namely €1000-€1500. They may spend this on activities besides the materials and the decorations that are needed to decorate the streets. In Groningen, an amount of €1000 is available for each Leefstraat.

Besides the variable costs for each street, there are also general costs made by the municipality. These are for example, the salaries of the employees that are guiding the Leefstraten project, the placing of traffic signs and closing down the streets, and in Ghent picking up and storing the picnic tables and the turfs.

### Stakeholders

Other stakeholders that are involved are nearby neighbours, academics, and organisers of the Leefstraten. The role of these stakeholders will be questioned differently to children and caregivers. The questions per group of interviewees can be found in Appendix A.6.1.

Yvette van Dijk, the Policy Officer Urban Development at the Municipality of Groningen, is responsible for the pilot of the Leefstraten in Groningen. She mentioned that

in Groningen, the goal of the pilot was to reclaim public space from the car. Here, the Leefstraat serves as an instrument to let people experience in an accessible way what it is like to play safely in the street and to park the car somewhere else. They also mentioned in their communication with the Leefstraten organisers that they should use more plants and other greenery for the design of the street.

Fee Vandepitte, one of the three employees of the Municipality of Ghent who are responsible for the Leefstraten project, mentioned that the main goal of the Leefstraten is to get people together and let them meet each other . She gave the example of when the political elections were broadcasted live in a Leefstraat. Residents with different political views came together and discussed the differences, resulting in an acceptance of the different opinions. She argues that Leefstraat gave a 'familiar' feeling, children went outside more often, and residents even left their valuables outside. In Ghent, residents want to include more plants and greenery in their Leefstraat, but there is no encouragement from the municipality. This is also because it is difficult to plant permanent plants in the city centre of Ghent.

Kim Carlotta von Schönfeld, an academic with a PhD in Land Use Planning, spoke more about the design of urban areas. She stated that contact with nature is important for children, and this can and should be implemented more often. Incorporating the act of planting trees into the urban planning design is a way to do so. For children it is really nice to have a play opportunity right in front of their house, because otherwise you need to be able to go to a park for instance. She stressed out that when caregivers have multiple kids it might be quite difficult to get everyone at a play facility, with their bikes for instance. This accessibility to play areas is a real issue, creating a threshold for people to go and thus something like a Leefstraat might be a good opportunity. In a Leefstraat, children can just walk outside to play. The Leefstraat supports the relationship with neighbours, however differences in opinions can also create new tensions. Implementing Leefstraten on a larger scale might not be feasible, because having a good flow of traffic and multiple Leefstraten in a city can be difficult in the urban planning of, for instance, public transport. You have to take issues like this into account with planning. In addition, a Leefstraat probably cannot be implemented everywhere. In Brazil for instance, bureaucracy and corruptness of the government may make it very difficult.

### Accessibility

The accessibility differs between Ghent and Utrecht. Since the Leefstraten in Utrecht are mainly organised by the inhabitants, it is crucial that the organisers get the support of a majority of the inhabitants of the Leefstraat. If this is not the case, the initiative is simply not feasible. When there is enough support, the application process is quite straightforward. In Ghent, the application process is really similar to Utrecht.

### Recommendations

#### *1. A case-by-case approach*

The main challenge when setting up a Leefstraat is garnering the support of the residents. It is not possible for the municipality to organise a Leefstraat without the support and approval of the inhabitants of the street. In the end, they are the ones that need to maintain the streets and tackle problems that might arise.

Furthermore, parking issues should be taken into account, as it may be an impediment to scaling the Leefstraten initiative. A case-by-case approach is needed to design a plan of approach that fits the needs of the neighbourhood.

#### *2. Information is key*

An opportunity is to better inform cities and neighbourhoods about Leefstraten. When municipalities inform residents about the possibilities, it is likely that more streets will consider the initiative and eventually decide on organising a Leefstraat. Seeing the Leefstraat in other places inspires people but municipalities need to play an important role in making the initiative accessible if it is desirable to expand. Otherwise only very independent and already closely connected streets will be able to organize a Leefstraat.

#### *3. Scalable budget*

It is recommended that for each city, the cost structure should be unique. The cost structure is very different in Ghent compared to Utrecht. However, they both work well, and the residents are content with the structure. Therefore, the cost structure does depend on factors like the culture of the neighbourhood and city. Some streets are for instance keen on having a lot of plants, others prioritize places for adults to have a drink. The Leefstraat itself can be relatively low budget, but setting up the initiative in new

municipalities requires working hours from someone managing the project as was mentioned by Yvette van Dijk. These costs might be a threshold when it comes to expansion.

## 6.2 Animal Farm

### Executive Summary

The intervention involved trips to three animal farms and one zoo, in Amsterdam and Amersfoort respectively, in order to explore different animal farms and their effects (e.g. less wealthy, less green). For one animal farm, an excursion with one daycare group of urban children aged 2-4, accompanied by their daycare caregivers, was organised. Moreover, interviews were conducted with animal farm and daycare owners to get their perspective on how nature affects their own and children's well-being. For the zoo, a visit was planned to Dierenpark Amersfoort. Two employees, who are both involved in the educational programmes at the park, were interviewed to get a better understanding of the interventions done at the zoo. Additionally, random visitors from all trips were asked questions about their mood and their day to get an understanding of what people like to do at the zoo, and how it makes them feel.

Key takeaways from this case study revolve around the integration of the community into an animal farm-based intervention, and a stronger focus on parental well-being when designing such an intervention. Furthermore, our case study has shown that simpler interventions could be at least as beneficial, if not more, than more sophisticated (animal farm-based) interventions. Further areas of research to explore include holding the intervention at a larger scale and with a more diverse group to increase the robustness of our findings.

### Introduction

Animal farms and (petting) zoos are widespread around the country and provide a low-cost option for encouraging interaction between children, animals and caregivers in a green outdoor environment. Especially urban children in the Randstad area have limited opportunities to interact with animals or play in nature. Therefore, organising (regular) field trips to animal farms could stimulate their learning about animals and enhance their mental and physical well-being.

### Relevance of (petting) zoos

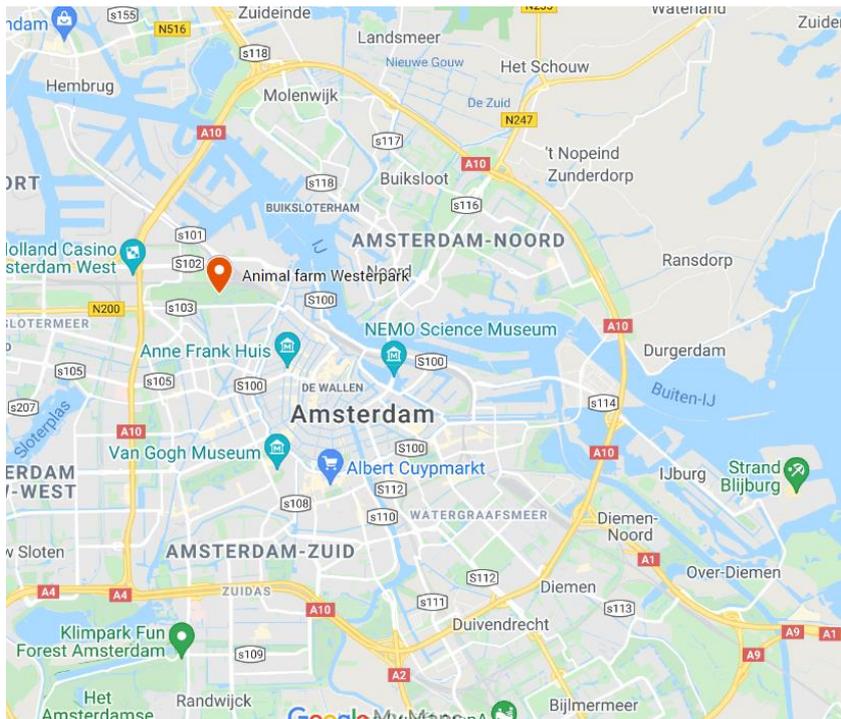
Interaction with animals in a natural environment has been found to have positive developmental effects for children and improve their caregivers' well-being (Donovan et al., 2018). Through examining the well-being of toddlers/children and their caregivers around an animal farm or zoo visit, I identify ways of increasing children's well-being in urban settings and hope to raise awareness among governmental institutions in order to set up (government-funded) nature-based interventions. This can encourage healthy childhood development and promote the mental well-being of the caregivers, since their well-being is crucial to wholesome interactions with their care receivers. Additionally, these experiences can broaden a child's knowledge about nature, affecting mental development and potentially initiating an interest in nature later in life.

**Table 6.2:** Evaluation of (petting) zoos

	Supervision			Urban planning	
	Safety	Bonding	Education	Cost	Location
Petting zoo De Gliphoeve					
Petting zoo De Werf					
Petting zoo Westerpark					
Amersfoort Zoo					
Symbols ranked from high to low:					

### Kinderboerderij Westerpark

The Kinderboerderij Westerpark is a city farm located within the Westerpark in Amsterdam with the vision to educate children about nature and the environment and raise awareness about these topics. The park is located within the city and surrounded by residential areas, most of which are structurally well-off. Since the animal farm is located inside the park, safety concerns with regards to traffic etc. are not strongly present, but unexpected accidents with animals or on the integrated playground can potentially arise (Table 6.2). The location as well as impressions of the petting zoo Westerpark can be observed in Figure 6.7 and Figure 6.8, respectively.



**Figure 6.7:** Location animal farm Westerpark (Screenshot Google Maps, 2021)



**Figure 6.8:** Impressions of the petting zoo Westerpark (SIMPLY AMSTERDAM, 2021; Your Urban Playground, 2020)

### *Observations of the children at the park*

Three girls and three boys aged 2-4 from the daycare SamSam Westerpark, joined by two daycare workers, visited the Kinderboerderij Westerpark on the 3rd of August 2021 for approximately one and a half hours. The daycare has a nature-focused, healthy and creativity-stimulating approach and mostly accommodates children from wealthier parents. While one of the Involve team members interacted with the children and supported the daycare workers in showing the children around the animal farm, one Involve team member communicated with one of the daycare workers about the

children's "usual" behaviour in the daycare and at the farm. Two other Involve members observed the children's interactions with the animals, each other, and the caregivers from a distance, investigating whether the children showed any striking behaviour such as crying, excitement and particular interest in or feelings towards the animals. Additionally, I examined whether the children were playing or communicating with each other or rather independently, and whether they seemed to have a positive relationship with their caretakers.

While the three boys were immediately happy to interact with the Involve team, i.e. strangers they had just met for the first time, the girls were rather shy and hesitant towards us and stayed closer to the daycare workers. The children-caregiver interactions were very familiar (e.g., holding hands) and respectful. One boy particularly showed high levels of excitement and continuously shared stories with us. When looking at the animals, the boy was the first to approach the animals to pet them. Though the other boys were hesitant at first, they quickly joined the other boy and did not seem scared of the animals. The girls were more hesitant, especially towards the bigger and potentially less familiar animals such as goats and sheep, though they did seem comfortable with smaller animals such as rabbits, cats and dogs. When asking the children questions, some were very talkative while others simply nodded. In general, they were excited to tell stories about animals. One boy also hugged one of the Involve members shortly into the intervention. Especially the girls who were very quiet in the beginning seemed to open up after a while, which the accompanying daycare workers also stressed. The children-children interactions were friendly and the children were eager to play together. However, interactions among children were rather limited.

One thing particularly striking was the short attention span of some children. One boy repeatedly mentioned that he wanted to bike (instead of looking at the animals) but did show interest in the smaller animals a bit later into the intervention. When looking at the rabbits, the children seemed to be less distracted. Another boy, whom the daycare worker described as rather hyperactive and nervous on a day-to-day basis, was quite focused at the animal farm. In general, the children's attention and interest in the animals improved after half an hour into the field trip, which might be due to initial unfamiliarity and simply some required time to focus on the intervention.

At the end of the visit, we introduced a game to play with the children that involved yes/no questions and further elaborations when answering “yes”. The questions asked included, but were not limited to, whether and what the children learned today, whether and why they would like to visit the farm again (with their parents), and whether the other children were nice to them. However, due to the young age of the children and their short attention span, the children kept changing their answers or all simply agreed and thus concluded that the game was rather inefficient for figuring out how the children liked the intervention.

The general activity levels of the children were rather low, e.g., the children did not run around a lot. This was also influenced by the caregivers telling the children to stick together.

#### *Interview with daycare owner*

Agnes Bakker is the owner and manager of the daycare centre Ikke&Zo which is located in a wealthier neighbourhood near Westerpark in Amsterdam. I interviewed her to get a pedagogical perspective on which nature-based interventions daycares in urban areas are engaging in, and what could still be improved. Her daycare adopts a nature-focused approach that includes going outside with the toddlers at least twice a day in any weather as well as frequent field trips to the beach, park or other green spaces, granting the children freedom to explore and play according to their likings.

In general, letting the children discover themselves opposed to a high level of planning and guidance seems to encourage children’s learning to a higher extent. Simply letting toddlers try out things independently also improves their confidence and they are often happier in nature settings. Field trips do not need to be costly as toddlers often enjoy a simple neighbourhood playground just as much as going somewhere more expensive. Organising bigger day trips moreover often comes at the cost of using public transport, which can be stressful for daycare workers as they constantly need to be attentive to all children so no one roams off. Due to the limited attention span and easy distraction of young children, caregivers moreover need to make sure to teach the children to watch out for dangers. Different cultures have different visions of the required

amount of outside play, and strict regulations as present in the Netherlands can hinder the development of a child's independence. According to Agnes, urban children naturally require more outside play time and excursions to nature, as they otherwise end up with lower developmental levels when compared to village kids. City children are thus often informally called "back-seat kids" (that need to be brought to and picked up from everywhere). For Agnes, going outside improves her mental well-being in the sense that it allows her to take a break from the day and gives her freedom and space, which she especially values in the current COVID-19 times.

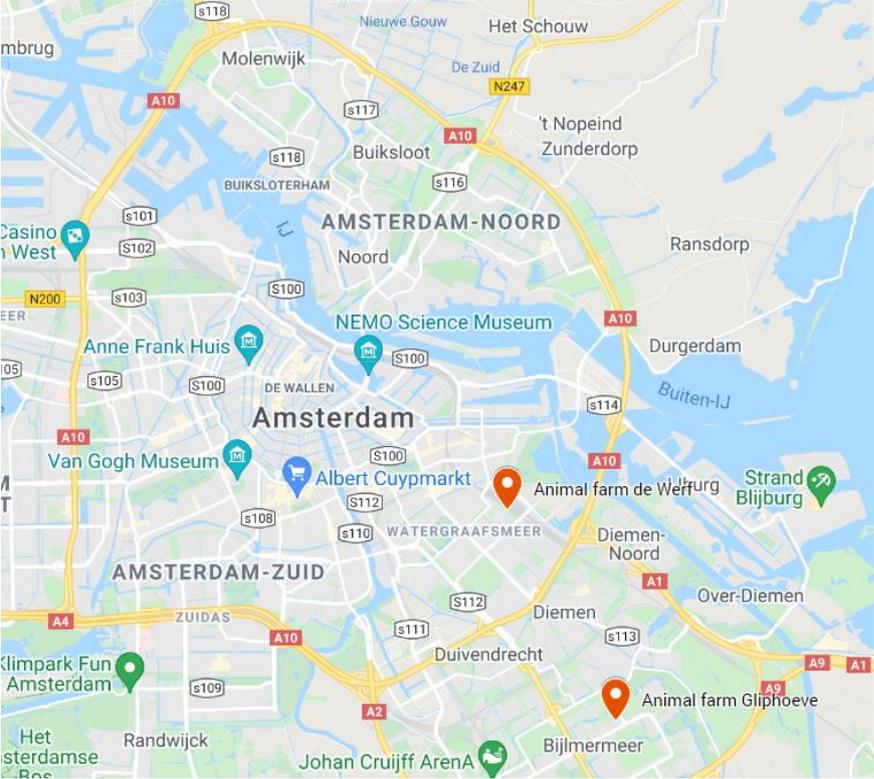
### *Kinderboerderij Gliphoeve and Kinderboerderij de Werf*

Two petting zoos in Amsterdam East were visited for further observation and interviews with animal farm owners in order to gain broader insights into the setup and effects of animal farms on childhood development. Those two animal farms were the Kinderboerderij Gliphoeve, set up in the 1980's and owned by the Stichting Werkwijs, and the Kinderboerderij de Werf, a petting zoo founded about 30 years ago.

The Kinderboerderij Gliphoeve is located in a structurally weaker area of Amsterdam than the Kinderboerderij de Werf (see Figure 6.9). This was also reflected by the surroundings of the animal farms. While in Gliphoeve the petting zoo was ring-fenced by tall apartment blocks (see Figure 6.10), the neighbourhood of the Kinderboerderij de Werf consists of row houses with families (see Figure 6.11).

The petting zoos also differentiated in size and setup. The Kinderboerderij Gliphoeve could easily be accessed by citizens since it was located in the middle of the block and no entrance doors were present. Various enclosures could be visited containing animals from ponies to chickens and goats as well as a small playground. Pigs and cats were free to move throughout the whole farm (see Figure 6.12). Although it was surrounded by houses, there could not be much noise noticed. Kinderboerderij de Werf was more separated from the surroundings with a high fence and with a remarkable shelter at the entrance. The several enclosures consisted of similar animals to the petting zoo in Gliphoeve (see Figure 6.13). According to their own information, the animal farm in Gliphoeve has around 20,000 yearly visitors, while de Werf attracts 45,000 visitors per year. For de Werf, around 70% of them come from the neighbourhood, but currently the share of tourists and people from further away is growing. This number of visitors is

covered by two educated managers working part-time, student interns as well as approximately 40 volunteers that are not able to participate in the regular job market throughout the year.



**Figure 6.9:** Location animal farm Gliphoeve and animal farm de Werf (Screenshot Google Maps, 2021)



**Figure 6.10:** Surroundings animal farm Gliphoeve (I amsterdam, 2021)



**Figure 6.11:** Surroundings animal farm de Werf (Screenshot Google Maps Street View)



**Figure 6.12:** Impressions of the animal farm Gliphoeve



**Figure 6.13:** Impressions of the animal farm de Werf

For both of the farms, an interview was conducted with the animal farm manager and owner, respectively. Furthermore, I had the chance to speak to visitors of the respective park to gain some more insights about their decision to visit the park as well as how they perceive them in terms of mental well-being for their children and themselves. More elaborate transcripts of these interviews can be found in Appendix A.6.2.

#### *Interviews with animal farm owners*

Since both animal farms are placed in the heart of a neighbourhood, both owners stress the importance of creating a sense of community through the petting zoo. This is also reflected in the number of visits which are mainly from people living in the neighbourhood and visiting the animal farm on a regular basis (e.g. de Werf: estimate of ~70% of visits by neighbours). The animal farms are visited by children up to 7 years, mostly accompanied by their parents to pet the animals. Especially in the poorer areas this is caused by the lack of own backyards. As the children become older, their objective of the visits changes and around the age of 10 they engage to help voluntarily on the farms.

While the official objective of the animal farm in Gliphoeve is slightly more focused on educating and integrating students who are distanced from the job market (e.g. people with disabilities, people doing their community service, people with police contact through 'HALT') into society by working on the farm, in de Werf the focus is set on the education of children. However, de Werf also takes in people doing their community service (taakstraf) as employees/volunteers.

The biggest challenge for the animal farms is to raise enough budget to maintain and expand the animal farms. A higher income could not only help to maintain the status quo, but would help them to do more for education and more for the community around. The farms could support education on a sustainable society, for instance, by having special days, taking in more group activities, and rearranging the terrain for a better educational experience. This would be carried out by employing higher educated people and keeping them longer since the highly educated employees regularly leave after 2-3 years due to the lack of opportunities to develop.

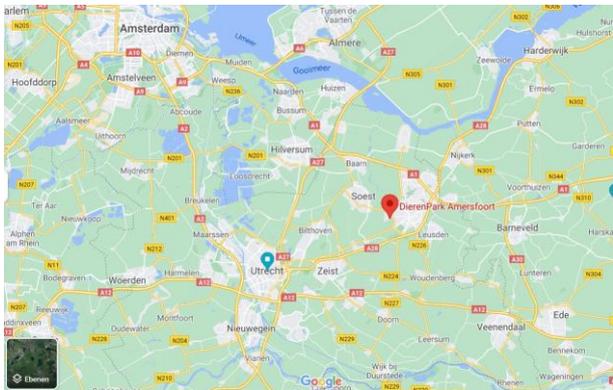
For now, the visiting children do not have a lot of supervision on the farms unless they come in student groups organised by their school or daycare organisation. Mainly they are guided through the park by their caregivers. Usually this is accompanied by a relaxed mood, however, if parents are stressed, which is quite seldom, this can have a slightly negative effect on the children picking up their parents' emotions as observed by Gitta Bessem (de Werf). Moreover, the animal farm owners try to support the children and groups of children to connect and interact with the animals. Especially shy and anxious children need a bit of guidance on how to interact with animals in order to lose their fear and connect with nature. The focus is not on forcing animals to give something to the children, but on how children look after the environment and can support animals and nature.

An anecdote by Gitta Bessem (de Werf) about a family often coming by not only shows the positive effect an animal farm has on the children to animal interaction, but also highlights that the children feel more connected to nature in general and started noticing small things that disturb nature, such as plastic bags lying on the streets.

An entirely new project planned for the academic year by the animal park Gliphoeve should support people with slight mental disabilities. In different courses, similar to small internships, they will be taught different things like how to take care of animals, run the pancake restaurant and a newly opened store as well as how to do the gardening. This is all accompanied by an employed job coach.

## Dierenpark Amersfoort

Dierenpark Amersfoort is a zoo located in the west of the city of Amersfoort on the edge of the Birkhoven forest (see Figure 6.14). It is well reachable by car from the surrounding cities Utrecht and Amsterdam in approximately 30 and 40 minutes respectively. The zoo covers about 20 hectares containing a wide variety of wild animals. Great importance is attached to teaching children about animals in a playful way (see Figure 6.15). The zoo was visited to understand which education and well-being focused interventions are already conducted for toddlers by the animal park itself, as well as which reasons families have to visit the zoo with their children and what common demographics they display. To analyse this, an interview with two employees of Dierenpark Amersfoort was conducted and various parents visiting the zoo with their children were approached to answer short questions.



**Figure 6.14:** Location Dierenpark Amersfoort (Screenshot Google Maps, 2021)



**Figure 6.15:** Impressions of the Dierenpark Amersfoort

### *Interview Hylke Steggerda and Carlijn Speksnijder*

An interview was conducted with two employees of Dierenpark Amersfoort, to get a better understanding of the current interventions done. Carlijn has been working at the zoo for eight years and recently became an educator there, while Hylke represents education, marketing and communication at the park. Longer transcripts of the interviews can be found in Appendix A.6.2.

Dierenpark Amersfoort strives to stimulate children to commit to improving the world we live in. However, this message is hard to convey to young children aged 0-5. Because of this, they are not the main focus within the zoo's target audience. Nonetheless, in the past they have organised educational events for them. Examples of activities they did are making games where children have to put an egg next to the bird it came from, or milk a cow. To teach young children something, your story has to be simple and short, and you have to focus on one specific thing. Young children have a very short attention span, when the story is not concise and simple they quickly lose interest. Putting time and effort into teaching this group something while at the zoo is not always worthwhile for the zoo itself. Simply adding play areas such as a slide is often enough to create interest for these young children. Other challenging factors when creating events for young children are safety and the parents. Parents often make most decisions for their child, because of this you have to convince them of the activity.

Hylke and Carlijn state that it is best for both the child and parent to visit the zoo together. Parents want their children to be taught something, and they want to have the feeling that they can teach their child something. Parents rarely worry when they are at the zoo, since the zoo is organised in a clear manner, however they might get a little restless at the playground since their child is much more active there. Overall, once they leave the zoo the parents are happy, since they got to spend some quality time with their child. Children on the other hand often do not immediately show an effect of visiting the zoo on their emotions. No research has been done by them on the relation between the parent and the child after a visit to the zoo, however they expect there to be a positive effect due to the quality time they get to spend together.

When visiting a zoo, children get to see a lot of different animals, especially when compared to visiting animal farms. Children often recognise the animals that their parents recognise. Carlijn notes that younger children are often most interested in animals that are in a group, move a lot and can be viewed from close by. This attracts their attention the most, an example are fish. They are often interesting and fun for younger children (ages 0-5). Movement is an important factor in attracting the attention of children, because of this, large animals attract less attention, according to Carlijn. This is in accordance with the observations of the animal farms, where it was seen that children prefer smaller animals.

Overall, young children need to have small tasks, or simple and short stories to help them learn something while at the zoo. To get their attention something has to happen right in front of them, otherwise they lose interest too soon. When it comes to education, it is easier to teach something to older children than it is to teach something to younger ones. Furthermore, it is important for both the child and the parent that they can do activities together at the zoo. This improves the mood of the parent, and is also expected to improve the relationship between the parent and child.

#### *Visitor interviews*

Interviews with visitors of Dierenpark Amersfoort were conducted to analyse which aspects of the park toddlers and their caregivers are enjoying the most and which reasons they had for visiting. Longer transcripts of the interviews can be found in Appendix A.6.2.

All caregivers interviewed stated that they felt relaxed at the park and safety concerns were not present. One couple particularly stressed that they see being outside as healthy, both for themselves and their children, and as a balancing activity to their job; they thus try to engage in many outdoor activities in their free time. One father also undertook the trip to the animal park to have some quality 1-on-1 time with his son. Yearly subscriptions to the zoo were common, which indicates that many parents value visits to the zoo. Many simply visited the zoo as their children enjoy seeing the animals, but some visitors also mentioned educational benefits for their children. The animal park is very child-friendly and displays many (interactive) information boards allowing

visitors to learn about the animals. Since most toddlers are not able to read yet, interactive learning elements, e.g. with sound as seen in Figure 6.15, are more suitable for the target group. Moreover, many interviewed caregivers stressed their liking of the “klim-alles route”, where children can discover the zoo in a playful way, e.g. through climbing and sliding (Figure 6.15).

Compared to other zoos, Dierenpark Amersfoort moreover allows children to watch the animals from their height (e.g. due to full-length glass windows at enclosures) instead of needing to be lifted by a caregiver. The toddlers seemed particularly interested in bigger and more exotic animals such as giraffes, lions and elephants, which is contrary to the children preferring the smaller and more familiar animals at Kinderboerderij Westerpark. Due to climate change and the extinction of animals, some parents worry that some of the current animals in the zoo will no longer exist in a few years. Hearing this, it seems that parents are already educating children about climate change and its consequences from early on, and that a trip to the zoo can contribute to teaching children important lessons with regards to the topic in a child-friendly manner.

Generally, it can be seen that young children do not need a lot of “extras” to have an exciting experience at the zoo, as young children learn best by trying and figuring things out by themselves - and they only have a short attention span so long educational interventions are likely to fail. Parents and small interactive play elements can support children's learning, especially when it comes to encouraging children to make decisions that promote a more sustainable and animal friendly world. Even though the interviewed zoo professionals mentioned smaller animals were more of interest to toddlers, there was also a noticeable interest in bigger animals among the children visiting the park. Overall, the physical and mental capabilities of toddlers are still developing, making it harder to design interventions for these ages.

### Costs

#### *For the daycare*

Considering most animal farms are free of charge and located in areas that are easily accessible by foot or public transport, no major financial costs are involved in the

visit. Daycares cover the costs for such field trips. For larger zoos, entrance fees and transportation costs are likely to be higher.

Non-financial costs to be considered include public regulations. Going outside is legally required as part of a daycare's "pedagogical policy". From the interview with Agnes Bakker, the owner of daycare Ikke & Zo, it was noted that municipalities have certain regulations regarding the supervision of children. For example, at least one caretaker needs to supervise 8 children, two caretakers per 14 children, and so on. Disobeying the rules comes at a high financial cost or closure of the daycare. Though these are the official legislations, more caretakers are often needed and organising a field trip is thus often limited by the number of employees available. Regulations moreover state that a group of toddlers can only be supervised individually for a maximum of three hours and keeping a schedule of the day is mandatory. Finally, the weather can also restrict a field trip to an animal farm.

#### *For the animal farm*

The main cost factor for the animal farms are the employees. Additionally, there are costs for the maintenance, use of material and getting rid of the trash as well as for the food and supplies for the animals. Overall, a minimum of €90,000 per year (including 1.5 full-time employees) is needed to run the farm without costs of renting/buying a place (petting zoo de Werf).

Those costs are covered by several income streams. First of all the animal farms are subsidised. The subsidy can vary per animal park but is approximately €20,000 per year (petting zoo de Werf). Furthermore, the animal farms sell food in a canteen or small booths. A further way to drive revenue is to rent out space for pets whose family hosts are on vacation. Another way to make money would be to charge an entrance fee, however, the interrogated animal farms were free.

Since the costs and subsidies widely vary per petting zoo, no specific numbers can be indicated. Thus, the cost factors will be elaborated on in a general manner in order to provide a guideline for what to look for when considering starting a petting zoo. First, a sufficiently big space has to be bought or rented. The business and specific licenses have to be registered at the municipality (Netherlands Enterprise Agency, 2020). Ongoing expenses are the employees salaries, mortgage, insurances, utilities and electricity as well as food and supplies for animals (TRUiC, 2017).

### *For the zoo*

When looking into interventions that take place at the zoo, there is a wide range of possible costs. The costs mainly depend on the type and length of intervention. If a zoo organises a small, one-day event it often does not cost more than a couple of hundred euros. However, a large event that lasts multiple weeks can have material costs of €20.000-€25.000 (Dierenpark Amersfoort). These costs do not yet include operational costs such as the employees that have to be employed to create and host the event. An exact indication of an intervention organised by the zoo is difficult, since the range is so large. It can be anywhere from a couple of hundred euros to tens of thousands. To create a detailed cost overview it would first have to be determined what kind of intervention one would like to organise.

### *Stakeholders*

#### *Animal Farms*

Animal farm owners facilitated the research by providing access to their property and sharing their thoughts about the observations on children's and caregivers' well-being at their farm. If the findings show that interaction does improve the well-being of children, the owners might be able to use this to start partnerships with surrounding daycares and schools. The employees of the (petting) zoos, due to not having an emotional connection to the participating children, moreover offer a more objective point of view about the behaviour of the children around the animals when compared to the children's caregivers.

#### *Zoos*

Dierenpark Amersfoort, a zoo in Amersfoort, The Netherlands, provided another research opportunity. Two of their employees were interviewed and randomly selected visitors were asked several questions. The employees were able to give an objective point of view about the behaviour of parents and children, while also offering a deeper understanding of the interventions they have done before. The results of the case study may be interesting to them, as they might offer them additional information on an audience that they have not specifically targeted in the past.

### *Daycare centres and caregivers*

The group leaders of the daycare centre accompanied the children to the farm. They offer a less biased point of view when compared to the parents since they are not directly related to the children. Furthermore, if the child is a regular at that daycare centre, the group leaders will know the child well and will be able to understand their behaviour just as well as their parents would. For the daycare centres, this study could be beneficial since, if the results show that interaction with animals does improve the well-being of children, they might want to add more of these excursions to their curriculum. In addition to the daycares, the primary caregivers, namely the parents, play an essential role in the evaluation of caregiver well-being. While having a slightly biased point of view since parents may want to put their child in a better light, they do know the child the best out of all participants. This means that they can better understand the behaviour of the child.

### *Challenges*

Initially, surveys were created to monitor the wellbeing of parents and toddlers. The surveys would have been included in the interventions. During the research, however, it was challenging to find children and caregivers willing to participate in the research. Hence, the surveys are excluded from our interventions. For possible later purposes, the surveys can be found in Appendix A.6.2..

At the same time, including the surveys would have brought several cautions as well. Firstly, the caregivers have to agree to fill in questionnaires by themselves as well as them and their care receiver(s) being watched and interviewed during their activities at the zoo/animal farm. The experiment is also highly based on self-reporting of the caregivers. This comes at the cost of self-reporting bias which needs to be reconsidered in the interpretation of the findings. This might result in answers which are socially desirable or based on the recall bias (Althubaiti, 2016). Also, the awareness of observing the well-being of the care receiver increases so that better health might be reported afterwards. Third, the care givers and receivers themselves might act differently while being aware of being watched by and interacting with 'strangers'. Hereby, especially the effect of inhibiting emotional arousals due to the fact of being observed should be considered for care receivers and givers (Yu et al., 2015). Furthermore, as researchers,

there may be a bias, likely seeking to confirm the hypotheses when interpreting the results (Althubaiti, 2016).

Finding animal farms and daycare groups to participate turned out rather challenging, as the COVID-19 situation as well as summer holidays decreased the participants' availability and safety. Since there is still a high chance of infection and restrictive measures are still in place in the Netherlands, interactions between people might differ from normality. Moreover, due to time constraints, some parents are not included in the intervention.

### Conclusion and Recommendations

Through our interventions and the desk research, the following recommendations are made below.

#### *1. Integrate and involve the community*

Especially when animal farms are located in the heart of the neighbourhood, farms could enhance the solidarity and feeling of togetherness of a community. Petting zoo De Werf estimates more than two-thirds of the visitors to be from the neighbourhood, and these rates of interaction could enhance the well-being of parents and caregivers. From petting zoo De Gliphoeve, it was noted that petting zoos can also integrate other, more vulnerable groups to the community, such as disabled students or people with a distance to the job market. The central role that a petting zoo can take within a neighbourhood should not be taken too lightly, and it could be beneficial for the environment in which families grow up. Toddlers and children will then also be likely to benefit from the community sense the petting zoo creates.

#### *2. Focus on the wellbeing of both parents and children early on*

Since toddlers from this age group are very likely to go outside with supervision, being present at the animal farm can massively strengthen the bond between parent and toddler. At a larger zoo such as Dierenpark Amersfoort, parents and toddlers can be connected through interactive play elements, whilst generally (petting) zoos form a great opportunity for parents and toddlers to learn from each other. Next to this educational

and pedagogical element, various interviews have also shown the positive effects letting their toddlers play and roam freely can have on the parents. For example, parents experience feelings of peace and joy when their children have fun. Moreover, even at larger zoos, such as Dierenpark Amersfoort, parents noticeably are not actively concerned about the safety of their children if they feel that the animal farm is designed in a proper manner.

Simultaneously, children also benefit from petting zoos through the increased exposure they have to animals and nature. Children from less wealthy areas are especially likely to feel these advantages. These children might not have their own backyard and/or have fewer opportunities to go outside in general. Moreover, toddlers that are relatively shy and reserved are also seen to blossom when immersed into nature. Through early interaction with animals, the toddlers are more likely to cultivate a positive attitude towards animals, which could result in more connectedness with nature in their entire lives.

### *3. Keep it simple, keep it playful*

Our observations moreover indicated children's eagerness to play. Since children are required to concentrate on the animals at the petting zoo, and the daycare workers moreover restrict free movement/roaming of the children due to bounded supervision capabilities, including a play aspect in the animal farm visit could provide a concentration break for the children in which their activity levels are simultaneously heightened. The same holds for Dierenpark Amersfoort, where breaks at the playground or a combination of play and observational elements such as the "klim-alles route" can improve the focus of toddlers.

Considering the insights from the interviewed daycare owner Agnes Bakker, local and "simple" field trips such as the animal farm visit are equally effective for children's well-being as more sophisticated ones. Importantly, the children should be allowed to discover the farm independently to maximise their learning benefits. Since our observations moreover showed that the experimental group of children felt more comfortable around smaller and more familiar animals, petting zoos with these animals

appear the most suitable for toddlers as they will likely feel more relaxed and curious instead of reluctant and scared.

#### *4. Suggestions for future research*

In the group of daycare children, the animal farm seemed to calm a boy that was usually more wild while a girl that was usually very shy seemed to open up around the animals, as judged by the children's daycare caregiver. This suggests that contact with animals could "smoothen" intense behaviour of children, or in other words move behaviour from extremes towards the average. For the future, it would thus be interesting to repeat the intervention with children who show a form of behavioural disorder such as an attention-deficit/hyperactivity disorder (ADHD). Furthermore, a larger and more diverse group might also be beneficial for the robustness of the findings.

## 6.3 Community Gardens

### Executive Summary

What: This case study aimed to research two interventions: (i) the difference between two community gardens in the Netherlands and (ii) the effect of a gardening intervention on pre-schoolers.

The main take-aways are

- It is beneficial if community gardens are blended with playgrounds as they attract children.
- Additional elements such as shops or animals could boost the number of visitors to community gardens and therefore increase overall exposure of nature to kids.
- Kids should be able to stimulate all the senses in the community gardens.
- Community gardens could be blended with allotment gardens since this guarantees the existence of green spaces and promotes knowledge sharing.
- A gardening activity such as replanting sunflowers seems to have a short term (the same day) effect on the perception of happiness by children.

### Community garden visits

#### *Introduction community gardens*

The Netherlands has a long history with community gardens. As early as the Middle Ages, there were 'coelghearde' which are seen as the predecessor of present-day community gardens. There are roughly two types of community gardens in the Netherlands.

A 'volkstuin' (allotment garden) is a plot of land that is made available for individuals to rent that usually do not have a garden at their house. Until the 1950's all allotment gardens were kitchen gardens, but nowadays people can choose freely what to do with the gardens. A 'buurttuin' (community garden) is a plot of land that is shared and maintained by people in a certain neighbourhood or community. In the Netherlands there are subsidised community gardens, that usually receive funds from the local government. There are also commercial community gardens that rely on private funds or donations. Community gardens can have a variety of purposes; community improvement, physical and mental well-being or aesthetic. However, Ans Hobbelink states that in some places such as Utrecht the concepts of allotment gardens and community gardens are moving

towards each other. A core of allotment gardens can be surrounded by public gardens that are accessible to everyone. This additionally guarantees the existence of community gardens because there is always someone available and responsible for the gardening. With just community gardens, the gardens could be neglected because there is no shared responsibility. This can be faultily interpreted as a subsiding of interest while this problem can be resolved by a different type of structure to the garden, such as allotment gardens at the centre and a community garden on the edges.

In our case study, two community gardens were visited. Taka Tuka Land in Rotterdam, which is a government funded community garden and the Moestuin in Utrecht, which is a commercial community garden. These two gardens had both a garden and a playground and are outstanding because of their size. In the following section, a short description of these two community gardens is provided along with a juxtaposition between the two different types of community gardens. Amongst the interviewed stakeholders was Jacqueline Stammeijer, an expert on nature education in Taka Tuka Land, Mirjam Romp, general manager of De Moestuin and several visitors who visited the gardens together with their children. Tom Voorma was also interviewed, who works for the municipality of the Hague, and Ans Hobbelink, board member of the Dutch national allotment garden association, about their views of the intersection of community gardens and children.

*Taka Tuka Rotterdam*

**Table 6.3:** Evaluation of Taka Tuka

	Supervision			Planning	
	Safety	Bonding	Education	Cost	Location
Taka Tuka garden					
Taka Tuka playground					

\* The level of bonding depends on whether the children visit the garden with or without their caregiver. If they visit with the caregiver, the level of bonding would be pretty high. However, if a child visits the garden with their school, the level of bonding is 0.

The community garden Taka Tuka in Zevenkamp (outskirts of Rotterdam) was established roughly 15 years ago by two neighbours with support of the community after the municipality wanted to use the plot of land to build new houses. Taka Tuka consists of two parts, a garden and a playground. The garden is approximately one hectare. The most important purpose of the Taka Tuka garden is to have a garden for the community, where people can meet each other and maintain the garden together. There are different plots: herb garden, a flower garden, a vegetable garden and a fruit garden. Most children that visit Taka Tuka go to the playground rather than the garden, which is also perceived as safer. There are a few schools that visit the garden for nature education purposes. The organisation of Taka Tuka consists of a board and a group of volunteers.

*De Moestuin*

**Table 6.4:** Evaluation of De Moestuin

	Supervision			Planning	
	Safety	Bonding	Education	Cost	Location
De Moestuin					

Founded in 2002, De Moestuin is a commercial community gardening concept located in Utrecht. Its purpose is to offer a safe place for children to play with nature and help people who cannot participate in the labour market (e.g. handicapped, ex drug addicts and burn-out). Additionally, directly beside the garden is a specialised school for handicapped children from which the children help in the garden. The site covers over 2,5 hectares of land and contains a small store where vegetables farmed in the garden are sold, a cafe, lots of plots for farming, a small animal farm, a bee farm, various playground equipment, and a large greenhouse used as an event hall. The garden is freely accessible to any visitors and kids are allowed to play anywhere in the garden. Although there is no entrance fee, the owners of the garden would like guests to pay a visit to the cafe and the store. The neighbourhood in which De Moestuin is located is considered to be of relatively higher socio-economic class, just as the average visitor.

### Key elements of the community garden's

When entering TakaTuka Land, it is at first difficult to tell that you are entering a community garden. The garden is surrounded by fields of grass, small canals and lots of trees. A public dirt path leads towards the garden, which consists of plots of vegetables and flowers. Some of the plants growing are artichokes, lavender and sunflowers. The garden is accompanied by a small container building with a kitchen, bathroom and storage. Adjacent to the garden is a small pond, a field of grass, and a labyrinth fruit garden. Furthermore, there is a playground of approximately one hectare, which is fenced off and charges 1€ entry (alternatively a subscription of 25€ a year is possible according to Kesha, mother of three). The playground also includes a small daycare centre as well as a cafe. While the garden has a wild feel due to its uneven plots and variety of plant species, the playground is relatively neat and structured. Though there are mainly natural elements, there are also man-made materials including a water pump. The caregivers present with their children during our visit acknowledged that the integration of natural elements in the playground were not only beneficial but important for their children's development.

De Moestuin Utrecht is not only much bigger in size at 2.5 hectares of agricultural land, but also has a very different structure to TakaTuka Land. One enters the moestuin through its shop where the produce is sold, which then leads into the cafe. The terrace of the cafe looks onto the garden itself, which consists of vegetable and flower plots, a greenhouse and animal housing for chickens, pigs, goats and bees. Towards the back of the garden is a bee farm, which serves agricultural and educational purposes. There are also multiple play areas including a slide, a water pump and a wooden xylophone. Furthermore, there is an event space which can be rented.

There are notable differences between TakaTuka Land and De Moestuin in terms of structure. De Moestuin Utrecht is more organised than TakaTuka Land with rows of vegetable and flower plots, and an Asphalt road that connects the different parts of the garden. While both gardens are open to the public, the Moestuin is only accessible through the shop and cafe, while the TakaTuka garden is open access. The former might deter visitors and thus children that do not want to consume at the cafe but may feel obliged to.

Furthermore, the playground at De Moestuin is integrated into the garden, while the playground in the TakaTuka Land is separated by a fence. The location of the playground at De Moestuin might be better for children, as they are playing while

surrounded by the community garden, thus maximising exposure. However, Keshia, a mother interviewed at TakaTuka Land, expressed her affinity towards the fence as it provides safety and prevents vandalism. However, these issues are not a problem at the Moestuyn as the garden is only accessible during opening hours, with employees working across the garden.

A last major difference between the two gardens is the presence of animals, of which TakaTuka Land has none. This can be explained by the budgetary differences of the gardens, which will be discussed in the next section. As is mentioned in the case study on animal farms, interaction with animals can have beneficial effects on children's development, meaning that De Moestuyn Utrecht may have more to offer in that regard. However, for urban areas, having livestock in community gardens may be unrealistic both for financial reasons and land scarcity.

### Commercial vs. public

The community gardens visited were TakaTuka Land and De Moestuyn Utrecht, which differ on multiple aspects, most of which can be attributed to their financial structure. TakaTuka Land is primarily financed through subsidies, though the organisation makes some revenue from cooking workshops and nature education activities, i.e. school visits. Furthermore, the playground provides some funding through the entrance fee. Both TakaTuka Land and De Moestuyn have running projects where, for example, people with disabilities can work on the farm. This is another source of funding for these gardens, as it is a source of subsidies. However, TakaTuka Land is noticeably less financially prosperous compared to De Moestuyn Utrecht, which can be deduced from the size of the garden, the type of equipment and the infrastructure located on the premises. Although De Moestuyn gets some subsidies, it has an established shop, along with a busy cafe. Furthermore, it receives some income from visitors paying for harvesting flowers. However, the manager Mirijam mentioned that some parts of the premise were underfunded, notably the bee farm.

As TakaTuka Land is intended to serve the neighbourhood instead of generating profit, it is more concerned with how to bring people together instead of making itself marketable to a wide array of customers. This is shown in where people choose to locate themselves in the gardens. At TakaTuka Land, most people are located next to the vegetable plots and the playground, while activity in De Moestuyn is centered around the

cafe. As a result, children and their caregivers at De Moestuïn are less involved with their natural surroundings, which may hamper the positive impact of a community garden on children's development.

However, making the community garden attractive to customers may be more effective than targeting the community. De Moestuïn Utrecht has a financial incentive to maximise its visitors, explaining the increased value placed on the cafe and shop. This exposes more people, including children, to the community garden, as caregivers will be more interested in visiting the garden. While promoting the commercial aspect of a community garden might reduce the interactions that caregivers have with natural elements, children will nonetheless be drawn to the environment surrounding the commercial component, namely the garden itself.

#### Neighbourhood & accessibility

Taka Tuka Land is located in the Zevenkamp in Rotterdam. With an average income per capita of EUR 23.800 it is the neighbourhood with the lowest income in the district of Prins Alexander and belongs to the lower quartile of income in Rotterdam. The garden is a meeting place for locals and notably mothers with children and people from the Salvation army (cite Jacqueline). Taka Tuka Land has a small parking lot and is located near a metro station. Furthermore, the families that were spoken to were all from Zevenkamp and had a Dutch or Asian heritage.

De Moestuïn is located in Utrecht-Oost in a relatively wealthy neighbourhood with an average per capita income of EUR 32.800 and belongs to the top quartile of income in Utrecht. The garden is accessible by car as there is a large parking lot nearby and by tram. Entrance is free, but the owners stated that the visitors generally are affluent as the bulk of them come from the same neighbourhood. However, new guests from further away seem to have found their way to De Moestuïn and the initiators hope to see new visitors from lower income neighbourhoods.

#### Target groups & organisation

As mentioned before, the main purpose of the Taka Tuka garden is to bring people from the community together. When the garden was founded, they had large support of the community, but Jacqueline mentioned that there is a small specific group that visits the garden and she would like for more people to visit the garden regularly. The

volunteers at the Taka Tuka garden organise a variety of activities throughout the year. These activities include cooking together and organising workshops that are usually related to biodiversity and health. From the beginning on, the Taka Tuka garden has worked with a group of handicapped people, who visit the garden sometimes to help. Taka Tuka also has a nature education program, where they work together with 3 primary schools. The pupils visit the garden regularly and learn about plants and harvesting. They also use the plants, herbs and fruits from the garden to make their own products like pesto or jams. Jacqueline, who is in charge of the program, stated that the nature education program is usually the first moment of active contact with nature for the children. The reason for this is probably that the children in Zevenkamp live in an urban environment and the fact that there has been a decrease in the budget for nature education from both the schools and the municipality. Taka Tuka Land, the playground, has a different entrance than the garden and has more children visitors than the garden.

The target group of de moestuin is less clear-cut than the one of Taka Tuka. They focus on children and disabled people, but everyone is welcome to visit the garden and sit on the terrace. De Moestuin works together with the Mytyschool, which is a school for disabled children. Mirjam said that she would like to have a building that is dedicated to nature education and she would like small gardens for the children. Children can also throw their birthday party at De Moestuin, where they will decorate plant pots and replant a sunflower. There is also a bee farm in the garden. People that visit the garden can harvest the flowers, but they cannot harvest fruits or vegetables. This is different than in the Taka Tuka garden, where all the plants are harvested by the people in the community. De Moestuin has more people in employment, for both the garden and the cafe. De Moestuin also provides employment to people with a disability or for some other reason do not have a place in the labour market. At De Moestuin, there is a party and meeting location, which creates commercial revenue for the organisation. Jacqueline from the Taka Tuka garden specifically said she would not want to do this, because the garden is supposed to be easily accessible for people from the neighbourhood.

### Recommendations

- 1) *Community gardens should be blended with playgrounds as kids are attracted to the playground areas.*

While community gardens structured like TakaTuka Land generally align better with BvL mission in terms of targeting communities and low-income households, De Moestuin offers valuable insights regarding what elements can make a community garden better at targeting children and their caregivers.

One takeaway on what can increase childrens' interaction with nature in community gardens concerns the location of the play area. With the playground in TakaTuka Land being separate from the community garden, the interaction of children with the different elements of the community garden is limited, even crowding out time spent in the garden. De Moestuin offers a better strategy of targeting children by integrating different play elements throughout the community garden, such as slides and musical instruments. When children travel from one play element to another, they encounter different parts of the community garden, and may be encouraged to use the community garden as their playground. However, a problem that might arise are safety concerns of parents. If the play elements are integrated into a public community garden, some parents may be hesitant to bring their children to the garden. This can be addressed by fencing off the garden and introducing opening hours.

*2) Additional elements might boost the number of people visiting the community garden and therefore lead to an increase in the number of children exposed to the natural elements (attract the caregivers).*

For one, the commercial element in De Moestuin deters lower income households from visiting the garden, as they might feel obligated to consume something from the cafe. While Mirjam mentioned that consumption from the cafe was not a requirement for visiting the garden, having to enter the garden through the cafe may cloud that message. Furthermore, though having the community garden focused around the commercial element leads to more investment in making the garden attractive to visitors, it might not attract the target group of the BvL, namely financially disadvantaged households. However, the greater number of visitors does translate into more children visiting. Ans Hobbelink mentioned as well that having animals or a shop attracts more people who then get interested in the garden.

3) *Stimulate all the senses.*

Lastly, Jacqueline stressed the importance of stimulating all of childrens' senses in order to encourage curiosity for nature. This mantra is especially relevant for NBIs centered around community gardens, as they allow all five senses to be addressed, namely sight, touch, smell, taste and sound. TakaTuka Land does this for adults too by offering various workshops, such as cooking workshops.

4) *Community gardens could be blended with allotment gardens since this guarantees the existence of green spaces.*

Putting allotment gardens at the core of the green space and surrounding it with freely accessible community gardens ensures a feeling of responsibility. It also allows for a transfer of knowledge to people that do not garden often. Both prevent neglect and removal of gardens.

### Preschool planting intervention

#### Introduction & set-up

As part of our case study for community gardens, an experiment was conducted with children who were 4 to 6 years old. The 27 children that took part in the experiment are all in the same public primary school, which is located just outside the city centre of Rotterdam. The intervention was replanting sunflower sprouts and sowing herbs, which included tasting basil. Children were asked to draw a place outside where they felt happiest. They were instructed to draw this one week before the intervention, and after the intervention. The children were divided in three groups. The first group made their second drawing on the day of the intervention, the second group made the drawing three days after the intervention and the third group made their second drawing one week after the intervention.

#### Results

The first thing that stands out is that in subgroup I, there were multiple children who drew the planter with flowers in them. Therefore, the small experiment seems to have a short-term (on the day itself) effect on what the children perceive as their favourite

place outside. In subgroup II, some children drew more natural elements in their second drawing, but there were not very big differences. There were also some children that drew a beach, probably because the weather was good in that period. Some of the children in subgroup III drew more natural elements in their second drawing. The most important conclusion of this case study seems to be that children integrate their recent experiences in the drawing. Therefore, experiments like this makes children think more about nature, which could be beneficial.



**Figure 6.16:** A child's drawing before (left) and after (right) the experiment, subgroup I



**Figure 6.17:** A child's drawing before (left) and after (right) the experiment, subgroup II

### Limitations

The results are probably biased because there was a school trip in the period of the intervention, so there were some children that drew themselves on the school trip. Also, the school of the experiment already provides nature education and has, for example, they already had a project about small vegetable gardens. Therefore, doing this small experiment is not that different from the regular activities for the children.

# 7 Conclusion & Discussion

## Conclusion

The aim of this report is to research to what extent nature affects early childhood development and how its impact can be measured. On a more practical level, key stakeholders are mapped on the intersection of childhood development and nature in the Netherlands, Israel and Brazil. Moreover, the research has zoomed in on some key nature based interventions by means of case studies in the Netherlands.

The stakeholder structure differs for the Netherlands, Israel and Brazil. In the Netherlands, decision-making is decentralised and thus small organisations have a lot of responsibility and knowledge. This is not the case in Israel. Here, the decision-making process is very centralised. Therefore, it is difficult for smaller organisations to make an impact. In Brazil, the main difficulty is government stability. It is difficult to have a constant policy for children. Moreover, the large disparity in development of cities further complicates things.

The choice of the case studies involves a trade-off between stakeholders and NBI's. Three case studies are selected: Leefstraten, animal farms and community gardens. All NBI's that were studied during these case studies are examined by a scheme where each NBI is rated on underlying criteria of safety and urban planning. After researching the Leefstraten initiative the main finding is that the Leefstraten have a positive effect on social cohesion and a child's willingness to play outside. Practically, the NBI of Leefstraten is not scalable because it involves large engagement of the residents. The conclusion drawn from the animal farm case study is that the scale of the farms themselves does not have an impact on the effectiveness of the intervention for interaction with nature by children. Hence, a zoo is equally effective as a small animal farm. The main take away from the community garden case study is that a community garden in combination with a playground (for kids) and a cafe (for caregivers) can boost the number of visitors and thus increase the interaction between nature and children.

To emphasise the importance of NBI's, an extensive literature review on the topic of the effect of nature on early childhood development is carried out. Subdivided into the health and well-being of children and sociocultural and generational phenomena. In terms of health and well-being, it can be concluded that the access to green space and

playgrounds greatly benefits the development of children with the age of 0-5. Finding that both physical and emotional health are improved when children have access to green space. Examples of this are BMI, motor ability and emotional well-being. When it comes to sociocultural and generational phenomena, city planning, contact with animals, nature education and leisure time in nature were all found to be important in the development of young children. Main methods that have been used in literature to research the effects were the C2N method, which measures the connection of children to nature in four dimensions through a survey approach, and the seven C's method, which helps with play space design and evaluation of NBI's for children. The C2N method is successfully used to design the animal farm case study. Jointly, these methods and interventions can tackle the problem of children's inaccessibility to nature in urban environments in the years to come.

## **Discussion**

The objective of this research was confronted with several limitations. The initial plan to go to Israel to carry out the case studies had to be cancelled due to the current COVID-19 pandemic as well as the unrest in Israel. Thus, it is questionable if our results can be fully transferred to toddlers and their caregivers living in Israel or Brazil since cultural differences might come to play as outlined in Section 2.2. It is also suspected that the ongoing unrest prevented key stakeholders in Israel from coordinating with us and providing further valuable content. Further research could aim to replicate this study and examine possible differences.

Moreover, difficulties arose also in carrying out the case studies in the Netherlands, estimated to happen due to the COVID-19 pandemic and vacation time. First, finding daycare groups turned out to be extremely difficult. Second, there might have been less activity in the gardens, streets and farms we have visited since people might have been stuck at home – ill or quarantined – or spending their vacation somewhere else. This was especially noticeable in Leefstraat, where there could be found only a few children and especially children under the age of 5. Additionally, our research group found itself to be decimated on the field trip due to self-isolation obligations.

Since our field research was only carried out on a few specific dates, the weather might have influenced the people's well-being as well as their general behaviour and activity planning (e.g. no people at the Moestuin). Future research could try to control for the variable 'weather' by carrying out a panel study, for instance.

The studies also were primarily based on qualitative rather than quantitative findings. Although effects were made measurable the study has more of an exploratory design and further research might want to aim to further quantify certain variables subjective of nature-based interventions in order to design urban NBIs the best possible way for an excellent childhood development and caregivers' well-being.

# 8 Bibliography

## 8.1 Introduction

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## 8.2 Effects of Nature on Early Childhood Development

### 8.2.1 Health and well-being

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## 9 Appendix

### A.2.1: Health and well-being

#### BMI

It is interesting to touch upon the differentiation between boys and girls found in literature. Sanders et al. (2015) investigated the effect of neighbourhood green space on the physical activity of boys and girls aged four or five in Australia. They found that boys living in areas with more neighbourhood green space were physically more active when compared to boys who lived in areas with less green space. These boys were found to watch more television as a substitute for being active outdoors. It is interesting to note that this distinction could not be made for girls. The reasons for this phenomenon remain unclear, but the authors stated that girls may play outside less often. Therefore, this could be a great opportunity for future research.

Not only the amount of green space can lead to differences in health outcomes for children, also the walkability of neighbourhoods play a role. Research done by Spence et al. (2008) found that the walkability of neighbourhoods and, in particular, intersection density, were associated with the odds of being overweight among preschool girls. However, this association was not found for boys.

#### Motor Ability

Fjortoft et al. (2000) found that children improved their motor ability through playing and exploring a natural environment. This paper, in combination with the study of Fjortoft (2001), gives some evidence for a positive effect of nature on motor ability. However, more research needs to be done for a stronger and more definitive conclusion.

#### Mental Disorders

The nature-deficit disorder may be a major driver of the increasing number of children diagnosed with ADHD, anxiety, and further psychological issues (Louv, 2008). Moreover, Taylor and Kuo (2011) suggest that routine everyday activity in green spaces lowers symptoms of ADHD in children compared to built outside settings.

## **Emotional well-being**

Balseviciene et al. (2014) examined the effects of the proximity to city parks and residential greenness on the emotional and behavioural problems of children aged four to six. The educational level of the caregiver mattered for the outcomes. Close proximity to parks improved mental health for children with a low educated mother. Surprisingly, more residential greenness was associated with worse mental health for children with highly educated mothers. For emotional problems specifically, they were unable to find a relation with city parks-proximity or residential greenness.

Weeland et al. (2019) have conducted a meta-analysis on the impact of exposure to nature on self-regulation in school children. The study finds that nature might be used to stimulate the self-regulation of children, since the effect of nature is small, but significant.

## **Intelligence**

Moreover, Beames et al. (2019) state that a natural environment stimulates children's intelligence, creativity, motivation and attentiveness. In this way, nature is expected to boost children's learning abilities. Thus, contact and connectedness with nature is seen to be necessary for children's development (Kuo et al. 2019).

## **Air Pollution**

Dutch research on the effect of traffic-related air pollution in urban areas on childhood respiratory diseases for two year-olds states that air pollutants are positively associated with asthma, wheezing and ear/nose/throat infections (Brauer et al., 2002). An even stronger association between traffic-related pollution and asthma diagnoses during the first year of life was found. When the children were investigated in a follow-up research at four years old, the findings were confirmed.

A German study investigating children up until the age of two by Gehring et al. (2002) found associations between traffic-related air pollution and coughing. However, due to the fact that they were still very young, it was difficult to make conclusions about the development of asthma. McConnell et al. (2010) did research on new-onset asthma in relation to exposure to air pollution near children's homes and schools in Southern

California. They investigated children from kindergarten and first grade, aged around five to seven years old, who had no asthma or wheezing problems when they entered the study. The children were examined yearly to investigate the relation to traffic-pollution in a three year follow-up. They concluded that when children are exposed to higher levels of traffic-related pollution near their schools and homes, this might have an effect on the development of asthma.

## **A.2.2 Sociocultural and Generational phenomena**

### **Urban Nature**

Single households in cities are less eco-efficient, requiring more resources per capita (Lyytimäki, Petersen, Normander & Bezák, 2008), which poses a threat to biodiversity conservation. However, the researchers still highlight the importance of green spaces within a city by urban populations, as it is a part of recreational time and opens possibilities to socialize with people.

A prominent example of environmental segregation has been reported in the United States. A study by Dr. Robert Bullard (1984), an important figure in environmental justice, discovered that waste disposal sites in Houston city were not randomly scattered around the city, but found mainly around poor and Afro-American neighbourhoods and even schools. This study was striking, as it found that, even though the ethnicities in the city were only 25% African-American, 100% of landfills and 80% of incinerators were located in predominantly Afro-American neighbourhoods. The other 20% were located in a Hispanic neighbourhood. Moreover, it revealed that a big number of waste disposal sites were located nearby schools, of which most were African-American. This is a clear example of economic and racial discrimination in access to waste-free environments.

Even though not as detailed, similar results were found in Israel, where evidence suggests spatial distribution has marginalized Arab minorities. These minorities in Israel are exposed to environmental hazards such as toxic-waste dumping, open sewage, and industrial park development the most. For instance, there are Bedouin villages which are severely exposed to sewers produced from neighbouring Jewish towns and cities (Jan Marie Fritz, 1999).

The New Israel Fund (NIF) was established in 1979 to fight for a more fair city and neighbourhood planning. However, there are still inequalities regarding the access to pollution-free environments. As these studies are from two decades ago, it is worthwhile to research if this still holds, or if the NIF has been able to reduce this inequality.

On the other hand, there is also research suggesting that parks might lead to higher crime rates as they might provide safe places for illicit activities such as drug dealing or assaults. A study by Eric McCord and Kimberly Houser (2017) compared two different US cities and found that parks are associated with higher crime rates in their immediate surroundings. However, it is not yet clear if crime would be more dispersed if these parks were not around. Furthermore, there might be a bias due to the comparison of different cities at different periods of time.

The role of city planning in well-being within cities goes even further: There are studies indicating that urban green spaces can contribute to crime prevention. Kuo (2003) shows the link between arboriculture (tree planting) and a healthy social ecosystem. Spaces without greenery or another designated purpose often become a wasteland or no-mans-land, which invites crime into the areas. A simple solution for this is to plant greenery in deserted public spaces, since it promotes healthy social behaviour and improves individual well-being.

Up until the 90s, city planning in Israel was centered around controlling the land for the Jewish majority, with little consideration of human rights or equality of distribution. This resulted in highly unequal spatial distribution of resources and the marginalization of the non-Jewish population. According to Dr. Hershovich (2006), chief planner of the Jewish Agency, Projects like Tama 35, an Integrated National Master Plan for Construction, Development and Preservation, intend to give more importance to equality, fairness and human rights. National security is being replaced by addressing the population's needs, environmental issues and equality.

## **Cultivating appreciation of Nature**

In 2020, Israel's government created a fund to sustain municipalities in conducting urban nature surveys. The objective is obtaining enough insights to deliver informed decisions on how to develop sustainable cities while preserving nature (Urban nature, 2021).

Conversely, a body of literature assesses that the way in which public spaces are maintained can affect the presence of biodiversity. A case study concerning social-ecological initiatives in the inner-city area of Greater Manchester explored the connections between biodiversity potential and user participation in local green commons (Dennis and James, 2016). The research provides evidence on the positive link between the ratio of biodiversity in an area and the level of user participation. As the volunteer input increases, data shows a proportional growth in biodiversity levels. Other important observations relate to the size of the site and the kind of activities conducted within it. Larger sites were associated with much lower voluntarism in terms of hours, while those offering a wider number of activities seemed to attract greater participation. Former and latter connect logically: sites conceived to be more concentrated and reachable with limited access can be administered even with limited resources, as in the case of volunteer citizens. Furthermore, more interaction opportunities accommodate more volunteer involvement, stimulating their participation. In substance, a variety of activities required in terms of management generates opportunities for citizens' intervention, which translate to physical activity and better health.

These findings may be of great interest for policymakers who could consider designing open green spaces in the function of establishing social-ecological networks in the interest of both citizens' wealth and urban resources' management purposes. In other words, granting settings which are easing the involvement of citizens in urban green spaces would not only benefit their well-being in terms of health, but it would also produce a positive stimulus in the levels of urban biodiversity and provide means towards the decentralization of natural resource management. Under social considerations and taking the right precautions, volunteering activities could be designed to allow both caregivers and children to participate. The final effect would be establishing better interpersonal bonds within the family and the community, additionally granting high quality occasions to provide environmental knowledge and increase the sense of discovery and affection of babies towards nature.

Particularly in Israel there are differences between different groups' views on nature. Dromi & Shani (2020) investigate how nationalism and environmentalism affect nature in Israel mainly between a group of environmental activists and Jewish Israelis. Both groups see caring for nature as a key element of nationalism, but want to do this in

different ways. One group sees non-intervention with nature as environmentally friendly, while the other group tends to be more active with nature to preserve it best.

## **Education**

Overall, education has an effect on the development of people's perception of nature. Littledyke (2008) highlights the importance of science education and states it can be linked to the development of positive environmental attitudes and helps to make critical environmental choices. Paul and Nagendra (2017) find that people that are undergraduate are less willing to participate in nature conservation. Furthermore, undergraduates rated the quality of nature less positive and were expecting less infrastructural or biodiversity improvements in the park than people that were further educated.

## **Leisure**

Watching from a broader perspective, leisure time in open settings does not only benefit relationships within families and friends, but can be a catalyst for improving integration among different cultures. In 2009, an empirical survey was conducted in Zurich, Switzerland, to get an understanding on how outdoor leisure activities can affect social interactions between local and immigrant young people (Seeland et al., 2009). The interviewed subjects were pupils from schools in the Zurich area. In general, respondents recognized sports and other leisure activities which can be performed for free in easily accessible open areas as crucial to making new friends. Males and females mentioned outdoor spaces almost equally, while those who moved to Switzerland mentioned them slightly more frequently than natives. These open spaces included urban forests, parks, playgrounds and swimming pools.

Finally, the study suggests that outdoor contacts could be considered as a medium to reduce division. Across the selected quarters of Zurich where interviews took place, an important observation related to the level of cross-cultural friendships. In the poorest area, where the percentage of foreigners was the greatest, youngsters tended to have less intercultural interactions. Older students were more likely to have a mixed group of friends compared to younger children, while teenage girls showed greater propensity for overcoming nationality and ethnicity differences. Since frequenting open spaces overcomes social segregation, these can represent a fundamental setting to allow for

aggregation and the establishment of new contacts. Data showed that parks and playgrounds are frequented by foreign and Swiss pupils at roughly the same rate. Thus, these places can be considered as having great potential for encouraging social inclusion of non-natives. A major adjustment which could help integration further would be involving all parties into the planning of outdoor areas. By incorporating a variety of cultural traditions of green space into the project design, it would be possible to make all youngsters feel at “home”. This would ease the process towards inclusiveness and cohesion.

### A.3.1.1 Examples of nature play areas



Figure A.3.1.1: (a) North Canyon Nature play area



Figure A.3.1.1: (b) Fillmore Discovery Park

### A.3.2.1: The 7 Cs Criteria questionnaire used by Brussoni et al. (2017)

Seven Cs ratings for each childcare centre at T1 and T2.

Seven Cs Criteria	Centre A		Centre B	
	T1	T2	T1	T2
Character Total /25	10	24	5	23
1. Build quality: What condition is the play space in (including its features)?	3	5	1	5
2. Atmosphere: What is the character of the play space? Does this play space have an overall sense of softness?	1	5	1	4
3. Vegetation: Does the vegetation offer visual stimulation? Are there opportunities for interaction with the vegetation? Is vegetation used as a play prop?	1	5	1	5

4. Surface materials:

3 4 1 4

Is there a range of surface materials in the space?

Are these materials engaging and stimulating?

Do they contribute to an overall sense of softness  
in the space?

5. Light quality:

2 5 1 5

Is light quality balanced?

Are there colour differentials?

---

Context Total /25

12 18 16 23

1. Health and Safety:

2 2 5 5

Is the play space secure from traffic and other dangers?

Does the space suffer from vandalism or animal  
incursion?

2. Microclimate:

1 4 2 5

Have microclimate conditions been addressed? (i.e.  
too hot, too cold, too exposed to wind.)

3. Views looking out: 4 4 4 4

Does the play space offer views to the surrounding landscape?

What can children see beyond the play space boundaries?

4. Views looking in: 2 5 1 5

Is the play space attractive to look at?

5. Boundaries: 3 3 4 4

Are there clear physical boundaries that are stimulating and engaging?

Where possible, do the boundaries create a link with the surrounding landscape?

---

Connectivity Total /15 3 11 3 13

1. Entrance and exits: 3 3 3 3

Is it easy to access the outdoors?

Is indoor and outdoor space connected visually?

Is there a clear entrance and exit to the space?

2. Hierarchy of pathways: 0 4 0 5

Are there paths that promote movement and exploration of the space?

Do these paths allow safe integration of foot and bi/tricycle traffic (if necessary)?

3. Moving around the space: 0 4 0 5

Do the paths loop?

Do the paths allow children to make decisions as to where to go?

---

Clarity Total /20 8 13 5 20

1. Design: 1 3 0 5

Is the layout of the play space clear and navigable?

Is the play equipment is appropriately placed? (Not dominating the centre of the play area)

2. Zones: 2 4 0 5

Are the different zones of play clear? (e.g., messy zones, sand play, water play, bicycle or tricycle space)

3. Seating: 2 3 3 5

Are there spaces where children can sit (including informal seating, boulders)?

Are there comfortable places for adults to sit adjacent to the play space?

4. Logistics: 3 3 2 5

How easy is it to set up and pack away the play space?

Is there ample storage?

---

Chance Total /15 5 11 1 15

1. Mystery: 1 4 1 5

Are there areas and materials that promote exploration? (e.g., look behind, stand on for prospect, crawl into, look up into )

2. Loose material play: 2 5 0 5

Are there natural materials in the play space to create and build with, ma-nipulate, and move throughout the play space?

3. Messy zones:	2	2	0	5
Are there areas for water play?				
Are there places to play in the dirt?				
Are there sand play areas?				
Can children make mud?				

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Change Total /25	4	20	5	23
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1. Differentially sized spaces:	0	5	0	5
Are there small spaces for individuals, medium spaces for small groups, large spaces for group assembly?				
2. Range of space types:	1	4	1	5
Are there open spaces for movement and activity?				
Are there undefined spaces that accommodate play?				
Are there spaces that provide shade or shelter?				

3. Accommodates a range of ages/developmental stages: 1 4 0 5

Are there spaces that accommodate different age groups? (<3; 3-6; 6-9; 9-12; 12+)

Does the play space accommodate different developmental stages and abilities within the same age range?

4. Ground plane: 0 3 2 4

Are there changes in the topography that make space stimulating and engaging? (e.g., mounds, steps, ramps, undulating surfaces, ditches, decks, terraces).

5. Materials: 2 4 2 4

Do the materials in the play space change with the seasons?

---

Challenge Total /10 2 7 0 8

1. Risky play: 1 4 0 4

Are children encouraged to take risks and challenge themselves in this space? (e.g., height, balance, speed, using tools or other materials)

2. Graduated challenge:

1      3      0      4

Does the space contain opportunities for physical and cognitive challenges with varying levels of difficulty?

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TOTAL SCORE /135	44	97	35	125
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**Table A.3.2.2: The C2N index questions used by Barabbe et al. (2019)**

**Enjoyment (ENN)**

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V1	My child likes to hear different sounds in nature.
V2	My child likes to see wildflowers in nature.
V3	Being in nature makes my child feel peaceful.
V4	My child likes to garden and plant .
V5	My child enjoys collecting rocks and shells.
V6	My child enjoys touching animals and plants.

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**Empathy (EMN)**

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V6	My child feels sad when wild animals are hurt.
V12	My child is distressed when he/she sees animals being hurt
V13	My child is heartbroken when animals

---

pass away

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**Responsibility (RN)**

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V8	My child believes that picking up rubbish from the ground can help nature
V11	My child treats animals, plants, and insects with care
V14	My child enjoys recycling paper and bottles

---

**Awareness (AN)**

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V9	My child notices wildlife wherever he/she is
V10	My child chooses to read about plants and animals
V15	My child feel the difference between indoor and outdoor
V16	My child notices birds and other sounds in nature

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**Question about kindergarten**

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Duration	How long has your child attended nature kindergarten for? ( in months)
Frequency	How many times per week does your child attend nature kindergarten?

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**Table A.3.2.3: Metrics - Outcome variables**

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<b>Metric's name</b>	<b>Paper</b>	<b>Author</b>
Contact with natural elements	The importance of outdoor play for young children's healthy development.	Bento et al.
Risk importance	The importance of outdoor play for young children's healthy development.	Bento et al.

Specialization opportunities	The importance of outdoor play for young children's healthy development.	Bento et al.
Physical activity	The impacts of unstructured nature play on health in early childhood development: A systematic review.	Dankiw et al.
Creativity	The impacts of unstructured nature play on health in early childhood development: A systematic review.	Dankiw et al.
Learning	The impacts of unstructured nature play on health in early childhood development: A systematic review.	Dankiw et al.
Connectedness to/interest in nature	Toddlers' prosocial behaviour: From instrumental to empathic to altruistic helping.	Sobko et al.
Comfort level with animals	Planting the Seeds for Nature-Based Learning: Impacts of a Farm-and Nature-Based Early Childhood Education Program.	Rymanowicz et al.
Self - reported ( mental) health	Natural environments–healthy environments? an exploratory analysis of the relationship between greenspace and health.	De Vries et al.
Enjoyment of nature	Toddlers' prosocial behaviour: From instrumental to empathic to altruistic helping.	Sobko et al.
Empathy for nature	Toddlers' prosocial behaviour: From instrumental to empathic to altruistic helping.	Sobko et al.
Environmentally	Taking kindergartners outdoors:	Elliot et al.

responsible behaviour	Documenting their explorations and assessing the impact on their ecological awareness.	
Perceived environment	Can the neighbourhood built environment make a difference in children's development? Building the research agenda to create evidence for place-based children's policy.	Villanueva et al.
Children's lung functioning	Air pollution and respiratory health among diabetic and non-diabetic subjects in Pune, India—results from the Wellcome Trust Genetic Study.	Salvi et al.

**Table A.3.2.4: Metrics - Treatment/Independent variables**

Metric's name	Paper	Author
Farm	Planting the Seeds for Nature-Based Learning: Impacts of a Farm-and Nature-Based Early Childhood Education Program.	Rymanowicz et al.
Noise	The role of informal green spaces in reducing inequalities in urban green space availability to children and seniors.	Sikorska et al.
Extreme temperatures	The role of informal green spaces in reducing inequalities in urban green space availability to children and seniors.	Sikorska et al.
Informed green spaces	The role of informal green spaces in reducing inequalities in urban green space availability to children and seniors.	Sikorska et al.
Green playground	Where do children choose to play on the school ground? The influence of green design.	Lucas

Green spaces near school or home	Natural environments near schools: Potential benefits for socio-emotional and behavioural development in early childhood.	Scott et al.
Outdoor squares feet per child	Nature and the Outdoor Learning Environment: The Forgotten Resource in Early Childhood Education.	Cooper
Walkability to green spaces	Can the neighbourhood built environment make a difference in children's development?	Villanueva et al.
Housing density	Can the neighbourhood built environment make a difference in children's development?	Villanueva et al.
Traffic	Can the neighbourhood built environment make a difference in children's development?	Villanueva et al.
Public transport	Can the neighbourhood built environment make a difference in children's development?	Villanueva et al.
Air pollution data such as % of ozone or PAHs	Air pollution and respiratory health among diabetic and non-diabetic subjects in Pune, India— results from the Wellcome Trust Genetic Study.	Salvi et al.

### A.5.2.1 - Stakeholders The Netherlands contact information

Name	Type of organization	Contactperson	Contact information
Rijksoverheid	Governmental		
DuurzaamDoor	Governmental		
Municipality Rotterdam	Municipality	*Olaf van Velthuisen	stadsecologen@rotterdam.nl o.vanvelthuisen@rotterdam.nl
IVN	NGO	**Ian Mostert	i.mostert@ivn.nl

Staatsbosbeheer	Governmental	**Keelin O'Connor	k.connor@staatsbosbeheer.nl
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Speeldernis	Foundation	*Carolien Ruigrok (director)	carolien@speeldernis.nl
Woeste Westen	Foundation	Martin Hup (director)	www.woestewesten.nl/contact.php linkedin.com/in/martin-hup-31561b15
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NUSO	Foundation		
Groene Kinderopvang	Daycare		
Tarwekracht	Foundation		
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Gemeenten voor Duurzame Ontwikkeling (GDO)	Foundation		info@verenigggdo.nl

\* Contactperson/organisation has been contacted

\*\* Contactperson is already interviewed or called

## A.5.2.2 - Stakeholder's Israel contact information

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Givat Haviva	National education Centre	Management@givathaviva.org.il
Israel Council for the Child	NGO	ncc@children.org.il
National Institute for Health Policy Research	Research/Academia - Health	nihp@israelhpr.health.gov.il
Financial & Strategic Planning Administration	Government	NA
Bikom	NGO	bimkom@bimkom.org
Arie Hershovich	Academia	NA
B'nai Israel community Day school	Private	dayschool.3830@gmail.com
Ministry of Education	Government	info@education.gov.il
Ministry of Health (mother/child department)	Government	call.habriut@moh.health.gov.il
Caregivers Israel	NGO	info@caregivers.org.il
Society for the Protection of	NGO	international@spni.org.il

Natural Israel

Gazelle valley

Private

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### **A.5.2.3 - Stakeholder's Brazil contact information**

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<b>Name</b>	<b>Type of organization</b>	<b>E-mail</b>
Catalytic Communities	NGO	info@catcomm.org
Green Cross Brazil	NGO	contact@gcint.org.br
Ministry of the Environment	Government	NA
Ministry of Education	Government	NA
Educate A Child	NGO	NA
Friends of the Earth Brazil	NGO	NA
Instituto Benjamin Constant	Government	ibc@ibc.gov.br
Land Alliance	NGO	info@lta.org

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### **A.6.1: Case study Leefstraten**

#### **Methods and Measures**

The main method to investigate the Leefstraten is to interview children and caregivers who are present at the Leefstraten. Through an array of questions we aim to

discover what their view is concerning the Leefstraat. Furthermore, we aim to find out what they think can be improved. Below, we state the questions which we will pose to caregivers:

- What is your biggest worry about letting your kid go outside (under normal circumstances and during the closed street)?
- In what way does the Leefstraat influence your relationship with your children?
- Can you notice a difference in your children's behaviour when the street is closed?
- Do you experience a change in your behaviour with regards to the Leefstraat?
- How do you think the Leefstraat affects your life with relation to your children/family/neighbours?
- How often does your child play outdoors and does it change because of the Leefstraat? Why?
- What are the downsides of having a Leefstraat?
- What is the biggest benefit of having a closed street?

Now, we state the questions which we pose to children:

- What is your favourite thing about the Leefstraat?
- Is there something you do not like about the Leefstraat? What is it?
- What do you miss within your Leefstraat?
- What do you like to do when playing outside?
- Do you like playing inside more than outside when there is no Leefstraat?
- Do you like playing inside more than outside when there is a Leefstraat?

Next to children and caregivers, we also interview nearby neighbors, academics and organisers of the Leefstraten. The methodology here is slightly different. These interviews will consist of two parts. Namely, a fixed set of questions and a set of questions tailored towards that specific person. We do this since we believe that, for instance, a specific academic has a different expertise. The set of basic questions for each aforementioned group are stated below. We start with municipalities/ policy makers:

- What is the main reason driving the Leefstraten within the municipality/neighbourhood?
- What is the impact that the Leefstraat has on the community regarding social cohesion/safety?
- What does the organisational process look like within your municipality?
- Are the capacities/resources dedicated to the initiative sufficient?
- To what extent is nature incorporated into the initiative of Leefstraten? Can this be extended and how?
- What are the costs of the initiative and how is it funded? What needs to be improved regarding this?

Below, we state the questions for nearby neighbors:

- Do you generally travel to go to a Leefstraat? How often? If yes, do you experience a change in your behaviour with regards to the Leefstraat?
- Do your children want to go to the Leefstraat? Do you think that the Leefstraat has (an) effect(s) on your children's behaviour?
- What are your thoughts on a Leefstraat in your own street?

Below, we state the questions for academics:

- What do you think is the effect of Leefstraat policies on caregivers and their children?
- Is there a role for nature within the initiative of the Leefstraat? Can this be extended and how?
- How do you think a Leefstraat would impact the life of the community?
- Do you think Leefstraaten are feasible on a larger scale?
- What are the limitations of implementing this initiative?

## **Interviews**

**Interview with organizer Bart of the Maurice Verdoncklaan, Ghent (Monday August 2nd)**

It is a real place, not just for the kids anymore. Just has much more potential. When the Leefstraat is ready, pay attention because the kids have to get used to it again. 15 years already with his wife in organizing.

- What was the main reason for organizing a Leefstraat?

More extensive and no traffic is really very pleasant. Normally there is traffic here but also on the sidewalk you have the pressure of cars passing by. Living space for all the local residents. Outdoor living space (compare large garden countryside). The city delivers turf.

- Why play street then?

There was an initiative in Antwerp, he read those articles and thought that was cool. At the same time that initiative came here so it was set up.

- How did you experience organizing the Leefstraat?

Organizing is great, Ghent did the first year outsourcing to foundation. Foundation had researched it well. Number of them have become city officials, Sophie. Are reused the turfs. After 2 years it was self-organized. City checks up on it. Foundation is called horse of Troy. Progressive city government probably also led to developments in Ghent.

- What is involved in organizing? For example the preparation, the activities etc. Does nature play a role in this?

Designer is Bart. The city only provides tools, organizing itself does not. You feel tiredness of always taking initiative. There were performances and clowns etc. many residents are users. And their kids are already parents so their interest ebbs away. Young families have to do it now. Make sure it doesn't bleed to death. Dream is permanent. Asphalt away. Is also communicated, Sophie knows. There is also less active mowing now, is nicer and better. Blackberries are there, wildflower garden. Is not taken over by other neighbors.

- What do you yourself notice during the Leefstraat with regard to social cohesion (neighbourhood feeling)/safety/the type of activities? Are there any particular benefits or challenges (yet)?

Invites to come together. Greater social cohesion. Not immediately friends and hanging out with each other but you can be together. Doing low profile things. There is a gap in the winter though. Challenges: house has been empty for 15 years and we know owner. Buy that house and turn it into a community centre or rental facility. Coolhousing. Would also overcome winter. Further challenges: someone drove through. City says keep 4-foot strip clear for emergency vehicles. But Bart is still going to put a substantial obstacle possibly to stop them. Set up banks again for example.

- What are the costs of organizing a Leefstraat and how is this paid for? Are there any related improvements possible?

They work with 200 euros here. City has a lot of tables. Pallets from people in the industry. Everybody plants. Very low budget. Last summer very hot, canopies tried but festival tent is the ideal picture. Plants important part of garden. Plants to delineate bike lane to keep kids safe.

- Working from home interesting economic aspect.

Working outside, although laptop in terms of internet and reflection is difficult outside. Then such a living space becomes even more valuable. With all the home working. Social contact and outdoor space. Shared initiative of the street in terms of taking initiative. First time the first half of the group. Fifth or sixth time, every year since 2014. By the Trojan horse. Benefited because there are many children. Traffic is easily diverted. Used to be a bumpy street. First already together initiative or high greenery to build (bins of greenery). They already knew each other.

### **Interview with organizer Dirk of the Koolkapperstraat, Ghent (Monday August 2nd)**

- What is the main reason driving the Leefstraat within the municipality/neighbourhood?

The street shared the initiative of organising Leefstraat together. The local residents already knew each other. In the past, they had taken an initiative together to install high greenery (planters). They started the Leefstraat project in 2014 and have been doing it every year since. It started in cooperation with Paard van Troje. The street benefited a lot because there are many children living there. It was also a good place because the traffic

could easily be diverted. It was good for all the other children to get to know each other. 2 year olds are watched, but 5 and 8 year old children can play outside by themselves. Especially at the end of the afternoon children play together and parents have an aperitif. It gives a certain peace in the house. In winter, houses are small, vertical, downstairs space small. The fact that they can go outside gives peace. Back from school, tired, being able to go outside with peers. When they are happy, we are happy.

- What is the impact that the Leefstraat has on the community regarding social cohesion/safety?

Before COVID-19 many activities, cava bar, flea market and children's activities (open air cinema), mobile circus. Last two years, less organized due to COVID-19. Resident has lived here for eleven years. Village feeling in the city. Safety: the lane for two-wheelers must be watched, scooter and cyclists. Sometimes signs are moved when moving. Signs are not put back. Much safer than normal and in winter. Then someone always has to be there. Especially in the evening a lot of passing. Parking lights are cut off. Criticism of closing the road. Also someone with a wheelchair, position has changed. Children from the area come to play. More familiarity, so less comments.

- What does the organisational process look like within your municipality?

They had to go through the procedure of the municipality with a neighbourhood survey about the willingness for the Leefstraat. The street was surveyed beforehand and the city did an evaluation. Nine parking spaces were lost, so they had to engage the residents to park outside the city. Informing the neighbourhood is an important part.

- Is the capacity/resources dedicated to the initiative sufficient?

The furnishing is supported by the Paard van Troje. They supply grass mats, traffic signs and previously also planters. Partial furniture purchased.

- To what extent is nature incorporated into the initiative of Leefstraten? Can this be extended and how?

It used to be an 'edible street' with, for example, berry bushes and planters and small vegetable gardens. The edible street was more for the adults and the children were mainly

enthusiastic about the harvest, not necessarily the maintenance. It ran for two years. Furthermore, sandpits and water games, last year a small swimming pool.

- What are the costs of the initiative and how is it funded? What needs to be improved regarding this? Are there any obstacles?

Political fuss, green in majority have defended it. Conflict and some stopped, people wanting car in front of their house. Not really financial reasons. Costs besides the banks? Cavabar sold with a little profit and so a shared cargo bike was purchased with the street for shopping. Later, some of them bought their own cargo bike. Cost is perhaps more the time investment.

- Are there improvements of the Leefstraat?

Now it is four months and it can be longer. For example, from April to October. Some think it is long enough. Perhaps an electronic system with bollards to make it easier to put up and take down the bollards instead of signs on the street. To limit through traffic. Investments from the city especially, being looked into.

### **Interview with four residents/retailers of Gentbruggeplein, Ghent (Monday August 2nd)**

- What were/are your main reasons for organising the Leefstraat?

Motivation: Leefstraat is more fun than parking. Atmosphere, and getting closer to the neighbours. More contact with the neighbours, you get to talk to each other easier. Improved social cohesion. Local shopkeepers who started the experiment.

- How was your experience organising the Leefstraat?

Organisation: things that could be better or things that are problematic. A lot of support from the city to get something like this off the ground is really necessary to get it done. Always coming to the meetings. The will is there and a lot of energy is put into it. This edition with small initiatives that are easy to organise yourself. Finding interim solutions with people who were initially against it (e.g. because of parking problems). First talk to each other and don't just do it for example). Disadvantages of the Leefstraten: parking spaces (on number 1), competition with the shopkeepers, like the café on the other side of the square or like other shopkeepers who are afraid to lose income because there are

less parking spaces so people go and do their shopping at the supermarket (only 2 parking spaces are gone).

- What do you take into account when organising the Leefstraat? Such as design, activities etc? How does nature play a role?

The criticism about the parking spaces and the wishes of the shopkeepers.

Target group: young and old people who participate. Very broad target group, many people who live in the neighbourhood and are successful when the cafés are open. Good atmosphere. Things specifically for children that are organised: circus, equipment for children (skating). Lots of different activities organised (performances, gymnastics lessons, flea market, food trucks etc., lots of ambition). Not necessarily much attention for nature or natural elements.

- What did you notice during the Leefstraat itself with regards to social cohesion/type of activities/safety? Were/are there any benefits or challenges?

Challenge: very important how the idea grows and the involvement from the neighbourhood to make it work. To get people to participate and to include people who are against the experiment by coming up with intermediate solutions. For example, including all the shopkeepers around the square. Partly with children, but not very much focused on children because it is still quite dangerous with the road and for the really small children there is no playground equipment. People who organise it don't really have small children either so that reasoning is a bit lacking

- What are the costs of the initiative and how is it funded? What needs to be improved regarding this?

The role of the municipality: they actually fund everything. A priori, it is not said that there is a budget. The message is to organise something -> several conversations -> we will pay for this and this. Good, also works better than here is a hunk of money.

A lot from the city, or local residents, umbrellas from the butcher, picnic tables from the city (they take them, store them, again for next year). What the city does now is good.

### **Interview with three residents/organizers of the Malakkastraat, Utrecht (Thursday August 4nd)**

- What is the main reason driving the Leefstreet within the municipality/neighbourhood?

It was created by someone in the street who had the idea. The idea was that it would be fun for both children and adults. And eating together often and being able to be together. Added value besides the playground around the corner: really a closed-off part of the street, it's also special that it's closed off. The children think it's very nice and special. They're going to ask when the street will be opened again. It's something special to them.

- What is the impact that the Leefstreet has on the community regarding social cohesion/safety? Were/are there any benefits or challenges?

No Leefstreet: children play on the pavement, so a lot less outside. And children of different ages play together. When the children are very small, they play under supervision but generally they can play just fine on their own without supervision. The children play outside a lot more. In the beginning it was a challenge that they didn't go off the Leefstraat, but now they're fine. They do gravitate towards each other more when things are trying. Change in behaviour of the children when there are Leefstraten: they go outside much more, the playing field does invite them to move. The street evokes something else than the playground around the corner. Above all, they play in other ways: creativity, new things. They also do it very much for the adults. It goes well together to focus on children and parents. The residents are planning things, how many weeks the street is and activities planned (wine tastings, hair afternoons, pancake afternoons, etc.). In the first year, they made up their own activities and thought up how and what to do. When it is quieter (more people on holiday) they plan fewer activities. What you plan as an activity must have an owner, they found out, if you want it to work. Children's meeting: you gave ideas but nothing was decided because that was up to the adults. For example, a swimming pool, football field, lemonade tasting and setting up a campsite are realised activities. How is the feeling in the neighbourhood: So much contact with the neighbours is really very good. A close neighbourhood was already there before the Leefstraat. How does that manifest itself in activities if there is no Live street? People often have a drink in the street. There are some activities throughout the year, arranged through the neighbourhood app. Many positive reactions to their Leefstraat. It is a permanent part of

the people in the neighbourhood. Quite a lot of people from the neighbourhood who subscribe to activities. The Leefstraatapp is already a wide area. A kind of oil slick. A large range to send out invitations. This year the street is six weeks. You really need people to put their shoulders to the wheel. Living in this area makes you feel extra responsible. Fortunately, the inconvenience has not been too bad up to now. The more people involved, the more they cooperate and help. They are very considerate of each other, for instance when a baby is born. Challenges are: The street may be completely blocked for all through traffic. Cyclists with a lot of speed sometimes pass by on the pavement. The biggest stumbling block is the turf, which is very expensive. Fortunately, for this year it could be stored at the playground. The turf completes the picture, they think. The Leefstraat helps a lot with social cohesion. Every year it's exciting how many people take part in organising it, carrying the burden. It goes so smoothly and nicely in so many ways. Only wish: that even more people would want to organise something, on a casual or a permanent basis. You have to keep the active members in the club. No social pressure. No noise after 10 o'clock. There are two 'Leefwachten' (neighbourhood watchdogs) who are points of contact for nuisance or something. I came up with that myself. As a kind of final responsibility. It provides an overview but almost no work.

- What does the organisational process look like within your municipality?

Before starting, they had to do a neighbourhood survey (support measurement): many formulations, streets and signatures later. Actually, nobody was not enthusiastic. The Leefstraat really belongs to the neighbourhood. Fewer parking spaces: good solution because many people are on holiday so there are fewer cars on the street. In general there is already a low parking pressure (many greenweels for example). In terms of organisation: how did it go compared to the first year? Back then, they really had to figure a lot out. Now they know exactly what to do. It's very organised now. And making people the owners of certain tasks also worked very well. The municipality gives money, supplies signs and asks some questions, but otherwise there is more contact with the community office.

- Is the capacity/resources dedicated to the initiative sufficient?

More help from the municipality is not necessarily desired, they think that it should come from the people themselves to really organise it. They expect it to be less free. It would be nice to have the possibility to store things for the Leefstraat.

- To what extent is nature incorporated into the initiative of Leefstraten? Can this be extended and how?

Green space: think about what can be done with the requested budget.

All stuff at the end of the Leefstraat: the grass hopefully goes back to the playground. The contact with the playground is good.

- What are the costs of the initiative and how is it funded? What needs to be improved regarding this?

They get subsidy from the municipality (1000-1500 eu, grass mat costs something like 600/700 euro). The support is from the municipality: they close the street and subsidy. But the other things they figured out for themselves.

### **Interview Yvette van Dijk: Policy Officer Urban Development at the Municipality of Groningen**

- How did the initiative end up in Groningen?

The City Council requested to investigate the feasibility of Leefstraten in Groningen. This is the first year that there are Leefstraten in Groningen. As a result of 'Vakantiestraat' (vacation street) with a (national) appeal. A few years ago, via the inspiration festival 'let's grow', a one-day street in the autumn holidays. Because of the timing and weather, this was less spectacular. Also once an actual residential street, not temporary. Advice was given to the council about 'are we going to carry it out' and how to interpret the council's question about permanent or temporary design. Because of COVID-19, people were more at home during the summer holiday. How does the initiative fit into Groningen? Contact with Utrecht about costs and organisation. Money/funding always is a problem. Trying it out in Groningen South with a pilot, also the area of the alderman who wanted the streets. In the end, there were two streets, but only 4 people applied, 1 was not accepted and 3 continued. Keep track of hours and budget in the pilot. Look at scaling up.

- What is the most important reason to organise a Living street within the municipality/neighbourhood?

Policy officer Quality of Life (climate adaptation and greenery). Reclaim public space from the car. Leefstraat instrument to let people experience in an accessible way what it is like to play safely in the street and to park the car somewhere else. Public space guideline, street for everyone and not just for cars. Social cohesion is a nice bonus but can also be achieved by transforming a grass field, for example.

- To what extent does nature/green space play a role within the Leefstraten initiative?

Mentioned in communication. Hits the spot. For and by the residents. Mention examples such as façade gardens. Walking trees (containers with trees and wheels) made by students. NK tile-swiping. A low-threshold way of doing things, but it is not imposed, although it is very popular.

- What are the costs of the initiative and how is it financed? Are there any obstacles or possibilities for improvement?

Hours spent by officials, paid for by the municipality. Costs of Yvette as coordinator. Cooperation with district team (social sector). They could help if a street had less organisational capacity. But this was not necessary for these streets. Subsidy from area team; small amounts (hand money). One thousand per street for rent of materials. Bouncy castle or furniture, green carpet. No food or drink. Costs of the officials themselves. If it is approached on a larger scale (after the pilot), a project leader would be assigned to the initiative (100 per hour for example) to oversee a larger number of streets.

- What would be the municipality's decision to appoint a project manager?

Cuddly project but colour of politics very important. Green measures with few square metres, others are. College's ambitions 30,000 tiles removed. Invest money in de-stoning, reclaim public space. People in green surroundings are happier people.

- Children in the initiative?

1 Street children signs with 'we want living street now'. Others more sports together, walking dinner. Mix between adults and children.

## **Interview Fee Vandepitte**

Fee is educated as a social worker. Responsibility at Leefstraten is supporting the groups. This includes the material to be laid out, budget and other practical things of the Leefstraat

- What is the main reason driving the LeefStraats within the municipality/neighbourhood?

Leefstraat wants to connect and tries to get people to come together and meet. There are more and more Leefstraten in Ghent. Ghent clearly wants to invest into such things. There are also "Leefpleinen"

- What is the impact that the LeefStraats has on the community regarding social cohesion/safety?

People of all ages come together. The connection in the district is not only between generations, but also between cultures. Good example is when the political elections were broadcasted. Even people with differences in political preferences come together. People had discussions and learned to deal with these differences. Children also went outside more often, because the street is transformed into a safe place with a lot of space. People even left their valuables outside, Leefstraat gives a safe and familiar feeling.

- What does the organisational process look like within your municipality?

20 weeks before the Leefstraat is set up, the application will be completed. Next, we look at what is possible in the street. Then the promoters try to enter into dialogue with everyone in the street by going to every door (call round).

- What do people want to see in the street?

Different people with different problems that might arise when setting up a Leefstraat and we try to think of a solution. Everyone needs to give their agreement. This data is collected and feedback. Afterwards a plan is made and an application must be made for the intake of public space. Once the mayor has agreed, communication to the neighbourhood begins. Communication materials are needed like flyers have to be made. During the Leefstraat we go everywhere to ask where support is needed to check if

everything goes as planned and if people have any comments. Finally an evaluation with the bewoners is taken (a form).

- Is the capacity/resources dedicated to the initiative sufficient?

Yes. Actually, which is most needed is the support from the city.. The costs for the material are actually quite low, the picnic tables and turf. People in the street have a lot of materials and equipment themselves, like lighting, beach chairs and other things that can be taken from people's homes.

- To what extent is nature incorporated into the initiative of Leefstraten? Can this be extended and how?

This depends on what the residents want. Sometimes the residents will take their own plants outside to put in the living street. It is difficult to put something permanent there because of various reasons. In every street people afterwards said that they wanted to have more green because it looks nice and attractive.

- What are the costs of the initiative and how is it funded? What needs to be improved regarding this?

Ten thousand euro is made available for Leefstraten en Leefpleinen. 2000 for Leefpleinen for animation shows and for the streets this is far less. In total there are 43 Leefstraten. The loan costs are not taken into account in this budget. Last word: A lot can be done if people want it and show initiative.

### **Interview Kim von Schönfeld**

- Do you think the child's needs are incorporated into residential planning (pavements for example) and how? Is this enough?

It is definitely different in other countries. Leefstraten encourage children to play on the streets. A starting point is to have a sidewalk at all: example Mexico City with a lot of trees and its walking culture. Workable obstacles. In the Netherlands: quite a few sidewalks/narrow ones. Less cars in the cities, different in smaller towns. More cars when further away from the city centre. Bikers and cars together: difficult for children, a threat.

- Incorporated enough? 0-5 year olds?

You can always do more, needs a lot more attention. Not necessarily narrow it down to street design. walk quite far with a child to a park: challenging. In the Netherlands you can take the (bak)fiets to solve it. Not the infrastructure everywhere. Play opportunities for children: do not always need to be in the same street/as close as possible. Nature would be great. Contact with nature is very important for children. In cities it can be done better. planting trees for instance in sao paulo is more incorporated into the city planning. It is not easier or harder to do it there than in the Netherlands.

- What do you think is the effect of Livingstreet policies on caregivers and their children?

It is great: place to play for children right outside the door. children living around the corner it is nice. Otherwise you need a bike, car or be able to walk to the park. Especially when you have more children. it gets complicated. Cargo bikes? They are expensive. idea of living street: nice to have a place to go closeby. You can engage with your neighbors in a nice way. In transition theory: not enough to trigger full change. For caregivers interested to experience it being non-car dependent. accessibility is a real issue.

- How do you think a Livingstreet impacts the community?

Can create new ties between neighbors, gives a chance to strengthen this relationship, make new friends and learn about the community. Also can result in tensions. It can go both ways. positive effects of neighbors knowing each other more, less anonymous. nature: depending on how natural the living street is organized. Leefstraten are not necessarily nature based. in Ghent they use for instance fake grass. Different from an actual garden with growing vegetables for instance.

- Do you think Leefstraten are feasible on a larger scale? Does every city fit for a leefstraat?

People have to come up with the idea and do a lot to make it happen -> Bottom up. top down: other issues for instance with the parking spots. in Ghent: challenge. Can be complex. The streets trigger things, but she does not really think that it is applicable on a larger scale. in barcelona: still space for cars around the block, the issue of reaching places to go with children. It is a package deal, you cannot do the streets on a large scale but have

no good public transport for instance.

- What are the limitations of implementing this initiative?

Leefstraat: does depend on how you go along with your neighbors (ideas about how it is supposed to be designed for instance). Can be positive or negative.

- What are some potential issues when implementing a Leefstraat in, for instance, Brazil

No living streets there, but plenty of initiatives that are comparable (são paulo). they can be implemented there but the question is why they probably haven't -> bureaucratic reasons/corruptness can play a role? Latin America is more of a bottom up work. Not much attention from the government to it. If you have the right people on it, it might work well.

- Do you think the Leefstraten have a long-term effect on the child's willingness to go outside?

Yes. Even though they are not permanent, different for different ages of the children. Some age cohorts are more dependent on their parents. Maybe really small children might get adjusted to the idea to go outside/positive experiences with it. Parents might be worried if they think that their children are not going to be careful enough.

## **Neighbourhood conversations**

### **Maurice Verdoncklaan, Ghent**

*Nancy (resident)*

She used to be involved in the organisation. It is now the fifth time that they are having the Leefstraat. Normally she is not that worried about safety but there was an accident the week before where a car was being chased and it went straight through the street. Fortunately no one was outside when it happened. There is support from the people in the street to have the initiative but for some people there are only disadvantages and no benefits. They for instance have to give up a parking space and park further away. This year there are also people coming from other streets in the neighbourhood, especially

children. The idea for the street was not originally for children but for all ages. Other people were wondering what was the relevance of the street because there is also a park, but that is a bit far for children and the elderly. The street feels like an extension of a garden. This makes it really cozy and easily accessible. Regarding the activities, they are having some this year. It is quite spontaneous like a neighbour making pizzas for dinner for the whole street. Furthermore it is like having drinks together in the evening. Because the Leefstraat is three months during summer they do not schedule a lot of activities. This length is also sufficient for them because there is less contact during the winter months. There is not a lot they like to do differently next year. Some things that seem important are having plants, both edible and for decoration. Fifteen years ago the neighbourhood started with Speelstraten so there was already contact. They are a neighbourhood with tight relationships.

*Eveline (resident and single mom of two children: 8 and 4 years old)*

The oldest boy likes to play soccer with his friends although they are now on holiday. There is actually nothing he would like to change in the Leefstraat or that he is missing. The little girl likes to make drawings and then deliver them to the other neighbours. It is also noticeable that the Leefstraat supports that children from all ages are playing together and not only with children their age. Regarding the safety of the street, the accident with the car of the week before was actually quite a shock, but they do understand that it is an extraordinary risk. Furthermore, she is normally watching when the girl is playing outside but this is not necessary for the boy. She does leave them alone when there are other kids as well and when she is cooking for instance. She notices the kids are very enthusiastic about the Leefstraat. They want to eat quickly for instance so that they can play outside again. They are also eating outside more. Children from other streets in the neighbourhood are joining as well. The girl was a bit scared and not eager to answer the questions, but she would love to have a pool outside. This year some of the things they use in the Leefstraat broke and they are putting some things inside sometimes. Another disadvantage for some people is the parking spots that are gone. Over the years neighbours are getting used to it and they are also getting to know the initiative. Sometimes people are having drinks after 22.00 and then there might be some nuisance. The mother also mentioned right at the beginning that the Leefstraat is one of the reasons

she is living in the neighbourhood. Right after they moved into the street three years ago her husband left. During this difficult time the Leefstraat really facilitated contact with her neighbours which got her through difficult times.

*Male (resident and father of a child of 17 months old)*

He has multiple children. He said he experienced no negative effects of the Leefstraat. The advantages he came up with are, among others; more contact with the other neighbours, an older lady down the street goes outside more often than before the Leefstraat, children can play outside safely, his daughter plays with other children and makes new friends and he was very glad that the Leefstraat was just in front of his house. In addition, he mentioned that there is a good mix with children of all different ages and that people from other streets in the neighbourhood participate as well. He stated that he would like to have the Leefstraat permanently, because he really enjoys it. Even mentioned that it is now easier to find a parking spot. The design of the Leefstraat depends on the people who are participating.

*Female (resident and stepmom of 13 year old boy)*

She does not make use of the Leefstraat, basically because she and her husband have to work a lot. However, she really likes the enthusiasm, interaction and livability of the Leefstraat. She mentioned no disadvantages, even finding a parking spot was no issue for her. So, in her opinion, the Leefstraat might come back next year.

*Male (resident and father of two girls of 5 and 4 years old)*

His children use the Leefstraat a lot. In this way, they get into contact with other children, also from other ages. They do not necessarily play outside more often, only closer by home. An advantage is that there is more interaction in the neighbourhood and people get to know each other way better as the Leefstraat is a kind of additional garden. He could not think of any negative side-effects, not even noise nuisance. He mentioned that the flowers create a great vibe. To his liking, the Leefstraat could be extended a bit longer, only no Leefstraat during winter period would be fine.

*Male (resident and became a dad last month)*

He does not use the Leefstraat a lot, every now and then, sometimes in the evenings or weekends. The interaction with the neighbourhood is an advantage. He would like to take his child to the Leefstraat if he is a bit older. He could not come up with some disadvantages, closing the street is no problem at all. He thinks it is a safe place for children to play. The Leefstraat may be organized yearly.

### **Koolkapperstraat, Ghent**

*Esther (nearby neighbour)*

The elderly lady is living in a neighbouring street. She promotes the Speelstraat which is a similar initiative specifically for children but is also aware of the Leefstraat. Actually not a lot of children are living in her street. Still she thinks they are relevant initiatives to get the street together and have a nice time. She also knows there is support for these initiatives in the neighbourhood. Speaking for herself she is not sensitive to nuisance and she is still able to park her car.

*Female (nearby neighbour)*

She just graduated and thinks that the initiative is specifically interesting for families with young kids. It is also relevant to get people with different backgrounds together. Tables are a good way to get more interaction in the street. For now she is not necessarily interested in the Leefstraat for herself. She is also not going over to the place. There are not any drawbacks for her because she only has a bike and is therefore not experiencing any parking problems for instance.

*Cafe owner (nearby the Leefstraat)*

She is aware of the Leefstraat and is not experiencing any disadvantages from the initiative. She is however not a fan of the Speelstraat, because they are blocking the route with signs and consequently keeping customers away. When an initiative is not bothering her café she thinks the initiatives are ok. But she thinks when parents are going to live in a city they cannot claim a lot of space for their children and they have to be aware of that.

But the political environment is left (green-oriented) and promoting green spaces so she thinks that is why the initiatives are advocated.

*Ann (resident and mom)*

She was really enthusiastic about the Leefstraat. Ann was very fond of the connection with the neighbors and told us that the contact with the neighbors improved due to the experiment. She also liked that there was more green space available and that the Leefstraat made it really easy for children to play together more easily, it lowers the threshold.

*Ann's child*

The child really liked everything about the Leefstraat, especially all the friends to play with.

*Hilda (resident)*

Hilda thought that the Leefstraat, which was for three months, was a bit too long. Two months would be long enough for her. The vibe in the street depends mainly on the weather. Overall she was quite negative about the Leefstraat. Arguments she gave were among others; that she had to walk further to the garbage bin and that it is more difficult for her friends and family to reach her, because there are no parking spots in front of her house anymore. The amount of green space was good, maybe a bit more flowers would have been nice. In addition, the neighbors speak more often with each other, especially young people who are involved in the Leefstraat.

*Dylan (resident and student)*

Dylan thought that the Leefstraat is a quite nice place to be and enjoy your time. As well as eating outside, now there are tables available to sit at. This creates more contact with the other neighbors as well as their children can get to know each other better. The only

downside is that it is sometimes quite noisy when he wants to study. Also, there are less students present to get to know each other. He said that the Leefstraat can be some time longer than the three months it is now.

*Maria-José (resident and mom of two children of 8 and 4 years old)*

She told us that every year the organization of the Leefstraat is the task of another family. Some activities are harder to organize than others. This and last year the duration of the Leefstraat was shortened. Maria-José told us that her children like the Leefstraat really much, they think it is amazing. Sometimes she even cannot get them to come inside again. Long before the Leefstraat starts, they are already asking for it. A lot of young people use the Leefstraat. An advantage of the Leefstraat is that it is really good for the connection between the residents, children eat a lot outside with friends for instance. They also play with children from all ages, which might be an addition to their social development. For instance, it is a way to learn new words and also learn a lot about the interaction with others. Residents from other streets are welcome as well and a lot of other children make use of it. In addition, she experiences a feeling of safety and the idea of a village in the city. She had no suggestions for improvement. When we asked about the opportunity to place more plants, she said that there was one year they had more green, but it was too much work to maintain. She only experiences the Leefstraat as being a mom.

*Female (nearby neighbour)*

She enjoyed the Leefstraat, especially for children. If she had children she would be willing to let them play there. Does not think there are any negative consequences of the Leefstraat.

### **Gentbruggeplein, Ghent**

*Male (nearby neighbour and dad of two children of 14 and 12 years old)*

He had not visited the Leefplein yet but it does look like fun, especially in the evening. He would like to go there sometime to have a drink. It makes the neighbourhood more lively and adds to the café at the corner. It is the first time there is a Leefplein and it was initiated

by the shops. It would be great if it would come back but he can imagine the parking difficulties. The Leefplein can be used by people of all ages and they initiated activities like petanque and a yoga session. The community is not that tight but they will greet each other when they meet. This has not changed a lot yet. He is curious as to how the dynamic is going to change with the new apartment complexes.

*Female (nearby neighbour and mom of a 11 years old boy)*

She thinks the Leefplein is a nice initiative and is going there in the evening. She likes to have a drink with the neighbourhood and notices that many neighbours are going there. The neighbourhood has somewhat tight relationships and not much has changed since the Leefplein yet. There is not a lot missing but adding more green would be nice, specifically some trees or plants. Her son is not going to the Leefplein because there is a playground a few streets away.

*Female (nearby neighbour & mom of two children 6 and 4 years old)*

She knows about the Leefplein but has not been there yet. There is a threshold for her to sit there in the evenings but she likes the idea of having a yoga session to get in touch with the neighbours. She would join if there is a second one. She would bring her kids to the Leefplein but the youngest one does still cry a lot and there is not much for the children to do or play with, only a lot of parked cars.





**Figure A.6.1.3:** Gentbruggeplein (Ghent, 2021)\_



**Figure A.6.1.4:** Malakkastraat (Utrecht, 2021)

## **A.6.2: Case study Animal Farms**

### **Survey planning**

Initially, questionnaires were set out to be sent to the parents/caregivers that participated in our interventions. Questions revolved around the caregivers' and their children's well-being, and were planned to be sent pre- and post-intervention.

For the daycare worker, a mood ranking which will be extended by a few additional questions about her general well-being and her relationship with the children would have been performed. Answers to certain statements in the questionnaires will be on a scale from 0-10 (Disagree - Agree) and both questionnaires will mostly include the same questions for the benefit of finding direct changes in certain categories. We moreover included general questions about the participants' demographic background as this allows bundling respondents into characteristic groups and then applying the sample to the bigger population.

### **Pre-Intervention Questionnaire**

The following section regards statements about your **child**:

Please indicate how much you agree with the statement on a scale from 1-5.

1 - Disagree

2 - Somewhat disagree

3 - Neither agree nor disagree/Neutral

4 - Somewhat agree

5 - Agree

1. My child feels comfortable around animals
2. My child enjoys touching animals and plants
3. My child feels sad/distressed when an animal gets hurt
4. My child treats animals and plants with care
5. My child likes exploring nature and animals
6. My child asks questions about animals
7. My child has lots of energy

8. My child treats other children fairly
9. My child is interested in learning about animals

In the following section, please indicate some basic demographic information about your **child**.

Age:

Gender:

Weekly hours in daycare/kindergarten:

Does your child have a nanny or another main caregiver despite you (his/her parents)?  
Yes/No

If yes, please specify which role (e.g. nanny, grandparent, etc.) this person has:

The following section regards statements about **your** current mood. Please indicate how you feel **at this moment** of filling out the survey on a scale from 0-10.

0 relates to the lowest imaginable state of the specific mood, 10 relates to the highest imaginable amount of the mood.

I feel ...

- Stressed
- Relaxed
- Exhausted
- Happy
- Worried
- Excited
- Frustrated
- Annoyed
- Overall, emotionally well
- Overall, physically well

Is there any specific event or other happening that impacted your current mood?

For the following questions, please indicate on the same 0-5 scale as above how much you agree with the statements.

1. I go out in nature to relax on a regular basis
2. Being surrounded by nature improves my mood
3. Interacting with animals improves my mood
4. Interacting with animals diminishes my stress levels
5. I enjoy interacting with animals
6. I feel a strong connection to my child

Lastly, please provide some information about **your** demographic background below.

Place of residence:

Age:

Gender:

Relationship to child: (e.g. Biological mother/Non-biological mother/etc.)

Income class (Low/Middle/High):

Working situation (Full-time employed/Part-time employed/Unemployed/etc.):

Are you a single parent or raising your child with a partner?

### **Post-Intervention Questionnaire**

The following section regards statements about your **child**:

Please indicate how much you agree with the statement on a scale from 1-5.

1 - Disagree

2 - Somewhat disagree

3 - Neither agree nor disagree/Neutral

4 - Somewhat agree

5 - Agree

1. My child feels comfortable around animals
2. My child enjoys touching animals and plants
3. My child feels sad/distressed when an animal gets hurt
4. My child treats animals and plants with care
5. My child likes exploring nature and animals
6. My child asks questions about animals
7. My child has lots of energy
8. My child treats other children fairly
9. My child is interested in learning about animals

10. My child was in a better than usual mood at the animal farm.

11. My child was adventurous at the animal farm.

12. My child wants to visit an animal farm again.

13. What did your child enjoy most about the trip to the animal farm?

*The following section is to be filled out right after and 3 days after the field trip to the animal farm.*

The following section regards statements about **your** current mood. Please indicate how you feel **at this moment** of filling out the survey on a scale from 0-10.

0 relates to the lowest imaginable state of the specific mood, 10 relates to the highest imaginable amount of the mood.

I feel ...

- Stressed
- Relaxed

- Exhausted
- Happy
- Worried
- Excited
- Frustrated
- Worried
- Annoyed
- Overall, emotionally well
- Overall, physically well

Is there any specific event or other happening that impacted your current mood?

For the following questions, please indicate on the same 0-5 scale as above how much you agree with the statements.

1. I go out in nature to relax on a regular basis
2. Being surrounded by nature improves my mood
3. Interacting with animals improves my mood
4. Interacting with animals diminishes my stress levels
5. I enjoy interacting with animals
6. I feel a strong connection to my child

*Fill out right after*

1. I was scared of seeing my child interact with animals
2. What did you enjoy most about the trip?
3. I feel a closer connection to my child after having participated in activities together

*Fill out 3 days later*

4. I would like to visit the farm again
5. We are likely to engage in more outdoor activities as a family in the future

## **Interview with animal farm owners**

Several interviews were conducted with the owners of the visited animal farms in Amsterdam. Questions were asked regarding the costs, feasibility, challenges and stakeholders involved in setting up field trips for daycare groups to the petting zoo. We moreover asked about the owner's observations of children's and their caregivers' typical behaviour among the animals.

### **Interview with Gitta Bessem (animal farm De Werf)**

#### General questions:

- Could you please tell us a bit about the animal farm's history?

Founded 30 years ago by people living in the street. Organizing a big party was very fun, doing something for each other, getting to know each other (verbonden). Wanted something permanent. Let's start a petting zoo. No legislation etc. built a stable, and had to get rid of a house near the skating rink. Got animals from everywhere, farmers donations etc. was a lot smaller then. Sheep's meadow was not there yet, much smaller. Municipality werf van aangroei planten voor in de stad. They left and combined everything. 45.000 visits each year. Work with appr. 40 volunteers each year. Students doing their internships. 2 managers, degree, make sure everything is safe for kids and animals. Got a keurmerk a few years ago, certified. According to legislation. Fire safety, voedsel en waren autoriteit, arbo wet, zonozs, hygiene, good employer, special needs kids, extra careful so extra legislation.

- Do people come for a one-time experience or is it more of a regular visit of certain types of people (in regards to caregivers and care receivers)?

Lots of neighbourhood people. Did a postcode check, people from diemen, ijborg, more tourists, mentioned in newspapers. 70% neighbourhood.

#### Costs (set-up, maintenance):

- Largest cost factors?
- Set-up costs? (e.g. land, animals, housing)
- Variable costs? (e.g. animals, employees)

90.000 needed to run it, minimum. Try to manage all the costs, every three months data, how do you use your material etc. (waste is expensive to get rid of, 7000). Managers with a degree have a part time job, 1.5 FTE is a major cost. Taking care of the animals.

Income: subsidy from Amsterdam oost, 20.000 eur, COVID resulted in less income, so 10.000 more from Amsterdam. Rest earn themselves. Have a pet hotel for people on holiday, 150 rabbits in the stable. Set this up in 2012, professionalized the process. Automatic data, the canteen has less income, usually through-traffic. Sponsoring, activities, donations and gifts from the neighbourhood. People donate a lot. Sense of community. Always mentioned on funda that the petting zoo is around the corner. Lots of volunteers that can't participate in the regular job market. People find a goal for their day here, social environment. Pretty well-organized now, so able to do more for the community. People that need to do their community service (taakstraf) can do it here. Lunch for elderly people that are a bit lonely. Voting station.

#### Time/Feasibility:

- How much time farm owners have to accompany daycare groups

Challenge! Need a lot of volunteers, or people on your payroll for education, don't have money for that. Working with volunteers, a lot of them are willing to take care of animals, but children are something else. Work together with council, natuur en milieu educatie (NME), lessons developed for childrens farms. Part of the task force that created it. Pilots at her farm. She likes to do it. Organization Anmec, they have nice lessons that you can borrow, schools are subsidized. Ask a school to organize it and give them here. Subsidy division: she does not know why some farms get more funding. Wethouder van animal welfare, he wanted them to develop a vision on animal wellbeing. 1,5 years working to create that vision. One of the first in NL to have an agreement. He gave people to make changes at the farms in return, to keep the animals better. Council and they came together, found out that the decision making process is not clear for everyone, just how the farm is doing and how much impact it has on their city part. Discussion to make is more even, but some are bigger and smaller, some make more impact, some can be more stand-alone. Difference between equality and equity.

Biggest challenge: money. Could do more for education, more for community maintenance. 2 managers she needs to pay, she would like higher educated people, but can't pay their salary. Students like to learn a lot there, but leave after 2/3 years because she can't offer more. If you had more money: education, focused on sustainable society. Special days, having groups, let them find out themselves, rearrange the terrain, they grew a lot. Could be more room for education.

#### Challenges:

- Is there an off-season? How is this handled in terms of costs and maintenance?

She makes an estimate for the whole year, knowing she earns more in summer. Animals still need to be cared for, less income. Income evens out. COVID was a problem, because less income in summer. She was lucky, she saved the roof of the hay shed as it was leaking, was able to repair the roof, and invested that to stay alive.

#### Stakeholders:

- What are the stakeholders?

Visitors, government, employees, volunteers, donors. She luckily does not have to ask. Also has volunteer managers that can run a day. 2/3 days a week on the farm without pay. Next to my own job.

#### Behaviour/mental well-being:

- What typical behaviour can be observed among groups of children visiting the animal farm?
- What is the typical behaviour of caregivers in this environment?
- How do toddlers/children usually react to the petting zoo's animals?
- Are there different patterns in children's behaviour/interaction with the animals (e.g. toddlers/children who are shy or more extroverted)?

The farm is visited by a lot of young children, up to 6/7. Afterwards, they don't like it any more. Come back around 10-12 to help, different interests. Never problems with behaviour of little ones, come with caretakers that are always around. Not a lot of supervision. Sometimes they are a little shy, have anxiety. Chickens are loose, pigs can be

really intimidating. Some are really okay with everything. Connection is important, try to teach children to look at their environment, what it needs from you. In the past, what can we get from animals (rabbits on your lap etc), change the perspective. Don't force the animals anymore. Used to visit elderly people with dementia, don't do that anymore, but they can come to them, help them with feeding. That is okay too, but this is more educational. Observe the environment and see what it needs.

Babies from morning to 12, come back at 3, take naps in afternoon. After school after 3, with brothers and sisters.

If you see that a kid has anxiety, go to them, observe, don't force them, calm them. Sometimes that doesn't work, come back another time. Adults that are scared of birds, need to confront their fear, get closer each time. Children don't have the vocabulary to describe their fears, you need to show them. Children are often very relaxed. With COVID, first time people see animals. Kids doing fine though. First connect with something before you can take care of it. Her kids came here a lot, by observing the animals they also see other things, like plastic on the street etc. also try to do that with the volunteers, what do they need to function properly. Some need a repetitive task, some want different things, depending on the person, connect.

If parents are stressed, it can have an effect on the kids. Not that often at her farm. Kids pick up the emotions. In the bijlmer there is more anxiety towards animals. Some kids are scared of kids.

Self-selection? Probably, she can imagine. If you are stressed and you do come, you have to be further in managing your anxiety. Interesting to work together with a psychiatrist.

### **Interview with Nienke (farmer at the Gliphoeve)**

#### General:

- Could you please tell us a bit about the animal farm's history?

This animal farm has existed for a really long time already, since the 80's. Back then, one of the residents of the surrounding flats, farmer Floor, had a lot of chicken in the garage

boxes in the bottom of the flat. The place where the farm is now, was still a rough patch of unused land. So he decided he would just break the land, which you could still do back then. He put animals on the land, and that's how the farm started. Farmer Floor ended up moving to Germany as this had always been his dream. The land became empty again when he moved, which they thought was a shame. So the foundation, stichting werkwijis, took over and gave the farm a slightly different objective.

The objective is to educate students who are 'distanced' from the job market in some way. So they might have a disability or for instance personal circumstances. For instance, people who have to do community service, or youth have been in contact with the police through 'HALT'. They educate them to make their start in society again.

This is the objective. Of course there is also a function within the neighbourhood. Being a green oasis for children.

- What is the age of the children/youth coming to the animal farms usually?

This varies from children with their parents, still in the stroller. To when they start coming by themselves around the ages of 8th. We even see them come and do internships from their 16th. So really children of all ages. Different ages do of course have different objectives.

- Do people come for a one-time experience or is it more of a regular visit of certain types of people (in regards to caregivers and care receivers)?
- Any experience with disabled children?

So the younger children, with parents, come on the regular of just once. And the older children come more on a regular basis?

It differs slightly. We also see parents with younger children, who live in the neighbourhood, come by almost daily. This is also because people who live around here often do not have a backyard where they can play around. So this functions as their backyard really.

- So it really is a community place here?

Yes, certainly

- Not that many visitors from outside the neighbourhood?

You do get some, nearby, a new neighbourhood has been built with a different demographic. a higher income. They come here as well and you can see the visitors change through this new neighbourhood slightly. More educated people. But in general it is still Bijlmer people who visit.

- The group of people you described as behind or distanced from the job market, would those include disabled people?

Yes, they have mild mental disabilities. A physical disability is difficult here as the work is heavy. So they have a mental disability.

- What activities can be carried out with the children/toddlers?
  - What are common activities? Are there specific activities which drive the mental well-being of caregivers and care receivers?
  - What kind of activities and tasks do they usually carry out?

In the new academic year, we will start an entirely new project with people with a slight mental disability. They will do a lot of different things. Like taking care of animals, running the pancake restaurant, they will open the small store we have here and keep all of the gardens. All in different 'internships'/courses, they will be taught. In the past it was primarily, taking care of the animals. So we are expanding on this.

- So for the younger children it is mainly walking around...?

Yes, playing, investigating, getting to know the animals.

#### Costs (set-up, maintenance):

- Largest cost factors?
- Set-up costs? (e.g. land, animals, housing)
- Variable costs? (e.g. animals, employees)

She is not the person who knows the most about the costs. But they get a subsidy from the township. This covers part of the costs. The rest of the costs they have to cover

themselves. They do this through for instance; fundraising, selling for example eggs, educating the before mentioned students. It really is just trying to scrape it all together, there is never really enough money. We get some money from the daycare with which we work together. The costs are really just quite high.

Time/Feasibility:

- How much time do farm owners have to accompany daycare groups?

A lot. We are busy with our work the entire day of course, but children are free to help with any part of the work. So during your own tasks, you are also educating and supervising the children. On rainy days it might not be that busy as little children come. But there are also days when we might already have ten students of ourselves walking around. And on top of this there could be 50 children. Then you really are busy, it might take up your entire day.

For the groups of students we educate ourselves, we know when they will be here. They come on set times and have set tasks. So we can prepare for them. Visitors we can never predict for sure.

- What is the estimate of the amount of visitors daily?

Difficult because we are a location people can just walk through. So who do you count as visitor and who are just crossing to get to the other side of the location? On average, an estimate would be about 50 visitors a day. Who are really there for the farm.

- Optimal length of intervention
- Any additional requirements for petting zoo owners? (e.g. extra employees, support, licenses)

To take care of the animals, you need a certain degree. We also employ a jobcoach, this job coach also helps people from outside of the farm. We have someone who has worked in special needs education. However this is not a necessity. The main thing is that working with the students we have is something that does not suit everyone, it is more than just taking care of the animals. We do not have anyone working from a pedagogical background.

- Have there been any “shocking”/extraordinary events for children’s well-being at your place (e.g. animal bites/hits kids)?

We have daily incidents where the kids run after the chicken. This however is part of the education we offer here, we explain to them what the effects are, so it is about communicating and teaching the children the right behaviour.

We have cases where someone on purpose let the gates open to let the ponies on the street, still not the end of the world but this is a bit more inconvenient as the ponies are of course bigger. Any serious incidents with animals getting hurt or something alike has not occurred.

In the end, accidents can happen, maybe with children just a little more often. We teach the children the responsibility, that animals also have feelings, and the consequences of their actions.

- Do you ever get any complaints from, for instance, the neighbourhood?

We very rarely have had complaints. She herself is also rather surprised by this. The goats, for instance, make a lot of sound around lunchtime. Maybe it is due to people from certain backgrounds (for instance Suriname), where the sounds are more nostalgic. Also the neighbourhood realises the benefits and the good cause of the farms so they accept the noises.

- Is there an off-season? How is this handled in terms of costs and maintenance?

During the summer holidays, the students are away. So we have less students and more visitors. In the winter this is the other way around. So there is a sense of balance. In terms of costs, we work with a budget for the entire year.

#### Stakeholders:

- What are the stakeholders?

The biggest organisation is “Orion College”, secondary special needs education.

We also have a platform with the neighbourhood, moving forward. We work together with them in terms of the activities for the neighbourhood. With the township we work

together and we of course have to be answerable to them. Finally the people living in the neighbourhood come by. We call ourselves a 'buurtboerderij'. It is not a standard neighbourhood and we are in the middle of this neighbourhood. So we like to add something and make it a safer place for the children.

- What animals are usually in the petting zoos? How many of each different species?
- Which animals are most suitable for which children?

Very young children think the pigs are scary, larger animals as well. Bunnies for instance are better. It is more about discovering the world for them.

We also offer rides on the ponies for children until 6 years, afterwards the children will become too heavy. As the kids get older, the ponies for instance become more interesting. They start to be able to help out at the farm and want to be useful, it is less about the animals.

- Do the groups get to walk around by themselves?

When we have groups, we always have someone present to them.

For the students, a teacher from the school and someone to help with taking care of the animals (us). For visitors we are here ourselves.

#### Behaviour/mental well-being:

- What typical behaviour can be observed among groups of children visiting the animal farm?

We see a difference in behaviour after COVID-19. The children have not seen animals in over one and a half years. Many find the animals a bit scary, it is all new for them. Children who have been in contact with the animals before, get adjusted faster, they really like being here again.

Getting used to the animals is important, so meeting animals on a regular basis. If people for instance have pets at home, the children behave much more freely here with all kinds of animals. If the parents find the animals scary themselves and they do not have pets, you also see this in the behavior of the kids.

- Do kids come here alone?

Yes, children from the neighbourhood do not always have their parents with them. We prefer the kids coming with their parents, we are no daycare. However parents do not always have the financial means to get a babysitter. So young children (from ages 7/8 upwards) already are out on their own on the street. So we of course prefer them coming here instead of doing worse things. This is our job here in the neighbourhood as well.

### **Interview with daycare owner**

To get professional insights on current field trips into nature and general outdoor play of young children, we conducted an interview with Agnes Bakker, the owner of the children's centre Ikke&Zo in Amsterdam. The daycare is located in a wealthier urban neighbourhood close to Westerpark and emphasizes a green play environment in its approach.

### **Interview Agnes Bakker (Ikke&Zo, nature-focused daycare worker)**

#### General conditions:

- What is your exact approach of emphasizing "green play environments"? Is your daycare a green daycare and if yes, what does it look like? (e.g. many trees/outdoor space/...?)

Agnes is the owner and manager of Ikke & Zo: Toddler groups, BSO's (children of ages 6-12). They are in nature with the kids quite often, in a healthy way. They have a large playground in the back of the building. The kids are a bit reluctant to go to Westerpark, because then they need to go there and play on a smaller playground. They strive for the kids to be outside a lot. Their policy is to go outside with the toddlers twice a day regardless of the weather conditions. Babies go outside less, but the BSO's go outside a lot as well. However, older children sometimes prefer just to relax inside; on the couch or reading a book for example. If the weather is good, BSO's go outside often, although not every time. Toddlers do go outside every time. The outdoor activities mostly revolve around the freedom of the toddlers to explore and play themselves in the way they like.

For older children (BSO's for example), the activities become slightly more planned and regulated.

### Costs:

- Who pays for the intervention (entrance, travel costs etc.)?
- Are costs a limiting factor in selecting activities? What kind of activities would you carry out if you had unlimited money?

Regarding the costs, a lot of times activities within the city are not free. Ikke & Zo pays, there is no extra fee for the parents. The parents and caregivers are not that involved in the activities, given that they drop off their children before they go to work.

- Which kind of nature-based interventions do the kids engage in?
- How do you interact with your care receiver(s) in a park/animal farm/certain nature-based setting when you "came with a group"?
- What do you consider when choosing a location to go with your care receiver?

Regarding the interaction between the employees and the children; this varies a lot. For example, if you go to a theatre, you'll first play with them in an interactive way, after which they're free to roam around and to explore themselves. There is a tendency for adults/employees to spell out and plan everything, but toddlers can also discover a lot themselves, both on their own and together. So it's better to leave them be and discover their own things.

### Feasibility:

- How frequently can you organize these kinds of interventions for children? Would you like to do it more often? What are the limiting factors?

There are no real limiting factors regarding taking the kids outside, is it part of their policy to go outside with the children. By organizing those outside activities, they are upholding their pedagogical policy. When looking at activities that we would like to organize but couldn't, there are no real examples that come to mind. The children don't need to go to the Efteling, the activities can be really simple.

### Challenges:

- Is there something that “stresses you out” in preparation for a children’s outdoor activity by just thinking of it?

Taking the kids out can be a handful, but they don’t get stressed that easily. The only hassle can be using public transport to get somewhere. Luckily the children listen very well, which makes it easier to do such things. Furthermore, you have to count the number of children you have with you throughout the whole day. The BSO is more free than the daycare. You are always happy when the day went well. You need to be able to trust each child, but some are so young and wild that you need to guide them to each activity.

- What is the most challenging thing in setting up an (outdoor) activity with children?
- What is the most challenging thing in taking care of children groups especially in nature based environments?
- (How) do you engage children who are not “open to others” by themselves?

Kids do run away. Imagine this, you are a child, and you are visiting Artis. You are standing in front of the monkeys, and you have this round cage. The child will see something happening on one side, and go there. Then, he will see something else, and go to the other side. It is a large job to keep them together. Sometimes they can be too free, as they can’t see danger yet. You discover a lot when you are outside, but you also need to warn them of the dangers.

### Stakeholders:

- Intervention with parents possible or only with daycare workers?
- Are there any fundings from the government side or any other foundations/organisations supporting daycare activities (in nature)?
- Is the law/regulations preventing you from doing certain activities which you actually would like to carry out/would be good for children?

Parents are always going to play the most important role. Beforehand, you make an entire summer program, and they usually have confidence in the people that work here. However, you do have to stay realistic. When taking care of young children, you can’t go

somewhere too far away, these are all factors that you need to consider. Other factors you need to take into account are the weather, and the number of people you have available to help, there are certain regulations by the municipality regarding the supervision. For the BSO, you need one caretaker for every 8 children. For the toddlers, you need two caretakers per 14 children, or 1 for every 8. You need to take this into careful consideration, because if you don't comply with these rules, you can get a large fine, or even be shut down. Two for every 14 kids is really little, you are limited to the number of people you have in service. You can't have just anybody come along as caretaker.

Each day needs to be specified, and a schedule is mandatory. You are only allowed to monitor a group alone for three hours maximum. You are also bound by food for instance. There are certain regulations by law, but also your own regarding your pedagogical considerations.

When looking at the parents, you see a lot of expats here. There are not that many different cultures. When looking at different cultures, you often see that those parents don't like their children going outside that much, and because of the large cultural differences, they don't choose this daycare. On the other hand, you have Scandinavian kids that are used to being outside a lot, with a lot less rules as they live in nature. Here in the Netherlands they have to comply with a lot of rules. When looking at letting loose, a toddler needs to be taught how to fall. However, due to all these regulations, we need to remove everything that might make them fall, and this is not good for the development of the child. The strict regulations definitely hinder the development of the child, as you can get very scared because you don't know the dangers, resulting in insecurity. Many city-kids will therefore be less developed than village-kids. We call them "back-seat kids", kids that always need to be brought and picked up when playing with them. That is why with city-kids, you need to undertake a lot more.

Behaviour/mental well-being: children mental-well being:

- What is in your opinion most crucial for children's well-being?
- How does mental well-being/discomfort express itself in the children in general?
- How do you think increased exposure to nature impacts your daycare children?

- Could you observe any specific behaviour mood changes in your care receiver during/after activities?

The most crucial in the well-being of children is to give them the confidence in what they can do well, and let them try. It is necessary to let them fall sometimes to teach them that things can be difficult too. Parents or the daycare should not always be there straight away.

The benefits of kids going outside a lot is that they get happy playing outside. It gives them confidence in themselves. For instance, we have a lot of shacks/cots here, and one of them has an upstairs with very difficult and steep stairs. Kids learn how to get up, they try, and sometimes they fall, it is part of the process to get back up and try again. It is all part of discovering these things yourself and doing it.

#### Caregiver mental well-being:

- Have you ever experienced mental discomfort due to your caregiver duties? How did you feel about that?
- Which activities with respect to your caregiver duties are the most stressful for you?
- Do you prefer nature based interventions or indoor activities? Why?
- (In case she has worked in a normal daycare before) How does your work differ in a nature-focused daycare compared to a regular one? Any differences in your personal well-being?
- Could you observe any specific behaviour mood changes in yourself during/after nature-based activities?

When looking at your own state of mind as a parent or caregiver: who does not want to be outside more right now during these times with COVID, you have the freedom and space outside. Inside is a lot scarier right now. All the employees really want to go outside as well. There is no stress or fear either when going outside with the children here, there is a square here in the back. Furthermore, being outside also gives a break to your day. A few years ago we started our days with going outside in the morning straight away, but the neighbours did not really like this. They still end the day outside most of the time. Each daycare has a focus on children going outside, it is really important. You even need an outside space as a daycare center.

## **Interview with two employees at Dierenpark Amersfoort**

### **Interview Carlijn & Hylke**

#### General information:

Carlijn Speksnijder; educator since January 1, but has been working at the zoo for 8 years. She is also a board member of the foundation, which supports projects globally. She manages a group of volunteers which give information to the visitors.

Hylke Steggerda; she represents education and marketing & communication (Action marketing, communication to others, such as the press). She also works on evaluation research and creating the program/the events. She contributes to the realization of educational pieces. It is a compact and effective team. They collaborate in many group projects together.

- What type of people visit the zoo overall?

They have been working on visualizing the visitors of the zoo, differentiating mainly between day and night visitors. Mainly there are young families, highly educated, often two children of the older target group, 5-8. There are also younger children, but they often experience the park in a different way. It is easy to teach something to this group of people, because they are also eager to know more. People mainly come for the animals, but they also want to teach their children something. Parents often enjoy playing a part in this, by explaining things to children themselves.

- Do you often get visitors that come by multiple times a year?

There are often repeating visitors, people that have been to the zoo before and can be convinced to return. At the moment they are also trying to communicate to people nationally, for example via the press. People don't often think of Dierenpark Amersfoort when they think of a zoo, this makes it hard to get more awareness among adults since they don't know the park yet.

- What kind of interventions have been done to teach young children something?

Young children (0-5) are not really a part of their target audience. During the school holiday in May they focussed on young children, but this is difficult because they have a

very short concentration span and are often overly stimulated. Additionally, it is often hard to convey information to young children. It has to stay simple and short, trying not to say too much. Focus has to be on one thing, this way this will stick. They have tried to make a clear division between young and older children, but this was difficult since it often overlaps and young children actually really like simple objects (such as rocks) while older children don't. Mission is to stimulate children to commit to a better world. It is hard to convey this to young children.

- What activity did you do during the school holidays in May?

Put the egg next to the correct bird, milk a cow. They have to be small tasks for this target audience. You miss a lot when you put a lot of effort into this group. Children were not very interested. Farmlife was interchangeable with real animal farms. Small children often think that simply going to the zoo is already very special. The target group is not ignored entirely, a slide is, for example, enough for this group. For young children, it's best to visit the zoo with their parents, both for the child and the parent. Sometimes after school care groups visit, but daycares do not visit so much. They want to motivate the new generations to improve the world, inspire parents but also their younger brothers and sisters. However, they chose not to focus on this.

- What costs come with the activity?

Program Aventures in which education is important: material costs: 20,000 - 25,000. The employees are not included in this. This is a very large event.

It is difficult to give an overview of the costs, because the activities vary a lot in size. Basic information is not expensive, just explaining to children what the animals do. It is mainly about the essence and the incentives it gives. People should stop using photos and collages. Use a mix to surprise people. Important to first know what you want to say, and then make it as easy as possible. Important to ask yourself whether it fits with the image of the zoo, no cartoons and funny things just to make the child smile. Animal well being and awareness. They also want the children to actually do something, active and interactive, together with their parents, or other children.

- Limiting factors for young children?

It has to be very simple. You have to be able to see it and then immediately do it. It also has to create a memory. It also has to be in a large group. Safety is also a limitation when it comes to younger children. The parent makes most decisions for the child, especially important to convince the parents for an activity.

- Does the parent guide the child?

This depends on the age. In the end the parents make the most decisions.

- Approximately how much time do people spend at the zoo?

A day visitor is there for about five hours. Someone with a subscription for about 3 hours. It is not exactly clear where children decide to stop or spend the most time.

- What are parents concerned about when they are here?

Primary things. The child is doing things and is also taught something, this is important to a lot of people. Parents want to be able to convey things to their child, and have the feeling that they can explain something to the child. Wanting to share experience is the most important.

- Are there certain areas where the parents feel less at ease?

The advantage is that it is pleasant and clear. The park is organized in such a way that you know exactly where you can go. Maybe a playground, because children are more restless there. It is mainly important that the parents can keep control over the actions of the children and where they go.

- Some final words, Hylke?

A very young group is a challenge, but it is interesting to know how you can start something to make them more interested in nature. You want to convey information, but it can be difficult to find a balance. At a certain point you pass the essence when you make it too sensational. It does not need to have a Disney feeling, they have given themselves a difficult limit.

- Do you often conduct research for a young target group?

You can always conduct more research. They are in contact with Wageningen University to do some research. The zoo association has been working on research about the best visitor experience in a zoo, but this is mainly focussed on parents. It is rather difficult to measure the effect. The effect is very small, but probably has an impact. Research has been going on for a while to understand what parents think. More research could be done. Now they are mainly searching for a way to measure the experience. Finding a sample is easy, especially when you use subscribers.

- What are factors that influence whether children learn something or not? Personal characteristics or more the educational aspect?

It is very important to do things yourself. Young children often learn things by accident. Being aware of a certain type of animal often happens at a later age, it has to be as simple as possible. Children often know iconic animals, for example from books, but they do not know in which countries the animals live.

- Do children get energy?

This varies per child. There is no 'perfect' emotion with which the parents and children leave the zoo. You often know later on whether something has had an effect, sometimes the child does not show this effect in the moment itself. There is not necessarily a short term effect. For children it works best when they can tell it to another person, not necessarily a child, but in a known environment.

- How do the parents feel after the visit?

They are happy because they are doing something fun with their child. It is exhausting, but parents mirror the feelings of their child.

- Does the visit have an effect on the relation between the parent and the child?

No research about this, but it is probably a positive effect because of the quality time with the child.

- What is the effect on children with ADHD/handicap?

The experience is probably a lot different, but they have not really done any research on it.

- Does the child focus on a few animals or on a lot?

For younger children, the animals that are in a group, move a lot and can be seen from close by, are the best. Children recognize the animals that their parents recognize. For very young children, fish are very fun. Moving especially has a large impact. Large animals thus attract less attention, since they are further away.

- Some final words Carlijn?

No. 0-5 just has to simply happen right in front of them.

## **Interview with visitors**

Short interviews with visitors of the animal farms and the zoo were carried out in order to understand more about the motivation for their visits and potential effects on their well-being.

### **Interviews Animal Farm Gliphoeve**

#### *Mother and her son Miguel*

Miguel and his mother visited Boerderij de Gliphoeve on Tuesday morning, after a trip to the dentist. As the farm is located conveniently in the middle of a walking route, it is easy to just walk through it. Miguel is five years old, and he likes to pet and look at the animals when coming to the farm. They usually go to the farm Bijlmerweide, as it is a lot bigger. Miguel and his mum were really sad that the farm had to close during COVID, and are both really happy it is open again. They also recently visited a zoo for the first time. Miguel's mum thinks visiting places like this is really important for the education of children, as they learn how to interact with animals. She also really likes that schools visit farms here too, as it should be a part of education. She notes that this specific farm is quite small, but has a good location.

#### *Mother with a boy of 3 years old*

They do not often come to this animal farm, although they live nearby, because the animal farm 'the Bijlmer' is much bigger and nicer. There are more opportunities to touch and be

with animals at the bijlmer. The child likes all of the animals, most important at an animal farm for them is to be able to pet the animals and get in contact with them. This place is too closed off, more open cages and opportunities to enter the cages is better. The development is not something she notices and not a reason to go there. He was already sweet with animals. He just really enjoys himself at animal farms.

*Father of two children (own statement: not fluent in Dutch yet) with his 18 months year old son. He also has a 4 year old daughter.*

They go almost every day, they live very nearby. The boy really likes it there, he wants to go on his own account. For him it is more about discovering. His sister of four really likes going there as well, but she wants to help Nienke the farmer. The father really notices a development in his daughter. She wants to help feed the animals, for example. For young children, the bunnies are nice. They can pick them up and discover themselves. The girl likes to help out and do things at the farm. The father thinks it is the best place in the neighbourhood, there are many activities. In terms of differences in his son, he becomes very calm at the farm. He is able to sleep well, he makes less of a fuss at home. The animals calm him down and relax him.

### **Interviews Animal Farm De Werf**

*Mother and her two daughters. one of 4 and one of 7 years old*

Before COVID-19 they would go to the animal farm regularly. This is the first time back. Sometimes the girls are a little scared, however the behaviour is not different from the behaviour before COVID-19. They like driving around in their cars. Also the guinea pigs and bunnies are fun. The chicken and pigs are scary. The sandbox is used by the youngest daughter. Sometimes they go to other animal farms. They are here today because the parents have a week off and every day they do something fun with the kids. The influence she notices on her kids is the fact that they are more calm when they get home because they were able to lose their energy. The mother has no big suggestions which would improve the animal farm. The freedom the girls have is really nice, they can walk around freely. Before more animals could be petted and reached, with COVID this has become less.

### *Grandparents and little boy*

The farm was visited by two grandparents and their grandson of 15,5 months. This was their second time visiting this farm. The parents of the child live in the neighbourhood, so they come here more often. He is still very little, so he is less interested in the animals, and more focused on the toys and playground. He does walk around quite a bit and observes everything. The grandma stated that she believes it is really important that children learn that there are more beings in the world, like animals, and that they become aware of that. At the farm, they learn about the animals, and later on also get to interact with other children when playing. She believes that some children from the start on have more with animals than others, they for instance have a cat, and children get used to animals much easier that way. Considering the farm, she states that moving around freely is very important, and space is needed. Many houses here do not have a big garden and have busy streets, so places like this add a lot of value. If she thinks about the behaviour of her children, she remembers that they often are more relaxed after being in nature.

### **Interviews Dierenpark Amersfoort**

#### *Questions:*

#### Parental well-being:

- How did you feel before you came here, any stress involved? How do you feel now?
- Do you have any safety concerns about your child at the zoo?
- What part of the zoo are you looking forward to the most?

#### Connection between children and parents:

#### *Closed questions*

- How old is your child?
- Do you live in a city or in a village?
- How often do you engage in activities in nature with your child?
- How often do you visit the zoo with your child?

### *Open questions*

- Why did you go to the zoo with your child today?
- What did you do at the zoo today (just watch animals/also go to the playground/restaurant etc.)?
- What do you think is something your child learned today at the zoo?
- How did the visit impact your mood / well-being?
- Do you feel a closer connection to your child at the zoo?
- Are you planning to revisit the zoo, why/why not?

### *Grandmother with two children (aged 4 and 1,5 years old)*

The grandmother tells us that it is a pleasure for her and her grandchildren to visit the zoo. The children live in Amersfoort, but she herself comes from a town in Zeeland (Yerseke). She has a subscription for the zoo, and thus visits the zoo regularly (once every three weeks) with her grandchildren. At this point, the children enjoy the larger animals, such as giraffes and elephants, although she has indicated that this varies per time. The grandmother believes that all sections of the zoo are educational and beneficial for the children, and she also thinks that the safety in the zoo is well maintained. The “klim-alles route”, a playful manner for the children to explore a section of the zoo, is also a great addition to the zoo in her opinion. Normally, the grandmother spends a lot of time with her grandchildren outside, such as going to a park to spot and feed birds.

### *Young couple with two children (aged 2 years old and 4 months old)*

Going to the animal zoo was quite okay for the couple; the toddlers were energetic and very much looking forward to it. They normally have a subscription for Blijdorp, a zoo in Rotterdam, but they are in Dierenpark Amersfoort because of their holidays. They spent a visit to another zoo (Burgers' Zoo) a couple of days ago as well. They are thinking about going to Dierenpark Amersfoort more often! For the parents, the visit to the zoo brings about mixed feelings. They like the animals that the zoo offers, but do think they are made to live in cages that are too small. They visit the zoo for their own well-being and sake as well, but visit mainly for their children. They enjoy trips to zoos, and fall asleep easily afterwards as well. The parents do not worry about safety in the zoo. The children wanted to see polar bears, but unfortunately they are not present at the zoo. Instead, they are mostly excited about the elephants and giraffes. They are still a bit too small for the “klim-

alles route". In general, the family tries to be outside a lot during the week, but especially on the weekend they like to take a walk or to cycle. Namely, they argue that being outside is healthy, both for themselves as well as the kids, especially if you have a 9-to-5 office job like they both have.

*Grandmother with child (aged 3 years old)*

Both of them live in Amersfoort. The child loves animals a lot: she is a big fan of giraffes, dinosaurs, turtles and lions. They haven't been to the zoo for a while, and she missed the animals a lot. She was uncomfortable with being in the playground or going down the slide, but she is very talkative and likes to speak a lot about the animals that she has seen. For the grandmother, it feels like a very relaxing trip outside. She takes care of her grandchild for two days a week, and they like to spend time outside when they are together. For example, they go to the Bosvijver each week to sit down, relax and pick flowers for the mother of the grandchild. The grandmother is worried about nature and climate change, as she is worried that it is heading the wrong way. But for now, she is very happy that her grandchild enjoys the trip as much as she does, and that her grandchild loves to roam around freely in the zoo.

*One mother with child (aged 3 years old) and another mother with child (aged 2 years old)*

Both of the family members live in Amersfoort. For one mother, it was the first time at Dierenpark Amersfoort, whilst the other one comes more often. They believe that the park is very child-friendly; both in the atmosphere as well as the design of the park. For example, they feel that their toddlers can see the animals easily from their eye-level, and that the glass sides of the cages make it very accessible for toddlers as well. One child (3 years old) was energetic and lively, while the other was slightly more reserved. However, the children liked to interact together in the zoo. The former child had already seen four elephants at the zoo, and was really happy to be in the zoo! His mother and him go to the animal farm quite often as well. The parents believe it is a good way to bond with their toddlers, while they are also happier and relaxed during the visit to the zoo. The parents are not concerned with the safety of the toddlers around the zoo. The parents go outside with their children often as well, and the mother without a subscription is definitely considering getting a subscription from now on.

*Young couple with two children (aged 2 and 1 years old)*

The children are both very enthusiastic and talkative at the moment but they were in the morning as well. The mother was a little bit stressed about this in the morning and also on the train going to the zoo. They live in Amersfoort and their reason for visiting the zoo is mostly because it is a nice day out. The father tells us that they also go for educational purposes since in a book they cannot learn or see clearly how big a mouse is compared to an elephant. It is their first time with the children in a zoo and they are looking mostly forward to seeing the giraffe because of the song (“En de giraf de aller-langste ne-e-ek”). Also the father tells us that he has no worries regarding safety in the park. Maybe they do not get to see all of the animals.

*Father and son (aged 4 years old)*

They live in Nieuwegein and have subscriptions for the zoo. That is why they visit the zoo approximately 5 times a year. This is especially fun for them because they are without the boy's smaller sister and they can spend some quality time with each other. The boy was enthusiastic but not necessarily restless in the morning. Also because he comes here more often and it was early in the morning. They look forward the most to the lions. There are no concerns regarding safety. The boy falls sometimes but they are used to it and it is not necessarily bad. Because of corona they do go out less but they still try to make time to be in nature such as visiting an animal farm or going for a walk such that they can run. The father hopes the children will remember the animals and worries that it will be different in the future (with regards to endangered animals).

*Two couples; one couple with two children (3 and 1 years old) and one couple with one child (5 months old)*

Their stress levels in the morning were quite high (a 7 out of 10) but this was over as soon as they got into the car. Now they are very relaxed and the children are as well. They are enjoying themselves a lot. In general they do not go out in nature that often, probably once every three weeks and they visit a zoo once a year. They do live in a small town.

*Young couple (one child aged 3)*

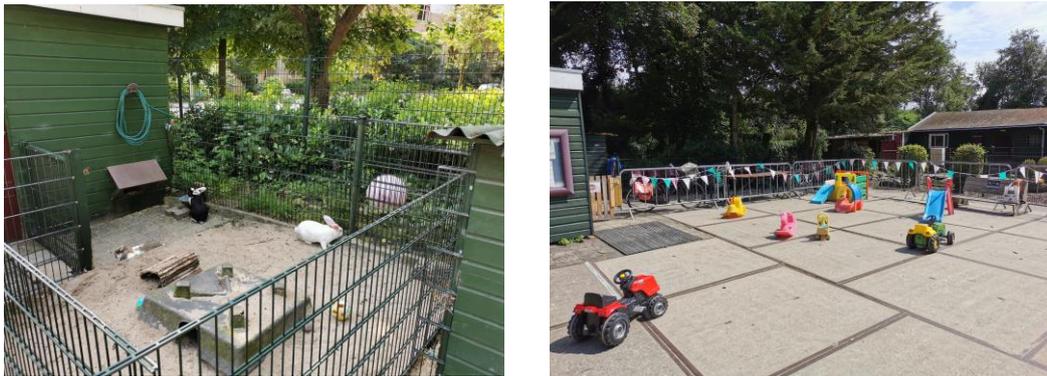
They wanted to visit the zoo today because they were nearby on holiday and it would be nice weather today. The morning was quite relaxed and now they either play at the

playground or are watching the animals. The boy wants to see everything. They live near Rotterdam and have access to a forest as well where they go often. A couple of times a year they visit a zoo. They do not deem it super educational yet for the boy because he is not yet able to read. Furthermore, they have no worries about the safety in the park. The 'klim-alles routes' were also safe and doable for him.

### *Foreign couple with young child*

The child is almost one year old and the family is from Almere, an area where green spaces are present. They have a yearly subscription to the zoo and visit the park twice a week. Since their child is still very young and cannot walk yet, the parents notice limited opportunities for the child to engage with nature, but Dierenpark Amersfoort always excites the child. The toddler especially likes the birds, but also seemed very excited and screamed around the tiger. The parents stress that despite the animals, the child is also interested in the plants and entire botanical fauna. The family also comes to the zoo to simply take walks. Since the family regularly visits the park, the caregivers did not feel any strong emotions such as excitement in the morning. Safety concerns despite the risk of infection with COVID-19 are not existent.

### **Photos**



**Figure A.6.2.1:** Impressions De Werf (Amsterdam, 2021)



**Figure A.6.2.2: Impressions De Glijhoeve (Amsterdam, 2021)**



**Figure A.6.2.3: Impressions Dierenpark Amersfoort (Amersfoort, 2021)**

## **A.6.3: Case study Community Gardens**

### **The effect of a gardening workshop at primary schools**

To study the effect of gardening activities on the perception of the environment of a child with an age range between 4 and 6 years old, we conduct an experiment that asks participants to complete a drawing task and a workshop task. The experiment is conducted with an entire school class of children, once in a rural area on the outskirts of Rotterdam and once in a very urban area just outside the city centre of Rotterdam.

#### **Introduction**

The goal of this entire study is to find evidence for positive effects of nature on early childhood development. In light of this, the effects of community gardens are researched and an experiment is conducted to see whether an activity involving community gardening has a short-term effect on children. The intervention/activity that is central to the experiment are the sunflowers and the sowing of herbs by the children of a primary school class aged between four to six. The short-term impact is evaluated by the analysis of children's drawings where they sketched a place outside where they feel happiest.

#### **Experiment research question & hypothesis**

A clear research question needs to be formulated to define the exact effect that is studied. The following research question is thus evaluated:

*Does a community gardening workshop have a short-term effect on the perception of happiness of four to six year olds?*

#### **Participant sample**

The number of children that participated in this experiment is 27, with ages ranging between four and six all from the same school and year. Detailed information on the school cannot be provided as the school wishes to not be disclosed. However, to give some flavour to the story, the following general information is given: the public primary school is located in the Rotterdam area in the Netherlands in a neighbourhood that has an average household income in the lower 25th percentile of the country, and the distribution of citizens' ethnicities and religion is similar to the median of the country.

With respect to nature, some small parks are near the school but no (small) forest. The surroundings can be better identified as industrial due to the close proximity of the Port of Rotterdam.

## **Methodology**

### Sketching method

Analysing any direct effect of interventions on children is notoriously hard as young children cannot report on their activities themselves, unlike adults. Often caregivers of children are given surveys to report on their child. The aim of this experiment is to measure any effect of the intervention directly (repotting and sowing) by requesting the participants to make a drawing and draw conclusions from it. This approach is in line with the study of Çubukçu (2018) which also investigates the drawings of children. Our case studies novel adjustment to this 'drawing' research method is to request the same drawing of the participant twice, once before the intervention and once after the intervention. Additionally, to research a lasting effect of the intervention in the short-term, the experiment children group is split into three subgroups. Each subgroup is requested to make the second drawing at a different time.

### **Question explained**

The exact request that is made twice to the participants needs to be bound. We do want the child to make a drawing, but what should they draw and how can we ask this to the child in a way that they grasp the meaning of the request? Not every four year-old would understand the full meaning of happiness anyway. The question that is asked is "teken een plek buiten waar jij je het meest blij voelt", which translates to "draw a place outside where you feel happiest." The way that the Dutch sentence is phrased takes into account what a child can understand by use of the easier to understand word 'blij' rather than the more complex and abstract word 'gelukkig'. Additionally, hints of possible answers to the request are given to help the child understand the question (e.g. grandmother's garden, football field, playground).

**Timing**

Figure A.6.3.1: Timing Drawing Experiment

Day	Activity	Description
1	Drawing I	Request all children: "Draw a place outside where you feel happiest"
7	Intervention	Replant & sow edible plants
7		Request subgroup I "Draw a place outside where you feel happiest"
8	Drawing II	Request subgroup II "Draw a place outside where you feel happiest"
14		Request subgroup III "Draw a place outside where you feel happiest"

The experiment consists of two drawings made by participants and an intervention. A week before the intervention, the participants are requested to make their first drawing without knowing anything of the intervention to come. Next the intervention follows. After the intervention the group of participants is randomly split into three subgroups. Each subgroup receives the same request of making a drawing as before the intervention, however the timing of when they receive this request differs. Subgroups I,II and III receive the request zero, one and seven days after the intervention, respectively. An overview of the timing is provided in Figure A.6.3.1.

**The effect of a visit to community gardens of child-caregiver couples**

Community gardens have proven to show various benefits to children and caregivers, both in terms of physical and mental health. Firstly, adults that live in households where at least one member participates in community gardens consume more fresh produce compared to the general population (Alaimo, Packnett, Miles & Kruger, 2008). This benefit is likely to extend towards all household members including young children and adolescents, a phase in which fostering healthy eating habits is crucial for later life.

This finding relates to the fact that increasing rates of overweight and obesity are often related to undernutrition (Corrigan, 2011). In the Netherlands alone, about 8.1% of children between the age of two to nine are overweight (Seidell & Halberstadt, 2020). Besides fostering environmental connection, community gardens can help create awareness of food systems, consequently improving eating habits during and outside harvesting seasons.

In terms of mental well-being, the community aspect of these gardens may help ensure adequate social support to caregivers and young children through greater interaction with adults and children from one's neighbourhood (McVey, Nash & Stansbie, 2018). Furthermore, the increase in green space in urban areas can positively affect children, caregivers, and anyone else regularly confronted with the community garden.

As many studies have been conducted on the benefits of community gardens for adults, the purpose of this case study is to narrow this down to children and caregivers. Specifically, we will investigate whether a visit to a community garden positively influences the subjective well-being of caregivers and their children, as perceived by the caregiver.

To test this, we initially planned to conduct an experiment in which we measure the change in well-being of a child-caregiver pair from a visit to a community garden. The experiment would have taken place in the first week of August in the community garden Taka Tuka Land in Nesseland, a district on the outskirts of Rotterdam. Participants would be recruited through posters across the city, as well as through Facebook posts, with the chance of winning a voucher in return for participation. When signing up for the experiment, caregivers will provide some personal details, and one week before the visit, they will fill out a survey regarding the assessment of their child's and their own well-being. The assessment concerns enjoyment, empathy, responsibility and awareness, and can be found in more detail in the Appendix. During the visit itself, the caregiver and child would be guided through a few gardening basics and encouraged to do it themselves. At the end of the visit, the caregivers would have to answer the same questions regarding their own and the child's well-being. However, this experiment could not go through. However, the design as mentioned above as well as the questionnaire down below are still provided.

## **Hypothesis**

Given previous studies on the benefits of community gardens for adults, we expect similar results for children and caregivers. In particular, we expect children and caregivers to have a greater sense of connection to the environment, and potentially a better mood. Given time reasons and financial limits, we cannot test how repeated exposure to a community garden affects well-being, which is why we limit ourselves to one visit. However, we still expect to find significant results in terms of the change in well-

being, as minimal exposure to natural elements can have a positive impact on caregivers and especially children. If possible, future cases should study this effect over longer time spans in order to get a more accurate view of how children benefit from community gardens.

### **Focus groups with stakeholders and experts**

Community gardens can play an important role in early childhood development. Therefore, we will conduct focus groups to bring stakeholders with different perspectives and interests together. The composition of the focus groups should be an expert on community gardens, an expert on child development and the role nature plays in it, a child psychologist and someone from a municipality of a big city (Rotterdam, Amsterdam, Utrecht, the Hague). The goal is to start a conversation from different perspectives about the role community gardens could play in early child development. We want to discuss the current situation of community gardens and the involvement of children and what the future plans are. From the municipalities we want to know what their current policy is for the interaction between nature and child development generally and the interaction between community gardens and child development specifically. In these focus groups, we want to touch upon different aspects of community gardens by asking broad questions, in which the different perspectives can come forward.

First, we want to establish the current situation and how the different parties are involved. For example, do municipal policy makers take the child perspective into account when designing the community gardens or are visits from children just a nice extra? For this question the insights of the experts could be very useful by, for example, giving information about the perspective of the children.

Second, we want to dive deeper into the structure of community gardens and what structure would benefit young children best. For this question the different perspectives could also be beneficial, because there is probably more than one effect and probably more than one way to achieve that effect.

Third, we want to look into the question of how community gardens can be incorporated into densely populated cities. Also for this aspect, it would be valuable to have the perspective of both a city planner and a community garden expert to investigate what the most efficient way is to incorporate a community garden.

Lastly, we want to touch upon the role of caregivers. We want the panel to also discuss what the beneficial effects of community gardens could be for the caregivers, not only for the children. Another aspect of this is addressing the awareness among caregivers about community gardens. For example, how do you get caregivers to take their children to community gardens and what is the best way to inform caregivers about the benefits of community gardens.

We hope that by conducting these focus groups, we do not only get answers to the questions for our study, but that it also gets the experts thinking about the different perspectives and how they can use it in their respective fields.

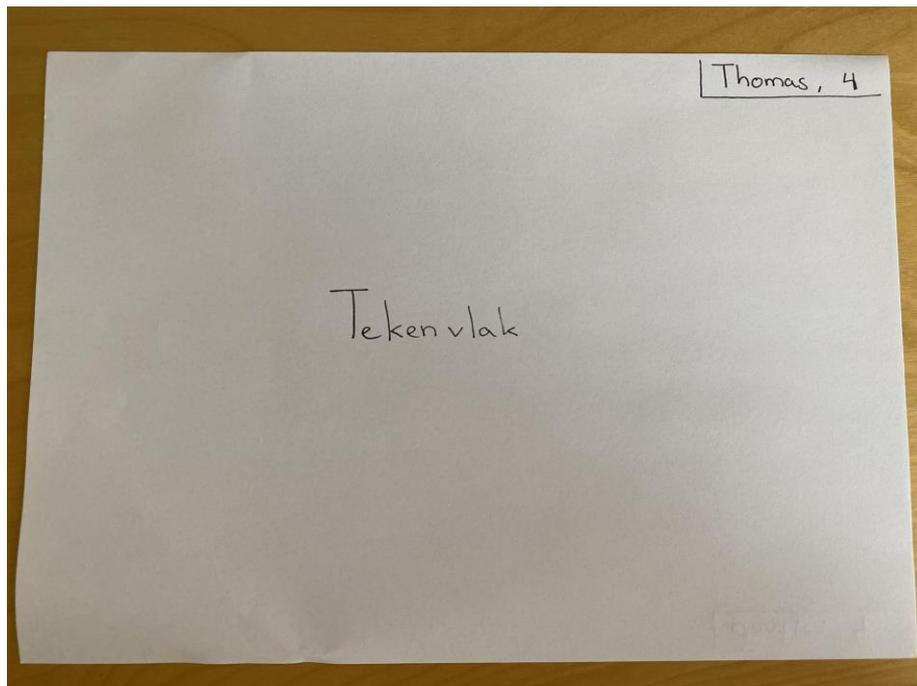
However, due to time constraints the focus groups were transformed into interviews. These still followed the same structure and are provided below.

### **Instructions for the teacher (in Dutch)**

Het kleine experiment bestaat uit 3 stappen. Twee stappen zijn het maken van een tekening en een stap is de interventie:

- 1) Dag 1: Verzoek alle kleuters tot het maken van een tekening
  - a) door middel van de volgende vraag: “Tekenen een plek buiten waar jij je het meest blij voelt”. Hints mogen gegeven worden zoals een plek waar je je fijn voelt in de buitenlucht, zoals het schoolplein, het park, een voetbalveld etc.
  - b) Laat de kleuters hun **naam** en **leeftijd** in de rechterbovenhoek van de tekening schrijven, met twee aanliggende lijnen zoals in de illustratie

hieronder. Dit zodat wij de namen gemakkelijk kunnen anonimiseren



**Figure A.6.3.1:** Drawing instruction

- c) Mocht de tekening er te erg uitzien als gekras; vraag de kleuter naar wat hij heeft getekend en noteer op de achterkant van de tekening in steekwoorden wat de kleuter heeft getekend.
  - d) Scan of fotografeer deze tekeningen en stuur ze op naar [involve@efr.nl](mailto:involve@efr.nl)
- 2) Dag 7-8: Interventie: Uitplanten van kiempjes en zaaien van kruiden
- a) Plant samen met de kleuters de planten kiempjes uit op het schoolplein (met gietertje bewateren).
  - b) Zaai samen met de kleuters de kruiden (met plantenspuit bewateren), deze mogen de kleuters de volgende dag mee naar huis nemen.
  - c) Tijdens de interventie zouden de volgende zaken uitgelegd kunnen worden:
    - i) Vertel wat het is dat ze planten (een zonnebloem kiem).
    - ii) Vertel dat het plantje uit een zaadje is gegroeid dat ze op kunnen eten.
    - iii) Vertel dat er voedingsstoffen in de grond zitten.
    - iv) Vertel dat plantjes water nodig hebben.
    - v) Vertel dat plantjes lucht nodig hebben.
    - vi) Vertel dat door het licht van de zon de plantjes groeien.

- vii) Vertel dat de plantjes bloemen krijgen.
- viii) Vertel dat uit de bloemen vruchten groeien.
- ix) Vertel dat in de bloemen zaden zitten.
- x) Vertel over bijen.
- xi) Vertel dat niet alleen zonnebloemen maar ook fruit en groentesoorten op deze manier groeien.
- xii) Vertel dat dit op elke plek met water, aarde, licht en lucht kan, dus ook in de tuin, in het raamkozijn etc.

3) Na de interventie wordt de groep in drie willekeurige subgroepjes opgedeeld (het liefst op alfabetische volgorde zodat vriendjes/vriendinnetjes niet perse bij elkaar zitten). Elke subgroep wordt net zoals in stap 1 gevraagd om een tekening te maken met dezelfde vraag: "Tekenen een plek buiten waar jij je het meest blij voelt". Het verschil tussen de subgroepjes zit in de timing waarop de taak wordt gevraagd. De timing is als volgt:

- a) Subgroep I op dag 7-8
- b) Subgroep II op dag 8-9
- c) Subgroep III op dag 14-15

### **Questionnaire pre - post intervention for parents**

This questionnaire took inspiration from the Connectedness to Nature Index for Parents of Preschool children (CNI-PPC).

#### **Pre Intervention Questions**

The following section regards statements about your **child**:

Please indicate how much you agree with the statement on a scale from 1-5.

- 1 - Disagree
- 2 - Somewhat disagree
- 3 - Neither agree nor disagree/Neutral
- 4 - Somewhat agree
- 5 - Agree

1. My child enjoys touching plants and the soil
2. My child treats plants and insects with care
3. My child believes picking up rubbish from the ground can help nature
4. My child likes exploring nature
5. My child asks questions about the plants
6. My child has lots of energy
7. My child is able to share the gardening tools
8. My child is interested in learning about nature
9. My child was in a better than usual mood at the community garden.
10. My child was calm at the community garden.
11. My child wants to visit a community garden again.
12. What did your child enjoy most about the trip to the community garden?

The following section regards statements about you as a **caregiver**:

Is there any specific event or other happening that impacted your current mood?

Please indicate how much you agree with the statement on a scale from 1-5.

- 1 - Disagree
- 2 - Somewhat disagree
- 3 - Neither agree nor disagree/Neutral
- 4 - Somewhat agree
- 5 - Agree

1. I go out in nature to relax on a regular basis
2. Being surrounded by nature improves my mood
3. Gardening improves my mood
4. Gardening diminishes my stress levels
5. I feel a strong connection to my child

### **Post Intervention Questions**

The following section regards statements about your **child**:

Please indicate how much you agree with the statement on a scale from 1-5.

- 1 - Disagree
- 2 - Somewhat disagree
- 3 - Neither agree nor disagree/Neutral
- 4 - Somewhat agree
- 5 - Agree

- 1. My child enjoys touching plants and the soil
- 2. My child treats plants and insects with care
- 3. My child believes picking up rubbish from the ground can help nature
- 4. My child likes exploring nature
- 5. My child asks questions about the plants
- 6. My child has lots of energy
- 7. My child is able to share gardening tools
- 8. My child is interested in learning about nature
- 9. My child was in a better than usual mood at the community garden.
- 10. My child was calm at the community garden.
- 11. My child wants to visit a community garden again.

Some open questions

- 12. What did your child enjoy most about the trip to the community garden?

The following section regards statements about you as a **caregiver**:

Is there any specific event or other happening that impacted your current mood?

Please indicate how much you agree with the statement on a scale from 1-5.

- 1 - Disagree
- 2 - Somewhat disagree
- 3 - Neither agree nor disagree/Neutral
- 4 - Somewhat agree
- 5 - Agree

1. I go out in nature to relax on a regular basis
2. Being surrounded by nature improves my mood
3. Gardening improves my mood
4. Gardening diminishes my stress levels
5. I feel a strong connection to my child
6. I feel a closer connection to my child after having participated in activities together
7. I would like to visit the community garden again
8. We are likely to engage in more outdoor activities as a family in the future

Some open questions:

1. What did you enjoy most about the trip?

## **Interviews**

### **Jacqueline Stammeijer - Expert Nature Education at Taka Tuka Garden Rotterdam**

#### General information

Jacqueline is coordinator of the volunteers at the Taka Tuka garden and she provides the nature education program. The board is mostly busy with contacting schools for this program, preferably these schools are in Zevenkamp. Most children that visit the garden through the nature education program are 5-7 years old. They visit every week and the lesson of the week is based on the season. They start with a scavenger hunt to get to know the garden by exploring it themselves. It is beneficial to start with fruits and flowers that the children recognize. When the children start with the nature education program, they don't really know a lot about nature. This is because the children live in the city, but also because of their age. There is not a lot of nature education from the schools itself, mostly because of budget cuts from the municipality and the schools themselves. Schools really need someone who is really enthusiastic about nature to have a nature education program. There are some programs from the municipality, where children can help in a small vegetable garden.

- How did the initiative start?

15 years ago, the municipality wanted to build houses on the plot of land, but two neighbours, Leon Rook and Frenk Walkenbech, stopped it by collecting autographs from people that live in the neighbourhood. Since then, Taka Tuka has been in contact with the

municipality. They decided to make it an edible garden to make sure people stay in the garden longer and not just walk through it. The Taka Tuka garden is from and by the community.

- What is the target group?

People that live in the neighbourhood. The purpose is to let the residents meet each other. There has always been a collaboration with the care group that is close to the garden.

- Do children visit the garden and with whom?

Most children visit the playground, which is also safer because there is a pond in the middle of the garden. Sometimes parents from the salvation army visit with their children. There is also a daycare close by, but they do not visit very regularly.

- How big is the garden?

Almost one hectare. They started with a small garden and the mayor planted one of the first trees. The children from one of the participating schools planted the fruit maze.

- How many people take care of the garden?

There is a team of volunteers that maintains the garden, this group mostly consists of people living in the neighbourhood. It would be nice if this group was a lot bigger, because there are not a lot of 'regular' volunteers. The board consists of four men.

- How many nature education lessons are taught on a weekly basis?

There are 2 classes that participate in the nature education program. Hopefully next year 3 dayparts will be filled with nature education.

- Do you have plans for the future?

They want more people from the neighbourhood to actively participate and help in the garden, because now it is mostly a small group of volunteers and visitors. They want to expand the restaurant and cooking-with-the-garden initiatives at a low cost to target multiple groups. The municipality wants to privatize the Taka Tuka playground, but the organization now receives budget from the municipality to maintain the garden and the playground.

- What do children enjoy most on a day in the garden?

Mostly the children like just being in nature. Most of the children also visit the playground because they have a very short attention span. Usually there is 30 minutes of education and 30 minutes in which the children can play. In the nature education program, they also make products from the fruits and vegetables they harvest, for example pesto. The children always get something to take home with them. The children really like this.

- How would the ideal community garden for a 0-5 year old look like?

The most important thing is to focus on the experience of the children and make sure that multiple senses are targeted. It's also important the children can see what they are being educated about. Children also find animals really amusing. It is important to keep it really simple for young children. It is also really important to keep safety in mind for young children.

- How is the garden perceived within the neighbourhood?

It would be nice if there would be more people from the neighbourhood to help in the garden. It is special that people from the community can harvest things themselves from the garden, but they are expected to only harvest for themselves. It is not a produce garden. In the beginning, this garden was a 'pilot' community garden, because it was relatively large.

- Do you want more (financial) support from the municipality?

Preferrably yes. They are always in contact with the municipality. The constructions are a little vague, for example they have to pay rent for the building that stands on the plot of land. The board members are mostly busy with getting funds, which is a shame. There is a lot of bureaucracy, which complicates the process. It is not possible to make this community garden fully commercial, that is also not the purpose of the community garden. They cannot and do not want to ask commercial prices for the cafe, because their target group consists of mostly low-income people.

- Do you have concerns about safety?

There are not many problems. They have a small camera for the building. They also tell people they can sit in the garden, but treat it with respect. They did start to put chairs behind the fence, because it almost became a place for teenagers to hang around at night.

- What were the biggest challenges because of COVID-19?

The number of people that could visit the community garden. It was also difficult that people could only visit outside when there was bad weather.

- Is there a shortage of nature education in schools?

Yes, most schools do not have a nature education component in their curriculum. It is very important to learn more about nature and where food comes from. There are green spaces in Rotterdam, but you have to visit them yourself and look for them. The children that visit the garden become more calm during their visit.

- Is the positive effect a long term effect?

Probably yes. It is important for children to get a routine and to hear/see things more often so they remember it better.

- Do you children become more careful?

Yes they do. There are children with different cultural backgrounds. For example, some children wanted to take some plants with them so their parents could cook with it. So they do realize the plants that grow in the garden are used to prepare food.

- What were the biggest challenges with regards to COVID?

The maximum number of people that could be received since people were only allowed outside. That meant they could not hide inside when it rained for instance. On the other hand, since it is an outdoor place they have less rules to adhere to as well.

- Do you think that there is too little nature education?

It can always be more. You really have to search for green spaces in Rotterdam while these places are so important. Being healthy yourself and having a healthy environment goes hand in hand. Children for instance become more calm when they go to a community garden. I notice that their volume goes down. At first they thought everything was dirty.

You notice a long term and short term difference in how they react to nature and their behaviour in general. I think animals do appeal a little bit more to small children than plants.

- What changes in the attitude of children?

They learn a lot but also differently. There are a lot of children from different backgrounds. Some children want to bring food home instantly because they know their mother uses the vegetables for instance. It is important to let the children experience a lot. The older they get, the easier it is to really teach them things about nature.

### **Mirjam Romp - General Manager De Moestuin in Utrecht**

We asked Mirjam what she would like to improve about the garden; she replied that she would like to have a (dedicated) building for nature education and workshops for children.

She would like 'kindertuintjes', plots of land which of group of children is fully responsible for.

The community people (any age) with a mental/physical disability who don't have a place in the labour market. Additionally, she referred to the cooperation of a "Mytyschool" (school for kids with a disability).

People can harvest flowers and pay in the store. Furthermore you cannot harvest vegetables yourself; but you can buy them in the store (add the entrance of the garden). They have a bee farm (to teach children). She mentioned that it was underfunded. 2,5 hectare of farm. They had pigs, chickens and goats. People usually come here by car.

She mentioned that in general a lot of people of a high income class come here and she would like to see that change. Upon asking her whether that's because of the positioning of the garden (near a lot of high income neighbourhoods) or other factors she replied that it is probably because of just the distance and she expects that people from further away (so also from low income neighbourhoods) will come.

## **Tom Voorma - Project Manager Green Municipality The Hague**

### Short meeting notes

Natuur & milieu educatie → cuts and therefore sometimes only picked up by external organizations.

Some motives were mentioned for starting community gardens for the neighbourhood such as a meeting spot (relation to Leefstraat for instance; which one is more effective/ (cost)efficient; objectives?). Also the reason why decentralization (bottom up) is important. Less vandalism when objects/space is owned by the community. Some housing associations assign one flatmember to pick up the idea for community gardens as to increase social cohesion. CG in areas of social housing

Other stakeholders mentioned:

1. Loket stadslandbouw
2. Onseten (does sort of the same as Tom Voorma but then independent)
3. Jonglereneten (at the daycare).
4. Stadslandbouw NL
5. Transitiecoalitievoedsel
6. De kortste weg
7. Stadsboerderij The Hague?
8. Stichting voeding en kind

Synergies:

- Relevant for Animal Farm: Hans de Rijk & Lianne van Kampen (afdelingshoofd stadsboerderijen) [lianne.vankampen@denhaag.nl](mailto:lianne.vankampen@denhaag.nl)

## **Ans Hobbelink - Board Member Dutch Allotment Gardens Association AVVN**

Ans tells that she has been incredibly fond of nature since being a small child because she was stimulated to be in the garden by her parents. She is a European cultural anthropologist and has her own consultancy bureau for coaching of management

focussed on green projects. She also has been a researcher at WUR. Nowadays she is also head of an allotment garden that is mixed with a public park. All individual allotment gardens are part of AVVN and Ans is now on the board for a couple of years. AVVN does not only do allotment gardens but also public community gardens (became more modern throughout the years) and helps with the startup of new initiatives.

Ans tells that a lot of allotment gardens face closure by municipality and solutions are in the middle: creating a mix of public park and gardening. An allotment garden is a community garden; a place where you can farm together or enjoy something together. Key difference is that an allotment garden exists of individual plots with overarching associations. A community garden is inherently overarching. She also states that a community garden relatively quickly changes/fades/deteriorates. The divide between allotment and community garden is changing. For instance, tuinenpark 'Ons buiten' in Utrecht, a garden with an individual core where people rent a plot, but around the core is a freely accessible community garden with animals. There are specialised plots for 5-12 year olds to farm. Funnily enough not only the children learn, but also the caregivers! Parents ask other people for help.

'Schooltuintjes' were removed because of capacity (people and money) of the school. Ans finds nature education extremely important. They have a programme for kids of the BSO and kids out the neighbourhood where each month a group of children can go through the community garden with a theme each month (whats underneath a stone, what lives in a ditch, what mushrooms can you eat). The kids that come, come recurrently. They close the gates themselves. They also have guinea pigs, sheeps, rabbits and ducks. Additionally there is a store where people go to.

Garden is closed for safety reasons; also lights against dark. All people who own a plot have a key to the gate. She addresses vandalism which happens when there is ice for instance. People walk over the ice to the garden and break things.

The garden started with a horse, and a place where people could exchange things such as small plants or vegetables. From 2005 onwards this expanded and now they have a small shop which attract more people as well. There are days that is it is very busy. For example

at the open days where people can explore gardening together with activities aimed at children; dancing and edible flowers. Children like animals the most; also the like the first flowers in spring; or tomatoes and strawberries. She says that the animal farm attracts a lot of attention and caregivers come to it as soon as the kid is able to stand.

She says she wants more help from people from the community. They cannot expand even though there are a lot of people on the waiting list. 2/5th of the allotment gardens was removed a couple of years ago. Utrecht wants to build a lot of new apartments, directly next to the garden. This will bring shade to the garden. They talk with the councillor about this but it depends on the political environment for instance whether allotment gardens are deemed valuable. The plot of the allotment gardens could be used for other things in the eyes of the municipality. For instance, a football field. While allotment gardens add a lot of additional value with regards to biodiversity, education, social cohesion and climate adaptation. Because the garden exists over 60 years, a lot of biodiversity that has developed. It provides a cooler environment as well.

Giving an indication on costs that come to an allotment garden is really case dependent. 1 to 10 EUR per squared metre could be the renting price to the municipality. The allotment association pays for the bigger machines or tools and electricity. The municipality pays for the roads, the fencing and maintenance around the park. In comparison to a park; they are very cheap because they do the maintenance themselves and they even pay rent. A park however, uses people that do the maintenance.

In terms of scale, the organization consists of volunteers and members and this can add up to around 200 people involved. There are however also people joining activities for example. In Utrecht there are around 15 parks.

## **Visitors of Taka Tuka Land**

*Kesha (mom of three children: 1,5; 2 and 6 years old)*

She visited the garden with all of them. We had a casual conversation with her during which we posed a few statements. She was playing with her kids at the following device during the interview:

- “Awareness is important for the development of my child”

Yes, very important; we have lived near an industrial terrain with little nature. The little nature that was there was littered with trash. Therefore, I teach my children to tidy and relating back to the nature aspect, we like to go to TakaTuka land as its a safe playground with nature element

- “Is community gardening important for the development of my child?”

Yes, although I haven't been to the takatuka garden, I do the albert heijn moestuintjes together with my children. I think it is important for them to respect nature in general. We also have pets and I have the feeling that they are more empathetic towards them than other kids.

An important note that Kesha made was that she really likes the Taka Tuka Land playground because of two things:

- (i) Safe and tidy. There is no litter (broken glass, cigarette buds), the garden is fenced and there is place for her to sit in the shade if she wants to (with a cafe!)
- (ii) The garden contains a lot of natural elements, which she find important! She really wants her youngest boy to stay away from gaming as long as possible. And she said that she goes outside whenever possible. She particularly want her kids to ‘get dirty’.

Observational:

The kids were playing with wet sand; and it seemed as if they had a common agenda

*Kai (father of two children: 2,5 years and 7 months old)*

He visited the garden with his oldest daughter and two of his nieces (5 and 7 year old). We posed two statements.

- “Awareness is important for the development of my child”

Yes nature is important for my children. Kai stressed that since he became a dad he finds it important to go to places in nature with them. He thinks citylife is his choice (with little nature) but therefore find that he needs to visit nature. Kai could not really explain fundamentally why he had to go, it seemed intuitive.

- “Is community gardening important for the development of my child?”

At first he did not understand the question. But then replied in a manner that basically stated that he find nature important. He did not go to taka tuka land. He said that once children go to school they will learn more about nature (and how crops grown).

*Gerda (grandmother of two children: 4 and 6 years old)*

Gerda was in the Taka Tuka playground with her grandchildren.

- “Awareness is important for the development of my child”

YES! Important to increase awareness of nature and the importance of nature, because of climate warming. They limited the budget for nature/small gardens, which is problematic. It was her first time in the playground and the garden, but she does always visit outdoor spaces. She thought is was a normal opinion to think nature is important for children development.

- “Is community gardening important for the development of my child?”

She thinks it could help with the development.

Taka Tuka playground is mostly for smaller children, because her granddaughter (6) got bored quickly. She goes to the playground with her grandchildren when they get bored. She thinks it’s important that the children can explore the playground themselves. She was not worried about anything in the playground, she thought the children were safe here.

## Photos





**Figure A.6.3.2:** Impressions from Taka TukaTuin (Rotterdam, 2021)



**Figure A.6.3.3:** Impressions from Taka TukaLand (Rotterdam, 2021)



Figure A.6.3.3: Impressions from De Moestuyn (Utrecht, 2021)