CZECH UNIVRTSITY OF LIFE SCIENCES

CZU Faculty of Environmental Sciences

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Restorative Green Spaces in Displacement: Theoretical concepts of restorative landscapes and their potential application in refugee camps

Diploma thesis

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Prague

2023

CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

Faculty of Environmental Sciences

DIPLOMA THESIS ASSIGNMENT

Bachelor of Science Sana Jajeh, BA

Landscape Engineering
Landscape Planning

Thesis title

Restorative Green Spaces in displacement: Theoretical concepts of restorative landscapes and their potential application in refugee camps

Objectives of thesis

The main objective of this thesis is to formulate design recommendations for green spaces with restorative properties in refugee camps as means by which to reduce the level of stress of refugees and help them better integrate into a new environment based on theoretical concepts of green space influence on human well-being. Practices of green spaces will be investigated in different contexts including gardens in healthcare facilities and community gardens. The last step is to propose general design recommendations for a restorative green space in the camps of the displaced in order to support their well-being.

Methodology

The main research question of this thesis as follows: What are the general design recommendations for a restorative green space in refugee camps that will support the inhabitants' health and well-being?

The main research question was broken down into multiple sub-questions that will identify the structure of the thesis and contribute to fulfilling the main objective.

• How can green spaces influence human health?

• What are the existing green space practices in refugee camps and their significance to the inhabitants?

• What are the green spaces available with potential restorative properties and their existing design principles?

• How to incorporate the design principles of restorative landscapes from other contexts in the camps of the displaced?

This thesis applies a combination of research strategies guided by a literature review of the existing theories and evidence on the influence of nature on human health and investigates different types of green spaces with restorative effects like healing gardens in health facility departments and their design recommendations. Existing practices in green areas in refugee camps will be researched as well in order to understand the importance of greenery in the camps.

The methodology incorporates the qualitative data methodology through semi-structured Interviews with experts in the field of nutrition and health, cultural geography, and landscape architecture on restorative and therapeutic landscapes for the general public and vulnerable communities. Furthermore, an online survey filled by current or past displaced individuals has been distributed and aims to identify the stress in displacement and the role of greenery in reducing the stress level. Based on the existing theoretical concepts and the combination of the above methodologies, recommendations for green space design in refugee camps will be proposed.

The proposed extent of the thesis

65 pages

Keywords

restorative landscapes, refugee camps, healing gardens, community gardens

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Recommended information sources

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Expected date of thesis defence

2022/23 SS – FES

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Prague on 20. 03. 2023

Author's declaration

I hereby declare that the work presented in this thesis titled *"Restorative Green Spaces in Displacement: Theoretical concepts of restorative landscapes and their potential application in refugee camps"* has been carried out by me under the guidance of my supervisor Peter Kumble, Faculty of Environmental Sciences. The information derived from literature has been duly acknowledged, and a list of references is provided at the end of the thesis.

Date: 30 March 2023

Sana Jajeh

Acknowledgments

Abstract

The journey of displacement is accompanied by a wide range of challenges that negatively impact the overall health and well-being, particularly mental health, which was recorded to be on a distinct level of disturbance in refugee communities compared to the general public. This research proposes recommendations to design a restorative green space to reduce stress among the displaced following Ulrich's stress reduction theory. Drawing on multiple data collection methods, including interviews with experts and researching the existing restorative green space recommendations, particularly healing gardens in healthcare departments, the criteria for selecting the recommendations were based on the recurrence of design recommendations between healthcare departments and the outcomes of the methodology. The results depicted a high level of similarity between the qualities emphasized in a restorative landscape in healthcare departments and the qualities needed in the context of displacement. Additionally, findings suggest initiating the green space on a small scale and realizing it in phases. Furthermore, incorporating refugee camps as part of the environmental policies of encouraging biodiversity and improving environmental quality. This research argues for integrating design interventions from healthcare departments in the context of displacement and allowing the flexibility to use them based on the available resources and space in the camp.

Keywords: restorative landscape, refugee camp, healing garden, community garden, healthcare garden, stress reduction, health design

Abstrakt

Cesta vysídlení je doprovázena celou řadou problémů, které mají negativní dopad na celkové zdraví a pohodu, zejména na duševní zdraví, jehož zhoršení bylo u uprchlíků zaznamenáno ve výraznější míře než u široké veřejnosti. Tento výzkum předkládá doporučení pro návrh regenerační zeleně, která by měla snížit stres u vysídlených osob v návaznosti na Ulrichovu teorii redukce stresu. Vychází z několika metod sběru dat, včetně rozhovorů s odborníky a výzkumu existujících doporučení pro regenerační zelené plochy, zejména léčivé zahrady ve zdravotnických odděleních, přičemž kritéria pro výběr doporučení vycházela z opakovaných doporučení pro návrh mezi zdravotnickými odděleními a z výsledků metodiky. Výsledky zobrazily vysokou míru podobnosti mezi kvalitami zdůrazňovanými v regenerační krajině ve zdravotnických odděleních a kvalitami potřebnými v kontextu vysídlení. Zjištění navíc doporučují iniciovat vznik zeleně v malém měřítku a realizovat ji po etapách. Dále začlenění uprchlických táborů jako součást environmentální politiky podpory biodiverzity a zlepšování kvality životního prostředí. Tento výzkum má argumenty pro integraci návrhových intervencí z oddělení zdravotní péče v kontextu vysídlení a umožňuje jejich flexibilní využití na základě dostupných zdrojů a prostoru v táboře.

Klíčová slova: regenerační krajina, uprchlický tábor, léčivá zahrada, komunitní zahrada, zdravotnická zahrada, redukce stresu, zdravotní design

List of Abbreviations

COA – Centraal Orgaan opvang asielzoekers. Central Agency for the Reception of Asylum Seekers

AZC – Asielzoekerscentrum. Centers for Asylum Seekers

NGO – Non-governmental organization

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1. Introduction

1.1 Problem statement

Between the year 2000 and the middle of 2022, the UNCHR estimated the number of global forced displacements had reached 103 million, and 32.5 million are refugees (UNHCR, 2022); an average of 24 individuals per minute were forced to flee their homes in 2015 (Ghosh, 2018). Compared to the number of filed asylum applications in 2014 (709,800) in 38 European countries, the number of applications in 2015 has increased three times compared to last year (2 million) (Ghosh, 2018). While the refugees continue to experience unpleasant living conditions in some camps designed for short-stay durations and are sufficient and functional temporarily, grid-layout settlements are established to shortly accommodate displaced individuals due to conflict (Figure 1.1), where in reality, for a large number of refugees, "*the only home they have ever known is the camp*" (Harrouk, 2021). The planned refugee camps (PRCs) stay longer, and the average duration for the current refugee crisis is 20 years, where people spend an average of 17 years in a settlement (Rooij et al., 2016). It is no longer sensible to perceive these areas as temporary. The continuous expansion of some camps is resulting in an "*accidental city*," a term referring to some refugee camps as places created out of chaos and disorder, initially beginning as temporary spaces (Perkins et al., 2017), Dadaab Refugee complex, for example, has been implemented temporarily for refugees fleeing the 1991 civil war in Somalia, expanded over the years to include five camps, and is considered the third largest city in Kenya, accommodating 217,511 registered refugees and asylum seekers as of March 2020, where some inhabitants have spent over 20 years in this complex (Harrouk, 2021).

In the long run, people are faced with the challenges of unlivable conditions, from lack of resources, security, limited space, protection from climatic conditions, poverty, and other contributing factors; these camps turn to slums quickly as they expand and grow older, which could lead to an impenetrable, dangerous environment for disease, violence, and crime (Harrouk, 2021). Over extended periods, continuous exposure to unlivable, dangerous, and harsh conditions deteriorates human health and well-being.

Figure 1.1: Refugee camp, Kilis, Turkey (photo by: savas_bozkaya via Shutterstock)

Psychologists and health experts are faced with a distinctive set of challenges working with individuals with a refugee background, which distinguishes their mental health service needs from other disadvantaged communities, shedding light on the common service needs for the refugees regardless of their background diversity, due to their unfortunate experiences of physical and emotional, and other traumatic events, which makes many of them vulnerable to a range of psychological illnesses symptoms before and after settlement (Murray et al., 2010).

1.2 Research gap

Research highlights the distinct level of mental disturbance in refugee communities compared to the general public (Fazel et al., 2005). Taking into account the current situation and the increase in the number of refugees, there is a continuous necessity for further investigation of the mental health and psychoeducational approaches dealing with refugees to evaluate their effectiveness, not only in mitigating symptoms of trauma but including other aspects of health and well-being, like the psychological and social aspects (Murray et al., 2010), especially during difficult global-scale situations such as pandemics where the vulnerable communities might suffer higher consequences; according to a study on the mental health of refugees and migrants during the covid-19 pandemic through a self-reporting survey with input from over 20,000 refugees and migrants, reported a significant impact on mental health, specifically certain subgroups (elderly, women, insecure housing conditions) noting the increase in discrimination and daily life-stressing factors (Spiritus-Beerden et al., 2021). There is an urgent need for

mental health interventions to help refugees mitigate the different sources of stress they are exposed to.

While people flee due to different causes, the common factor for all refugees is escaping from an unpleasant or traumatic event and the need to seek safety and refuge in a healthy environment. Unfortunately, many displaced individuals left their homes looking for stability, only to face a long journey with indefinite future, not to forget the challenges accompanied by starting a new life in a new location, surrounded by unfamiliar landscapes and a new cultural context. Refugees' and asylum seekers' lives were described as a concerning swamped, uncertain life where possibly mental and physical health aspects for well-being and recreation are limited (Rishbeth et al., 2019). Mental health services in the camps of the displaced are inadequate, and there is a motion to develop mental and emotional multimodal interventions to address this issue (Tyrer & Fazel, 2014). In this research, the intervention of green spaces with restorative qualities will be proposed as a way to directly or indirectly positively influence the refugee's well-being, directly through practices in green spaces like gardening and indirectly through visual exposure to one. To maximize the potential influence of green space, the restorative properties observed from existing green spaces will be investigated to understand their efficiency in their designated contexts and extract the criteria applicable in refugee camps. Emergency planning needs to take into consideration the possible unfortunate event of a long-term crisis and adapt its design and planning principles to create living spaces that accommodate the human health components by considering the psychological, physical, and social well-being.

2. Research objectives

This research aims to formulate general design recommendations for green spaces in refugee camps for the purpose of stress reduction among inhabitants and as means to support their psychological and overall health and well-being. Inhabitants in some refugee camps often struggle with mental health due to various unpleasant conditions they were exposed to and still are in their current location. While green spaces are not intended to solve the various issues they are facing, they can serve as a vehicle for health recovery from different aspects through direct or indirect interaction with the green space, which can serve as a refuge from the various stressors in their lives. In order to fulfill the objective of this thesis, it is crucial to understand the restorative values of green

spaces and the extent to which it influences human well-being. On this basis, the main research question and sub-questions were formulated.

2.1 Research questions

The main research question of this thesis is:

What are the general design recommendations for a restorative green space in displacement camps that will support the inhabitants' health and well-being?

The main research question was broken down into multiple sub-questions that will identify the structure of the thesis and contribute to fulfilling the main objective.

- What are the existing green space practices in refugee camps and their significance to the inhabitants?

- What are the theories of supportive green spaces, and how does a green space influence health and well-being?

- What are the green spaces' supportive properties and existing design recommendations?

- How to incorporate the design principles of supportive landscapes from other contexts in the camps of the displaced?

3. Literature review

The literature review will provide the theoretical foundation for formulating design recommendations for a restorative green space in refugee camps. Starting from identifying stress, one of the significant negative psychological factors common in displacement and some of the identified stressing reasons in displacement camps. Followed by green space significance and recorded gardening or planting practices in some camps. The next section will then elaborate on the different types of therapeutic landscapes and their design recommendations in different health departments. Moreover, the benefits of gardening and a case study on the influence of gardening interventions in a refugee camp are investigated.

3.1 Definition of stress

Stress, in general terms, is a psychological response caused by an individual's challenging environmental situations, which can endanger, intimidate, or threaten their health and comfort (Ulrich, 1999); these responses include emotions like sadness, anger, fear, and coping mechanisms (Ulrich et al., 1991b). Furthermore, stress also triggers physiological responses, which can be apparent through a reaction from the cardiovascular, skeletomuscular, and neuroendocrine systems (Ulrich et al., 1991b).

Stress effects can be measured through self-reports of perceived stress related to certain stress sources or living conditions of individuals (Cohen et al., 1983). Measuring stress is a challenge for researchers due to the data limitations on stress exposure of participants (Crosswell & Lockwood, 2020); however, psychological stress in adults can be measured using self-report on drastic life situations such as traumatic experiences, previous exposure to stress in life, and the current perceived stress in multiple aspects such as loneliness, financial difficulty, workload, and safety, the factors to consider are the most familiar to the targeted group, relevant to the research question, and the theoretical predictions connecting that stress type to the desired result (Crosswell & Lockwood, 2020).

3.1.1 Stress reasons in refugee camps

Factors leading to stress considered in Kaplan (1995) are categorized under: Harm and resource inadequacy; the harm category includes direct danger, such as physical injury, or through perceived signals and indicators of possible harm. Meanwhile, resource inadequacy is determined by the sufficiency of available resources to solve the problem at hand and has three determinants, via appraisal, intuition, or gradual reduction.

Crosswell & Lockwood, 2020 sorted the stressors by their timescale (Table 3.1.1) and highlighted the possible inaccuracy of the natural stressor types to fall accurately into a single category.

Table 3.1.1: stressor types and definition according to Crosswell & Lockwood (2020).

Type of stress	Definition
Chronic stress	Circumstances that are menacing and difficult, obstructing daily or life for a prolonged duration (minimally one month).
Life events	Episodic and time-limited that requires the individual to drastically adjust their life routine, such as getting fired, losing loved ones, or getting in an accident).
Traumatic life events	A sub-class to the life events category, however, involves a situation where physical or psychological safety is endangered.
Daily hassles	Daily life minor obstacles, such as traffic, arguments, and workload, can accumulate and overwhelm the individual or create frustration over time.
Acute stress	Resulting from a challenging short-term event that triggers a psychological and/or physiological stress reaction, like giving a public speech.

Loss of self-identity, esteem, efficacy, and continuity are some of the effects of forced resettling due to natural disasters, ethnic cleansing, poverty, and other unfortunate events, which can cause depression, loneliness, and indifference (Winterbottom, 2007). August and Gianola (1987) address the main reasons for psychiatric issues in South Asian refugees related to the challenges resulting from moving and integrating into a new environment; the common challenges include poverty, sociocultural change, extended dependency on welfare, isolation, language barriers, illiteracy, and loss of self-esteem.

1- Different environment

While there are many reasons for stress, they vary in different contexts and situations, even between refugee camps worldwide. However, some common stressing factors exist for all refugees arriving in a new country with a different language, culture, and habits. Factors contributing to stress among refugees arriving in the United States

include learning a new language and adapting to the new culture, law, and system while trying to find means of living (Murray et al., 2010).

2- Previous exposure to stress or trauma

Additional stressors, such as a traumatic or unpleasant experience in life before migrating, could be previously existent. The authors indicate that some individuals went through a traumatic experience before arriving in the US, and the difficulty of coping with these experiences might increase with the stress of moving to a new country, meanwhile providing easy access to mental health services could be challenging in the refugee and immigrant community (Murray et al., 2010).

3- Post-Traumatic Stress Disorder (PTSD)

The American Psychiatric Association identifies PTSD as a psychiatric disorder in individuals who experienced or were exposed to a traumatic life event or a set of circumstances affecting their health and well-being; mentally, physically, spiritually, or socially (American Psychiatric Association, n.d.). Accidents, natural disasters, combat, historical trauma, rape, and sexual assault are examples of traumatic and unpleasant life events that may result in PTSD (American Psychiatric Association, n.d.). Individuals fleeing their homes leave behind a whole life lived in that place due to an unfortunate life event which could possibly cause PTSD. A study on the effects of traumatic life events on mental health among populations that encountered mass conflict and displacement reviewed 181 surveys of over 80,000 refugees and calculated a weighted prevalence rate for PTSD between 13% and 25% (Steel et al., 2009). The strongest associations with PTSD and depression, according to the study, were torture experiences and accumulating encounters with trauma.

4- Loss of control

Marcus highlights that stress arises from the feeling of control loss, or inability to control one's life situation; this feeling negatively affects one's immunity system along with other physiological health aspects (Marcus, 2000).

5- Boredom & uncertainty

For many individuals in the camp, gardening practices were used to distract themselves from the extended duration of boredom and future uncertainties (Winterbottom, 2007).

The drastic change in life patterns and interruption of the daily, monthly, and yearly routines, which are halted for an unknown duration, and forced inactivity are among the main challenges in refugee camps (Andemicael, 2011).

3.2 Importance of green spaces throughout history

The importance of gardens is highlighted in different cultures and religious beliefs. In the Islamic religion dating back to the 7th century, the garden design resulted from the lifestyle as led by the prophet and guided by variables such as climate and society, and the instructions of the Holy book (Ansari, 2011), where metaphors for paradise were often used for gardens, and describing heaven with garden features such as fruit trees and meandering water, and the reward for good deeds depicted a place with shaded trees, flowing water, sweet fruits, and aromatic flowers (Ansari, 2011). Furthermore, Persian historical poetry and literature elaborate on the importance of flowers and plants to psychological well-being; the development of the Islamic civilization greatly incorporated gardening and agriculture and drastically influenced the landscapes in the Middle East (Millican et al., 2019). Moreover, the authors correlate the history of the Islamic cultural heritage of transforming arid lands into green spaces to the challenge the Syrian refugees faced after fleeing their homeland, sometimes within a few days after arriving in a new location, they began to plant gardens and look for a way to reuse the available water (Millican et al., 2019). While it is generally acknowledged that Syrians love green spaces, other indicators of the significance of green space in different cultures are also noted through the gardening practices in Uganda and Indonesia (Millican et al., 2019).

According to Sachs (1999), the belief in nature as a healer existed as early as in the fifteenth century in Europe; where outdoor activities were included as a substantial part of a therapeutic plan from physicians, even in the mid-eighteenth to the early nineteenth century, there was a great emphasis on interacting with outdoor spaces to improve mental well-being in psychiatric patients. Hospitals had easy access to the surrounding spaces, windows designed directed outwards, planted gardens, and encouraged patients to interact with nature through farming programs (Sachs, 1999).

3.3 Benefits of nature on health and well-being

Different research supports the fact that interacting with nature is a form of therapy, as multiple people when feeling any negative energy, choose to spend time in a natural or quasi-natural environment to feel better (Marcus, 2000). A study on the effect of 10-week nature therapy in a forest with Danish veterans suffering from PTSD using qualitative interviews found that exposure to nature improved the veteran's PTSD symptoms and prepared them emotionally to deal with stressful situations; it furtherly mentioned that nature helps in mitigating the symptoms but not completely heal the condition (Poulsen et al., 2016).

A fair number of published studies in the medical field support the fact that a proper design of the habitat positively influences the overall health of humans, such as lowering anxiety levels, pain relief, reducing blood pressure, shorter time spent in the hospital in some cases according to a survey study (Rubin et al., 1998). Contrariwise, a connection is highlighted between low-quality environmental design to deteriorating health effects such as the need for increased medical dosage, increasing blood pressure, restlessness, delirium, and so on (Rubin et al., 1998).

Ulrich's (1999) findings in his chapter conclude that selected types of nature can have a tremendous healing impact on psychological, emotional, and behavioral elements of stress. It was apparent that even critically stressed patients benefit from viewing nature for a few minutes. Furthermore, gardenlike sceneries can reduce pain, as mentioned by the individual's self-reports of how they identify pain and the results of the required amounts of medications (Ulrich, 1999). The possible benefits of a properly designed garden with supportive healing parameters within the healthcare facility include stress/anxiety reduction for the garden users, lower depression rates, increased quality of life for chronic patients if the garden encourages exercising, and pain mitigation (Ulrich, 1999).

In the context of a workplace with non-patients, an office study using the experimental design on an individual's psychological state was more positive in the presence of plants than when no plants were available (Larsen et al., 1998). Furthermore, another similar study on office workers with access to a window overlooking nature outlined the improvement of the office worker's mood in reduced frustration and overall well-being and life comfort (Kaplan, 1993).

The sensorial benefits of gardens were brought up in five different conversations in the Domiz camp, associating gardens with improved air quality, countering sewer odor nearby, and the ability to breathe (Millican et al., 2019). One of the refugees condemned the inability to breathe or sleep, saying, "*this place is like a desert, when there are no trees there is no life*".

A study on the influence of green spaces on the sense of well-being of Somali Bantu females concluded that green space activities helped them mitigate the displacement stress in the two camps in Kenya and facilitated their resettlement in the United States (Coughlan & Hermes, 2016).

3.4 Recorded greening practices in camps

Many studies and news articles recorded different types of green space practices in refugee camps where people created their own little gardens or gathered flowerpots and took care of them; in camps where space is given, people started a community garden. An article published in The New Yorker (Kraft, 2020) named (The plants that make refugee camps feel more like home) shares photos of the plantings recorded in different camps. Henk Wildschut visited the Choucha refugee camp at the borders of Tunisia across Libya and noticed green tendrils and small green plantings inserted in the ground (Kraft, 2020). Meanwhile, near another tent, someone carefully tied a spring of leaves carrying petals to support it, he questioned the survival of these plants in such harsh weather, but it was right there, and someone was taking care of them (Kraft, 2020); that was the moment Wildschut decided to visit other camps around the world and published his project in a volume (Rooted), while he expected plantings to happen in long-term camps, turned out refugees created green spaces for themselves regardless of the duration of stay (Kraft,2020), according to Wildschut "*The gardens allow these people to quite literally put down roots, they are a symbol that says I belong here, even at least for a short while*" (Kraft, 2020). Wildschut elaborates on his experience after talking with many refugees that a few were planting for food, the majority were doing it for a mental goal; after his experience in four countries, his book proposes a shared desire "*to make a personal mark on such impersonal environments*" (Kraft, 2020). One refugee in a camp near Baalbek, Lebanon, created a boundary around the tent by filling plastic bags with sand and stones and with juvenile greenery within the boundaries, which could represent

the desire to create private spaces (Kraft, 2020), and many other planting practices using any available material to contain these plants and take care of them (figure 3.4.1).

Figure 3.4.1: (1) Choucha camp, Tunisia (Henk Wildschut, 2011), (2) Za'atari camp, Jordan (Henk Wildschut, 2018), (3) Saadnayel, Bekaa, Lebanon (Henk Wildschut, 2018), (4) Calais, France (Henk Wildschut, 2016).

One of the suggestions on green area practices in camps is to provide or create areas similar to that of urban agriculture, from a long-term sustainability perspective, which has multiple advantages from self-sufficiency, training, and growing agricultural skills of the refugees, as well as the other psychological benefits from the direct interaction with the fields (Perkins et al., 2017). Despite the idea that planting means the place is not temporary anymore, greening always comes with many advantages, such as

improvement in air quality, food production, shading, and psychological improvements (Perkins et al., 2017).

3.5 Theoretical concepts of restorative landscapes

The most popular theories used in empirical research on the restorative ability of landscapes are the attention restoration theory (ART) and stress reduction theory (SRT).

3.5.1 Attention Restoration Theory (ART)

The theory suggests that exposure to natural environments can restore the ability to concentrate (Kaplan & Kaplan, 1989). The authors mentioned two types of attention: directed and voluntary; the first is used for situations requiring intentional and consistent attention, while the latter is effortless or soft attention. The theory suggests restoring attention fatigue after an extended duration of directed attention through voluntary attention (Kaplan & Kaplan, 1989). For an environment to be restorative, it needs to have the following components, according to (Kaplan, 1995):

1. Being away: According to the author, natural settings such as mountains, seas, and forests are human's favored environments to maximize the restorative potential; however, this does not necessarily occur exclusively in faraway extents, in contexts where such environments are not available, accessible nearby natural environments can facilitate resting people's directed attention.

2. Fascination: In the context of a natural environment rich with captivating soft natural elements, it can attract attention undramatically, such as the clouds, sunset, snow patterns, and leaf swings by the breeze, where it is easy to be there and get the chance to contemplate.

3. Extent: The location and how far it expands. It is easily fulfilled in some environments; however, places with limited areas can encourage the sense of extent through design measures using trails and paths that make the area look expandable. Another tool that can fulfill the sense of being in a different location is miniaturization; a model example of a combination of both tools is Japanese gardens. Other design interventions in this regard are historical artifacts that can simulate the feeling of connectedness to history and past eras.

4. Compatibility: Humans perceive nature as a highly compatible setting, as if there is a special connection between natural settings and human preference.

3.5.2 Stress Reduction Theory (SRT)

Stress reduction theory proposes the concept of restoration from stress through exposure to natural environments; in contrast, the same recovery process is hindered in an urban context (Ulrich, 1981a). The theoretical base of the conceptual framework on the potential of a garden to have healing properties incredibly emerge from its ability to facilitate stress mitigation and restoration (Ulrich, 1999); he supports this stress-centered theory on the results underlined by Cooper Marcus and Barnes from their interviews with individuals in four California healthcare gardens. Ulrich's (1999) theory on supportive garden design proposes criteria for healthcare gardens that encourage stress mitigation for its users through promoting the following (Figure 3.5.1):

1. Sense of control and access to privacy

2. Social support

3. Physical movement and exercise

4. Access to nature and other positive distractions

For the scope of this thesis and considering the targeted group's vulnerable situation, stressful environments and life events, the Stress Reduction Theory will be adopted, and restorative landscapes will be used to mitigate stress levels in displacement camps.

3.6 Therapeutic landscapes

Joanne Westphal categorized five types of therapeutic gardens (Smith, 2007 ex. Westphal, 2000):

1. Healing gardens: designated to influence the restoration of the body functionality directly or indirectly. The main goal is to restore well-being in one or more of the three aspects of life: physical, psychological, and spiritual.

2. Enabling gardens: The scope focuses on maintaining and improving physical health by addressing the user's psychological needs. These gardens can be programmed

to maintain and improve the users' physical health through physical activities and promote spiritual well-being through meaningful activities.

3. Meditative gardens: designed to focus on inner thought processes for individuals or small groups. Mainly targets spiritual and psychological well-being, and physical health as a subsequent goal.

4. Rehabilitative gardens: created to assist the medical recovery process in achieving the target medical goals through physical rehabilitation as a primary purpose, and the subsequent benefits are psychological.

5. Restorative gardens: Focuses on recovering the psychological/emotional aspects for the users in order to regain balance by passively allowing the body to recover after stressful life events (Smith, 2007 ex. Westphal, 2000).
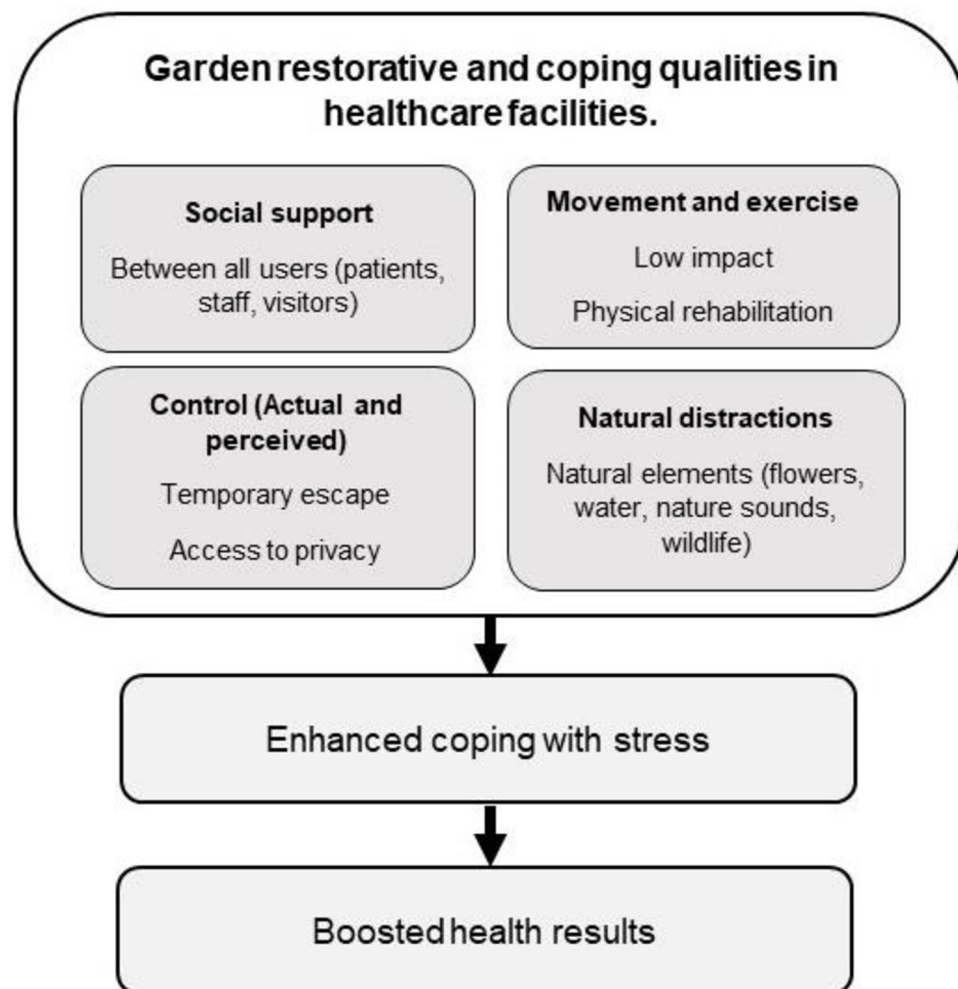

Figure 3.5.1: Garden influences on health results (Ulrich, 1999).

While the primary purpose and design for all the therapeutic gardens differ, they have multiple shared criteria and qualities dedicated to encouraging a positive influence on human health and well-being. These shared qualities will be investigated to apply them in the context of displacement. Numerous studies prove the healing and therapeutic characteristics of gardens on refugees in mitigating the psychological impacts of migrating to a new country (Hartwig & Mason, 2016), thus; the healing and restorative gardens will be investigated; their properties and design recommendations to target the overall health and well-being of refugees inside the camps, as well as encourage beneficial influence after exposure to stress and trauma.

3.7 Healing gardens

Ulrich (1999) defines a healing garden in a broader sense as a garden that hosts a variety of features and constantly stimulates positive and therapeutic energy in its visitors; they can be indoors or outdoors and vary in size, such as an atrium to a large-scale park within an urban context. Marcus (2000) further elaborates on healing gardens as natural outdoor spaces with features that promote health and well-being by reducing stress levels through direct and indirect interaction with the garden elements and the overall environment.

3.7.1 Difference between a normal and a healing garden

For a green space to qualify as a garden, it needs to include permanent components of natural elements, such as plants, trees, various flowerings, and water (Ulrich, 1999). Meanwhile, for a garden to qualify as a healing garden, it needs to emit a positive and therapeutic effect to the great majority of the visitors, whether this garden is considered a good design according to professional designers or not, from a healthcare design terms, a healing garden fails when it negatively influences the users of the garden (Ulrich, 1999).

Within the scope of healthcare facilities, Marcus & Barnes (1999) clarify how a garden can have therapeutic influences using the three aspects of the healing stages by targeting the well-being through: alleviating physical pain or consciousness of the pain, mitigating stress levels of patients suffering emotionally or physically, and providing comfort in a medical setting. As a result, stress reduction, boosting the overall well-being,

and psychological expectations of recovery, which in turn positively reflect on the physical health.

3.7.2 Healing garden design criteria

For the specific requirements of designing a healing space, it is demanded to have an intersection between two goals, creating a space, and easing a process (Marcus & Barnes, 1999 ex. Thompson, 1998), while a landscape architect is instructed to create the space, easing the healing process is a new addition to the landscape architect's skillset, this serves as the interaction point between sensitivity to the recovery process and the design requirements (Marcus & Barnes, 1999). The authors conclude in their chapter on the design philosophy that the spatial exploitation and the ability to control and implement the available design elements, which are the realm of a landscape architect, must be manipulated to fulfill the requirements of the healing process. With that, the landscape architect evolves to become solicitous to include emotions, health, support, and nourishment (Marcus & Barnes, 1999).

Several mechanisms need to be fulfilled for a healing garden to maximize its therapeutical potential; these include natural aesthetics that attracts people to visit and enjoy its design features and plant variations meanwhile feeling the wind and sunlight and hearing birdsongs; moreover, integrating powerful design elements that invite people to socialize, take a walk, contemplate alone under the sun or shade, exercise, and so on (Marcus & Barnes, 1999). A study on the use of outdoor spaces in hospitals found that 95 percent of interviewed individuals determined positive mood changes after sitting outside for some time, from being sad, uneasy, or depressed to a more stable and peaceful state; more than two-thirds pointed at planetary components of the outdoor space; meanwhile more than half included the sensory aspects like audio and smell, which helped enlighten their psychological state (Table 3.7.1) (Marcus & Barnes, 1999).

Table 3.7.1: Percentage of respondents who named these qualities as helpful in attaining a mood change in four hospital garden settings (Marcus & Barnes, 1999 ex. Marcus & Barnes, 1995).

Percentage of Respondents Who Named These Qualities as Helpful in Attaining a Mood Change in Four Hospital Garden Settings	
Trees and plants: flowers, colors, greenery, heritage trees, being in nature, seasonal changes	69%
Features involving auditory, olfactory, or tactile sensations: birds/squirrels, wind/fresh air, quiet, light/sun, shade, fragrances	38%
Psychological or social aspects: peaceful, escape from work, openness/large, privacy/secret places, oasis, companionship, watching others, knowing it is here	50%
Visual qualities relating to more than plant materials: attractive landscape design, views, variety of elements, textual contrast/quality, differing shapes/sizes	26%
Practical features: seating, well-maintained, accessibility, vending machines, smoking allowed, pathways	17%
No answer or 'don't know': number of respondents: 143	8%

3.8 Healing gardens within the different healthcare departments

This section incorporates the design requirements of different departments in healthcare facilities. A refugee camp accommodates people with a wide range of differences, to accommodate this diversity, multiple healthcare departments will be considered; children need a space to play and interact with nature, and adults need to relieve stress and

engage in social and physical activities. Although the healthcare gardens are designed based on the requirements of each patient group, there are a set of shared criteria between the departments, which will be identified for possible application in refugee camps. The available departments are:

1. Acute Care General hospitals

2. Psychiatric hospitals

3. Children's hospitals

4. Nursing Homes gardens

5. Hospice gardens

3.8.1 Acute Care General hospitals

Acute care hospitals are the institutions that we associate the word hospital with; appendix operations, child injury in a playground, giving birth, or visiting a friend recovering from an accident are some service examples, as they often contain multiple departments, and it's not usual for these facilities to include a garden (Marcus & Barnes, 1999, p. 157).

Based on a set of research methodologies, including published research, field observations, case studies, common sense, and research on exposure to nature in relation to stress mitigation (Marcus & Barnes, 1999, p. 196), the authors propose the following guidelines that are not rules however, aiding the design process and sorted under eight general categories (Marcus & Barnes, 1999, p. 157):

1- Planning the hospital site

- Design-inclusive of outdoor space from the beginning of the design stages

- Using materials extracted from the location upon expansion or start of the implementation process.

- Providing a favorable view to the outdoor space users in the hospital buildings' planning process.

- Incorporating a sense of history in case of renovation of an old facility.

- Diverse outdoor experiences for the different user groups with different ages (location and type differences such as near cafeteria, courtyards, and roof terrace).

- One space to "*get away*" at least, somewhere that encourages the feeling of being away from a hospital and the outside world.

- An outdoor setting next to a dining area.

- Considering the essential function of staff monitoring outdoor spaces during the design process.

- An outdoor space that the hospital workforce can temporarily occupy.

- Protection or maximize exposure to the sun to be used in cold or moderate weather conditions.

- Minimizing noises.

- Design in consideration of the policies, maintenance budget, and design intentions to maximize the potential use of the outdoor space.

2- Awareness of outdoor spaces

- Facilitating wayfinding to the outdoor spaces by implementing way-finding signs and maps in different facility locations.

3- Views of outdoors

- Window locations and placements to be overlooking and adjacent to outdoor spaces, therapeutic settings, and staff offices while minimizing the outside to see inside, enabling views of wildlife.

- Balconies and terraces with garden views and maximizing interaction with nature indoors through interior design elements that enable the patient to look directly at flowers brought by visitors.

4- Physical access to outdoor spaces

- Creating a space that is visually and physically usable.

- Locating main entries near departments with a higher likability of usage.

- Proper materials and types of door and flooring installations and easy to walk on.

- Avoiding reflection from materials like light concrete.

- Implementing handrails, wide walkways, and walking paths.

5- Site planning within the garden

- A human-focused design by considering factors like the time of usage, number of individuals, and type of activities.

- A setting that encourages relaxing, familiar, and nourishing energy.

- Materials familiar to the users to reduce their anxiety, like typical old-style sidewalks.

- Ease of wayfinding to reduce confusion.

- Incorporating the courtyard walls as part of the overall garden design.

- Incorporating subspaces with various privacy levels and encouraging a sense of enclosure in some areas to maximize the security feeling.

- Elevated protection, such as a gazebo, to emphasize the sense of protection and security.

- A central gathering location for outdoor events.

- Implementing an entry element such as a gate to encourage a sense of entering and departure from the garden.

- Locating seating in a way to experience a panoramic view.

- Design in consideration of wheelchair users.

- Interior space as part of the exterior: complementing the indoor and outdoor experience.

6- Planting

- Preserving existing old trees on site

- Scaling down the context surrounded by high buildings through tree canopies.

- Incorporating diverse plant materials.

- Visual variety of plantations with attention to preventing visual disorder.

- Dense plantation instead of sparse, incorporating diverse trees, shrubs, and flowers.

- Enabling options for exposure to sun and shade.

- Incorporating native plants to encourage a sense of place, with consideration of the fragrances and sensory-stimulant ones that invite to touch and interact, plants that move easily with a breeze are recommended as well.

- Outdoor setting that encourages harmless wildlife.

- Buffer plantings between the garden and the surrounding rooms to emphasize the feeling of privacy for both sides.

7- Furnishings

- Designing outdoor elements to encourage social support, like subspaces that a group can occupy.

- Variety of seating types and formations to maximize the time spent outside and accommodate the number of individuals, whether sitting alone or with a group.

- Materials of seatings selected in consideration of the budget, garden aesthetics, and climate.

- Encouraging a sense of enclosure with plantings around the seating.

- Seatings with tables to enable a broader range of outdoor activities such as eating, reading, and writing.

- Accommodating the climate by incorporating features such as shading areas, wind shelters, and heat-reflecting exteriors.

- Incorporating memorable materials such as a water feature or an artwork.

- Considering a playful feature that enables garden users to smile in a serious environment.

- Implementing bins near doors and outdoor social settings to reduce littering.

- Incorporating sufficient lighting and electrical outlets.

8- Maintenance and administrative policies

- Maintenance of the garden to ensure continuous safety and therapeutic benefits.

- Keeping the gardens available for use at any time.

- Educating staff on the benefits of outdoor spaces and communication may be easier outdoors.

- Allowing the volunteers to interact with the patients by taking them to the garden.

- Incorporating space for storage in the design process.

- Smoking and non-smoking designated areas.

- Using organic methods to attract wildlife (Marcus & Barnes, 1999).

3.8.2 Psychiatric hospitals

The outdoor places of psychiatric hospitals accommodate one or multiple of the following (Sachs, 1999, p. 235):

1- A large hospital grounds with several acres at least.

2- Specialized small mental health facility with a limited outdoor space usually enclosed by the building.

3- Psychiatric ward or unit in a general hospital, with a usual small size and shared with the entire facility.

Design guidelines of psychiatric hospitals (according to Sachs, 1999, p. 304):

1- design-specific to the client requirements: Utmost care must be paid in designing spaces depending on their users; the goal is to understand what the client needs to create a positive restorative space that encourages healing.

2- Cooperation and involvement of stakeholders: From architects, and site planners, to landscape architects and clients, including psychologists and other healthcare staff, to be directly involved in the whole process of designing and developing the

healthcare facility. Cooperating with the staff and patients will provide insights to design ideas specific to the targeted group. Furthermore, a public participatory process with the neighborhood community is encouraged to develop a strong connection between the community and the facility once it is built.

3- Landscape as part of the whole: Outdoor design elements are to be treated as part of the whole design process, including indoor space design. The arrangement, type, and connection to the indoor space must be considered when designing the landscape. It is essential to have an apparent connection to the indoor space.

4- Connecting outdoors with indoors: Facilitated through architecture, using openings like windows, for psychiatric patients, it is essential to keep them connected with the outside world, especially when they are unable to physically be there due to different reasons, including the weather, as well as for some patients who might feel trapped inside, a window can provide the patients with a sense of escape.

5- Facilitate wayfinding to the outdoor space: Users of the health facility, like the staff and patients, depending on the patient's program, should be informed of the available outdoor space, methods like signage, views from indoors, or even printed brochures and maps.

6- Design for specific needs when possible: It is strongly encouraged to inform the designer of the type of patients that will be accommodated so the design can be appropriately adapted. In case it is not possible (in situations where people with different illnesses share the same place), it is recommended to create a design based on the mutual preferences of the patients with a range of psychiatric disorders with reference to the research findings.

7- Plethora of experiences and places: When the space allows, provide a mix of spaces for the clients to discover, such as a water feature or herb garden, to inspire people to explore the available landscape. It is recommended to create a scale of spaces radiating from the main enclosed building to more open and less specific; it helps patients in psychiatric facilities to come out of their usual pattern and encourages the recovery process.

8- Enable activities even in limited spaces: A small courtyard or even a rooftop as an example can be used as a different experience for the users doing activities such as

a meeting of a small group, solitary sitting, or a small physical activity with a basketball hoop, and badminton.

9- Providing a balance between space safety and privacy: Going outdoors can serve as an escape from the patient's indoor routine, especially for individuals requiring continuous attention from the nurses; it is crucial to design a space that provides the feeling of escape and solitude while still visible to the staff. Utilizing design elements, in this case, for example, materials, topography, or furniture, to achieve this goal.

10- Provision of an easily readable space: At least one space that can be easily readable and to navigate through for patients who find it challenging physically and/or emotionally to go outside. The design should be simple enough, which does not necessarily mean tedious; properly arranging and implementing plenty of design elements will create various experiences to engage the senses.

11- Avoid fishbowls: Psychiatric hospitals are often designed with complete enclosures for the patient's safety. Design measures need to be incorporated to reduce the fishbowl effects by creating a buffer to the windows, allowing privacy to each patient and visual access to the outside.

12- Separate space for the staff: Providing an outdoor space where they can rest and connect with their colleagues, away from patients and visitors.

13- Attention to the type of materials used: patients in psychiatric hospitals may see things differently. Thus, attention must be given to the type and orientation of design elements incorporated in the facility.

14- Using durable materials: The durable materials can last longer in case of any reaction by the residents, which can cause damage to their surroundings. Attention must be paid to any potential element that might be used as a weapon.

15- Implement a water element: a water element can drastically contribute to the overall quality of the landscape. A water feature can encourage various activities, such as meditation or gatherings. Furthermore, it can attract wildlife which in turn provides the visual attribute, while the audio characteristics of the water reduce noises such as traffic.

16- Providing time-telling indications: patients in psychiatric hospitals may struggle with the sense of time, so it is recommended to implement visible time-telling elements such as large clocks.

17- Sun and glare: reducing glare, considering the medications that some patients may be taking, which has the side effect of raising photosensitivity. Shaded areas and areas for short exposure to the sun should be provided. Attention must be paid from creating shadows that might be disorienting for the patients.

18- Variety of stimulating plants: Aside from the visual aesthetical attribute of plants like their shape and color, it is encouraged to use plants that stimulate the other senses, such as soft plants to touch, or with a pleasant scent to smell, or contribute to the auditory sense in the breeze, all these attributes contribute to an abundant sensual experience for the user.

19- Avert harmful vegetation: While most plants are safe, some can be poisonous when eaten, while others can irritate when encountered; since patients can attempt to test or touch the plants, any potential danger must be omitted from the site (Sachs, 1999).

3.8.3 Healing gardens for children

Healing gardens for children is a relatively young concept in the medical field; one of the earliest specialists in this field is Lady Allen, A British Landscape Architect who was inspired by the Emdrup Adventure Playgrounds in Copenhagen in the mid-1940s, a playground that practiced the idea of developing children's abilities to design their community by providing manual handling of their environment while being guided by trained individuals (Moore, 1999), she took the concept back with her to London and led a movement to implement similar facilities for families suffering from a traumatizing experience during World War I, later on expanding this to include children with disabilities, the concept followed the development of other concepts like children's farms where it focuses on animals (Moore, 1999).

The author describes a healing garden for children as an integration tool between the child's authentic self and the surrounding environment (Moore, 1999). According to the Convention on the Rights of the Child, Article 31, it is the child's right to freely develop their physical and social skills through play and entertainment and engagement in activities appropriate to their age (Convention on the Rights of the Child, 1989).

Based on Moore's (1999) research findings on the history of the general requirements for children's environment, recreation, and outdoors which can be applied to children healing gardens, he mentions the most basic five hypotheses:

1- Outdoor entertainment: One of the essential elements contributing to a prosperous child's development.

2- Environmental conditions: As in the quality of the outdoor space in which kids can play or practice physical activities, the design here plays a crucial role in determining the level of captivation for the children to use the playground.

3- Nature as an element of healthy child development: Designing the space to attract children to interact closely with natural elements like plants, animals, and sunlight.

4- Activity trainers: To maximize the outdoor and indoor experiences for children, trained individuals in child play help increase the child's creativity and activeness more than possible without encouragement or guidance.

5- Linking indoors with outdoors: One significant benefit of connecting indoor and outdoor spaces is improving the quality of life for the children, which can be achieved by providing visibility to the outdoor spaces with window openings, the easier it is to have visual access, the higher positive effect will be (Moore, 1999).

The author highlighted the fact that healing gardens are focused on improving the quality of life rather than curing an illness; in this sense, children healing gardens must accommodate all types of children, including the temporarily disabled or children with terminal illnesses, meanwhile taking into account the concept of "ability" which considers all children to have an ability or potential skill, and thus the garden functions as a tool for discovery of a new skillset and improving existing ones (Moore, 1999). The influence of nature was demonstrated by a study done by Moore & Wong (1997) on a school in Berkeley where pavement in the schoolyard was replaced by a garden environment, which resulted in a noticeable influence on the children's behavior and self-reflection, the schoolyard served as a peaceful, playful, and controllable environment for the children, as well as a place to bond with other kids and belong to a community, although these children do not require healing in the medical context; this positive effect on their psychological and behavioral state can be considered healing (Moore & Wong, 1997). Moore's recommendation in any place dealing with children as they experience the world

through their senses is to include an accessible natural area to enable them to freely express themselves and live in a world they can control, especially in institutions like rehabilitation centers where children have no control over the medication process they go through, which can be scary or stressful to them, the natural area can serve as a place to regain control, relax and release the negative emotions, as well as many other healing benefits to help them maintain health or recover (Moore, 1999). Furthermore, he mentions research-proved types of therapies that positively influence children and the possibility of mixing them in the same space; these include play therapy which encourages children to go outside to breathe different air and play, horticultural therapy where children can get in direct contact with nature by taking care of plants, and animal therapy by allowing contact with non-harmful wildlife in gardens designed to attract them (Moore, 1999).

A healing garden within a children's hospital context must consider all potential users like parents, patient children and their siblings, hospital staff, and children with ability limitations; this will optimize the garden to fulfill all design requirements like incorporating quiet corners in case of grieving users, and active areas for children to play (Moore, 1999).

The author identifies four typologies of healing gardens for children based on case studies and research, formal therapeutic garden, which is optimized exclusively for certain user groups; nonformal play and horticultural therapy garden which encourages the involvement of children in gardening and highlights the importance of freedom to engage with the surroundings, informal strolling garden on the other hand, facilitates therapy and relaxation through a tranquil environment with walking trails, and sensual-encouraging experiences for all users including the parents, and lastly community-based multiuse, multipurpose garden, which is a more flexible type that encourages the community involvement and includes a mix of the other three typologies (Moore, 1999).

Design guidelines for children healing garden (According to Moore, 1999, p. 369):

1. Site planning: The main attributes of site planning guidelines touch on the site orientation and the importance of the space receiving sunlight as much as possible throughout the year. Furthermore, avoid topographical variety for the ease of access and mobility for individuals with a disability and maintain the original natural elements of the site to preserve the original natural identity.

2. Location: The author emphasizes the importance of visual accessibility to the garden through the windows of the facility for children unable to physically visit the garden; moreover, locating it nearby playrooms facilitates transitioning between spaces for children and therapists who arrange outdoor activities like horticultural therapy, and lastly, positioning the garden to be visible to the publicly used spaces within the facility, such as cafeterias and waiting areas. These three points will strengthen the indoor-outdoor connection.

3. Security: Ensuring the hospital's security by enclosing the building from all sides and making it inaccessible to the public. Principles of a defensible space can be implemented in case the community uses the community garden.

4. Microclimate: This principle mainly highlights the importance of providing shelter areas from the sun since kids have sensitive skins and protection from the rain.

5. Garden access: making the garden more appealing and welcoming for the children by providing colorful visual elements such as sculptures and colorful flowering.

6. Entering and exit: design child-friendly entrances that are home-like environments to feel welcomed and comfortable.

7. Accessibility: Accessibility term differs according to the context; within a healing garden context, the space needs to accommodate everyone and especially individuals using a wheelchair or other medical mobility equipment, with particular attention to the smoothness of the pathways for ease of movement despite the method used, on the other hand expanding the pathway to be large enough for the maintenance cars and large-scale machines.

8. User category-focused areas: the author recommends the consideration of different types of users in the garden and the purpose of use, giving an example of public gardens with no access control to certain locations that have caused issues since there is not a solid use program, the categories mentioned are stressed families and individuals who suffered a loss, which require a quiet, tranquil space to deal with their grief and allow nature to heal, on the other hand, spaces designated for preadolescent and adolescent users.

9. Supervision: The design should consider a comfortable social environment that can accommodate the parents and staff with the children.

10. Attracting volunteers: For an environment that might be relying on voluntary work to maintain it, it is recommended to create an attractive area for people to voluntarily contribute their efforts by providing a wide range of choices and a variety of settings, as well as opportunities to interact with the families and the children.

11. Variety of quality social settings: these settings include social gatherings between children themselves or between children and their families, as well as the opportunity for children to sit alone when they want, and lastly, a space that can accommodate an event or entertainment.

12. Accommodating different patient types: the author highlights the importance of considering all types of patients in a medical facility when designing a healing garden and making it suitable for patients with different ability levels.

13. Requirements for play and rest activities: Each patient category has different abilities to perform an activity; the healing garden should accommodate every level of challenging and resting activities for the patients to discover their level of challenge.

14. Child-nature relationship: It is vital for the children to thoroughly experience nature, which is why the healing garden should provide every sensorial opportunity for the child to interact with nature, which can be achieved in multiple methods, including planting and harvesting.

15. Garden elements variety: the author strongly recommends incorporating a range of natural elements, starting with vegetation, which can be demonstrated through planters, pots, vine-covered fences, and hedges; furthermore, attracting non-harmful animals, and implementing water, a decisive element in healing gardens, as well as a favored play material for children.

16. Experiential learning: providing opportunities for the children to alter their environment through movable objects in the garden, like toys and small wagons.

17. Involving artists: the author recommends including artists in the design and programming of the healing garden and integrating temporary and permanent art to increase the aesthetical attribute of the garden.

18. Storage: design needs to consider allocating enough space for storage purposes outside.

19. Maintenance: The design elements must be within consideration of the financial and maintenance aspects of the space, keeping in mind the ability to provide maintenance to the space in the long term (Moore, 1999).

3.8.4 Nursing home gardens

Nursing homes are private institutions for seniors with chronic illnesses preventing them from caring for their needs and the lack of other care methods. Since nursing homes house many vulnerable people, it is often more protected, and the degree of protection can result in negative consequences such as isolation, boredom, and social exclusion from the resident's families and friends (McBride, 1999).

Design guidelines of nursing home gardens according to (McBride, 1999, p. 425):

1. Homely environment: The author emphasizes creating a home-like outdoor environment for the residents by applying multiple design factors, including understanding the sociocultural background of the residents to understand their definition of home, utilizing scale, services, materials, and design features that portray a residential environment, using traditional plants and vegetation, implementing details and edge definition to create subareas that provide a sense of intimacy.

2. Places for privacy: Emphasizing privacy by properly arranging landscape elements to create a private space. Some methods to achieve this include arranging seating areas where individuals can sit alone to reflect or have a private conversation. Other landscape elements like vegetation can be placed to limit visual and auditory access to some spaces. Furthermore, private spaces can be designed where residents can sit and interact with nature, like personal garden plots and personal bird feeders.

3. Sensory stimulation elements to increase mental alertness: Sensory-stimulating landscape elements include colorful plants, various vegetation textures, harmless wildlife, water features, movement-stimulating activities, and different landscape attributes that encourage residents to experience them, such as nature trails.

4. Opportunities to socialize: The author recommends using the site location and landscape elements to create opportunities for socializing or observing other people, such as street activities. Furthermore, frequent seating along main roads will

increase the opportunity to socialize. Movable seats could also contribute to social settings being created by the residents themselves according to their preferences.

5. Family outdoor settings: To encourage families and the community to visit the residents, outdoor spaces that support social and educational activities are recommended. Design elements include and are not limited to barbeque settings, outdoor play spaces for kids visiting the residents, and facilitating access to nearby recreational facilities by making them wheelchair accessible.

6. Outdoor activities: design should consider a variety of activities for the different abilities of the residents, such as walking routes with lengths and difficulty levels, as well as placement of seating areas to be nearby recreation areas to have visual accessibility and an outdoor physical therapy area.

7. Comfortable place: Indoor and outdoor design-oriented elements to increase the residents' comfort, such as signage for wayfinding, sunscreens, fences, and walls to reduce the sun strength, trees and their canopy for shading opportunities, clear paths, and so on.

8. Sense of security: Can be facilitated with design measures such as creating boundaries between community-accessible and resident-only areas. Use of light, ground cover, low shrubs, and high trees for surveillance and safety. Using night light to increase the sense of safety.

9. Accessibility: Design measures that facilitate the use of outdoor space, such as color-contrast pathways and ramps for wheelchair users (McBride, 1999).

3.8.5 Hospice gardens

Hospice care is located within a hospital ward or a separate facility that provides care for the dying patient and their family regarding their emotional, physical, social, and spiritual health (Marcus, 1999).

Design guidelines for hospice gardens according to (Marcus, 1999, p. 533):

1. A green home-like environment.

2. Transcendent image.

3. Cultural-adapted design.

4. Contrast between light quality both indoors and outdoors.

5. Relaxing natural sounds in the garden.

6. Design-sensitive to extreme temperatures and humidity.

7. Meandering walkways with proper design materials and shaded from weather conditions.

8. Seatings to sit and contemplate with protection from the weather conditions.

9. Spaces to socialize.

10. Incorporating design elements for touching, necessary to dying patients, plants can be incorporated for soft or furry texture, fragrant ones, and avoiding harmful ones.

11. Incorporating a water feature.

12. A child-accommodating environment that is safe enough and engages a child's attention.

13. A window view of nature.

14. Private garden for the staff.

15. Small private garden for family members to spend time after the passing of their loved one.

16. Temperature-controlled Garden room or conservatory.

17. Durable materials that can last long, feels assuring, and represent timelessness (Marcus, 1999).

3.9 Community gardens

A community garden is a place with social bonding potential between various ethnic groups in an area, providing a space to interact, assist each other, and strengthen the social connection between them (Wakefield et al., 2007). According to the American Community Gardening Association, a community garden is single or multiple individual plots that can grow flowers, food, or a community, which is developed, designed, and

maintained by a community and can be in an urban, suburban, or rural context (Soil Science Society of America, 2023).

The benefits of community gardens have been noted in the plethora of papers from different areas around the world; these benefits include:

- Encouraging physical activities (Armstrong, 2000; Twiss et al., 2003)

- Positive impact on mental health (Armstrong, 2000)

- Enhancing safety and security on a local scale (Schmelzkopf, 1995; Ferris et al., 2001)

- Strengthening the community and growing admiration of social diversity (Hancock, 2001)

- Enhancing sustainability and ecology on a local scale (Hancock, 2001; Schmelzkopf, 2002)

Another study on African refugees in Australia highlighted the importance of gardening as a way of connecting in a different environment and being self-sustaining (Harris et al., 2014). The study aimed to highlight the importance of community connections in people that lost much of the sense of home and belonging; 12 of the interviewed African refugees indicated similar psycho-social advantages related to land tenure, reconnecting with agriculture, and developing a sense of belonging to a community.

Children in a housing project perceive the community garden as a piece of land they control and feel ownership pride (Armstrong, 2000).

As some healthcare departments incorporated direct interaction with greeneries, such as horticultural therapy, for benefits on health and well-being, community gardens were incorporated in this thesis to explore the potential of applying them in displacement to encourage gardening practices.

3.10 Supportive green spaces qualities

The following section incorporates further literature findings on the positive influence of green spaces on health and well-being. Some incorporates design recommendations suggested by researchers to fulfill the component.

1- Encouraging a sense of control

A sense of personal control is a learned belief in the ability to lead and control one's personal life (Keeton et al., 2008). It is suggested that improving the control feeling in garden users is a condition of a proper garden design as a stress-tackling procedure (Ulrich, 1991a; Ulrich, 1999 ex. Grant C., 1994). From a psychological point of view, humans have the ability to mentally exist elsewhere in their mind by envisioning a place or situation and living through it; this is identified as "temporary escape"; a term used to describe situations of being temporarily elsewhere; can be a passive action like envisioning a natural area in mind as a place to go for refuge, or looking at such place through a window (Driver & Knopf, 1976). This term incorporates the active stress mitigation method as if the individual, in reality, did go to a park (Driver & Knopf, 1976). Temporary escape is considered relevant to control since the individual that temporarily distances themselves has likely accomplished an actual or tangible sense of control (Ulrich, 1999 ex. Ulrich et al. 1991). A study finding suggests that just the sole presence of a garden in the area resulted in assuring the residents of the neighborhood that they could "temporarily escape" when needed; even individuals who rarely visited or had never been to the garden appeared to be considerably psychologically influenced by the presence of a nearby park saying "*having it there because I know I can use it if I have to*," the author considered the same possibility to happen within a healthcare facility through the mere awareness of the presence of a nearby garden to help in stress reduction to a certain extent possibly (Ulrich & Addoms, 1981b).

Gardening practices are a way to temporarily escape the daily memories of war (Winterbottom, 2007). In the context of a refugee settlement, a study carried out in the Domiz Camp; a refugee camp on the importance of gardening in crisis highlights the sense of control that emerged by gardening as part of their cultural and religious attachment and as a way to exercise control of immediate surroundings when control over other events has been lost (Millican et al., 2019). Furthermore, in a community

garden context, the authors highlight the gardener's appreciation of feeling in control of their food, by growing and taking care of the amount and quality of production on their own (Carney, et al., 2012).

- Design recommendation

A garden that reduces stress by emitting a sense of control with the ability to have a choice to be in a private section of the garden or a public one, as well as the participation of patients in the design process promotes a stronger sense of control (Marcus, 2000).

2- A space for social interaction and gathering

Gardens that encourage socializing and human interaction, especially with loved ones, are proven to reduce stress levels and promote faster recovery for patients, regardless of the medical situation; some hospitals encouraged this by attractively designing waiting areas and prolonging the possible visiting hours (Marcus, 2000). A study in a large Canadian psychiatric hospital on the patient's and staff's choices of outdoor spaces showed that for open socializing, such as interacting with others, both patients and staff preferred natural and privately enclosed spaces; on the contrary, natural open spaces were preferred for passive activities such as sitting alone and observing others, meanwhile, both parties leaned towards vegetation-rich areas over areas dominated by buildings for other types of activities (Barnhart et al., 1998).

A study on how refugees and asylum seekers experience urban spaces through conducting 16 semi-structured interviews with individuals who had a variety of legal statuses and nationalities in the UK and Germany, highlighted the value and use of green spaces to the respondents (Rishbeth et al., 2019); families preferred visiting green spaces for recreation and social activities and mentioned becoming regular visitors of a historic park in east London (Rishbeth et al., 2019).

3- Movement to promote health and well-being

Exercise is a key factor in promoting physical and psychological health; an essential aspect of a garden is encouraging all types of movement through its design elements, like looped pathways (Marcus, 2000).

While physical movement is known for its benefits to mental well-being, multiple studies emphasize its benefits in mitigating depression; physical activities include different types

of exercises ranging from strength to aerobics and are frequently used in the treatment process of clinically depressed individuals (Ulrich, 1999 ex. Greist, 1984). A study proving the connection between physical movement and psychological state of improvement done on elderly in nursing homes concluded that more frequent physical movement was linked to reduced depression levels (Ruuskanen & Parkatti, 1994). A similar effect of physical exercising on lowering depression rates is noted in youth, including teenagers and toddlers, as per Koniak-Griffin (1994) on pregnant adolescents.

Recently settled youth with refugee backgrounds in Australia sought places that encouraged education and play (Sampson & Gifford, 2010); it was apparent through their choices of locations to study, read, and write outside of school such as the bedroom, library, and quiet corners at home. Furthermore, they enjoyed leisure activities demonstrated through their connections with open spaces and active participation in sports such as soccer and basketball, tech-related activities such as video games, and areas where they could take a break and rest (Sampson & Gifford, 2010).

- Design recommendation

In order to promote restoration through long-distance physical movements, which require more effort, significant care should be focused on facilitating wayfinding and independence through the design process of gardens, like providing walking features such as way loops, and special thought should be given to design physical movement and play areas for stress-mitigation for children (Ulrich, 1999).

4- Connecting with nature

Ulrich (1999) implies that humans may have a biological habit of seeking natural areas with healing properties after going through some unpleasant feeling or experience. Ulrich (1992) describes positive distractions within a healthcare context as design elements that successfully encourage healing and stress reduction in the users of the environmental space, in this scope, the patients and staff members.

In a study referred to by Marcus & Barnes (1999) on university students on the places they go to when they are feeling any negative emotions, 71 percent of the sample of 154 students pointed out an outdoor setting. The qualities of the place characteristics are nature's elements and sensory factors, as shown in (Table 3.10.1).

- Design recommendation

Natural areas' efficiency in encouraging healing has the following attributes: green plantation, meandering water, open space, harmless animals like birds, savanna habitat characteristics (as in scattered vegetation and low grass), and a sense of peace and safety (Ulrich, 1993). For a space like a hospital to maximize its therapeutic potential is to include a variety of planetary species, from flowers to trees and bushes that attract harmless animals (Marcus, 2000).

Table 3.10.1: Elements and qualities of places mentioned by university students when feeling stressed. (Marcus & Barnes, 1999 ex. Francis & Marcus, 1992).

Significant Elements and Qualities of Places Chosen by University Students When Feeling Stressed		
Types of Elements or Qualities	Number of Mentions	Percent
Natural elements	106	69%
Sensory qualities	97	63%
Evokes safety/comfort	94	61%
Provides privacy/solitude	79	51%
Viewpoint, expensive scale	43	28%
Urban milieu	42	27%
Opportunities for movement	36	23%
Opportunities for exploration/challenge	6	4%

5- Accessibility

The garden must be accessible to everyone, including those with special cases such as physical disabilities, as many special situations are to be considered as possible to allow and facilitate access to all habitats in the garden (Marcus, 2000).

6- Safety and Security

A healing garden should promote the feeling of safety and security; that can be achieved with a sense of enclosure, free of narrowing, where anyone can feel safe enough to close their eyes and take a nap (Marcus, 2000).

7- Social inclusion and support

The external source of psychological aid and attention by others toward someone is defined as social support (Ulrich, 1999). Various research in different healthcare facilities emphasizes the fact that individuals with extensive amounts of social support deal with fewer levels of stress with better health situations than individuals who are socially detached (Ulrich, 1999). Research proves that outdoor natural areas in a neighborhood, such as an urban park, can be exceptionally useful in encouraging social inclusion and affiliation with the community (Marcus & Barnes, 1999). Meanwhile, urban gardeners in Denver valued the social connections established through communicating and helping each other by sharing tools and productions (Teig et al., 2009).

8- Tranquility

Quietness increases the therapeutic value of a healing garden to encourage a sense of peace and listen to the sound of nature, birds, wind, and fountains (Marcus, 2000). One of the interviewed individuals with a refugee and asylum seeker background described her amazement at the number of green spaces in northern Europe and the chance to feel relaxation and peace among the losses in her life, as she frequently visited the place for a walk either alone or with her husband (Rishbeth et al., 2019), and temporarily escaping every day's concerns were mentioned by another, as an available nearby option, where she visited a lake to relieve stress and relax. Another solo asylum seeker mentioned sitting on a bench in a park to smoke and contemplate (Rishbeth et al., 2019). Youth with refugee backgrounds highlighted their connections to places that promote relaxation and restoration after resettlement, indicating the aesthetical aspects of a place like greenness, cleanness, comfort, and quietness (Sampson & Gifford, 2010).

9- Familiarity

Rishbeth et al. (2019) highlight the potential of the available services in the parks to trigger a sense of familiarity to remind the respondents of parts of their identity that have been forgotten or overlooked during the migration and resettlement journey, where people indicated feeling their original self again or reconnected to their old being (Rishbeth et al., 2019).

3.11 Case study from literature

Domiz Camp, North Kurdistan Region of Iraq

This case study is based on the research paper (Gardening in Displacement: The Benefits of Cultivating in Crisis). The authors conducted an evaluation study on the influence of the garden competition in the camp by visiting the site and interviewing families that participated in the gardening competitions in 2016 and 2017, managed by Lemon Tree Trust; an organization based in the United Kingdom and the United States to transform refugee camps by their gardening initiatives to provide employment opportunities, restore the cultural identity, dignity, and purpose (Lemon Tree Trust, n.d.).

The study was conducted in a single camp that accommodates 26,000 Syrian refugees using 26 interviews during a 2-week visit in January, and another in May 2017, while there were existing small-scale plantations in the alleyways and unused spaces, and using available containers like bottles and cans, the competition used that as a base to investigate further and develop connections with the gardeners (Millican et al., 2019). The data collection approach of Lemon Tree Trust captured both quantitative and qualitative information; the team was made of ethnographers and Syrian refugees translating. Furthermore, four tools were used in this study; ground canvassing to evaluate the current situation of green spaces in the camp, qualitative focus groups divided by gender, key informant interviews with families and individuals who participated in the competition in 2017, and 2017 data on participant's plants in their gardens and if they had previous experience (Millican et al., 2019). The researchers recorded and translated and identified the set of key themes that emerged during the interviews, noting that they were not significantly different from themes highlighted in other related studies (Millican et al., 2019). The perceived benefits from horticulture practices in the camp were sorted under four themes with quoted texts from the interviews (Table 3.11.1).

Table 3.11.1: benefits emerged during the interviews and were sorted by the key themes of human well-being (Millican et al., 2019).

Physiological	Nutritional	Psychological	Environmental (home and community building)
"A healthy garden is linked to personal physical and mental health"	"I garden for vegetables"	"Plants are good for Domiz for mental and physical health"	"Gardens give peace and relaxation, tress provide beauty"
"Nature is perfect, if you are tired it will give you energy"	"Food is available in Kurdistan, but doesn't taste as good, my own food tastes better"	"I am always in my garden, even in the winter, I garden for pleasure more than anything"	"This will benefit the community with fresh air, it's good for the community for the time being"
"When I arrived here at first I was ill for three months, this meant I could not start to plant a garden, I had to walk to the edge of the camp in order to see something green but I did this whenever I had the energy to walk"	"Is natural, clean, I know what I am picking"	"I love green things, I go to my garden first thing in the morning, I feel good when I am in the garden"	"It is 'an extension of our home and family space, all the family spend time there, the children study there, it is an extension of their house too"
"Jobs are important but cultivation too, seeds and trees are better than free vegetables, give us seeds and trees"	"Everyone can eat but without income some people eat little"	"I have so many problems but I feel relaxed in my garden, it helps me a lot"	"Gardening is a home thing, a chance to create my own place"

1- Gardening and mental health

Over half of the interviewed individuals mentioned the positive psychological influence of greenery on them. "*Fresh air*", "*Peace*", "*relaxation*", "*happy*", "*pleasure*", and "*beautification*" were often brought up as they described their feelings. For some others, it helped them be occupied and fill time, while other individuals mentioned the psychological merits themselves by stating that they specifically created the garden for the psychological benefits. Furthermore, there were references to the healing benefits of greenery, as one woman who was ill when she arrived at the camp, mentioned looking for green areas to help her recover. Meanwhile, another person indicated feeling energetic when exposed to nature (Millican et al., 2019).

2- A family activity

The garden served as a space to bring the family members together, while others mentioned their memories in the garden as children and how their parents taught them to grow plants; meanwhile, some mentioned providing a place for their children to play. The author suggests that a garden in the camp provides people with a sense of continuity, to be able to do the same activities they had done with their parents. Some individuals indicated that gardening is a chance to create their own place. Ten individuals referred to their garden as a child, such as "*I care for my garden like I care for my children*", and their garden as a top priority to take care of, "*A garden is like a child, you have to raise it with love and care, it is a source of oxygen and clean air*" (Millican et al., 2019).

3- Gardening and community building

Respondents were asked about the idea of a community garden as there was a plan to develop one. Even before implementation, social connections were developed through exchanging seedlings and helping grow each other's gardens in the camp; one woman described her garden as the mother garden since the seeds from her garden gave birth to some other ones. Both genders supported the idea of a community garden for different reasons, including a smoking area for men, gardening while watching the children for women, and to serve a tool to bring the community together, along with the necessity for growing food, encouraging social connections and sharing materials even while cultivating individually, and everyone appreciated what their neighbor's garden could

bring to the camp and eager to share advice for their gardens to flourish (Millican et al., 2019).

4- Food or flowers

Out of the 139 entries for the garden competition, only six grew entirely vegetables, while seven were entirely flowers. Most grew a mixture of trees, flowers, herbs, and vegetables. Food production was not the main reason for gardening. Reasons for gardening varied between shading areas, flowers for pleasure, a reminder of home, and food because they indicated it "*is natural*" (Millican et al., 2019).

5- The importance of external encouragement

The gardening competition encouraged people to practice and expand their gardens. On the other hand, some refugees stated that even without competition, they would still care for and grow their gardens and that the competition was enjoyable. However, they would still have the garden even without the competition happening. Although Lemon Tree Trust gave participants tree seedlings which enabled them to plant easily, people still continued to buy more seedlings from the camp nursery (Millican et al., 2019).

According to the authors, around 50% of the refugees in Domiz camp were growing something and would increase if provided more space; it also noted an increase of cultivating up to 75% after the gardening competition. However, the key challenges in the camp hindering the expansion of the gardens are the need for more space and a clean water source (Millican et al., 2019).

6- Belonging and home

Refugees shared photos and stories of their gardens back at home. Gardens seemed to provide a way for cultural connection to home, as some people brought umbrella tree seeds from Syria and asked about the possibility of growing them. Many people immediately started planting once they arrived at the camp in temporary containers with the possibility of moving them later (Millican et al., 2019).

Recommendations (Millican et al., 2019)

The study concluded with the importance of greenery and gardening in camps based on previous studies on the health benefits of interacting with outdoor spaces, including physical, psychological, health, and social benefits, with concepts like horticulture-based interventions in urban areas and therapeutic horticulture approaches (Millican et al., 2019). Furthermore, a plethora of evidence supports the environmental merits of urban agriculture to urban landscapes. The authors suggest these benefits can be equally applied in informal settlements. Horticulture-based intervention is suitable for offering therapeutic support, social unity, food security, resilience, and safety. The main conclusion points of the green space qualities are similar results to other studies in different non-camp environments, which include (Millican et al., 2019):

1- The role of space for personal peace and contemplation or spending time with the family and the community.

2- The significant connection between energy and physical health to fresh food, trees, and greenery

3- The role of activity to avoid extended durations of free time that enables adverse effects, including stress, whether it leads to employment or occupies time for the present moment.

4- Building and maintaining a sense of belonging, community, and connection to home (Millican et al., 2019).

4. Methodology

The methodology of this thesis is based on several research approaches. With the literature study as the foundation that facilitated answering the first, second, and third sub-research questions by identifying existing gardening practices in refugee camps and having a thorough understanding of supportive green space theories, types, and design guidelines, which led to selecting Ulrich's stress reduction theory as a base to answer the final sub-question of incorporating the design recommendations from other contexts into the context of displacement, and finally, the analysis results will lead to fulfilling the main research question (What are the general design recommendations for a restorative green space in displacement camps that will support the inhabitants' health and well-

being?) The following (Figure 4.1) displays the data collection methods from several sources; due to the various challenges of this topic, such as accessing a camp and collecting information from the targeted group, data has been driven from several resources to support the findings.
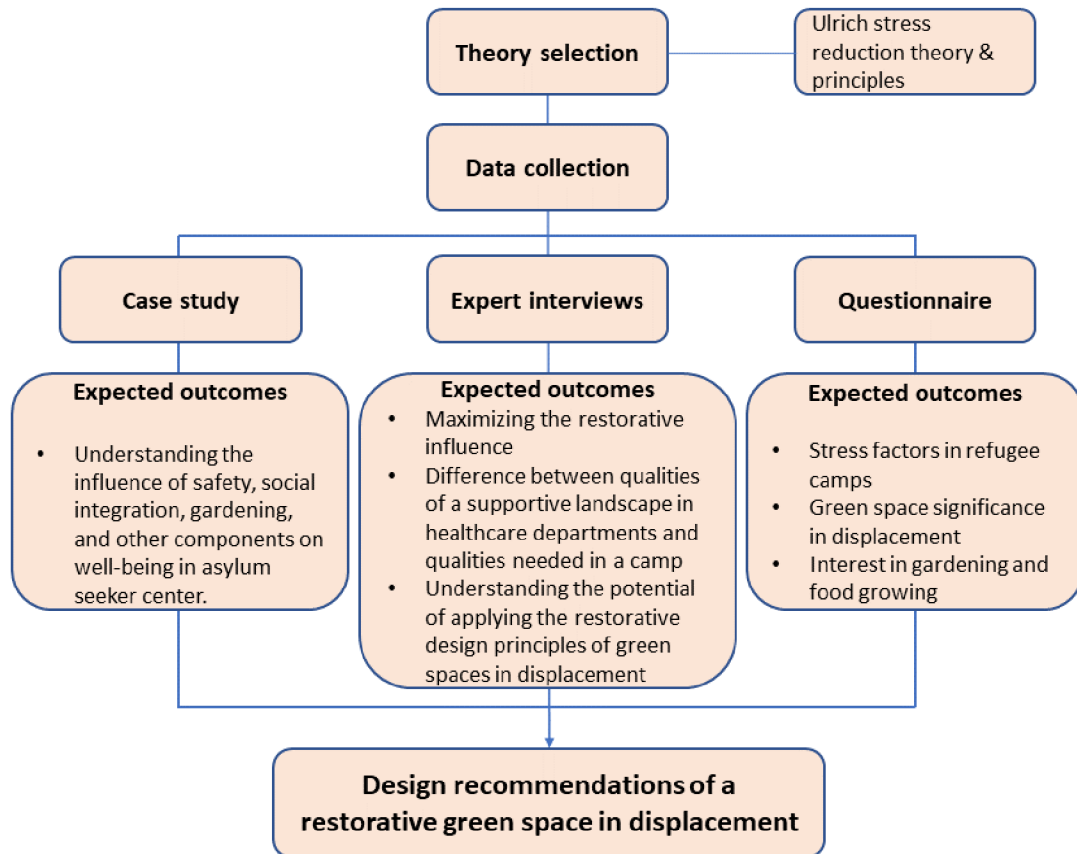

Figure 4.1: The methodological guide toward fulfilling the main research question.

4.1 Online questionnaire

The stress factors in refugee camps can differ from the ones in healthcare facilities or any other context; thus, the questionnaire aims to understand some of the stress factors refugees have been exposed to during the displacement journey and the role of green spaces in reducing the impact of stressors. The questionnaire is divided into three sections (Figure 4.2): The first asked about the possible stress factors and their severity, and the second aimed to address the connection between the individuals and green spaces, use, frequency, and significance. Lastly, understanding the respondent's interest in gardening and food growing in displacement.

The online questionnaire was launched from November 2022 until the end of January 2023 using Google Forms. The target respondents were individuals living in any camp worldwide or people who have previously stayed in one. The questions were available in two languages, Arabic and English, and were distributed via social media platforms like Facebook and Telegram.

Challenges

The main challenge for this questionnaire is reaching the targeted group, due to many reasons such as access to an internet source in a camp, people's uncertainties about clicking on an online link or worrying about collecting their personal information. To maximize the inputs and ensure anonymity of their identity, the questionnaire was accessible without an email login requirement and all questions were optional in case the respondent felt uncomfortable answering any of them. Furthermore, all questions were designed as multiple-choice, open-ended questions where the option (other) was provided for further elaboration when desired, rating questions on a scale of 1-5, and a few questions required a short answer like the name and location of the camp. Despite the questionnaire's anonymity level, it was still difficult to collect responses.
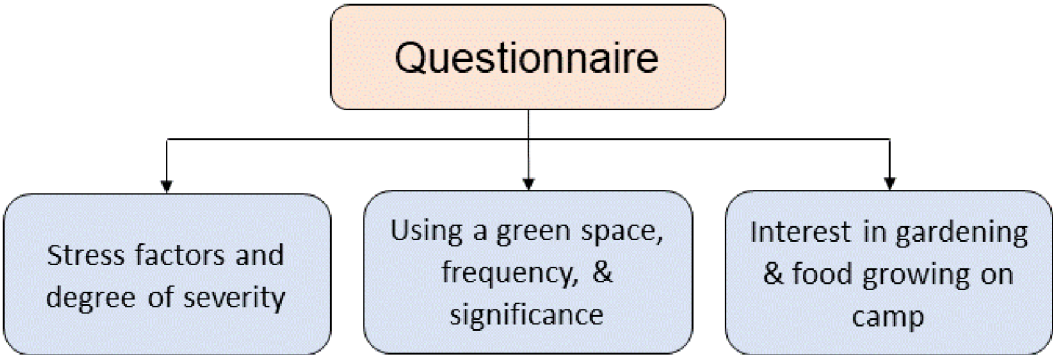

Figure 4.2: Questionnaire structure made up of three sections.

4.2 Case study

A case study has been conducted in an asylum seekers center in Wageningen, Netherlands, to understand the significance of safety, social and physical activities in the center, and other space qualities on health and well-being. During the site visit, informal conversations took place with some residents about their satisfaction with the location and interest in green spaces. Furthermore, a formal interview was conducted on January

30, 2023 (Appendix 1), with Rose Moestuin; the participating coordinator of the gardening group of Welcome in Wageningen, an independent immigrant support organization cooperating with the municipality of Wageningen by providing services for asylum seekers to get them engaged in a new environment and improve their overall well-being. The interview was conducted via phone call, and the questions aimed to understand the type of activities offered and their role in influencing the well-being of the asylum seekers and their level of engagement, the type of plants they use, and the number of participants.

Challenges

Access for outsiders to the asylum seeker center is mainly not allowed. Authorization was granted to participate in the volunteering community of the community garden in the center by accompanying the volunteer leader during the gardening process. It was unauthorized to take photos showing the resident's identities; only the gardening process was allowed to be documented. Conversations with asylum seekers have also not been recorded for the same reason, however, personal notes and observations have been taken during the process.

COA AZC Bosrandweg, Wageningen, The Netherlands

The following case study is based on a personal visit and observation of one of the Asylum Seeker Reception Centers (Asielzoekerscentrum) or (AZC), managed by the Central Agency for the Reception of Asylum Seekers, also referred to as the COA (Centraal Orgaan opvang asielzoekers). The AZC accommodates asylum seekers whose asylum is in process or having extended procedure, whose application is approved and awaiting housing, or whose application has been rejected and needs to depart within 28 days (COA, n.d.). The AZC is located in Wageningen and opened in 2017; this center has the capacity to accommodate 300 individuals. The AZC covers the shelter, allowance for food, clothing, and integration services like language courses and social events with the locals, as well as other life essentials from healthcare to leisure, education, sports activities, schools and playgrounds for children (Smit, M., personal communication, February 24, 2023). The centers were made for the asylum seekers to live independently, do their housework, take their children to school, attend governmental documentation interviews and appointments, and even volunteer at their

locations (COA, n.d.). Moreover, thorough elaboration is available for the asylum seekers on an online system where they can find information to facilitate the process of settling in a new country and an advisor for their different needs like a case manager, on-site supervisor, program supervisor, security guard, and caretaker (Figure 4.3) (COA info sheets, n.d.).

Figure 4.3: The online COA system info sheets section containing detailed information on the available services in the AZC (COA, n.d.).

4.3 Expert interviews

Experts in the fields of landscape architecture, cultural geography, nutrition, and health at Wageningen University, as well as refugee camp site planner, were interviewed in order to acquire knowledge from different perspectives and maximize the potential of the resulting design recommendations. The key experts are: Agnès Patuano, Karolina Doughty, Ellen Kampman, and Margriet Smit (Figure 4.3.1). The manner of interviews was conducted both online and in person, all the interviews were semi-structured, where some questions were pre-determined, and others were raised during the conversation. Questions have been customized based on the expert's field of specialization and the type of information needed for this research. Further details on the interviews and complete transcriptions are available in the appendix list.

Figure 4.3.1: A) Agnès Patuano, B) Karolina Doughty, C) Ellen Kampman, D) Margriet Smit

Agnès Patuano

Agnès (Fig 4.3.1 A.) is an Assistant Professor in Landscape Architecture at Wageningen University; she originally trained as a landscape engineer in France, where she undertook internships in various design offices in France, Sicily, and Canada. She trained in landscape research through internships at the University of Sheffield (UK) and at TUWien (Austria) before pursuing a Ph.D. at the University of Edinburgh (UK). She supported the development and delivery of one of only two European MSc programs training a generation of future practitioners in the fields of landscape and wellbeing. She joined the team at Wageningen University in 2019 and since then, has been working on developing a research agenda operationalizing landscape design solutions to support and improve the health of populations. She sits on the Scientific Council of the French research program ITTECOP led by the French Ministry for Ecological and Inclusive Transition. Her work has been presented at international conferences and published in peer-reviewed journals, and she has been awarded the Journal of Digital Landscape Architecture award 2019 on Scientific excellence for her paper "*Investigating landscape preference using fractal geometry*" presenting the results of her Ph.D. research.

The interview took place on January 23, 2023, and the structure of the questions was adjusted to focus on the interviewee's substantial experience with health supportive landscapes. The overall theme aimed to understand the concept of health supportive landscapes, their qualities, and the criteria of landscapes for vulnerable communities (Appendix 2).

Karolina Doughty

Karolina Doughty (Fig 4.3.1 B.) is an Assistant Professor in the Cultural Geography group at Wageningen University. She is a human geographer focusing on interactions between

place and well-being, with a particular interest in emotional and sensory aspects of engagements with green spaces. Her research contributes to the health geographical literature on "therapeutic landscape," a literature that explores how and why specific environments become experienced as restorative, focusing on interactions between material, emotional and socio-cultural elements. Her research utilizes qualitative, ethnographic, and audio-visual methodologies.

The interview took place on February 15, 2023, and discussed restorative landscapes from the cultural geography perspective, the leading landscape variables that contribute to the influence on well-being, the qualities of a restorative landscape, the role of cultural backgrounds and upbringing in the degree of influence, and the potential of applying the restorative green spaces concept in displacement (Appendix 3).

Ellen Kampman

Ellen Kampman (Fig 4.3.1 C.) is a nutritional epidemiologist and Chair in Nutrition and Disease at Wageningen University, the Netherlands. Her research focuses on the role of lifestyle in cancer prevention and prognosis. Her group conducts observational and intervention studies in high and low/medium-income countries. She published more than 200 original scientific peer-reviewed papers and book chapters, is a member of (inter)national advisory and scientific committees and is senior editor of the AACR journal Cancer Epidemiology Biomarkers and Prevention. Ellen studied Nutrition and Health at Wageningen University, was a visiting fellow at the Boston Harvard School of Public Health and received postdoctoral training at the Fred Hutchinson Cancer Research Centre in Seattle.

Ellen Kampman took part in a healing garden project in December 2016 dedicated to investigating the influence of gardening in a group on (former) cancer patients to help them "*meeting the norms*" of physical abilities and nutritional intake of fruits and vegetables and investigate the potential of group gardening as a form of social support (Wageningen University & Research, n.d.). The interview took place on February 02, 2023, and the questions were focused on understanding the details of the project and the final outcomes, as well as the expert's opinion on applying gardening in a group concept in displacement, recommendations, and the role of a professional in the process (Appendix 4).

Margriet Smit

Margriet Smit (Fig 4.3.1 D.) is a site planner directly involved in the development, restoration, and realization of the reception centers in the Netherlands (the AZC's) She worked for the Ministry of Migration and Asylum in Greece, coordinating the sheltering by the different NGOs of the refugees in the reception centers on the Hotspot Islands along the border with Turkey.

The interview took place on February 24, 2023, and discussed Margriet's experience in the Netherlands and Greece, the differences in planning methodologies, the current situation in the asylum-seeking centers, and the consideration of green spaces in the planning process; furthermore, the interview discussed the potential implementation of restorative green spaces, challenges, and recommendations (Appendix 5).

5. Results

The combination of the above methodological approaches highlighted multiple similar results to existing studies on stress factors in displacement, the role of gardening on the psychological benefits and strengthening of social connections, qualities of restorative green spaces, and design interventions. Regardless of the diverse background experience of the interviewed experts, many of the highlighted interview themes synchronized among multiple of them, highlighting aspects that can be incorporated in contexts other than healthcare facilities; furthermore, recommendations were underlined to facilitate potentially applying restorative green spaces in refugee camps.

5.1 Questionnaire results

The first question was to indicate the language of choice, and most of the respondents selected the Arabic language (Table 5.1.1).

Table 5.1.1: The first question to determine the language of the questionnaire and the total number of respondents.

Question	Answer	Number of respondents/responses
Q.1 Please select your preferred language. الرجاء تحديد لغتك المفضلة	Arabic العربية	26
	English	2

A total of 29 entries were recorded; however, each question had a different number of responses. In order to increase the clarity of understanding of the questions, the main keywords were marked in **bold**. The first set of questions identified the age group of respondents, whether they still reside in a camp and the duration of their stay (Table 5.1.2).

Table 5.1.2: Respondent's age group, current residence, and duration of stay in the camp.

Question	Choices	Number of respondents/responses
Q.2 How old are you? كم عمرك؟	15 – 20 years old	4
	21 – 25 years old	9
	26 - 30 years old	8
	31 - 40 years old	6
	41 - 50 years old	2
	51 - 60 years old	0
	61+ years old	0
Q.3 Are you still living in a camp? هل مازلت تعيش في المخيم؟	Yes	11
	No	18
Q.4 How long have you been there? كم بقيت هناك؟	Less than 6 months	7
	6 months - 12 months	11
	Between 1 and 2 years	3
	3+ years	6

The names and locations of the camps varied between seven countries, with two anonymous entries where "*I don't know*" or a letter was submitted (Table 5.1.3).

Table 5.1.3: Name and country of the location of the camp.

Question	Responses	Number of respondents/responses
Q.5 In which camp are you staying/stayed at? في أي مخيم أقمت / تقيم حاليًا؟	Weißgasse	1
	Ålesund اوليسوند	1
	Essen	1
	Bochum	1
	Wageningen	6
	Al bul camp - مخيم البل	2
	Hanover - مخيم هنوفر	1
	Lebanon camp — مخيم لبنان	1
	On — على الحدود التركية Turkey's borders	1
	Al Rahman — الرحمن	1
	Camp Sneek — كامب سنيك	1
	Kahramanmaraş كهرمان مرعش -	1

	انا كنت قد سكنت في عدة مخيمات سواء في الطريق نحو النمسا أو داخل النمسا، سكنت في الحي الرابع عشر ومن ثم في الحي الثالث ومن ثم في الحي العاشر واخيرا في الحي السابع عشر I stayed in multiple camps, whether on the way to Austria or inside Austria, I stayed in the fourteenth district, and then the 3rd district, and then the 10th district, and lastly in the 17th district	1
	Cottbus refugee camp	1
	Deutschland	1
	لم اقم في مخيم — I did not stay in a camp	1
	ليرسوم - Leersum	1
	كامب - Camp	1
Q.6 Which country is the camp located in? في أي دولة يقع المخيم؟	Netherlands - هولندا	8
	Germany - ألمانيا	6
	Syria - سوريا	3
	Turkey - تركيا	2
	Austria - النمسا	2
	Lebanon - لبنان	2
	Norway - النرويج	1
	I don't know - لا أعرف	1
	ض	1

The next set of questions aimed to identify the stress factors in refugee settlements and to what degree it influences the individual on a scale from 1 to 5. Previously identified stress factors in displacement were included as choices to facilitate the questionnaire, such as safety, resource availability, neighbors, and previous exposure to stress or trauma. Meanwhile, all questions included an (other) option to give the space for further elaboration when desired (Table 5.1.4). (Figure 5.1.1) represents the legend for the type of answer format offered for each question.

○ Closed-ended question
■ Select all that apply

Figure 5.1.1: Questionnaire answer types

Table 5.1.4: Stress factors and their degree of influence.

Question	Choices		Number of respondents/responses
Q.7 Have you been through a traumatic experience before arriving to the camp? (ex: loss of loved one, injury, domestic violence, losing your home, etc.) هل مررت بتجربة مؤلمة قبل وصولك إلى المخيم؟ (على سبيل المثال: فقدان شخص عزيز، إصابة، عنف منزلي، خسارة منزلك، إلخ.)	o	Yes	18
	o	No	8
	o	Other	Other – ظروف أخرى) 1 conditions)
Q.8 Was moving to a new country a stressful experience for you? هل كان الانتقال إلى بلد جديد تجربة مرهقة بالنسبة لك؟	o	Yes	23
	o	No	1
	o	Maybe a little	4
Q.9 How different is your culture from the culture of the country you're currently in? ما مدى اختلاف ثقافتك عن ثقافة البلد الذي تتواجد فيه حاليًا؟	(Very similar to my culture) Scale from 1 to 5 (Completely different from my culture)		
Q.10 Do you feel stress about the **difference** between your culture and the culture of the new country? هل تشعر بالضغط النفسي والتوتر تجاه **حجم الإختلاف** بين ثقافتك وثقافة البلد الجديد؟	o	Yes	8
	o	No	8
	o	Maybe a bit	12
	o	other	0
Q.11 How do you feel in the camp? Which of the following would best describe your current stress level? كيف تشعر/شعرت في المخيم؟ أي مما يلي أفضل وصف لمستوى التوتر الحالي لديك؟	o	I'm comfortable in this location	10
	o	I feel highly stressed and uncomfortable	5
	o	I feel stress only sometimes	6
	o	I feel depressed	7
	o	other	0
Q.12 Mark the factors you find **stressful** in the camp (mention others if any) ضع علامة على العناصر التي تسبب/سببت لك **التوتر** في المخيم (اذكر العوامل الأخرى إن وجد)	▪	No available garden	12
	▪	Safety	10
	▪	Neighbors	7
	▪	Camp managers	8
	▪	Lack of resources	14
	▪	Other	4 - كنت سعيدة بالكامب) كان مع أصدقائي و ا – متوفر به خدمات was happy with my friends and
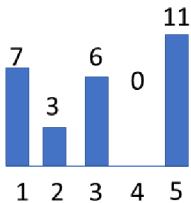
		the camp had facilities)
		- (حاجتي الماسة لرؤية اطفالي وزوجي بسوريا — My urgent need to see my children and husband in Syria)
		- (السكن والبرد القارس المرض — Housing and extreme cold illness)
		- (Annoyingly long process)
Q.13 Do/did you feel safe in the camp? هل تشعر/شعرت بالأمان في المخيم؟	○ Yes, I feel safe and secure	18
	○ No, safety is a concern here	10
Q.14 How do you rate the level of friendliness of the camp's neighborhood? كيف تقيم مستوى الود في منطقتك مع جيرانك داخل المخيم؟	(Very unfriendly neighbors) Scale from 1 to 5 (Very friendly neighbors)	4 5 13 4 2 1 2 3 4 5

After inquiring about stress factors and their severity, the following questions aim to understand the connection between the respondents and green spaces. Starting broadly on what the individual does when experiencing high-stress levels, the follow-up questions get more specific and direct on their perspective on the necessity of green spaces in the camps (Table 5.1.5).

Table 5.1.5: Importance of green spaces for each individual and the frequency of using one.

Questions	Choices	Number of respondents/responses
Q.15 When you're experiencing a high level of stress, where do you prefer to go to calm down? عندما تتعرض لمستوى عالٍ من التوتر، ما المكان الذي تذهب إليه لتهدأ؟	○ Visit a garden	7
	○ Visit any type of natural area	10
	○ Stay in my room	6
	○ Visit family or friend	4
	○ Other	▪ 1 (الذهاب إلى الطبيب- Go to the doctor)

Q.16 Do you consider the **availability** of green spaces as a **necessity** for living? (Ex: Gardens, Parks, scattered greeneries, etc.) هل تعتبر **توفر** المساحات الخضراء **ضرورة** للمعيشة في أي مكان؟ (على سبيل المثال: الحدائق والمتنزهات والمساحات الخضراء المتناثرة وما إلى ذلك)	(Not important) Scale from 1 to 5 (Very important)	
Q.17 How do you feel in a **garden** or any **green space**? ما مدى تأثير **الحدائق** أو **المناظر الطبيعية** على حالتك النفسية؟	○ I feel quite relaxed surrounded by natural green areas	12
	○ I usually go to the garden to help reduce stress levels or negative emotions	9
	○ I don't feel comfortable surrounded by natural green areas	4
	○ Doesn't affect me	3
	○ Other	0

The next question asks about the availability of an accessible garden in their location; based on the answer, the follow-up questions differ (Table 5.1.6). If a garden is available, the following asks about the services, visiting frequency, and if there is any missing service they wish was available (Table 5.1.7). On the other hand, if a green space is not available, the set of questions aimed to identify their desire to have one and the type of services they wish it included (Table 5.1.8).

Table 5.1.6: Availability of green space in the camp.

Questions	Choices	Number of respondents/responses
Q.18 Is there any green space in the camp? (Ex: Gardens, Parks, scattered greeneries, etc.) هل توجد مساحات خضراء في المخيم؟ (على سبيل المثال: الحدائق والمتنزهات والمساحات الخضراء المتناثرة وما إلى ذلك)	○ Yes **[Move to Q.18.1-1]**	19
	○ No **[Move to Q.18.2-1]**	9

Table 5.1.7: Questions displayed to respondents who have an accessible garden in the camp.

Questions	Choices		Number of respondents/responses
Q.18.1-1 How often do you visit this green space? (Ex: Gardens, Parks, scattered greeneries, etc.) كم مرة تزور هذه المساحة الخضراء؟ (على سبيل المثال: الحدائق والمتنزهات والمساحات الخضراء المتناثرة وما إلى ذلك)	○	Everyday	5
	○	4+ times a week	4
	○	Once a week	9
	○	I don't go there at all	1
	○	I don't have access to it	0
	○	Other	0
Q.18.1-2 What are the **utilities available** in this **green space?** Mark all that applies (mention others if any) ما هي المرافق **المتوفرة** في هذه **المساحة الخضراء؟** ضع علامة على كل ما ينطبق (أذكر خدمات أخرى إن وجد)	▪	Walking paths	12
	▪	Bike ways	10
	▪	Kids playgrounds	6
	▪	Many types of plants and trees	12
	▪	Seating	8
	▪	Fountain	2
	▪	Shading areas	2
	▪	Other	0
Q.18.1-3 Do you think there are any missing services you want to **include**? هل تعتقد أن هناك أي خدمات مفقودة تريد **تضمينها؟**	Long answer text		*"لا – No"*
			"Nein"
			"خدمة الإنترنت - Internet connection"
			"لا - No"
			"بعض أنواع الأشجار و الأزهار - some variety of trees and flowers"

Table 5.1.8: Questions displayed for individuals with no accessible garden in the camp. This section terminates if the respondent does not wish for a garden in the camp.

Questions	Choices		Number of respondents/responses
Q.18.2-1 Do you wish there was a garden in the camp? هل تتمنى وجود حديقة بالمخيم؟	○	Yes **[Move to Q.18.2-2]**	8
	○	No **[Move to Q.19]**	1
Q.18.2-2 What kind of services do you **wish to have** in the garden? ما نوع الخدمات التي تتمنى **وجودها** في الحديقة؟	▪	Walking paths	4
	▪	Bikeways	4
	▪	Kids playgrounds	5
	▪	Many types of plants and trees	8
	▪	Seating	5
	▪	Fountain	6
	▪	Shading areas	5
	▪	Other	1

The final section of the questionnaire aims to identify any gardeners and their interest in practicing this skill in the camp and if they are interested in growing their own food on the camp (Table 5.1.9).

Table 5.1.9: Brief questions on previous gardening experience and interest in growing food in the camp.

Questions	Choices	Number of respondents/responses
Q.19 Do you **own** a garden or farm in your country? هل كنت تملك حديقة أو مزرعة في بلدك؟	○ Yes	16
	○ No	12
Q.20 Are you a gardener or a farmer? Do you have any experience in growing your own plants/food? هل لديك خبرات سابقة بالبستنة أو الزراعة؟	○ Yes	13
	○ No	15
Q.21 Are you interested in **growing** your own food in the camp? هل أنت مهتم **بزراعة** طعامك في المخيم؟	○ Yes	13
	○ No	15

The final tab of the questionnaire includes a thank you message for the respondents and includes the option to provide any personal notes on the topic. Question type as a long answer text (Table 5.1.10).

Table 5.1.10: Final question and space to write any final thoughts on green spaces in displacement.

Questions	Choices	Number of respondents/responses
Thank you very much for your cooperation. Would you like to add any comments or personal opinion about gardens in refugee camps? اشكركم على حسن تعاونكم. هل ترغب في إضافة أي تعليق أو رأي شخصي حول الحدائق في مخيمات اللاجئين؟	Long answer text	Nein غالبا ما كان تعامل المسؤولون " سيئ للغاية لدرجة في احد المخيمات كانوا يستقطعون أموال من المساعدات الخاصة بنا و بصورة غير قانونية — *Often the managers treated us very badly to that in one of the camps they were deducting money from our aid illegally"* شكرا"— *Thank you"* يجب إضافة المساحات متى ما وجدت مجموعات بشرية و ذلك لخفض الضغط النفسي لهم أينما كانوفما بالك لو كانو لاجئين فهم بأمس الحاجة لهذه الراحة — *The spaces must be added wherever human*

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| | | *groups exist in order to reduce their psychological pressure wherever they are, let alone if they are refugees, as they desperately need this comfort."* |
| | | الخدمات رائعة وهناك اهتمام كبير بالحدائق" – *The services are great and there is a lot of attention to the gardens."* |

The combination of the above questions makes it possible to identify general stress factors in displacement and the relationship between stress and the availability of green spaces. Although the answer formats could yield more variety and direct inputs from respondents to express their feelings if they were based on short and long answer texts, however, this could as well become an obstacle to completing the questionnaire, considering the targeted group's potentially challenging environment, taking into consideration their location and perhaps the limited access to resources such as internet connection and energy supply; thus, the questions were facilitated by providing suggestions, as well as the option to express their personal opinions throughout the entire questionnaire.

5.2 Psychological well-being in displacement

One of the questions aimed to understand the overall well-being of the respondents by asking about the degree of stress during their stay (Q.11). Based on the results, ten individuals felt comfortable in the camp. Meanwhile, the other eighteen respondents varied between low to an extreme level of stress and discomfort, and seven individuals particularly highlighted being depressed rather than "*highly stressed and uncomfortable,*" noting that six of these respondents also selected "*no available garden*" as one of the stress factors in their location.

5.3 Stress factors in displacement

While the experience of displacement is drastically different between groups of people and even on an individual level, which was apparent in the literature review in the stress factors section in refugee camps, the questionnaire aimed to further understand the stress factors in modern times and their severity. The following elaborates on the identified stressors; some were expected and understood in the literature review and proved in the survey results, while new factors were uncovered during the methodological process.

1- Traumatic experiences

More than half the respondents (66.6%) reported going through a traumatic experience before arriving at the camp (Q.7), and one respondent stated having "*other conditions*" without further elaboration. The definition of trauma drastically varies between individuals; the question mentioned a few examples that usually identify as traumatic experiences, such as losing loved ones.

2- Moving to a new location

82% of respondents indicated the experience of moving to a different country as stressful, and four individuals found it partially stressful.

3- Lack of resources

The first highest voted stress factor in the questionnaire is the lack of resources; out of twenty-six, fourteen individuals indicated scarcity of life resources as a significant problem in displacement. While resources are a broad term and can refer to different types of needs, in this context, it is referred to essential daily life supplements such as food, clean water, clothes, and so on.

4- Lack of green spaces

The second most voted for in (Q.12), out of 26, twelve respondents chose "*No available garden or natural scenery*" as one of the factors they find stressful. Although nineteen respondents reported having an accessible garden, five of them still chose the "*No available garden or natural scenery*" as a stress factor.

5- Safety and security

Another major highly voted-for stress factor is safety. Ten respondents indicated feeling worried about the level of safety in the camp they stayed at.

6- Camp managers

Ten respondents indicated the camp managers as one of the stressful factors. One respondent who has had to move between multiple camps further elaborated, "*Often the managers treated us very badly to that in one of the camps they were deducting money from our aid illegally.*"

7- Neighbors

The questionnaire aimed to assess the friendliness of the camp neighborhood to consider the social influence on well-being by inquiring about it in two questions; (Q.12) mentioned neighbors as a possible stress factor for the respondents, and (Q.14) rates the level of friendliness of their neighborhood. Seven individuals marked neighbors as a stress factor; meanwhile, for the scale question, the highest respondent's choice was neutral (scale 3), and thirteen respondents did not lean towards rating their neighborhood as a very friendly or unfriendly area.

8- Instability

For some, the experience of displacement is not connected to a single location only; one of the respondents mentioned staying in multiple camps during their journey before arriving in Austria and had to move between four different camp locations there, "*I stayed in multiple camps, whether on the way to Austria or inside Austria, I stayed in the fourteenth district, and then the 3rd district, and then the 10th district, and lastly in the 17th district*".

9- Extended displacement & documenting process in a limited space

Twenty respondents out of twenty-seven reported staying in a camp for over six months, six of them were displaced for over three years, and three individuals are still counting. Furthermore, one respondent who still resides in the camp and has been there for six to twelve months elaborates on the stress factor type "*Annoyingly Long process*". The asylum-seeking process in some cases, takes a prolonged duration of time, "*it's a very*

strange situation where people are sitting in a small area and waiting" (Smit, M., personal communication, February 24, 2023).

10- Longing for loved ones

One of the respondents mentioned being far away from her loved ones as a stressing factor, "*My urgent need to see my children and husband in Syria*" the respondent as well described her feelings as urgent, highlighting the critical influence of being distant from loved ones as a significant stress to some individuals.

11- Culture

Cultural difference was one of the critical stress factors identified in the literature review. Based on the survey results, around 62% reported the drastic difference between their cultural background and the culture of the new country; eight individuals counted it as a significant stress factor, while twelve others chose feeling "*A little bit*" of stress about this difference.

12- Climate conditions, shelter, and illness

One of the respondents elaborates on the stress factors in displacement saying, "*Housing and extreme cold and illness.*"

13- Future ambiguity

Smit M. (Personal communication, February 24, 2023) described the asylum seeker's life as "*kind of a limbo*" due to the ambiguity of the future, where they do not know what will happen in their lives and the inability to visualize and have a perspective, which in turn troubles the mind about a future "*without context.*"

14- Disconnection from the location norms

Due to the lack of space in residential areas, the asylum seekers centers, in many cases, are built in faraway locations in remote areas where no one stays, which results in the lack of connection between the asylum seekers and the norms of the new country of stay, in some cases, they do not even know where they are staying (Smit, M., personal communication, February 24, 2023).

5.4 Green space significance in displacement

The choices of individuals on locations to go to calm down when experiencing a high level of stress were reported in (Q.15); seventeen individuals chose going to a green space or any natural area to reduce their stress levels, while six others reported staying in their own rooms, four selected "*visit family or friends,*" and the last respondent wrote, "*Go to the doctor.*" Although in (Q.17), twelve individuals reported feeling relaxed surrounded by natural green areas, and nine chose going to the garden to reduce stress levels or negative feelings when asked about the necessity of green space in displacement in (Q.16), only eleven respondents rated the necessity 5 out of 5, six individuals were neutral rating it 3 out of 5, three gave it 2 out of 5, and seven rated it 1 out of 5.

A total of nineteen respondents had an accessible garden in their camp location (Q.18); nine individuals reported visiting it four or more times a week, while nine others once a week. A few elaborated on missing facilities or elements they wished to have; one person wrote "*some variety of trees and flowers,*" while the other wrote "*Internet connection.*" The rest of the respondents who did not have a garden in the camp location were nine individuals, and eight reported wishing for an available garden (Q.18.2-1). The facilities they wished to have in this garden are shown in figure 5.4.1, with the highest vote for "*many types of plants and trees*" (Q.18.2-2). Two individuals expressed their opinion towards green space significance, where one mentioned, "*The spaces must be added wherever human groups exist in order to reduce their psychological pressure wherever they are, let alone if they are refugees, as they desperately need this comfort.*" The others expressed their gratitude towards the availability of services in their location, "*The services are great and there is a lot of attention to the gardens.*"

5.5 Gardening in displacement

Sixteen individuals reported owning a garden or farm back home (Q.19), of which four of them do not have experience in gardening/farming. Thirteen respondents have experience in gardening/farming regardless of owning a garden/farm (Q.20). Thirteen individuals expressed their interest in growing their own food on the camp (Q.21), in which ten of them are garden/farm owners, while three are not.
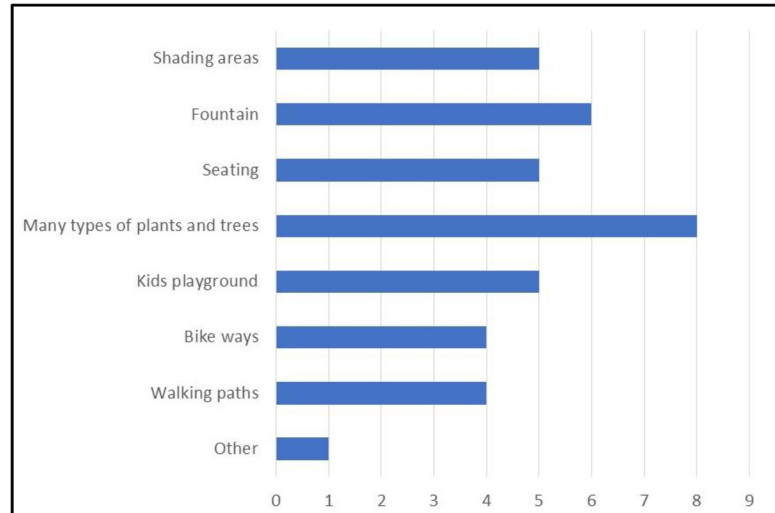
Figure 5.4.1: Facilities desired in the green space.

One of the respondents who does not own a garden/farm or have experience in practicing it is the same individual who wrote, "*The services are great and there is a lot of attention to the gardens*."

5.6 COA AZC Bosrandweg, Wageningen, The Netherlands

The site visit occurred on the 24th of January 2023, accompanying Moestuin, R., the volunteer team leader, who goes to the center every Tuesday to take care of the community garden, which consists of multiple green beds varying in size and distributed around the center (Figure 5.6.1). According to Moestuin, R. (Personal communication, January 30, 2023), the community garden project was initiated two years ago; gardening is her way of connecting with people, and she wanted to establish a connection between Wageningen city and the people living in the asylum seekers center. The idea was initially started by her desire to create connections with the asylum seekers that would continue even after they moved out of the center and settled in the country to ensure they were being treated correctly and if they needed any help. This is where the COA proposed the garden idea as a medium to facilitate this connection. The volunteer team found it easy to get people to interact with the garden and engage socially; however, it was hard to have a static group or the same people to join every time, as they had some available time at the beginning of their stay in the center but later on, they get occupied with other duties, move to another center, or look for housing, so it was never sure to

them how long the individuals would stay. Still, the volunteers found it easy to connect with people living there (Moestuin, R., personal communication, January 30, 2023). Some of the connections she created still continue even after the individual settles and moves out of the center. According to her experience, the gardening team varies between four to twelve people every visit, with the individuals almost constantly changing.

Figure 5.6.1: Some of the many green beds scattered throughout the asylum seekers' center.

The activities related to the garden as well are different every week and season; seeding, sowing, planting, or maintenance (Moestuin, R., personal communication, January 30, 2023), while other non-gardening practices include creating recipes and cooking together using the production of the community garden; peas, beans, onions, leafy vegetables, and annual crops are some of the productions they harvested. The volunteer team discusses the types of plantings with the involved residents and chooses based on that. According to the volunteer leader's experience with the residents, the garden is something big and important to some of them; it serves as a place to take care of and grow something, as well as to socialize. Meanwhile, for others, it serves as a nice addition to the center, and loves to see it there (Moestuin, R., personal communication, January 30, 2023). The volunteer community is discussing a further expansion of the existing planting areas with the COA in order to engage more people and increase planting, as well as their need for more volunteers to contribute, as there is a lack of people in some seasons like summer (Moestuin, R., personal communication, January 30, 2023).

During the site visit, I was introduced to the other volunteer members and the individuals in the center who participated in the planting process that day. We started at 10 am with five residents, three males; one from Russia, and two from Syria, with little to no previous experience in gardening but were eager to learn and help, while the rest were females from Syria. One recently moved to the center with a degree in agriculture and was interested in gardening. Another lady who has been in the center for a while and frequently participated in the process with previous knowledge of gardening as a hobby. She shared her experience in gardening different types of plants with the volunteers. During our conversation, she passionately described her garden back home, the variety of plants she had, exchanging seedlings with the neighbors, and how much gardening means to her, and that in her current room, she had multiple flowerpots, which she described as an important part of her living space when asked about what she planted in her garden back home, her answer was "*everything*" and started naming plant types (Female asylum seeker, personal communication, January 24, 2023). The last female previously lived in the center and settled in the city. However, her passion for the community garden in the asylum seekers center continues, and she pays a visit every now and then to take care of the garden and sometimes prepare it for the volunteers before they arrive. The individuals with longer stay duration in the center had a good command of the Dutch language and were using it to communicate with the Dutch volunteers; meanwhile, the relatively new arrivals have shown interest in learning by practicing their Dutch lessons with the volunteers as well. Some residents expressed their pleasant stay in the center and the willingness of the center managers to help them with their needs; one of the residents attempted to express their gratitude in Dutch to a volunteer member with the new vocabulary he was learning at the language course (Male asylum seeker, personal communication, January 24, 2023).

Before having the opportunity to approach and talk with the residents, they immediately came and initiated conversations. People were curious since it was the first time that they saw me in the center. The residents were very welcoming and immediately invited to join them for lunch. Once I explained the research topic and purpose of the visit, people were eager to help by filling out the questionnaire or being open to conversations only. By speaking to one person initially, he immediately introduced me to the other residents he knew in the center.

Each area of greenery is assigned to a different type of plant based on the participants' preferences. The areas were divided into vegetables, fruits, and flowers. As instructed by the volunteer leader, who was sharing her gardening knowledge with the participants, we were able to plant three small to medium-sized areas with different types of plants (Figure 5.6.2).

Figure 5.6.2: some of the plants instilled during the visit.

Meanwhile, many people stopped to have a conversation and ask about the process (Figure 5.6.3). Conversations took place with multiple residents; four were participating in the gardening process, while one person was observing the process and talking to the volunteers; he does not have experience in gardening; however, he described green areas as an important part of living space (Male asylum seeker, Personal communication, January 24, 2023). Flowerpots were observed on some of the windows of the resident's rooms in the center (figure 5.6.4).

Figure 5.6.3: Photos 1 & 2: The digging process by the residents. Photo 3: After planting the seeds.

Based on personal observations, the center appeared like a single connected community where everyone knows and looks out for each other. One of the individuals mentioned people sometimes coming together in a room to have lunch as a group (Male asylum seeker, Personal communication, January 24, 2023), while the volunteer leader mentioned coming together with the residents a few times to cook in the communal kitchen, and some brought their food and joined them (Moestuin, R., personal communication, January 30, 2023). The day of the visit happened to be the day of validation in the center, where everyone in the asylum-seeking process must go to the office on sight for some official documentation procedure and it was a busy day, however, people stayed outside the building despite the cold to socialize and smoke while others observed the gardening activities.

Figure 5.6.4: Flowerpots observed on the resident's windows where plastic yogurt containers were used to contain their plants.

5.7 Safety in the AZC

Housing rules are set for each camp for the residents to adhere to during their stay in the center. Attention is paid to the different safety aspects, including fire safety, swimming, domestic violence, and child abuse. To avoid or minimize accidents, information is provided upon arrival and through the COA online system, and posters are distributed in the center, with an emergency response team at the reception ready to act (COA, n.d.).

A survey conducted by the COA on safety levels in the AZCs filled by the asylum seekers regarding the feeling of safety in the center, where to go in case they felt unsafe, if they feel the space to discuss their sense of security with the COA and their neighbors, if they feel the COA's consideration of their safety in the centers, safety at night, the availability of support in case of unsafe situations, lastly a question that gives them the space to provide their ideas (COA safety survey, n.d.).

In a total of 54 recorded responses, around 86% felt safe in the AZC, the same result as the question on feeling the space to discuss their sense of security with the COA. Around 81% feel they can discuss the same topic with their neighbors, around 88% feel the consideration of the COA on their safety, and similarly, around 88% voted for both feeling safe at nighttime and receiving help in unsafe situations. For the last question, the COA provided the opportunity for the respondents to share their ideas, and around 59% showed interest in participating in providing further feedback (COA safety survey, n.d.).

5.8 Themes emerged from the interviews

5.8.1 Qualities of a supportive landscape

"*A health supportive landscape would be any landscape, any outdoor area that have shown to be beneficial for the health of people, be it physical, physiological, psychological, or social*" (Patuano, A., Personal communication, January 23, 2023). A group of qualities was highlighted during the interviews when asked about the description of a health-supporting landscape.

1- A space that does not demand anything from the user, where they can "*dial down*" and take time out from everyday life stresses (Patuano, A., Personal communication, January 23, 2023; Doughty, K., Personal communication, February 15, 2023).

2- Accessible and diverse enough to accommodate the different needs and inclusive of all users with opportunities to directly interact with the green space (Patuano, A., Personal communication, January 23, 2023; Doughty, K., Personal communication, February 15, 2023).

3- Feels safe (Patuano, A., Personal communication, January 23, 2023; Doughty, K., Personal communication, February 15, 2023).

4- Provides a sense of ownership of space and belonging (Patuano, A., Personal communication, January 23, 2023; Doughty, K., Personal communication, February 15, 2023).

5- A sense of control (Patuano, A., Personal communication, January 23, 2023).

6- Opportunities for social connections and support (Doughty, K., Personal communication, February 15, 2023)

7- Serves as a refuge to symbolically escape from everyday life stressors and feel like an oasis (Doughty, K., Personal communication, February 15, 2023).

8- Quiet and contemplative opportunities (Doughty, K., Personal communication, February 15, 2023; Smit, M., personal communication, February 24, 2023).

9- Nostalgic, provides a sense of identity and familiarity (Doughty, K., Personal communication, February 15, 2023).

10- Offers distraction and time-occupying activities (Doughty, K., Personal communication, February 15, 2023; Smit, M., personal communication, February 24, 2023).

11- Provides a clear perspective (Smit, M., personal communication, February 24, 2023).

5.8.2 Variables of landscape that influence well-being

From a theoretical perspective, particularly attention restoration theory based on evolutionary assumptions says that "*we're all equal in our ability to feel good in natural spaces*" from a practical point of view, however, the activities undertaken in these spaces have a significant impact on how we respond to them (Patuano, A., Personal communication, January 23, 2023). Green spaces have shown to be beneficial almost regardless of their type and quality, the degree of influence nevertheless varies, compared to not having a green space at all (Doughty, K., Personal communication, February 15, 2023); it is dependent on a plethora of variables that cannot be framed into a static set of factors, as they can be very design, site, population, and individual dependent (Patuano, A., Personal communication, January 23, 2023). Doughty, K. (Personal communication, February 15, 2023) further elaborates on her interest in restorative landscapes as a cultural geographer as the combination of both the material physical setting and the social and symbolic meaning attached to it, which in many cases

is site-specific, and how people attach meaning to places. Some of the main factors influencing the restorative potential in individuals highlighted in the interviews are:

10- **Proximity to natural areas:** There is evidence that supports the fact that even proximity to green spaces can influence measured and perceived stress (Patuano, A., Personal communication, January 23, 2023). Smit M. (Personal communication, February 24, 2023) during her visits to the camp on an island in Greece observed asylum seekers sitting on the shore to think and contemplate while looking towards the sea.

11- **Direct interaction with natural environments:** While some studies suggest that seeing the green space is enough, the degree of benefit is boosted when being present in the space itself and interacting with its elements; the type of activities varies according to the individual's preferences; some individuals feel connected and less lonely when sitting in a green space and observe people or children playing, meanwhile for others, it's taking a walk (Patuano, A., Personal communication, January 23, 2023). Doughty K. (Personal communication, February 15, 2023) highlights the importance of this benefit by calling it an "*intimate interaction with green spaces*" such as touching and smelling the green space elements, which encourages the feeling of "*being present and embodied in that moment.*" Meanwhile, in the refugee camp on the Greek island shore, Smit M. (Personal communication, February 24, 2023) observed different activities of the asylum seekers, such as fishing and kids playing around the water. Furthermore, one of the leading green space activities that were highlighted in previous studies and during the interviews was gardening. The participants in the garden project in the cancer center stated feeling better, as they have something that redirects their attention, which helped relieve the pain, reduce anxiety levels, and look forward towards the future (Kampman, E., Personal communication, February 02, 2023).

12- **Cultural background and upbringing:** Doughty K. (Personal communication, February 15, 2023) called attention to the key role of a cultural element in the degree to which a green space can influence restoration, how individuals interact with nature, perceive it, and their relationship with it. She further elaborated on the idea of spending time in nature and "*how we're sort of socialized into this understanding that nature is sort of good for us*", hence, perhaps it's a learned aspect as we grow up. Doughty K. (Personal communication, February 15, 2023) does not consider the

degree of influence of green spaces as universal; different cultures have different practices with natural areas; thus, cultural practices and personal background play an important role in the degree of restoration. Patuano, A. (Personal communication, January 23, 2023) further underlined the personal background and upbringing role as a factor influencing the degree of restoration since people visit green spaces for different reasons and different practices, going with family or alone, growing up frequently exposed to green areas or not, and if people used to visit green spaces as children. Moreover, she mentioned the idea about our perception of green spaces could be connected to our ancestors that spent much time in nature, and thus our brains are more prepared and easier for us to process. Another aspect of studying the personal perception of green spaces is the awareness of the restoration, as some individuals indicated not feeling any difference in a green space despite being measured as restored (Patuano, A., Personal communication, January 23, 2023).

13- **Social activities:** Gardens are often a popular choice for different types of activities, such as a private conversation between two individuals, family gatherings, outdoor events, horticulture therapies, or community gardening. Smit M. (personal communication, February 24, 2023) mentioned one of the asylum seekers centers where the staff decided to practice her hobby of gardening in the center which has encouraged the asylum seekers to join and even start growing their own vegetables, some lands were also grown by the local community who also joined the process, and people started connecting and sharing their gardening experiences. Furthermore, the gardening project in the cancer center served as a tool to connect people with mutual experiences and gave them the opportunity to open up and talk about their feelings (Kampman, E., Personal communication, February 02, 2023).

5.8.3 Benefits of gardening

The benefits of gardening have been noted in the garden implemented in the cancer center, where the participants stated feeling better as they are doing something that's distracting them and that it helped in reducing pain and anxiety (Kampman, E., Personal communication, February 02, 2023). Furthermore, they stated feeling positive about the future and that things will get better and improve. The project was implemented for five years, and it is still ongoing; people grew social connections where they met other individuals with different backgrounds and exchanged recipes and goods they grew

themselves (Kampman, E., Personal communication, February 02, 2023). Patuano A. (Personal communication, January 23, 2023) further emphasized the general benefits of community gardens, saying, "*Community gardens are always good*". Over and above that, similar benefits were observed during the site visit to the asylum seeker center (AZC) in Wageningen, Netherlands, where social interactions took place during the gardening process between the residents themselves and the volunteer members.

5.8.4 Negative variables in a space

Negative variables include any factor that would interrupt or reduce the restorative quality of green space. The variables that were identified in the interviews were as follows:

- **Littering and lack of maintenance:** areas that lack maintenance and cleanliness are usually badly interpreted, which can associate places with the upcoming negative variable (lack of safety) (Patuano, A., Personal communication, January 23, 2023).

- **Lack of safety:** "*if you wanna be in an environment that doesn't make any demands on you, you need to feel safe in it as well otherwise, if you don't feel safe, then you are on high alert, therefore it's not restful*" (Patuano, A., Personal communication, January 23, 2023). Doughty K. (Personal communication, February 15, 2023) further highlighted the point of safety by describing it as an instant detractor of the restorative quality of green space if not present.

- **Noise:** Noise sources can interfere with the tranquil feeling of green space and interrupt relaxing, like busy roads (Doughty, K., Personal communication, February 15, 2023).

- **Lack of accessibility:** being present and interacting with the green space is needed to maximize the restorative experience; thus, the space needs to be accessible and inclusive to everyone (Patuano, A., Personal communication, January 23, 2023; Doughty, K., Personal communication, February 15, 2023).

- **Lack of resources:** In the gardening project in the cancer center, the participants complained about the lack of water resources to water the plants, especially during summer period; furthermore, other complaints were associated with the distance, weight, and difficulty of getting the water (Kampman, E., Personal communication, February 02, 2023).

- **Personal preferences:** Doughty K. (Personal communication, February 15, 2023) underlined the role of personal preferences in the restorative quality of green space, noting the fact that a certain type of landscape that is beautiful and restorative to an individual can be the complete opposite to another.

- **Lack of perspective and context:** Smit M. (personal communication, February 24, 2023) highlighted the importance of having a perspective of the surrounding location where the residents are located, and understanding their location context, saying, "*it's about perspective and making your mind at ease*," furthermore she elaborates on the importance of having a future vision where they can know and plan what they wish to do in the course of time (Smit, M., personal communication, February 24, 2023).

- **Green areas planning standard:** Gardening initiatives in asylum seekers centers have been noted to be successful and appreciated; however, it is a vulnerable action due to the lack of structure and planning standards to include them (Smit, M., personal communication, February 24, 2023). Existing green elements are also noted to have minor importance during the construction of new refugee centers, where existing trees, in some cases, were cut down for other prioritized construction elements (Smit, M., personal communication, February 24, 2023).

- **Temporariness:** The gardening initiatives in asylum seekers center are as well threatened by the dependence on an individual (a staff member or asylum seeker) length of stay in the center; if the staff relocated or the resident transfers or moves out, the gardening initiative might slowly die down (Smit, M., personal communication, February 24, 2023), this factor needs to be put into consideration, as the asylum seekers are not staying and do not wish to stay as their future is not there (Smit, M., personal communication, February 24, 2023).

- **Refugee camp character:** Smit M. (personal communication, February 24, 2023) highlighted the overall character of some camps, describing them as "*It looks very much like a prison*" with elements like fences, barred wires, and containers.

5.8.5 Design recommendations in displacement

After discussing the general principles of a restorative landscape, their importance, factors, and negative influences, the following theme focused on how to apply these

principles in displacement. The following are recommendations that can be potentially implemented in refugee camps.

- **Involving the user:** For an environment to be restorative to the users, it is crucial to listen to their needs and incorporate them in the design; a sense of empowerment will be emphasized by using a space that was designed based on the input of the users (Patuano, A., Personal communication, January 23, 2023).

- **Accessible space:** Interacting with the green space is important to get the most benefit out of it, thus improving the accessibility of space in consideration of the different abilities and activity preferences of users, which will encourage visiting and spending time in the green space (Patuano, A., Personal communication, January 23, 2023; Doughty, K., Personal communication, February 15, 2023).

- **Encouraging a sense of control:** For individuals who have lost so much and have been under the mercy of many external factors, granting them a sense of control could go a long way, possibly by using the production aspect of a garden like growing their own vegetables (Patuano, A., Personal communication, January 23, 2023).

- **Open areas for activities:** Proposing large and open areas for social activities, such as public events, family gatherings, sports facilities, and children's playgrounds, and merge between them to include opportunities for parents to relax while watching over their children safely playing (Patuano, A., Personal communication, January 23, 2023; Doughty, K., Personal communication, February 15, 2023).

- **Opportunities for privacy:** Proposing pocket areas that are hidden or sheltered to provide a sense of privacy to use as a personal space or talk privately (Patuano, A., Personal communication, January 23, 2023).

- **Balance of space:** Patuano A. (Personal communication, January 23, 2023) referred to Kaplan's theory on the element of compatibility to highlight the importance of balancing a space to accommodate what the user wants by offering a plethora of facilities. Doughty K. (Personal communication, February 15, 2023) further elaborates on the importance of providing a flexible space that offers the opportunity for everyone to choose what to do, contemplating alone or socializing with others, different seating options, and so on.

- **Flexibility of outdoor elements:** Physical flexibility of space by providing moveable elements such as benches and tables may encourage a sense of ownership and belonging in the context of displacement, as well as facilitate coping with the limited conditions and situations of population influxes (Patuano, A., Personal communication, January 23, 2023).

- **Gardening opportunities:** The practice of gardening was highlighted by three of the experts to encourage multiple benefits, especially in displacement. Patuano, A. (Personal communication, January 23, 2023) further highlights the productive aspect of a garden to have a substantial restorative power resulting from being in touch with the rhythm of the seasons and the empowering feeling of producing things; using moveable raised beds or a small vegetable plot for each household as examples. Furthermore, the participants in the garden project in the cancer center reported benefits related to the psychological, physical, and social aspects (Kampman, E., Personal communication, February 02, 2023). Moreover, Smit M. (personal communication, February 24, 2023) further underlined the benefits of gardening in the asylum seekers center, where people appreciated its presence and made the environment much more friendly, improved social connections, and facilitated building a community. She further described gardening as a slow rhythm that does not rush or stress us. Similar benefits were observed during the site visit to the Wageningen asylum seekers center, where the residents joined the gardening process or gathered for social interaction around the green areas. Meanwhile, Doughty K. (Personal communication, February 15, 2023) highlighted the importance of physical interaction with green spaces as a way to be intimate with it through touching and smelling the landscape elements to be present and embodied in the moment.

- **Element of safety:** Patuano, A. (Personal communication, January 23, 2023) underlined one of the leading restorative elements in a green space and particularly for women and children; this aspect can be emphasized through a plethora of interventions; one of them is light and maintenance; however, she further mentioned the possibility of vandalism, which perhaps is a way for people to take ownership of a space. Another suggestion regarding safety was incorporating a separate garden for women and children with safety supervision when possible (Patuano, A., Personal communication, January 23, 2023).

- **Quiet and tranquil areas:** Doughty K. (Personal communication, February 15, 2023) emphasized the importance of a restorative green space to reduce the emotional and sensory impact of everyday life, which can be fulfilled through tranquil and quiet areas in the green space, to immerse in the space physically, and sit comfortably in it. When asked about the potential interruption of the tranquility aspect of a space when incorporating children's playgrounds and sports fields, Doughty K. explained "*If we imagine like sports and children playing might be a little bit noisy and busy, so those are maybe the things that could make it feel less tranquil.*" However, she further elaborated on this aspect from her experience as a mother, "*being able to have a space for family and for relations, like a social space outside of home and things like that, and a space where children can play safely. I mean, just being able to relax in that could be I think quite positive.* "

- **Cultural landscape elements:** Doughty K. (Personal communication, February 15, 2023) recommended providing a sense of familiarity in the green space to stimulate nostalgia and a sense of identity, which can be fulfilled through using cultural landscape elements as a reminder of home such as plants or fruit trees.

- **Encouraging biodiversity:** "*In the Netherlands, we are working a lot now also on the biodiversity because of the climate goals. It's very interesting, you know, you have the Green deal, which are all very kind of physical regulations but if there can be openings to having a more soft approach to your environment*" (Smit M., personal communication, February 24, 2023) recommended involving refugee camps in the policies of climate goals to become part of the solution through the soft interventions such as planting a variety of trees and flowers. The European Green Deal is a set of policies that ultimately aim to fulfill climate neutrality by 2050 following a green transition path (Council of the European Union, 2022).

- **Attracting wildlife:** encouraging biodiversity with the variety of plantings will attract wildlife; Smit. M (personal communication, February 24, 2023) further mentioned the concept of Japanese gardens where people can observe a green space from a large overall scale of space to a small scale where small details can be observed, such as animals.

- **Standard design recommendations guide:** A more structural approach is needed to integrate restorative green spaces in the planning of refugee camps to consider

health from a holistic perspective, highlighting the need to incorporate green spaces as an integral part of the planning process (Smit, M., personal communication, February 24, 2023). Smit M. further highlighted the need not to reinvent the wheel every single time; hence, a standard guide is recommended to facilitate the process of integrating it.

- **Start small and implement in phases:** In the context where space and resources are limited, Kampman E. (Personal communication, February 02, 2023) and Smit M. (personal communication, February 24, 2023) both highlighted the importance of starting the green space initiative on a small scale and grow gradually as the initiative attracts more individuals and yields more. Smit M. (personal communication, February 24, 2023) further recommends implementing the garden in phases and not everything at the same time by installing a few benches and planting a few trees with specific characteristics as an example, then gradually expanding to incorporate other landscape elements. She further highlighted this approach as a smart intervention since it starts small and can potentially grow into a more standard approach that can be applied universally (Smit, M., personal communication, February 24, 2023).

5.8.6 The role of a professional in displacement

Attention was called to the role of professional interventions in gardening initiatives in displacement during the interview with Patuano A. (Personal communication, January 23, 2023); the term professional here refers to an individual with a rich background experience in landscape and gardening practices. As multiple experts emphasized the importance and role of gardening as a way to destress and increase the restorative benefit, Patuano, A. suggested carefully examining the role of a professional in a community garden, "*as a landscape architect, if you go and you say why actually it would work better if you did this and this and this, you're going directly against that process of letting the people install their own site*," she elaborated on the point of community gardening to be less about production but more about practicing gardening together as a community. This concept was later discussed with Kampman, E. (Personal communication, February 02, 2023), who mentioned the patients that reported on the gardening practices to have given them something to look forward to in the future and monitor every day; a positive psychological influence to encourage long-term perspective

and the possibility of a better future which is associated with the long livability of the plantings, she further suggested that perhaps this psychological perspective might be needed in the context of displacement as well (Kampman, E., Personal communication, February 02, 2023), hence, she noted the key role of a professional is to be part of the community rather than a leader; a coordinator or advisor that ensures the continuity of the gardening initiative and prevent the plants from dying while letting the community do it themselves. Moreover, she further highlighted the critical role of a professional in initiating the project itself and facilitating the required materials and staying connected with the community.

6. Discussion

6.1 Design recommendations in healthcare facilities

Referring to the concept of restorative landscapes based on Ulrich's stress reduction theory and the combination of the above methodology results, the following (Table 5.8.1) shows the selected healthcare garden design recommendations based on the following criteria:

1- The recurrence of the recommendation in multiple healthcare departments

2- Qualities and recommendations concluded from the methodological results of this research

Table 5.8.1: Healthcare design recommendations after applying the criteria for selection.

Design recommendations	Healthcare departments	Design elements	Principles emphasized
Opportunities to socialize	Acute Care General hospital	- Designing subspaces that a group can occupy - Variety of seating types and formations	- Encourage social support - Maximize time spent outdoors - Accommodate the number of people, whether sitting alone or in groups
	Psychiatric hospital	- Enable activities even in limited spaces like a small courtyard	- Meeting in a small group - Solitary sitting

	Children hospital	- Variety of quality social settings - A space that can accommodate an event or entertainment	- Socializing between children themselves - Socializing between children and their families
	Nursing home gardens	- Frequent seat placement along main roads - Street activities - Moveable seats to be adjusted	- Socializing or observing other people - Increase opportunities of encountering other people - Social settings made by the individuals themselves
	Hospice gardens	- Spaces to socialize with family and others	- Encourage social support
Sensorial experiences	Acute Care General hospital	- Native plants that invite the user to touch and interact - Plants that move easily with the breeze	- Sensory stimulant
	Psychiatric hospital	- Variety of stimulating plants	- Abundant sensual experiences (Visually, touching, smelling)
	Children hospital	- Planting and harvesting activities	- Child-nature relationship
	Nursing home gardens	- Colorful plants - Various vegetation textures - Nature trails	- Increase mental alertness - Encourage residents to experience the place
	Hospice gardens	- Incorporating design elements for touching, such as soft or furry plants - Avoid harmful plants	- Affirmation of touching and being touched
Diverse outdoor experiences	Acute Care General hospital	- Seating areas with tables - A central gathering location for outdoor events	- Enable a broader range of outdoor activities such as eating, reading, and writing
	Psychiatric hospitals	- If space is available, a mix of places for the users to discover, such as a herb garden	- Encourage patients to come out of their usual pattern and encourage the recovery process.

	Children hospital	- Incorporating play and rest activities - Design consideration of a comfortable social environment that can accommodate the parents and staff with the children	- Social activities while children are under supervision
	Nursing home gardens	- Walking routes with different lengths - Placing seating near recreation areas - Family outdoor settings: design elements include and are not limited to barbeque settings, outdoor play spaces for kids visiting the residents	- Outdoor physical therapy area - Visual accessibility - Support social and educational activities, encourage families and the community to visit the residents
	Hospice gardens	- Child-accommodating environment that is safe enough and engages a child's attention.	- Entertaining the child visiting the patient and relief adults from stress
Areas for privacy	Acute Care General hospital	- Subspaces with a variety of privacy levels - Plantings around the seating - Buffer plantings between the garden and the surrounding rooms - A space that is designated to "get away"	- Sense of enclosure - Maximize feeling secure - Emphasize privacy for both garden users and individuals indoors - Encourage the feeling of being away from the hospital and the outside world
	Psychiatric hospitals	- Utilizing materials, topography, or furniture	- A temporary escape - Solitude, at the same time, enabling staff supervision
	Children hospital	- Access controlled areas for families	- Quiet, tranquil space to deal with grief and allow nature to heal

		and individuals who suffered a loss	
	Nursing home gardens	- Orientation of landscape elements to maximize privacy in designated areas through seat arrangements to enable sitting alone, vegetation placed to limit visual and auditory access - Private spaces such as personal garden plots	- Emphasizing the feeling of privacy - Interact with nature
Exposure to the sun and shade and accommodating the climate conditions	Acute Care General hospital	- Enabling exposure to sun and shade - Shelter from different weather conditions - Shaded areas - Wind shelters - Heat-reflecting exteriors	- Maximize opportunities to spend time outdoors
	Psychiatric hospital	- Shaded areas - Areas for short exposure to the sun	- Reducing glare in consideration of the patient's medication effect
	Children hospital	- Design the space to receive as much sunlight as possible throughout the year - Shelter areas from the sun and rain	- Expose the plants in the healing garden to the sun for growth, and children need a garden warmed by the sun to use in all seasons
	Hospice gardens	- Design sensitive to extreme temperatures and humidity - Shaded walkways - Seating protected from weather conditions	- A sense of protection - Enable usage of the garden in all seasons
Attracting wildlife	Acute Care General hospital	- Using organic methods to attract wildlife	- Inviting harmless fauna
	Psychiatric hospital	- Implementing a water feature to attract wildlife	- Adds value to the visual attribute

	Children hospital	- Gardens designed to attract non-harmful wildlife	- Encourage spending more time outdoors - Animal therapy
	Nursing home gardens	- Sensory-stimulating landscape elements such as harmless wildlife	- Sensory stimulation
Implementing a water feature	Acute Care General hospital	- Incorporating memorable materials such as a water feature or an artwork	- Provide a memorable experience in the green space - Encourage healing, rest, and contemplation
	Psychiatric hospital	- Implement a water element	- Improve the overall quality of the landscape - encourage a range of activities, such as meditation or gatherings - Attract wildlife which in turn provides the visual experience, while the audio characteristics of the water reduce noises such as traffic noise
	Children hospital	- Installing a water feature	- Garden elements variety - A powerful element in healing gardens, as well as a favored play material for children
	Hospice gardens	- Incorporating a water feature	- Aesthetic and auditorial benefits
Incorporating familiar elements Cultural-adapted design	Acute Care General hospital	- Familiar settings - Using materials that are familiar to the user - Native plants	- Relaxing and nourishing energy
			- Sense of place
			- Anxiety reduction
	Children hospital	- Child-friendly entrance design	- Welcoming and comfortable
	- Nursing home gardens - Hospice gardens	- Traditional plants and vegetation	- Reminder of home
	Acute Care General hospital	- Window locations and placements to be overlooking and	

Indoor-outdoor connection		adjacent to outdoor spaces, therapeutic settings, and staff offices while minimizing the outside to see inside - Enabling views of wildlife.	- Encourage using the outdoor spaces - Therapeutic benefit of nature viewing
	Psychiatric hospital	- A window view of nature	- A sense of escape for individuals unable to go outside due to health or other conditions - Reduce feeling trapped
	Hospice gardens		- Sense of serenity, connectedness, and spirituality of nature
Material selection	Acute Care General hospital	- Choice of materials based on the budget, garden aesthetics, and climate - Using materials extracted from the location upon construction or expansion	- Maximize creating a usable and aesthetical outdoor space
	Psychiatric hospitals	- Durable, long-lasting materials	- Protection from damage in case of patient's reaction towards their surroundings
	Hospice gardens		- Reassurance; represent timelessness
Accessibility	Acute Care General hospital	- Handrails, wide walkways, walking paths - Keeping the garden available to use at all times	- Visual and physical accessibility
	Children hospital	- Visual accessibility from indoors - Smoothness of pathways - Large and wide - Visual, colorful elements like colorful flowers	- Visual access for children who are unable to visit it - Accommodating all users - Facilitate access of maintenance cars

			- Making the garden more appealing and welcoming
	Nursing home gardens	- Color-contrast pathways - Ramps for wheelchair users	- Facilitate access to the outdoor space
Variety of greenery	Acute Care General hospital	- Diverse plant materials - Visual variety of plantation - Dense plantation instead of sparse, incorporating a diversity of trees, shrubs, and flowers	- Offers distraction from oneself - Stress reduction
	Psychiatric hospital	- Variety of stimulating plants	- Contribute to an abundant sensual experience for the user
	Children hospital	- Wide range of natural elements like vegetation through planters, pots, vine-covered fences	- Encourage sensorial opportunities with nature
Quiet areas	Acute Care General hospital	- Minimizing noise	- Enhancing outdoor relaxation
	Children hospital	- incorporating quiet corners in case of grieving users - Tranquil environment with walking trails	- Optimize the garden to fulfill all design requirements - Freedom to engage with the surroundings - Facilitates therapy and relaxation
	Hospice gardens	- Relaxing natural sounds in the garden - Seatings to sit and contemplate	- Nature auditory - Solitude - Sense of privacy to pray, meditate, or grieve
Maintenance and budget	Acute Care General hospital	- Design in consideration of the policies, maintenance budget - Implementing bins near doors and outdoor social settings	- Maximizing the potential use of the outdoor space - Continuous safety and therapeutic benefits - Reduce littering

	Children hospital	- Matching the budget allowance to the maintenance requirement of the space	- Continuous use and benefits of the outdoor space
Safety and security	Acute Care General hospital	- Incorporating sufficient lighting and electrical outlets - Elevated protection, such as a gazebo	- Emphasis on the sense of protection and security
	Nursing home gardens	- Design measures such as creating boundaries between community-accessible and resident-only areas. - Use of light, ground cover, low shrubs, and high trees - Using a night light	- Sense of security - Surveillance - Increase the sense of safety
User-focused design	Acute Care General hospital	- Consideration of the number of users, time of usage, and type of activities	- A positive restorative space that encourages healing
	Psychiatric hospital	- Proper understanding of the user and involving them in the design process requirements	- Insights into the user's specific requirements

6.2 Further specific recommendations

A few recommendations can be considered based on the identified negative factors in displacement during the interviews, which can be reduced through healthcare design recommendations from specific departments.

1. **Incorporating the walls of the courtyard as part of the overall garden design:** A recommendation from the acute care general hospital department. In the context of displacement, where the camps of the displaced are sometimes made of containers and surrounded by fences or barred wires and were described as "*It looks very much*

like a prison" (Smit, M., personal communication, February 24, 2023), the walls and fences can be incorporated into the overall garden design in displacement such as vine-covered fences using climbing vegetation. This can mitigate the overall visual attribute of the center.

2. **Preserving existing old trees on site:** Another recommendation from the acute care general hospital section. Smit M. (Personal communication, February 24, 2023) highlighted the importance of maintaining the existing green space elements on the site.

3. **Providing time-telling indications:** Within a psychiatric health facility, patients may struggle with the sense of time; thus, it is recommended to implement visible time-telling elements such as large clocks. Smit M. (Personal communication, February 24, 2023) underlined the importance of the psychological and contextual perspective of being aware of the location of stay, having a restful visual, and a future perspective that puts the mind at ease. Elements that indicate the location, coordinates, and time telling may improve the perspective on time, location, and context.

4. **Experiential learning:** As part of the recommendations extracted during the interviews on space flexibility (Patuano, A., Personal communication, January 23, 2023), this concept can as well be applied for children growing up in displacement by providing opportunities to alter their environment through movable objects in the garden like toys and small wagons.

The significance of green spaces and interest in incorporating them in areas of displacement were highlighted for the various well-being benefits, whether individuals found it enough to have it on-site or wanted to use the space for relaxation or observing the beauty of nature. The outcomes suggest the consideration of restorative green space recommendations from various contexts and especially healthcare departments to be incorporated in the context of displacement. The results need to be interpreted with caution in consideration of the limiting factors and the scale of the study at hand. The following incorporates further discussion on the potential application of the end results and possible challenges and concludes with recommendations regarding future research.

Reflecting on the main research question (What are the general design recommendations for a restorative green space in displacement camps that will support the inhabitants' health and well-being?), which was formulated with previous expectations on the likelihood of identifying similarities in restorative qualities regardless of the context. Furthermore, it was also desired to uncover further specific key recommendations to be considered in the context of displacement. The results indeed further supported the existing restorative qualities and demonstrated high levels of similarity between the qualities emphasized in a restorative landscape in healthcare facilities and the qualities needed in displacement, such as and are not limited to:

1. A space that serves as a refuge to symbolically escape from everyday life stressors and feel like an oasis

2. Sense of control and privacy

3. Safety

4. Offers natural landscape distractions such as flora, fauna, and water element

which as well falls under Ulrich's stress reduction theory principles of restoration through an environment that provides (Ulrich, 1981a):

1. Sense of control and access to privacy

2. Social support

3. Physical movement and exercise

4. Access to nature and other positive distractions

The results further highlighted a group of qualities that can increase the potential of positive influence, specifically in the context of displacement through:

1. The role that one's cultural background and upbringing have upon the degree to which a green space can influence individuals.

2. A nostalgic setting that provides a sense of identity and familiarity. When life situations force individuals to leave behind what they grew up knowing and practicing moving to a new context, a reminder of identity and home might facilitate reducing the stress of displacement.

3. A sense of ownership of space and belonging falls under the sense of control aspect of a place. "*I think the people in these camps, they've lost so much, and they've been at the mercy of so many external forces that granting them just a little bit of a sense of control can be can really go a very long way*" (Patuano, A., Personal communication, January 23, 2023).

Similarly, the design recommendations uncovered in the results as well demonstrated similar patterns such as and are not limited to:

1. Involving the user in the design process

2. Accessible space

3. Gardening opportunities

4. Possibility for various outdoor activities and experiences

Notably, the high level of similarities between the results was not expected. The data as well uncovered new findings which the author considers to be some of the critical contributions of this research regarding specific recommendations to facilitate incorporating restorative green spaces in displacement camps:

1. **Encouraging biodiversity:** Smit M. (personal communication, February 24, 2023) recommended involving refugee camps in the policies of climate goals to become part of the solution through the soft interventions with landscape elements such as planting a variety of trees and flowers.

2. **Start small and implement in phases:** Unlike the situation in healthcare facilities where the budget accommodates the garden design and will be prepared during the design and planning process of the entire facility, displacement camps often are set up due to an emergency and urgent response where time, resources, and space may be a limiting factor. The survey respondents reported resource scarcity as one of the main major stress factors in displacement; this may as well get in the way of applying the design recommendations which require a budget and availability of space. The realization of a green space as well may not be possible as part of the immediate emergency response planning due to the amount of time needed to implement it; however, a recommendation in this regard is for emergency planning to take into account early-on the need for a green space in the settlement and prepare for future implementation of one, by considering the restorative green space design

recommendations, as well as allowing space for implementation. Furthermore, implementing the green space in stages serves as a logical response to accommodate the urgent situation, it can be initiated with a small plot and a few seeds.

The role of a professional, in the beginning, is to initiate and encourage the inhabitants to be involved in the process. The stage-by-stage implementation enables time to interact with and understand the cultural background and practices of the inhabitants, which as well enables the possibility of involving the users in the design process and incorporating their needs as part of the design. Furthermore, this may as well encourage social interactions and connections, building the way to creating a community. The survey results highlighted the highest votes of neutrality on the neighborhood friendliness; while there could many reasons, it is justified to suggest community-focused activities in outdoor areas as a way to introduce the residents to each other. Social interactions can break the anonymity and communication barriers between the residents and facilitate identifying mutual interests. While the situation in displacement is temporary and individuals will come and go, this will enable a variety of inputs, which can be a benefit to incorporate a variety of recommendations and encourage restorative effects for as many people as possible.

By considering the recommendation of implementing the green space starting small and developing it in phases, the following benefits may accompany:

1. Accommodate the possibility of limited resource availability by requiring minimum resources to get started.

2. Stage-by-stage implementation of the green space design allows for broad flexibility to incorporate the needs of the space users.

3. Provide adequate time to study and understand the cultural background and practices of the users to potentially implement cultural landscape elements.

4. Contribute to the camp location's environmental and aesthetical quality.

The recommendations from specific health departments were included based on the results but not incorporated into the main table of design interventions as they did not fulfill both selection criteria; however, they may be considered for possible prospective studies in this field. Nevertheless, the aesthetical character of a location plays a vital role

in the degree to which a landscape can potentially influence restoration in individuals (Wang et al., 2019). where Wang et al. (2019) noted a strong positive relationship between aesthetic preference and restorative potential in their studies on the effects of characteristics of urban green spaces on aesthetic preferences and perceived restorativeness, the recommendation of incorporating the walls and other construction elements in the displacement camp in the design using landscape elements might help in reducing the characteristics of a location which are perceived as unfavorable, and facilitate restoration in displacement. Meanwhile, keeping existing trees on site is one way to meet environmental goals by preserving the ecosystem and biodiversity, which also falls under the recommendation of encouraging biodiversity.

The result of this research is intended to be used as an initial guide for future research on using landscape as a tool for psychological intervention among the displaced to help them mitigate the continuous exposure to stress factors. Millican et al. (2019) identified a plethora of positive influences of gardening practices for the individuals interested in gardening; the scope of the benefits can further be broadened to accommodate individuals having interests other than gardening by incorporating gardening practices within the larger scale of a restorative green space serving the community's different needs. Aside from the direct interaction with the green space, the indirect influence of the presence of a green space has been highlighted (Ulrich & Addoms, 1981b), which incorporates benefits for individuals who are not visiting the green area but are happy about its presence nearby, and the various benefits that include its contribution to improved health of young inhabitants (Ribeiro et al., 2019). A more structural approach is needed to integrate restorative green spaces in the planning process of displacement camps to consider health from a holistic perspective, highlighting the need to implement green spaces as an integral part of the planning process (Smit, M., personal communication, February 24, 2023). Smit M. further underlined the need of a structural approach to avoid reinventing the wheel every single time; hence, a standard guide is needed to facilitate the design process of restorative green spaces in displacement, with specifications on the elements, designated area types, and dimensions. While she identified a crucial gap in knowledge and the critical need for further research in this area, the author believes that a standard design recommendations manual that can be implemented in all refugee settlements everywhere with concrete recommendations might encounter many challenges due to the wide range of factors that may influence the design measures, especially in refugee camps from multiple aspects such as site

location, climate, area, context, environment, cultural backgrounds, population, and type of stress factors. However, formulating general recommendations that are broad enough to accommodate all refugee camps will serve as a tool to facilitate the integration of a restorative green space and significantly shorten the time required to realize it. Thus, the main goal of this research was to identify recommendations that are broad enough to accommodate as many of these factors and not associate them with a particular limiting variable. This cause can as well be supported by the evidence resulting from the interviews on the role of cultural background to the degree of influence on individuals and the role of feeling the sense of familiarity and reminder of home in a location. The recommendations can be adjusted as needed based on the available space and resources in the location. It is necessary to encourage an understanding of the stress factors the inhabitants are exposed to in the settlement location during the design process, as stress measuring can drastically vary between different settlements; in this regard, understanding the type of stress exposure in a specific location is another step to develop a more effective and usable restorative green space.

The methodological choices were constrained by the access to broader and more varied data collection sources, which is associated with the restriction of accessing refugee camps and waiting time to obtain permission. Furthermore, the lack of input on the survey cannot confirm the generalizability of these recommendations. It is as well beyond the scope of this study to test the concluded design recommendations due to the scale of this topic which requires a more extensive scope of time and resources; hence, the choice of relying on multiple source origins was made to cover the knowledge gaps from different perspectives. This research nonetheless highlights the need to incorporate green spaces as a tool for psychological intervention to mitigate the various stressors encountered in displacement. Further research is needed to test these recommendations from a practical perspective and examine the influence of applying them in different locations. The studies should take into account identifying the stress factors and their severity in the study location, as well as the available resources and space; furthermore, the role of cultural background to be considered in the design process.

7. Conclusion

The inhabitants of refugee camps are continuously exposed to different stress factors and live in situations where they have no control. This research sheds light on the importance of incorporating restorative green spaces as part of the planning process to serve as an aid in mitigating stress levels in displacement camps and provide a friendly environment where everyone can temporarily escape to recover in a location designed to accommodate the inhabitant's needs. Therefore, the main research question aimed to formulate design recommendations for a restorative green space in displacement camps based on the existing design recommendations of other restorative landscapes, particularly in healthcare departments. This research adopted Ulrich's theory of a supportive landscape by reducing the user's stress levels.

Data collection was conducted through several methods; an online survey filled by individuals that experienced displacement and stayed in a camp to understand the type of stressors, the significance of green spaces in displacement, and the degree of interest in directly interacting with the green space. Furthermore, a case study of an asylum seeker center in The Netherlands was conducted by joining the community garden volunteer group to understand the significance of safety, social and physical activities on health and well-being in the center. Lastly, several interviews were conducted with experts in the field of landscape architecture, planning of refugee settlements, cultural geography, and nutrition and health to develop the design recommendations.

This research implies that many restorative green space recommendations of healthcare departments can as well be applied in the context of displacement. A high level of similarity was highlighted between the existing restorative landscape qualities in healthcare departments to the ones needed in displacement. The criteria for selecting the design recommendations were based on identifying recurring recommendations between multiple healthcare departments and the results of the methodology of this research. The results introduced two distinct recommendations to be considered in the context of displacement:

1. Encouraging biodiversity: incorporating refugee camps in the environmental policies to improve overall biodiversity and landscape quality.

2. Start small and implement in phases: To maximize the potential of applying the restorative landscape in displacement, significant consideration should be given to the number of resources and space available. Thus, introducing the green space as a small initiative and expanding according to the resource availability places the idea of restorative landscapes with a realistic potential and consideration.

Nonetheless, the methodology identified a new gap in research concerning the need to develop a more standardized handbook. Experts call for a more structured approach and a straightforward guide that can be applied in the design and planning of displacement camps that facilitate integrating them. Future research should take into account the need for testing the recommendations in different contexts, sets of environments, and stress factors in a location while enabling the flexibility of these recommendations to increase the likability of applying them in different camps.

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List of appendices

Appendix 1: Rose Moestuin interview questions and transcription

Appendix 2: Agnès Patuano interview questions and transcription

Appendix 3: Karlona Doughty interview questions and transcription

Appendix 4: Ellen Kampman interview questions and transcription

Appendix 5: Margriet Smit interview questions and transcription