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Perception of native arid nature in urban surroundings by young urban educated dwellers in Jordan

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More than 33% of the Earth's land surface is considered arid or semi-arid regions, whereas drylands occupy up to 41.3% of the land surface. Increasing urbanization and technological advances cause a disconnection between the built environment and native nature. Also, although species of arid regions are characterized by a high degree of adaptation, they are rapidly moving toward extinction. Since one's perception of nature determines the way people interact with their surroundings, the perceptions of young Jordanians aged 18-39 was explored, and this age group is the largest in Jordan. This study was conducted using a survey. The target group was recruited in Jordanian universities via social media pages to allow the maximum participation of the targeted age group. What forms of nature the young individuals preferred and what forms were accepted, tolerated, and rejected in urban areas were examined. It was found that the participants are drawn to humid and non-arid nature, that is to nature that is generally non-existent in their urban surroundings.

Key words: Urban nature, nature perception, arid nature, young urban dwellers.

INTRODUCTION

Over two-thirds of the world's population will reside in regions considered water stressed by 2025 (Watkins, 2006); assuming that almost 90% of the population increase will be in arid regions; causing an increasing amount of urban sprawl that will affect native species and biodiversity (Alrusheidat, 2004). Most cities are built in a "*disequilibrium*" state from the natural environment (Wilson, 1984). Urban sprawl displaces native species and replaces them with non-native ones; a study conducted on thirteen towns on different continents showed that native plant species richness declined between 3 and 46% in a span of 50–150 years (Bertin, 2002). Urbanization not only affects native flora and fauna species but also biodiversity conservation (Cincotta et al., 2000); the increasing rates of urbanization are leading to a disconnection from the natural world. Naturalness represents the ecosystems with the original natural state, either, by historical benchmarking referencing of the pristine landscapes not touched by humans; or by the ecosystem self-organization, which

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allows addressing original ecosystems that adapt in an urban context. Many conservationists follow the historical benchmarks approach to define the wilderness and naturalness of an ecosystem (Reif and Walentowski, 2008), yet different kinds of nature can be included in the urban context (Ridder, 2007).

The "*Four Natures approach*", described in (the 1990s) (Kowarik and Langer, 2005) allows using the wilderness and naturalness terminology in the urban context. By addressing four kinds of nature in terms of landscape inheritances, human interventions, and environmental characteristics, these include the remains of pristine ecosystems, rural landscapes, novel urban green spaces on vacant open spaces within the urban context, such as gardens, parks, and graveyards created by humans (Kowarik, 2013). These green and blue urban spaces are nature-based solutions for city challenges, as they preserve biodiversity, fight climate change, and improve living conditions, health, and well-being (Artmann and Breuste, 2020).

Arid regions are contrary to humid regions, both characterized by precipitation amounts. There are three types of arid regions, the "*hyper-arid*" which forms 4.2% of the land cover, the *"arid zones"* which are estimated at 14.6%, and the *"semi-arid zones"* which cover 12.2%; overall, almost one third of the total land area in the world is an arid land. The forms of urban nature in arid regions are categorized into "*ephemeral annuals*", "*succulent perennials*" and "*non-succulent perennials*", which include a mixture of grasses, herbs, and small, short trees and shrubs (FAO, 2020).

Although arid species are categorized with a high degree of adaptation to harsh conditions, arid regions suffer more biodiversity loss than more species-rich regions (McNeely, 2003).

The five common perceptions methods of nature state five different approaches to preserving nature. The first method assumes that "*Everything in nature is connected*" based on cultural differences and beliefs, assuming that human activities cause a series of impacts that are reflected on the ecosystems and social systems. The second assumption is "*Nature is benign and perverse*"; this declares that nature is either gentle and promotes well-being or hostile. The third perception assumption is "*Nature is Fragile*"; this states that nature is delicate and vulnerable to ecosystem changes that throw it out of equilibrium. The fourth perception was promoted during the industrial era which states that "*Nature is durable*" assuming that nature can be shaped and changed according to various needs and desires, supposing that environmental damage can be repaired and rebalanced by science and technology. The fifth perception view is "*Nature is capricious*"; and changeable, according to different conditions in the ecosystems including weather, without having strong natural forces to maintain the ecosystems in a particular way rather than a random way (Marten, 2010).

Interacting with nature has positive impacts on humans, both physically and mentally (Beatley and Newman, 2013). Human well-being is measured in two perspectives: the clinical perspective represented the absence of negative conditions, and the psychological perspective represented in the prevalence of positive attributes (Barwais, 2011), and having social interactions of good quality (Johnston, 2019). Well-being in psychology refers to people's mood and interaction with their surroundings when exposed to certain events or different natures. Subjective well-being is typically considered as the good mental status that reflects people's satisfaction with their lives and experiences (Diener, 2000).

Urban nature is of great importance for urban dwellers' well-being. Green spaces, gardens, and parks enable them to interact with nature (Bhatti et al., 2014), thereby providing considerable physical and psychological benefits (Beatley and Newman, 2013).

People get more benefits when they interact with their preferred forms of nature (Martin et al., 2021). Nature perception is defined by people's previous experiences and stories with their surroundings, based on the stored information and interpretations that formulate actions and attitudes toward the surrounding natural systems (Marten, 2010), which in turn makes some forms of nature more preferred than others (Batt, 2009).

The selection of certain flora species in urban areas determines the diversity of fauna and avifauna species that exist within the ecosystem (Temple and Wiens, 1989). Moreover, the selection of diverse vegetation, distribution, localization, and structure, whether trees, shrubs, or ground cover, creates buffer zones and noise-controlled areas that attract various birds and contribute to protecting biodiversity (Hanle et al., 2021). In addition, the satisfaction of the urban dwellers is subjected to their needs acting as farming and food resources (Van Veenhuizen and Danso, 2007) or as a recreation destination and a stress relief tool (Beatley and Newman. 2013). Including nature improves the quality of life on the one hand, whereas the quality of life is associated with the benefits that people gain from nature on the other hand (Cárcaba et al., 2017) nevertheless, urban dwellers' happiness is a subjective term that can measure their satisfaction with their surroundings (Fontinelle, 2022).

This paper investigates the young urban educated dwellers' perception of their surrounding nature and explored their preferred forms of nature.

METHODOLOGY

Case study

The study sample was conducted in Jordan, a country with hot dry climate conditions that is considered one of the most diverse arid regions in the Middle East, due to the extent variety of ecological and regional natural elements (RSCN, 2013).

Jordan has one of the youngest populations in the world, with 63% of its population under the age of 30 (Unicef, 2020). It's the

Table 1. Participants in each age group.

Age groups	% of total responses	Number of responses (573)
below 18	4.20	24
18-29	42.60	244
30-39	24.60	141
40-60	27.60	158
above 60	1	6

Source: Authors

Table 2. Participants living context for the age groups 18-39.

Region	5 of total responses	Number of responses (385)
City context	84	322
Rural areas	14	54
Desert areas	2	9

Source: Authors

24th most urbanized country in the world; 91% of the population lives in urban areas.

Material

This survey consisted of thirteen questions. Young, urban, well-educated, and social media users were those selected for the sample. Jordanian youth's media and technology consumption patterns state that 91% of Jordanian youth use social networking sites daily (Abu lail, 2017) The survey was posted for up to 10 days from October to December 2020 via Jordanian university's social media networks, including the social network pages of the University of Jordan in Amman, Hashemite University in Zarqa, and the University of Petra in Amman. The questions were organized along three thematic blocks, the first block was to test nature cognition through understanding which forms of the natural elements both biotic and abiotic represent nature for the participants, the second one was to test the desired forms of nature and the last block was to test their interest in nature and biodiversity conservation approaches. The survey combined multiple-choice questions that allowed selecting more than one answer and check box questions to clarify the preferred answer, offering respondents the possibility to choose and rank among several options.

The participants are anonymous but they provided information on their age as shown in Table 1. In total, 573 persons participated of which 385 were between 18 and 39 years old. This group was selected as a representative young urban educated population of the country for the study.

To focus on urban living conditions, we categorized the participants on their living context, urban, countryside, and desert areas. The great majority of young participants of the study were urban living (Table 2). They were students and educated young urban dwellers.

Many photos were provided to identify the participants' cognition and understanding of native nature. A provided photo series represented natural elements of native arid regions varying from sceneries to selected plant and animal species, representing typical natural elements of the region, including seasonal aspects and artificial and urban elements (Table 3).

To test the knowledge and recognition of species/species groups and structural diversity, the participants were asked about whether they observed characteristic animals representative of a species group and structures in their surroundings: animals: e.g., house sparrows, mice/rats, snakes, sheep, bee; plants: black iris, sage, olive trees, juniper, and grass.

The authors aimed to investigate the planted vegetation's suitability to arid/semi-arid climates in the participant's surroundings by providing a question on irrigation frequency. Two questions of the survey raised queries on the acceptance of wildlife in the participants' living context.

One question of the survey aimed to investigate participants' preferred outdoor nature qualities in an urban context. The survey elicited responses to three types of features: forests with native species; designed landscapes and gardens; and recreational facilities such as shopping centers and malls. Another question identified the participants' preferred outdoor activities; the survey listed three outdoor activities: picnics, driving, and sports such as jogging, walking, or cycling.

In addition, the authors requested the participants to answer queries on the public awareness importance and to understand their interests in maintaining biodiversity, conserving nature, and reforestation initiatives. The last question aimed to illustrate the preferred plants in the participants surrounding whether they prefer arid regions' native plants that do not need a lot of water or non-native plants that need irrigation.

RESULTS

Results representation

The results show what young urban dwellers consider nature waters with surrounding green forests (85.5%), native semi-arid forest conditions (68.6%), native arid nature (Cactus plants 38.4%, native vegetation 35.3% - especially in flowering aspect, wild native plants 27.27%), and irrigated urban park green (32.7%). Participants did

Table 3. Selected species group by representative photos with reasoning.

Selected species group by representative photo		Reasoning
1. Animals		
1.1 House Sparrow		A popular avifauna in Jordan
1.2 Mice or Rats		High adaptation to environmental changes. Mice and rats are associated with human dwellings
1.3 Snakes		The snake was selected to illustrate the urbanization influence on arid and semi-arid native species' biodiversity
1.4 Sheep		To illustrate the grazing behavior in arid urban areas which threatens arid and semi-arid regions plants and vegetation
1.5 Bees		Bees are important pollinators in many ecosystems, they were selected to investigate the influence of urbanization on their natural habitat
2. Plants		
2.2 Black Iris		The black iris was chosen as it is considered the national wildflower of Jordan; it is endemic to Jordan and is an endangered species
2.3 *Salvia officinalis* (Sage)		Sage was chosen as it is considered one of the most common wild native plants in the region

Table 3. Contd.

2.4 *Olea europaea* (Olives trees)		The olive tree was included in the photos; due to cultural and religious beliefs of considering the olive tree as a blessed tree. In addition to the benefits, people can gain from planting it
2.5*Juniperus horizontalis* (Juniper bushes)		A convenient ground cover that suites arid region
2.6 Grass		Does not suit arid and semi-arid regions due to its high consumption rates of water

Source: Authors

Table 4. Which of the below pictures represents nature?.

Pictures as representatives of	% of total responses	Number of responses (n = 385)
Lake with surrounding forest (non-arid region)	85.50	329
Native coniferous forests in semi-arid region	68.60	264
Waters in a mountain creek	51	197
Cactus plant	38.40	148
Native vegetation in flowering aspect in spring	35.30	136
Designed irrigated green in urban park	32.70	126
Wild native plants	27.27	105
Sandy desert	26.20	101
A spider	20.26	78
Arid mountains (accessible by infrastructure)	18	70
A snake	17	66
Native vegetation in dry season	6.20	24
Urban residential neighborhood with street trees (low building density)	3.60	14
Densely built up city center (Amman)	2.60	10

Source: Authors

not recognize non-vegetated urban site as nature (only 2.6%, 3.6%) (Table 4).

The young urban dwellers normally do not have rural species or species from far outside cities in their surroundings. Besides the typical urban species (e.g. sparrow, mice, irrigated grass) a majority of people identified typical rural species (e.g., sheep, bee, sage, olive) as “their environment.” This suggests that urban dwellers are still mentally or even physically (by family relations) connected to rural nature. Many of them and their families moved to urban areas only in this or their parent's generation, and they come from the countryside

Table 5. Do you have any of the below species in your environment?

Picture	%of Total Responses	Number of responses (n= 385)
Typical urban species		
House Sparrow	49.30	190
Mice or Rats	33.20	128
Irrigated grass	53.20	205
Typical rural species		
Sheep	68.30	263
Bees	76.30	294
Sage	58.44	225
Olives trees	82.00	316
Natural native species		
Snakes	20.20	78
Black Iris	22.00	85
Juniper	18.70%	72

Source: Authors

Table 6. Do you irrigate the plants in your home garden or the street where you live, and if yes, how often?

Frequency of irrigation in the urban surroundings	% of total responses	Number of responses (n = 385)
Yes, every day	16.60	64
Yes, Twice a week	29.10	112
Yes, Once a week	16.40	63
Yes, rarely	9.60	37
No, the Plants rely on the rainy season	7.80	30
We don't have a house garden or trees on my street	20.50	79

Source: Authors

Table 7. Do you accept, reject, or neutralize wildlife presence in your living sphere?

Acceptance of wildlife in the urban living sphere	%	Number of responses (n = 385)
Accepted	16.10	62
Rejected	56.60	218
Neutral	27.30	105

Source: Authors

to which they are still linked. The typical urban species are less and the typical natural native less identified as “environment” (Table 5).

Question about irrigation of home gardens or trees in the street where the people are living, people in the majority have a garden, green spaces around the house, or at least trees in the street within their living context (79%, n=306). This means that they are not completely disconnected from nature. They also understand that most of the urban plants rely on irrigation (92.2%) and need mainly twice-a-week irrigation (Table 6).

The majority of questioned young urban dwellers reject wildlife in their urban living context. This is not surprising, but shows the disliking of nature on one side and also the fear of wildlife because of real or imagined danger (Table 7).

Unlike wild animals, wild plants are much more accepted in urban surroundings. A majority accepts them and only a small minority rejects this (Table 8).

The question about nature on the landscape level a

Table 8. Do you accept, reject, or neutralize wild plants that do not need irrigation in your living sphere?

Acceptance of wild plants in the urban living sphere	%	Number of responses (n = 385)
Accepted	53.20	205
Rejected	8.10	31
Neutral	38.70	149

Source: Authors

Table 9. Which of the below forms of nature do you prefer?

Preferred nature (landscape level)	%	Number of responses (n = 385)
Pristine landscapes	83.90	323
Designed landscapes	16.10	62

Source: Authors

Table 10. what outdoor qualities do you prefer in your surrounding?

Preferred outdoor qualities	%	Number of responses (n = 385)
Forests with native plants and animals	53.00	204
Designed landscapes, and gardens with non-native plants	29.90	115
Shopping centers, malls, and city recreational facilities	17.10	66

Source: Authors

Table 11. What outdoor activities do you prefer?

Preferred outdoor activities	%	Number of responses (n = 385)
Picnics	70.40	271
Jogging, walking, and cycling	15.40	60
Driving along with the car	9.40	36

Source: Authors

clear majority (83.9%) prefers natural (“pristine” landscapes in comparison to “designed” landscapes (Table 9). But the survey does not define what exactly is understood by “pristine” or “designed.”

Even when shopping centers and malls enjoy unbroken interest and are attractive among young urban dwellers, a majority don’t want to have it in their surroundings and prefer nature (Table 10). This is possible because of high degrees of urban mobility and because people do not need to shop daily. But perhaps they need nature contact daily. Here also the native forests are preferred against designed nature.

Having a picnic in nature is a social activity that is clearly preferred (70.4%). This shows that more a contemplative than active consumption of nature, maybe in urban surroundings, is attractive to the majority. This is related to climatic conditions not surprising (Table 11).

Most respondents (72.7%) claimed to be active in caring for nature conservation and biodiversity (Table 12). An overwhelming majority expressed interest in reforestation initiatives (70.1%). This must not mirror the real situation but represents a “possibility” to become active (Table 13).

A clear majority (68.8%) prefers irrigated non-native plants compared to native plants that make up “dry gardens”. The flourishing and all-year green is depending on irrigation and is mostly non-native. But both are less important for the majority (Table 14).

Results analysis

The result of one-way ANOVA revealed significant difference between context of young people and their selection of nature; such as wild native plants "F

Table 12. Do you care for nature conservation and biodiversity in your surrounding?

Care for nature conservation and biodiversity	%	Number of responses (n= 385)
Yes	72.70	280
No	2.90	11
Maybe	24.40%	94

Source: Authors

Table 13. I like to participate in reforestation initiatives. I think it is important for the environment.

Interest in participation in reforestation initiatives	%	Number of responses (n = 385)
Yes	70.10	270
No	7.80	30
Maybe	22.10	8500.00%

Source: Authors

Table 14. What plants do you prefer in your urban surroundings, native plant or non-native plants?

Preferred plants in the surroundings	%	Number of responses (n = 385)
Arid region's native plants	31.20	120
Non-native plants that need irrigation	68.80	265

Source: Authors

(382,2) = 5.12, α = 0.00", densely built up city Centre "F (382,2) = 4.78, α = 0.00", waters in a mountain creek "F (382,2) = 6.38, α = 0.00", native vegetation in flowering aspect in spring "F (382,2) = 6.20, α = 0.00" , native vegetation in dry season "F (382,2) = 4.00, α = 0.00", Designed irrigated green in urban park " F (382,2) = 5.74, α = 0.00", a spider " F (382,2) = 4.31, α = 0.00", sandy desert " F (382,2) = 5.00, α = 0.00", arid mountains (accessible by infrastructure)" F (382,2) = 4.10, α = 0.00", lake with surrounding forest (non-arid region) "F (382,2) = 9.76, α = 0.00", native coniferous forests in semi-arid region "F (382,2) = 8.83, α = 0.00", a snake "F (382,2) = 4.05, α = 0.00", urban residential neighborhood with street trees (low building density)"F (382,2) = 3.85, α = 0.00", cactus plant "F (382,2) = 6.12, α = 0.00" it can be seen, young visitors who live in the city have the highest represent nature for lake with surrounding forest (non-arid region) (mean = 3.89) meanwhile, they accepted the sandy desert like a nature (mean= 3.61). Arid mountains and Cactus plants are usually found in arid and semi-arid climates, but, interestingly, the young people who live in the countryside (mean=3.69) and who live in desert areas (mean= 3.56) have accepted them as nature (Appendix.1).

Furthermore it can be seen, the young people who live in the country side are more seeing “Bees” (mean= 4.26) and the young people who live in city are more seeing “Olives trees” (mean= 4.11) meanwhile they see fewer snakes in the city (mean= 2.63) (Table 15). However, young people have seen typical urban species in the city (mean=3.38), typical rural species in the countryside (mean=3.93), and natural native species in the desert area (mean=3.36) (Figure 1).

The significant difference between the context of young people and their participation in vegetation conservation (by irrigation) in three parts (d-Yes, e-No idea, and f- No at all), d) every day "F (382,2) = 3.32, α = 0.00", d)twice a week "F (382,2) = 5.82, α = 0.00", d)once a week "F (382,2) = 3.28, α = 0.00", d)rarely "F (382,2) = 2.65, α = 0.00", e) we don’t have any house garden or trees in our street "F (382,2) = 4.87, α = 0.00" and f) the plants rely on rain season "F (382,2) = 2.43, α = 0.00" (see to appendix. 2). It can be seen, the young people who live in country side have highest desire to participate in vegetation conservation by irrigation in every day (mean=3.87) while young people who live in the city have the desire to participate in vegetation conservation by irrigation once a week (mean=3.80) and lowest desire is for young people who live in desert area to participate in vegetation conservation by irrigation every day (mean=1.68). However, young people who live in country side are interested to participate of vegetation conservation by irrigation (mean=3.57), young people who live in desert areas have No idea (mean=3.78) and No at all (3.71) for participating in vegetation conservation

Table 15. ANOVA result for the context of young people and Species seen in the environment.

Where to live	Species seen in the environment	City	Countryside	Desert area	F	Sig
Typical urban species	House sparrow	3.31^{b}	3.51^{bd}	3.12^{b}	4.17	0.00
	Mice or rats	2.87^{ab}	3.10^{b}	3.18^{d}	3.65	0.00
	Irrigated grass	3.96^{a}	3.25^{c}	3.54^{c}	4.89	0.00
Typical rural species	Sheep	3.09^{ab}	4.03^{c}	2.96^{d}	5.21	0.00
	Bees	3.75^{ad}	4.26^{c}	3.61^{ab}	6.17	0.00
	Sage	3.69^{ad}	3.46^{c}	3.03^{d}	4.95	0.00
	Olives trees	4.11^{cd}	3.98^{bd}	3.79^{a}	6.98	0.00
Natural native species	Snakes	2.63^{b}	3.21^{cd}	3.56^{c}	3.36	0.00
	Black Iris	3.07^{ac}	3.69^{c}	3.40^{cd}	3.50	0.00
	Juniper	3.02^{d}	2.68^{c}	3.12^{b}	3.03	0.00

Source: Authors

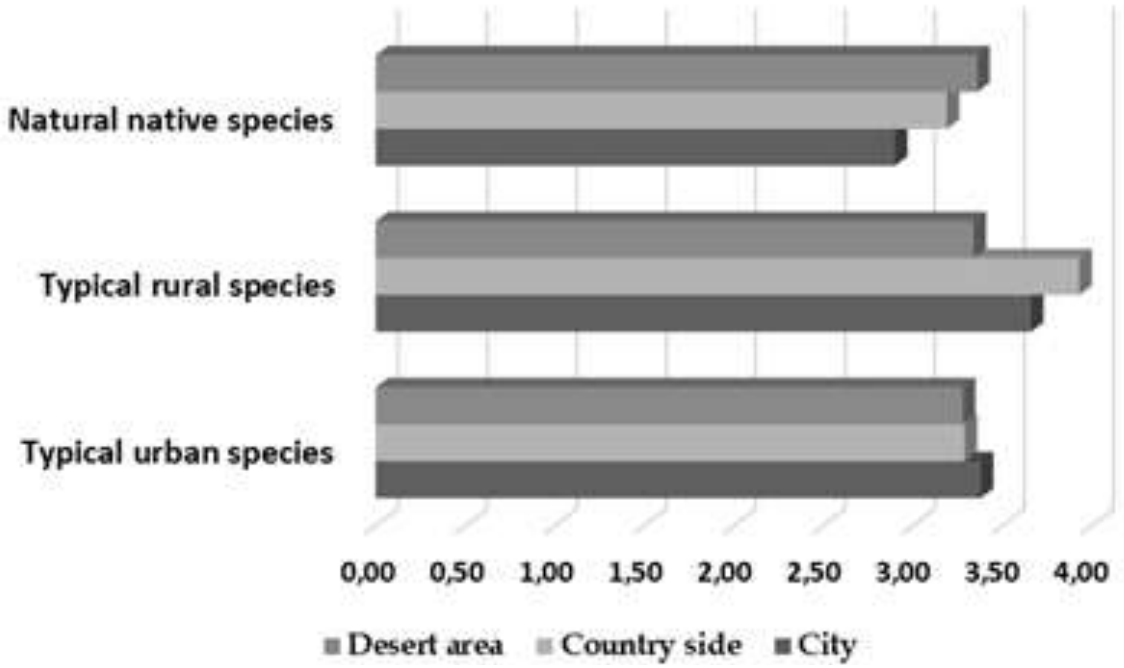

Figure 1 . Mean species were seen around the environment of young people context.
Source: Authors

by irrigation (Figure 2).

Acceptance of young people for wild animal species and wild plants species (no need for irrigation) in their living context was in three parts: Yes, No and Natural, 58.3% of young people can accept wild plants (no need for irrigation) meanwhile 54.1% of young people cannot accept to be exciting of wild animal species in their living context (Figure 3).

In acceptance of the presence of (P-W-W) in preferred nature (landscape level) is; accepting the presence of pets in the pristine landscape is low by young people (mean=2.03, t = -5.89), accepting the presence of wild animal species in pristine landscape (mean=3.36, t= -6.27) and the young people are accepting in the highest level of wild plants (no need for irrigation) in pristine landscape (mean=4.12, t= -6.51) meanwhile accepting the presence of wild plants (no need for irrigation) in the designed landscape is far less (mean=3.11, t= -6.51) (Table 16).

The young people who lives in city preferred forest with native plants and animal "F (382,2) = 5.45, designed landscape, gardens with non-native plants by residents of desert area "F (382,2) = 2.80, α = 0.00" and shopping centers, malls and city recreational facilities by residents

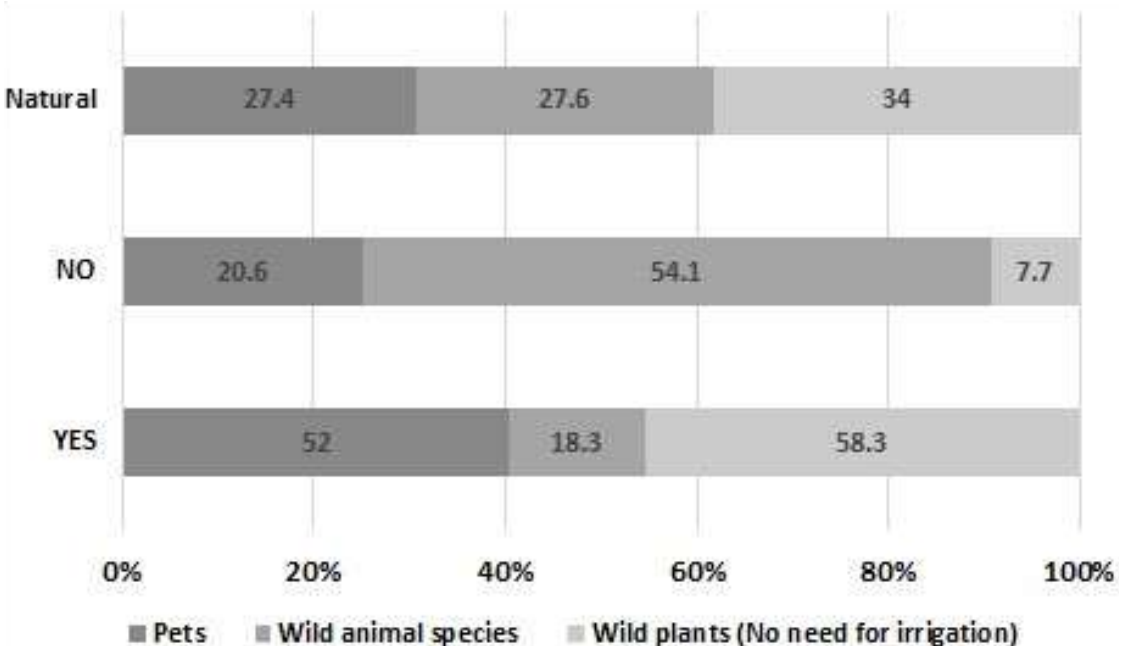

Figure 2. Mean of young people participating in vegetation conversation (by irrigation) in their context area.
Source: Authors

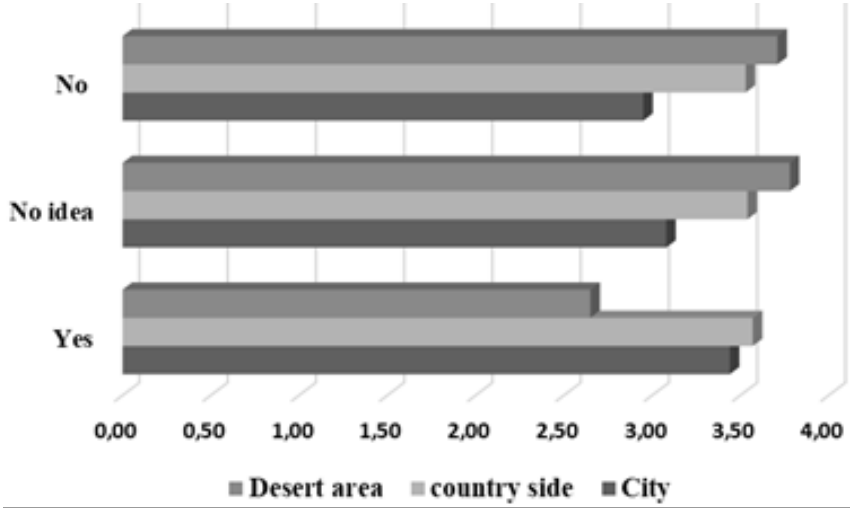

Figure 3. Comparison between acceptance of the presence of wild animal species and wild plants (no need for irrigation) (P-W-W) in the living sphere.
Source: Authors

of country side "F (382,2) = 4.21, α = 0.00" (Appendix. 3).

The result of one-way ANOVA revealed significant difference between preferred outdoor activities and their preferred of outdoor quality in the surrounding, forest with native plants and animals "F (382,2) = 7.02, α = 0.00", designed landscape, garden with non-native plants "F (382,2) = 5.66, α = 0.00" and shopping centers, malls and city recreational facilities "F (382,2) = 4.67, α = 0.00". It can be seen, the highest young people preference to have jogging , walking and cycling in picnic in designed landscapes, gardens with non-native plants (mean=4.23), driving along with the car and watching surrounding in shopping centers, malls and city recreational facilities (mean=3.91) and to have picnics in forest with native plants and animals (mean=3.79) (Appendix. 4).

The young people who live in city, "Picnic" is the most

Table 16. Independent sample t-test between preferred nature (landscape level) and acceptance preferences of (P-W-W).

acceptance of the presence of (P-W-W)	Mean		T	Df	Sig (2-tailed)
	Pristine landscape	Designed landscape			
Pets	2.03	3.23	-5.89	383	0.00
Wild animals species	3.36	3.00	-6.27	383	0.00
Wild plants (no need for irrigation)	4.12	3.11	-6.51	383	0.00

Source: Authors

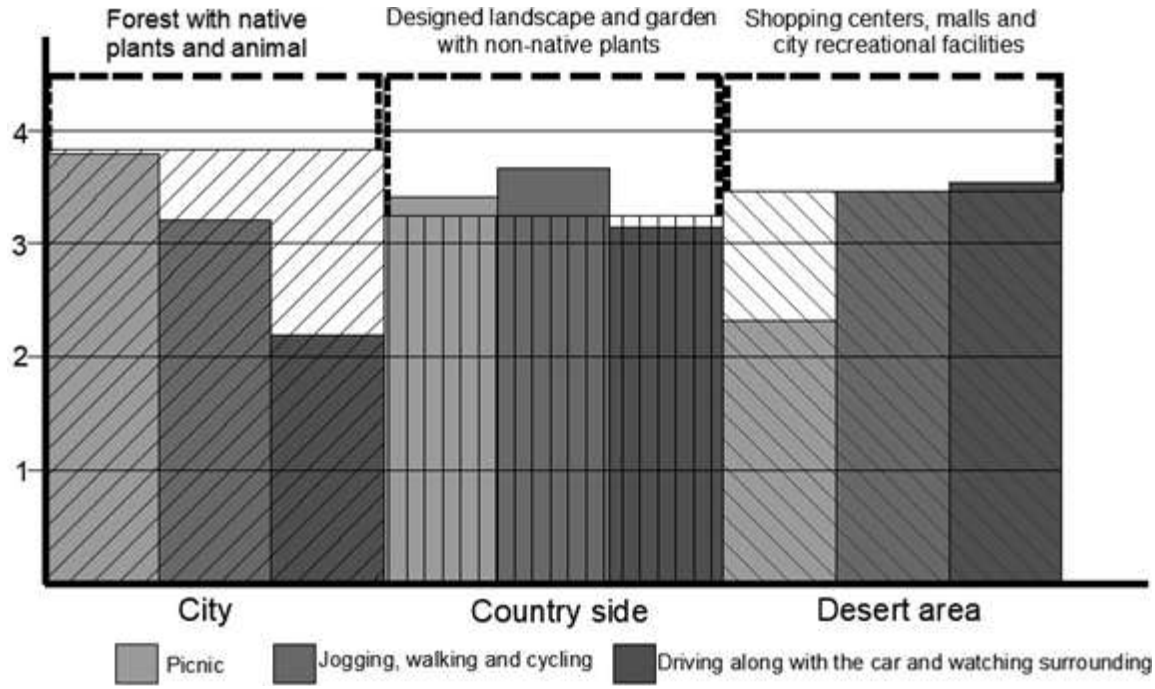

Figure 4. Comparence of preferred outdoor activities and its quality in the surrounding with different the young people accomondations.
Source: Authors

activity's preference in "Forest with native plants and animals" (mean = 3.83). "Jogging, walking and cycling" in "Designed landscape and garden with non-native plants" is the highest preference of the young people who live in the countryside (mean = 3.66). "Driving along with the car and watching surrounding" is most insisting of young people who live in Desert areas in "Shopping center, malls and city recreational facilities" (mean = 3.54) (Figure 4).

Acceptance of young people's desire to participate in the creation and conservation of nature in urban surrounding, 70.1% acceptance to nature creation in urban surrounding and 72.7% to conservation of urban surrounding nature by young people, meanwhile 7.8% of young people cannot accept to have creation of urban surrounding nature and 2.9% about conservation it (Figure 5).

The acceptance of plants with arid regions native plants and non-native that need irrigation for creating and conservation, most of the young people accepted to create urban surrounding by arid regions plants (mean= 3.95, t= -4.28) and the less acceptance of young people is creation of urban surrounding by non-native plants that need irrigation (mean= 2.97, t= -5.18) (Table.17).

DISCUSSION

What is nature in people's minds and what belongs to their surroundings?

The young urban dweller group most preferred "non-arid, humid nature" represented in the picture of a "lake surrounded by forests in the non-arid region", followed by

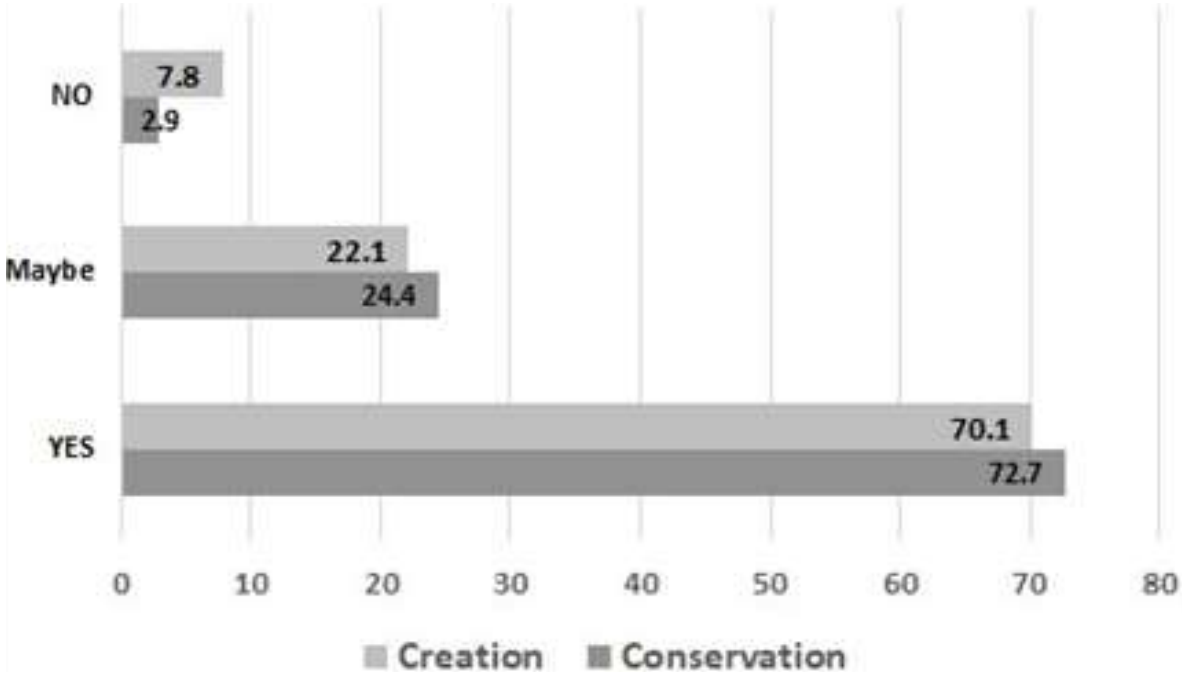

Figure 5. Comparing people's desire to participate in the creation and conservation of nature in urban surrounding. Source: Authors

Table 17. Independent sample t-test between participate in the creation and conservation and acceptance of the plants in the urban surrounding.

Acceptance of the plants	Mean		T	Df	Sig(2-tailed)
	Creation	Conservation			
Arid regions native plants	3.95	3.73	-4.28	383	0.00
Non-native plants that need irrigation	2.97	3.16	-5.18	383	0.00

Source: Authors

native forest nature. “Green nature” related to the water gets the highest rates. The photo of water in a mountain creek (Wadi Almujeb) considered a natural reserve and a tourist destination was selected by more than 50% of the respondents. Moreover, the least percentage of responses considered the urban nature of the daily surroundings. Native vegetation in the dry season in a Roman historical site is even more attractive. The view of the same location with flowering native vegetation during humid spring conditions scored higher. This shows the importance of “green nature” in general for the respondents as a preferred form of nature (Table 4). Moreover, the urban dwellers of Jordanian cities lack the availability of open spaces in their neighborhoods and crowded cities, which they seek in their picnics outside cities or at the side of highways and roads with natural views; this behavior is very common among city inhabitants in Jordan, especially those who are young, due to the planning of Jordanian cities that lacks the availability of these spaces where green nature can be included. The young urban dweller's choices of nature is affected by their needs and what they miss in their surroundings, which explains why the urban image was selected by least of participants and the historical site with native vegetation in both dry and flowering seasons outside the crowded city is selected by the majority of the young urban participants.

On the species level mostly good visible plants are well-recognized, more seldom small not very attractive, and visible plants and rare to observe animals. Some animal and plant species are culturally mostly little noticed or even disliked. People can be afraid of them (e.g. by spikes of plants or expected aggressively or health danger of animals). Many species do not belong anymore to the surrounding of young urban dwellers.

Although it is considered a common urban bird in the region, only nearly half of the young individuals responded that they have seen the house sparrow in their

living environment. It can be argued that the perception of nature on the species level is not very high, especially not in urban surroundings. Also, the other data (Table 5) suggest this interpretation. Besides this is rural nature well represented on a species level as traditional, and culturally rooted and still may be present in family life divided between traditional rural and actual urban. Two third and more respondents know and value the cultural species, especially agricultural ones.

Although mice and rats are associated with human dwellings and have high adaptation to environmental changes; they were reported noticed by one-third in the participants' surroundings. This reflects the ongoing practices to fight rodents in the city context as these species are rejected or disliked by many.

Snakes as rare observed animals, disliked or rejected by many, were only stated seen by less than one-third (20%) of the participants, this illustrates the urbanization influence on arid and semi-arid native species biodiversity, and the distinct of arid regions' native fauna due to the urban sprawl; that extended to the rural and agricultural areas; explaining why sheep were selected by a majority of the participants (68.3 %), threatening native plants with the overgrazing, this gives an indication on the need to organize the grazing activities in the urban context as the increasing amount of overgrazing is directly affecting the native plants and shrubs in arid regions (WADI, 2020).

The responses on the native species give conclusion and raise queries on the suitability and people's choices on the planted trees, and patterns of urbanization that directly affects the biodiversity and ecosystem balance in their neighborhoods.

Olive trees *(Olea europaea)* are native species that are agriculturally profitable; for both urban and rural inhabitants, they formed the most noticed in the participants living context. Olive trees (are very common due to cultural and religious beliefs of considering them as blessed trees; besides the benefits gained from planting them, they benefit from the fruit; these reasons encourage people to plant Olives in their farms, gardens, and in front of their houses (Olives_councel, 2022) and justifies selecting them by a majority of the young urban educated dwellers with (82%).

Other native species such as Bees, were also noticed by more than two third of the participants living environment at (76.3 %).

Black Iris is considered the national flower in Jordan, local government protects it, the wild endangered native plant was reported by less than one-third of the participants with (22%) of the total responses only.

Unlike the Black Iris, more than half of the participants (58.44%) reported seeing Sage (*Salvia officinalis*) in their surroundings. Sage (*Salvia officinalis)* is considered one of the most common wild native plants in the region. Its wide green leaves and strong aroma, in addition to its importance for medical purposes, characterize the plant, which encourages many people to plant it in their surroundings as well (Alfraih, 2020). Although grass is inappropriate for water-scarce regions, almost half (53.2%) of responses claimed its presence in their surroundings, which raises queries on the awareness for water conservation practices and the proper selection for the evergreen ground cover. On the other hand, the Juniper (*Juniperus horizantalis*) was only reported by (18.7%) although it is considered a convenient ground cover that suits the arid region.

People's choices of planted flora in their surroundings show that they prefer humid non-arid native species, which was noted when more than 50% of the young participants claimed they noticed grass in their surroundings.

The native species in semi-arid native landscapes (not cultural landscapes!) are by far less rated than any other. These are not only snakes that are often unlike, but also attractive Iris flowers. This shows that they are not often more a "part of their environment". These native areas are maybe more seldom visited than cultural landscapes

Due to the high population growth and the number of refugees in the surrounding countries; Jordan is ranked number ten among countries in water scarcity countries in the world (Hadadin et al, 2010). Despite these challenges, the results in (Table 6) on the number of times the participants irrigate their plants showed that Only (7.8%) of the participants have plants that are suitable for arid/semi regions, which rely on the rainy season; and 9.6% of participants stated that they rarely irrigate their plants in their house, garden, or the street; whereas the highest responses with less than one third (29.1%) of the participants irrigate their plants twice a week, The result yields conclusion on the participants desired plants in their surrounding environment and the fact that these plants are non-native and don't suit arid regions as it consumes a lot of water.

People are attracted to natural forms they miss in their urban areas, this explains why the majority of the responses with 83.9% of the participants determined that they prefer pristine landscapes more than designed landscapes (Table 9), and more than half (53%) of the participants prefer forests with native species more than designed landscapes (29.9%) and shopping centers within cities scored the least percentage with 17.1% (Table 10).

Quality of life is considered an important indicator of health (Owczarek, 2010). Nature-rich spaces within cities improve the quality of life and increase social interaction and personal empowerment (Keniger et al., 2013). Additionally, the quality of life is associated with the benefits people gain (Cárcaba et al., 2017), nevertheless, it is a subjective term that can measure happiness when meeting their interests and needs (Fontinelle, 2022), Which explains why two third of the participants (70.4%) prefer picnics in natural spaces, over Jogging and driving 15.4% and 9.4% respectively (Table 11).

The results on public awareness toward biodiversity and nature conservation showed that two third of the participants have a good degree of awareness of the importance of biodiversity conservation (72.7%) and care for nature in their surroundings (Table 12); they also like to participate in reforestation activities and they think it is very important for the environment (Table 13), yet their selection on preferred nature showed that (68.8%) of them prefer non-native plants which need irrigation (Table 14). This indicates that they prefer humid nature over native arid nature. The result implies increasing efforts and awareness programs to explain the importance of native nature integration and restoration, through planting arid native flora to conserve native nature and reduce biodiversity loss in arid regions. Although arid regions' flora species are categorized with a high degree of adaptation to harsh conditions nevertheless, the loss is higher than in other regions(McNeely, 2003).

Where which arid nature should be located and in which dimension?

Moreover, nature integration in arid regions involves actions on three dimensions, decision-makers and governance level, designers and practitioners' level, and individuals and local communities level. Actions vary from imposing regulations, and controlling grazing to protecting landscapes and native flora; other actions involve reforestation and dry land plantation and restoration and initiating awareness programs (FAO, 2009).

Action towards reforestation and nature restoration was initiated during the past decade, these initiatives allowed handling desertification and nature restoration processes through information coordination, systems observations, and employing solutions based on appropriate technologies, the cooperation involved global, national, and local level resulting developing measures to deal with desertification while improving socio-economic conditions. The solutions involved activities such as strengthening environmental information systems in various regions, measuring the ecological and socio-economic consequences, and the impact on climate change; supporting research, and Strengthening regional programs and international cooperation. Other actions involved financing related conservation and restoration projects, and increasing awareness, globally and within local communities to allow employing the best conservation and restoration practices (UNCCD, 2021).

Adopting the afore-mentioned actions in arid urban areas allows integrating arid nature into urban life, to promote an active, healthy, and, built environment, while protecting native arid biodiversity and ecosystems when considering native nature integration. The study illustrated that people are attracted to pristine landscapes that are rich in greenery and native flora and fauna species, yet, they are also attracted to nature, which they miss in their living context; this requires increasing efforts working on the individual and community level awareness and involvement. Moreover, it is agreed by many that nature restoration and reforestation improve the quality of life and fight climate change and global warming; whilst at the same time allowing social and economic development.

Although the targeted group's responses reflected that, they prefer none arid nature, their responses towards nature and biodiversity conservation state that they care and would like to participate in conservation initiatives, which assures the importance of awareness programs in arid regions for young individuals.

Conclusion

The study resulted in a conclusion on which forms of nature people prefer and use, and what is accepted, tolerated, or rejected. The survey questions illustrated the common understanding people have of nature, and how they perceive nature in arid regions. The young urban dwellers are mostly attracted to forms they miss in their surroundings; nature according to their perspective is associated with greenery and plants that grow in humid regions rather than arid ones. Furthermore, images of the most seen species illustrated the arid regions resident's choices on what to plant in their surroundings, the flora selection is associated with the gained benefits, aesthetic value, and religious and cultural factors, as shown when selecting the olives trees as the most seen tree in the participant's surroundings. Despite the arid conditions and lack of water availability, many participants are attracted to non-native plants that consume high amounts of water, and people tend to irrigate their plants regularly. Moreover, the survey illustrated that more than 82% of the participants prefer pristine landscapes outside the city context more than designed ones.

Nature is argued as the original ecosystem's natural state within a region; accordingly, naturalness in arid regions imposes planting the region's native plants that suit water scarcity in arid conditions. On the other hand, nature integration within cities improves residents' quality of life. Yet, activities on the governance and decision-making level should be initiated to regulate vegetation selection methods for both public and private spaces; the activities include creating policies and standards to allow the proper processes and actions while imposing regulations to organize the planning and development in urban areas to increase the integration of nature according to each plot area. Moreover, awareness programs help to spread environmental education in schools, and universities to increase social responsibility on the individual and local community levels. These initiatives allow protecting and conserving natural resources and protecting biodiversity in arid regions.

The effect of rapid population increases urban sprawl and threatens native nature, protections programs should be initiated to control the sprawl and regulate urban development without affecting native species negatively. Finally, governments should increase native nature integration and protection, and familiarize communities with proper nature integration and restoration activities.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

REFERENCES

Abu Lail D (2017). Jordan Youth Media Perception Survey, Ages 18 - 29. Networks of Mediterranean Youth Project. Amman, Jordan: UNESCO. https://www.netmedyouth.org/ (Accessed on 6th Nov, 2022).

Alfraih AA (2020). Wild medicinal plants and perennial forest trees. Retrieved 11 8, 2020, from http://www.ich.gov.jo/node/26716 (In Arabic).

Alrusheidat J (2004). Preventing Environmental Problems in the Arid and Semi-Arid Zones. Environmental Education is what we need. New Medit 3:50-54. https://newmedit.iamb.it/share/img_new_medit_articoli/146_50alrusheidat.pdf

Artmann M, Breuste J (2020). Urban agriculture—more than food production. In Making Green Cities (pp. 75-176). Springer, Cham. https://link.springer.com/chapter/10.1007/978-3-030-37716-8_4

Barwais F (2011). *Definitions of wellbeing, Quality of life and wellness.* National Wellness Institute of Australia. http://nwia.idwelness.org/2011/02/28/definitions-of-wellbeing-quality-of-life-and-wellness/ (Accessed on 23rd Oct, 2022).

Batt S (2009). Human attitudes towards animals in relation to species similarity to humans: a multivariate approach. Bioscience Horizons 2(2):180-190.

Beatley T, Newman P (2013). Biophilic cities are sustainable, resilient cities. Sustainability 5(8):3328-3345.

Bertin RI (2002). Losses of native plant species from Worcester, Massachusetts. Rhodora pp. 325-349. https://www.jstor.org/stable/23313508

Bhatti M, Church A, Claremont A (2014). Peaceful, pleasant and private: The British domestic garden as an ordinary landscape. Landscape Research 39(1):40-52.

Cárcaba A, González E, Ventura J, Arrondo R (2017). How does good governance relate to quality of life?. Sustainability 9(4):631.

Cincotta RP, Wisnewski J, Engelman R (2000). Human population in the biodiversity hotspots. Nature 404(6781):990-992.

Diener E (2000). Subjective well-being: The science of happiness and a proposal for a national index. American Psychologist 55(1):34.

Food and Agriculture Organization (FAO) (2009). Guideline for good forestry and range practices in arid and semi-arid zones of the near east. FAO Regional Office for the Near East. Cairo: Near East Forestry Commission (NEFC). https://www.fao.org/3/al040e/al040e00.pdf

Food and Agriculture Organization (FAO) (2020). The arid environments. Food and Agriculture Organization, United Nations. Rome, Italy: FAO, UN. https://www.un.org/en/delegate/get-caught-world-food-day-2021?gclid=Cj0KCQiA7bucBhCeARIsAIOwr--SI1v6-IONVvOi4HSVY33zhfVusUPsh2E7-YZphznIXP16k9Nf8bAaAvJtEALw_wcB (Accessed 14th Sep, 2022)

Fontinelle A (2022). Standard of Living vs. Quality of Life: What's the Difference. https://www.investopedia.com/articles/financial-theory/08/standard-of-living-quality-of-life.asp (Accessed 24th November,2022)

Hadadin N, Qaqish M, Akawwi E, Bdour A (2010). Water shortage in Jordan-Sustainable solutions. Desalination 250(1):197-202.

Hanle J, Singhakumara BM, Ashton MS (2021). Complex small-holder agriculture in rainforest buffer zone, Sri Lanka, supports endemic birds. Frontiers in Ecology and Evolution 9:608434.

Johnston D (2019). CANADIAN INDEX OF WELLBEING. Retrieved August 12, 2020, from https://uwaterloo.ca/canadian-index-wellbeing/about-canadian-index-wellbeing/wellbeing-canada

Keniger LE, Gaston KJ, Irvine KN, Fuller RA (2013). What are the benefits of interacting with nature?. International Journal Of Environmental Research and Public Health 10(3):913-935.

Kowarik I (2013). Cities and wilderness. International Journal of Wilderness 19(3).

Kowarik I, Langer A (2005). Natur-Park Südgelände: Linking conservation and recreation in an abandoned railyard in Berlin. In Wild urban woodlands (pp. 287-299). Springer, Berlin, Heidelberg. https://doi.org/10.1007/3-540-26859-6_18

Marten GG (2010). Human ecology: Basic concepts for sustainable development. Routledge. https://doi.org/10.4324/9781849776028

Martin MP, Woodbury DJ, Doroski DA, Nagele E, Storace M, Cook-Patton SC, Ashton MS (2021). People plant trees for utility more often than for biodiversity or carbon. Biological Conservation 261:109224.

McNeely JA (2003). Biodiversity in arid regions: values and perceptions. Journal of Arid Environments 54(1):61-70.

Olives_councel I (2018). The olive tree: the most important tree in jordan. https://www.internationaloliveoil.org/1082-the-olive-tree-the-most-important-tree-in-jordan/ (Accessed on 8th Nov, 2020).

Owczarek K (2010). The concept of quality of life. Acta Neuropsychologica 8(3):207-213.

Reif A, Walentowski H (2008). The assessment of naturalness and its role for nature conservation and forestry in Europe. Waldökologie, Landschaftsforschung und Naturschutz 6(3):63-76. https://afsv.de/images/download/literatur/waldoekologie-online/waldoekologie-online_heft-6-3.pdf

Ridder B (2007). An exploration of the value of naturalness and wild nature. Journal of Agricultural and Environmental Ethics 20(2):195-213.

RSCN (2013). The state of Jorda's birds. The Royal Society for the Conservation of Nature. Amman: RSCN. http://datazone.birdlife.org/userfiles/file/sowb/countries/SOJB_final_pdf.pdf

Temple SA, Wiens JA (1989). Bird populations and environmental changes: can birds be bio-indicators. American Birds 43(2):260-270. http://132.248.13.1/directorio/r/d_renton/pdf/22.pdf

UNCCD (2021). Managing Fragile Ecosystems: Combating Desertification & Drought. The United Nations, division for sustainable developement. UN. https://www.un.org/esa/dsd/agenda21/res_agenda21_12.shtml (Accessed on 8th Jul, 2021).

Unicef (2020). Jordan Youth. https://www.unicef.org/jordan/youth (Accessed on 13th Oct, 2020).

Van Veenhuizen R, Danso G (2007). Profitability and sustainability of urban and periurban agriculture (Vol. 19). Food and Agriculture Organization https://worldcat.org/title/462133272

WADI (2020). https://wadi-jordan.org/. https://wadi-jordan.org/ (Accessed on 29th Oct, 2020).

Watkins K (2006). Human Development Report 2006-Beyond scarcity: Power, poverty and the global water crisis. UNDP Human Development Reports (2006).https://ssrn.com/abstract=2294691

Wilson EO (1984). Biophilia. In *Biophilia*. Harvard university press. https://doi.org/10.4159/9780674045231

Appendix

Appendix 1. ANOVA result for the accommodation of young people and their selection of nature.

Place of Residence / Which one represents nature	City	Countryside	Desert area	Df	F	Sig
Wild native plants	2.92^{ab}	3.13^{b}	3.46^{a}	382,2	5.12	0.00
Densely built-up city center	2.87^{ab}	3.05^{c}	2.80^{d}	382,2	4.78	0.00
Waters in a mountain creek	3.11^{a}	3.65^{c}	3.79^{c}	382,2	6.38	0.00
Native vegetation in flowering aspect in spring	3.53^{ab}	3.04^{c}	3.39^{d}	382,2	6.20	0.00
Native vegetation in the dry season	2.21^{ad}	3.08	3.11^{ab}	382,2	4.00	0.00
Designed irrigated green in an urban park	3.10^{ad}	3.46^{c}	3.03^{d}	382,2	5.74	0.00
A spider	2.79^{cd}	3.13^{bd}	3.47^{d}	382,2	4.31	0.00
Sandy desert	3.61^{a}	3.14^{bc}	2.71^{b}	382,2	5.00	0.00
Arid mountains (accessible by infrastructure)	2.78^{ac}	3.69^{c}	3.40^{cd}	382,2	4.10	0.00
Lake with surrounding forest (non-arid region)	3.89^{d}	3.53^{c}	3.71^{b}	382,2	9.76	0.00
Native coniferous forests in semi-arid region	3.72^{b}	3.18^{a}	3.33^{cd}	382,2	8.83	0.00
A snake	2.45^{cd}	2.99^{d}	3.16^{b}	382,2	4.05	0.00
Urban residential neighborhood with street trees (low building density)	3.18^{d}	2.87^{b}	3.21^{ab}	382,2	3.85	0.00
Cactus plant	3.26^{ab}	3.07^{d}	3.56^{a}	382,2	6.12	0.00

Source: Authors

Appendix 2. ANOVA result for the accommodation of young people and participation in vegetation conservation (by irrigation).

	Where to live / Irrigation in the urban surroundings	City	Countryside	Desert area	Df	F	Sig
YES	Every day	3.61^{b}	3.87^{bd}	1.68^{a}	382,2	3.32	0.00
	Twice a week	2.79^{ab}	3.65^{c}	2.80^{d}	382,2	5.82	0.00
	Once a week	3.80^{a}	3.51^{c}	3.03^{b}	382,2	3.28	0.00
	Rarely	3.54^{b}	3.33^{d}	3.11^{cd}	382,2	2.65	0.00
NO IDEA	We don't have a house garden or trees on my street	3.08^{ab}	3.54^{c}	3.78^{d}	382,2	4.87	0.00
NO	The Plants rely on rain season	2.95^{d}	3.53^{c}	3.71^{b}	382,2	2.43	0.00

Source: Authors

Appendix 3. ANOVA result for accommodation of young people and their preferred of outdoor quality in the surrounding.

Where to live preferred outdoor quality in the surrounding	City	Country side	Desert area	Df	F	Sig
Forests with native plants and animals	3.87^{b}	3.21^{bd}	3.46^{b}	382,2	5.45	0.00
Designed landscapes, gardens with non-native plants	3.34^{ab}	3.10^{c}	2.80^{d}	382,2	5.06	0.00
Shopping centers, malls and city recreational facilities	3.11^{a}	3.25^{c}	3.18^{c}	382,2	4.21	0.00

Source: Authors

Appendix 4. ANOVA result for preferred outdoor activities and their preferred of outdoor quality in the surrounding.

Preferred outdoor activities / Preferred outdoor quality in the surrounding	Picnics	Jogging, walking, and cycling	Driving along with the car and watching surrounding	Df	F	Sig
Forests with native plants and animals	3.79[b]	3.21[bd]	2.19[b]	382.2	7.02	0.00
Designed landscapes, gardens with non-native plants	3.41[ab]	4.23[c]	3.14[d]	382.2	5.66	0.00
Shopping centers, malls and city recreational facilities	1.54[a]	3.67[c]	3.91[c]	382.2	4.67	0.00

Source: Authors