

## Aridity and Landscape

### Evaluation of the Landscape Indices in Drylands\*

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**Abstract** | Today, drylands account for one third of the earth grounds. The international nature conservation union defines the drylands as the regions with water shortage that might have limited precipitation or rainfalls for a short period of time. According to the climatic conditions and the daily increasing interventions of human beings in the ecosystems; and, considering the unbridled expansion of the cities, aridity and desertification and the grounds of its emergence, i.e. dry and arid lands, and the way the human beings treat it has become a hot topic of the day and a major concern of the landscape architects and theoreticians and environment supporters. However, the thing that has been so far carried out is the interpretation and evaluation of these grounds within the framework of a solely climatic and occasionally ecologic subject wherein the role of the human beings as the addressee influencing and influenced by it has been ignored or underestimated. The present study uses a qualitative method based on logical reasoning through library research to review the related literature on the subject within the area of the landscape perception process and seeks to offer a landscape-based mindset and showcase the objective-subjective potentials of the dry grounds within the format of arid landscapes. To do so, use has been made herein of an objective theory within the format of “visual lands” and a subjective theory within the framework of the ideations by Jacobs (2006) in order to reach answers for the study questions due to the fact that there are specified and codified indices available for evaluating landscape. The evaluation and analysis of the visual and mental indices of the drylands in these two formats is reflective of the idea that there is compatibility with the intended indices in the evaluation of the physical and biological indicators of the dry grounds, including morphology, vegetative cover, texture and color, and that these natural grounds can be realized as transcending beyond the solely climatic and environmental framework and grant them a landscape identity.

**Keywords** | Aridity, Dryland, Objective perspective, Subjective perspective, Arid landscape.

**Introduction** | Landscape expands a vast spectrum of meanings from its general expression to geographical, regional, local and real estate expressions. Such an attitude towards the meaning of landscape is indicative of the idea that the term “landscape” can be used in various methods according to various perspectives. Many of us have a visual sense of the term “landscape”

(Turner & Gardner, 2015, 1). As it is stated by Forman (1983), this scale can vary from a small pond or fire in front of a house to a river or a desert. In all of these cases, visual sense includes various kinds of elements incorporating landscape, changing through time and dynamic-ecological effect.

On the other hand, in order to design landscapes in certain climates with respect to the physical effects that may be brought about by them, climatic perceptions are of great importance. It is important for us to say

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that our perceptions of the weather and climate depend on our prior information and knowledge about the physical environment and that the study of such a topic is necessary for the investigation of climatic changes (Calleja, 2015, 15). If we have sufficient knowledge about our physical setting, if we perceive the climatic reality and if we imagine it, we will be able to figure this important issue that all our daily activities pertain to the weather and that it is essentially climate that expresses itself not only in the form of landforms but also in the form of atmosphere, flora and fauna (Stegner, 1992, 46). Therefore, since the nature differs subject to the effects of the natural, geographical and regional factors, it is highly important to pay attention to grounds in the landscape architecture. A landscape architect is in the first place in need of understanding and comprehending the place that has transformation and instability as its integral parts. S/he has to at least investigate factors like society, economy and ecosystem in regard of the geological, ecological and climatic properties (Harvey & Hopkins, 2005, 61).

One of the types of ecosystems that has recently drawn the architects' attentions is dry grounds (Drylands and land degradation, 2017). Half of the countries around the globe have parts of their lands and/or all their lands in dry environments, including very arid, arid or semi-arid regions that account for nearly one third of the earth surface. Arid ecosystems differ in terms of the climatic conditions, soil, vegetative cover, animals and people's activities (Wale & Dejenie, 2013, 278). Different experiences are witnessed under the influence of such a diversity in the audiences' perceptual grounds.

Thus, it is very important for the landscape architects in both their designing and reclamation approaches to pay attention to these grounds and their potentials and properties. This is why Wallace Stegner states that if we fall short of performing environmental studies before taking any measures in line with landscape designing, we can be dangerous to the place while loving it.

On the other hand, the lifestyle characteristics depend on the mental perception, living place and social status with the references, turning points and climatic values creating the subjective knowledge (Calleja, 2015, 16). One of the most important phenomena accounting for 35-37 percent of our planet and/or about 45 square kilometers is dry grounds or drylands wherein 15% to 20% of the world population lives.

### Research questions

This research aims to answer the following key questions: Is dryland a landscape? And if yes, how are its objective and subjective perceptions described?

### Research background

The expression "dryland" has been defined by Baro as "the environments that are permanently, seasonally or temporally influenced by considerable shortage of humidity" (Mainguet, 1999). In general, three overall geographical, ecological and landscape sets can be mentioned in the investigation of the aridity and drylands (Table 1):

From the perspective of the geographical theoreticians, there is no comprehensive definition for dryland and aridity due to the following reasons (Mohammadi, 2011, 10-11):

- Dryness is the trait of a climate;
- Land borders and arid regions are conventional subjects and do not follow a unit scale and criteria;
- The factors creating the arid climates are diverse and numerous and the recognition of all these factors and their roles is difficult;
- Multiplicity and diversity of the arid regions' properties;
- The possession of somehow abundant temporal and spatial fluctuations of some effective factors;
- Inadequacy of the meteorological stations.

In biological viewpoints as well as from the socioeconomic perspectives, since the properties and constraints that can explain the drylands include weather, drought, soil, water and biodiversity (Wale & Dejenie, 2013, 277), drylands and aridity types are not identical hence experienced to the extent of water shortages (Safriel & Adeel, 2005, 626). There are also limited sources that investigate the arid regions' landscapes within two formats of dryland landscape and arid landscape with the latter being realized as unique and possessing a spirit of place.

### Research method

The present article uses a qualitative strategy and logical reasoning to make a coherent review of the literature on "landscape perception process" thereby to investigate the arid grounds as a landscape type. Then, the indices extracted from the literature on this subject are utilized to compare and analyze the elucidated indicators.

### The Process of Landscape Perception by Audience

The individuals perceiving the landscape as an observer see it with its objective identifiable structural properties that constitute the "objective perspective". On the other hand, "subjective perspective" is focused on the individuals' mental understanding and their needs and perceptions as supported in the psychological theories (Heijgen, 2013, 33). Therefore, the conception of a landscape is the result of the mutual evolutionary and biological interaction between the landscape's physical structure and the individual's experience (Fig. 1).

Table 1: Classification and typology of the study background. Source: Authors.

Typology of the related works	Perspectives	Properties
Aridity in the geographical resources	Aridity is a sort of permanent climatic attribute in a region that includes insufficiency of precipitation to the required limit (Alijani & Kavyani 2004 & Mohammadi, 2011, 8)/low periodical precipitation in a region (Bruner (Khaledi, 1995) /typical nature of climate in respect to low precipitation that does not satisfy the plants' needs for striving (Khaledi, 1995 & Mohammadi, 2011, 8))/aridity is not a uniform concept and plants react differently to it largely depending on the growth stage wherein aridity comes about (Hahn & Manabe, 1975, 15-41 & Mohammadi, 2011, 10).	Dry grounds and lands as a climatic phenomenon
Aridity in ecological resources	Arid ecosystems have biphasic mosaic structure comprised of more or less patches (Aguiar & Sala, 1999, 273)/aridity is an image of drylands in adaptation to the water shortage (Maliva & Missimer, 2012, 21)/arid ecosystems are diverse in terms of climatic conditions, soil, vegetative cover, animals and people's activities (Wale & Dejenie, 2013, 277)/water is the key to the aridity perception but it simultaneously means physical changes in land that are determined by means of climate, vegetative cover and soil processes (European Commission, n.d.).	Non-uniform and diverse ecosystems in relation to human beings
Arid regions' landscape	Arid landscape's architecture offers unique solutions to six primary aspects: general personality, shelter for comfort, use of water, nature, culture and protection (Ivanir, Lisovsky, Orenstein, 2015, 168) /in fact, aridity is a term that covers a vast spectrum of landscape searches (Maliva & Missimer, 2012, 21-22)/spirit of place "is often unique and robust with its dominant geology being visible through rare vegetative covers" (Aronson, 2008, 394)/individuals feel threat, loneliness and/or being lost in vast horizons or they are generally attracted to them. (Sage, Morris, Rofe, Orenstein & Grner, 2013, 38-48).	Unique natural environment possessing a spirit of place

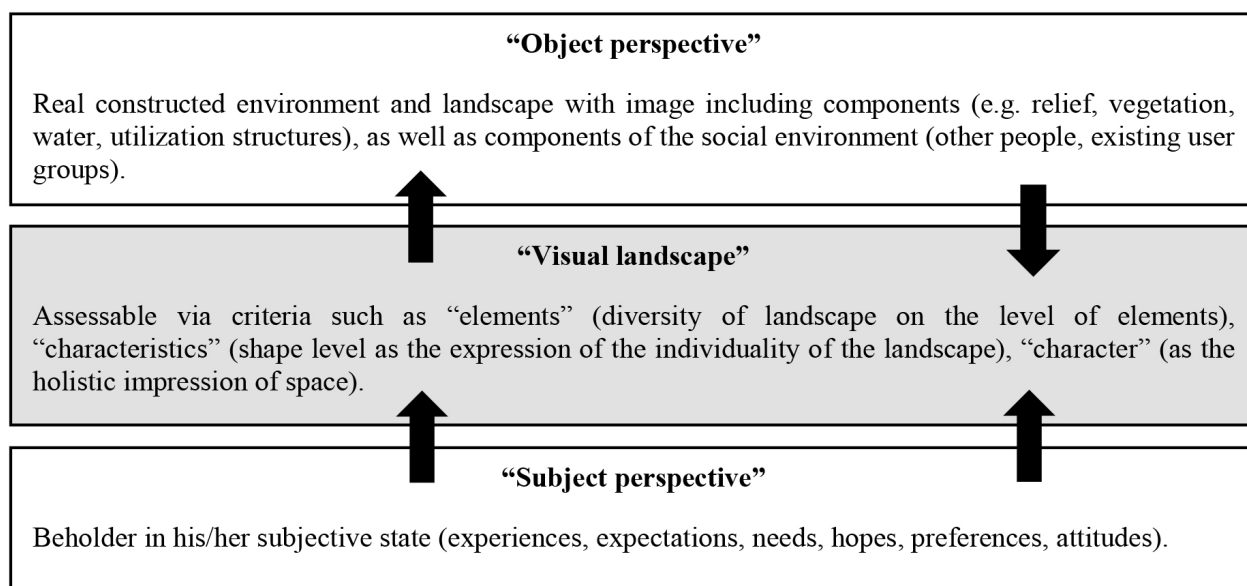


Fig. 1: Formation of the perceived landscape's imagination as a product of the interaction between objective and subjective landscape. Source: Heijgen, 2013, 33.

### • Objective perspective

Landscape quality is obtained from what observed in the landscape by the observer (Tveit, Ode Sang & Hägerhäll, 2012, 40). Thus, visual distinction is an important element in making decisions about the quality

of landscape. Tveit & Ode Sang (2006), a professor from agricultural sciences department, have interpreted the human beings' visual perception of landscape within the format of visual lands whose indices have been used for analyzing the visual qualities in a landscape. The visual

landscape evaluation in this framework is carried out based on the following concepts:

- 1) Stewardship: feeling of order and protection, human perception through active and exact management.
- 2) Coherence: unity of a scene, repetition of color and texture patterns, communications between the land use and natural conditions.
- 3) Disturbance : absence of contextual consistency and proportion in the structures and interventions
- 4) Historicity: historical continuation and historical richness, various temporal layers, extent and diversity of cultural elements.
- 5) Visual scale (landscape rooms and perceptual units): size, form and diversity of them as well as the degree of their openness.
- 6) Complexity: diversity, richness of elements and landscape properties; pattern deviation.
- 7) Naturalness: closeness to the predicted natural state.
- 8) Imageability: properties of a landscape existing in the whole landscape or in its constituent elements. Signs and special properties of both natural and cultural types, strong visual images for the observer and creation of distinguishable and memorable landscapes.
- 9) Ephemerality: change with the season and weather.

In fact, two points are very important in the studies of the landscape perception: that which element of landscape is to be concentrated in a certain situation or how it is when the discussion is related to such properties as proportion, supervision, classification and land cover (Tveit, Ode Sang & Fry, 2006, 44, 45). But, where would be the feeling point when your imagination of a landscape is only pictorial? For example, when the people are asked to explain their love for a special place, their description will be focused on the sounds of birds or water and/or their feelings of sand on the ground. Thus, some authors place more emphasis on the landscape and individual senses and recount landscape as “the unity perceived in the periphery of an individual through senses” (Heijgen, 2013, 34). Therefore, the audience interacts with landscape through his or her objectivity in addition to his or her subjectivity.

#### • Subjective perspective

According to Bell (1996), perception is the “activity performed in the brain for interpreting the senses”. This is not solely a real report rather it is the tendency

for participation and expectations in the audiences’ mind (Oxford Dictionary, 2013, s.v. “perception”). The way we perceive the landscape is always a combination of the realities, memories and objective expectations. In addition, Burassa (1988 & 1990) expresses that the landscape perception is determined by biological, cultural and personal indicators. The following diagram illustrates a simplified process of perception (Fig. 2): Experience is a qualitative aspect of Consciousness and it has been possibly truly described as a feeling (Karmanov, 1999 & Heijgen, 2013, 34). Chalmers writes: “when you look at a screen, you are aware of it and directly experience its images and words as part of your personal and mental life. It is via the blending of these experiences that Consciousness is created” (Chalmers, 1995 cited in Jacobs, 2006). Anyway, experience might be different at any instant though all of them may have a reality known as Consciousness. It seems that the theory proposed by Jacobs (2006) is one of the most appropriate theories on the quality of the landscapes’ mental perception and the multiple properties of the Consciousness and experience he has classified and interpreted as explicated beneath (Heijgen, 2013, 35-36):

- 1) Subjective: Consciousness is subjective. We do not have access to the experience of another person, we only have direct access to our own minds. Therefore, consciousness is essentially subjective. (Jacobs, 2006).
- 2) Qualitative: Consciousness is qualitative.
- 3) A Unity: Consciousness is a unity. All conscious experiences become part of one unified conscious field. A state of consciousness at a particular moment is not separated into different parts.
- 4) A process: Consciousness is a process. The contents of consciousness constantly change. Two moments of experience are never completely the same.
- 5) Continuous: Consciousness is continuous. We always experience, except when we fall asleep, go into coma or die.
- 6) Structural: Consciousness is structured. Regularities are found in our experience. We structure images, which makes us able to experience different objects and classify them.
- 7) Intentional: Consciousness is intentional. With other words, it is impossible to be conscious without experiencing something. Even when you close your

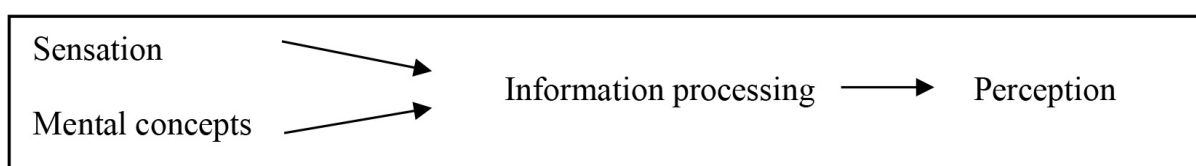


Fig. 2: Perception is an experiential process of the subjective concepts and senses. Source: Heijgen, 2013.

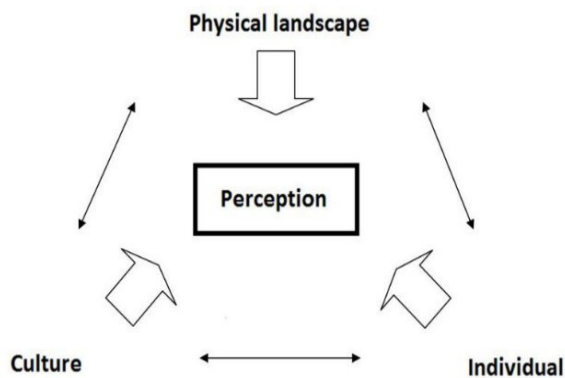


Fig. 3: Structure of Gestalt performance in audience's mental perception. Source: Heijgen, 2013, 37.

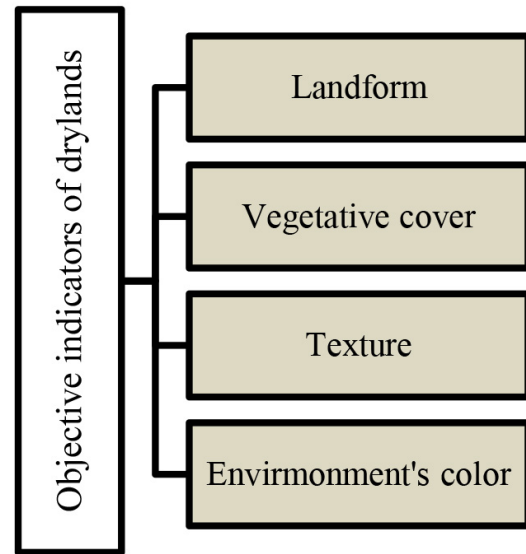


Fig. 4: Visual indicators of drylands. Source: Authors.

eyes, you will not be able to stop experiencing.

8) Coms in a mood: Consciousness comes in a mood. At every moment we experience, we are in a particular mood, whether bored, excited, sad, happy, etc.

9) Has a centre and periphery of attention: Consciousness has a centre and periphery of attention. We are able to influence our consciousness to switch between aspects, or details of the contents of our consciousness.

10) Possessing a Gestalt structure: Consciousness has a Gestalt structure: we tend to integrate loose stimuli into a coherent experience (Heijgen, 2013) (Fig. 3).

Thus, it seems that there is a need for human judgments, on the one hand, and biological and physical properties of the natural environment, on the other hand, for perceiving a natural environment. The natural landscape explains the physical landscape through referring to the physical effects of the landforms (morphological patterns), water, soil and vegetative cover; the drylands and arid grounds are also no exception to this rule and they can be investigated in terms of the following four indicators (Fig. 4):

### Drylands

The term "aridity" can be found in a vast spectrum of the texts differing in various cultures and historical epochs. To some, aridity is associated with barren lands while some others take it as the source of biological, cultural and aesthetical richness (Wescoat, 1990, 11). This term is associated in the minds of the majority of the people with a conceptual image of the drylands encompassing a vast spectrum of different manifestations of landscapes such as rocky hills and fruitless moors, weak vegetative cover with plants resistant to water shortage, areas of sand and gravel and sandy hills, low volumes of water and waterless

fields, low precipitation and high temperature (Maliva & Missimer, 2012, 21, European Commission, n.d). The Iranian human being is not only an exception to this axiom but s/he also unconsciously associates aridity in his mind with desert and wilderness since a vast part of our country is composed of arid and semiarid regions and such a perspective towards desert and wastelands is not necessarily negative rather signifying the direct participation of the individuals in such landscapes the same way that a large number of Iranian landscape types have been formed and developed in the desert regions and this is per se indicative of such a viewpoint since long ago not only in the Iranian individual's mentality but also in his or her tradition and culture, as well.

Aridity grants personality more than anything else to the arid region's landscapes (Stegner, 1992, 46) and transforms them into a display screen with utmost beauty exhibiting colors, properties and rocky structures (Petersen, 2012). Dettown underlines the uniqueness of the arid grounds in the following words: "you should have a non-human scale beyond the green color; you should put the beauty of gardens and grasslands away and know the geological time" (Stegner, 1992, 47) (Fig. 5).

### • Morphological patterns in drylands

These regions are exposed to wind erosion due to scarce vegetative cover. The runoffs' erosion also occurs in these regions. Thus, the sure thing is that landform appears in these regions differently from other places (Petersen, 2012) (Fig. 6 & 7). Thus, these grounds pave the way for the emergence of different and diverse qualities of morphological contexts.

The two general morphological (tectonic) patterns that form the drainage basin of these regions are ridgeline and trough line and shield and platform (Wilkinson, 1967, 81) (Fig. 8). In the type of landscape embracing





Fig. 5: Kinds of landscape in drylands. Source: Maliva & Missimer, 2012, 22.

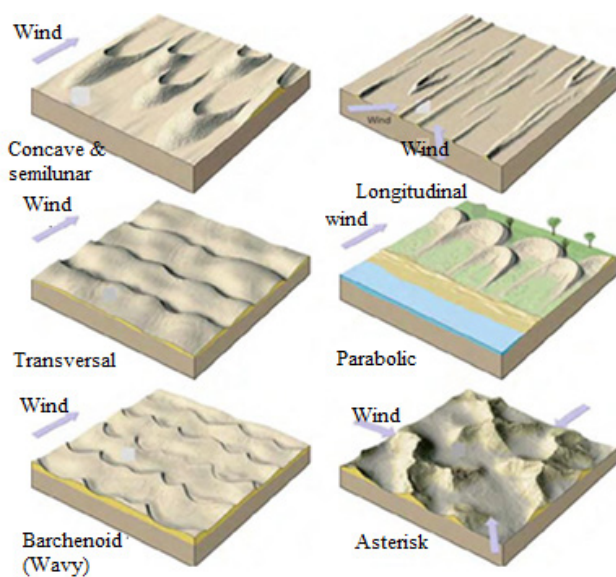


Fig. 6: Types of visual qualities as a result of wind erosion in hot and arid regions. Source: Brookfield, 2011.

ridgeline and trough line, visual indicators like water, shade, topography and slope are identifiable (Fig. 8a). But, in the platform and shield type, there is a very small elevation distinction (Wilkinson, 1967, 82). So, in this type of landscape quality, it is difficult to detect visual indicators like shade and topography (Fig. 8b).

#### • Vegetative cover pattern in drylands

Arid ecosystems have biphasic mosaic structures consisted of more or less patches. In the dry regions, water shortage controls the plant growth and diversity. The plant patterns in the arid ecosystems are specified based on the size, form and spatial distribution of the vegetative cover segments. These patterns are defined using two terms “tiger” versus “leopard” vegetation (Aguar & Sala, 1999, 274).

In fact, water shortage leads to asymmetrical vegetative cover that is often seen in the form of stripes, spots and labyrinths comprised alternatively of scarcely vegetated and barren lands (Mander, Dekker, Li, Mio, Punyasena & Lenton, 2017) (Fig. 9).

#### • Texture in Drylands

Arid landscapes have a limited crust consisted of weak organic materials and varying structures from clay to sand and gravel and the sedimentation and erosion of the soil particles and vegetative patterns have caused



Fig. 7: Visual qualities obtained from erosion in the hot and arid regions: Right: valley of stars in Qeshm , Left: Lut Desert.  
Source: [www.seeiran.ir](http://www.seeiran.ir); [www.karnaval.ir](http://www.karnaval.ir).

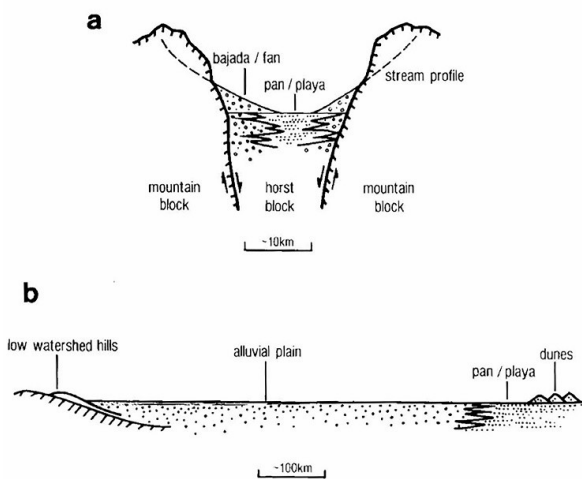


Fig. 8: desert landscapes morphostructural patterns of desert landscapes: a: ridgeline and trough line and b: shield and platform.  
Source: Wilkinson & Mabbutt, 1977.

considerable changes in the soil texture in this landscape and lead to inhomogeneous spatial distribution, variable soil permeation capacities, changeable runoffs and different erosion rates. This distribution influences the topsoil's physical status and vegetation patterns and causes the formation of texture. The biological soil crusts in the arid regions are diverse from surficial textures to the ones substituted in the course of time and/or from fine-grained textures to coarse-grained ones (Ferrenberg, tucker & reed, 2017, 3) (Fig. 10).

#### • Color in Drylands

Dryness neutralizes and restricts the earth's pigments, creates brilliance and garnishes and expands stars (Stegner, 1992, 46). It seems that the drylands can be classified in a spectrum from khaki brown colors to light cream and, on the other hand, it can be stated that green and blue are colors symbolizing such a landscape (Fig. 11).

#### Qualitative analysis of study subject

Based on what was investigated in the theoretical

foundation, it can be stated that there is a need for conscious experience in order to be able to perceive a natural environment as a landscape and this can come about when the awareness and experience are amalgamated and lead to "the perception of the quality seen". Such a perception is attained through concomitant interlacing of the visual and mental indices through experience in an environment in the audience's mind (Fig. 12).

On the other hand, Craik & Feimer state that the identification of criterion attributes 'usually implicates values and valuation, which can be (Coeterier, 1996 & Heijgen, 2013, 33). Therefore, the evaluation of the visual and mental indices in the arid grounds can assist us in reaching an answer to the study question.

#### The investigation and evaluation of the visual-objective qualities in drylands

To evaluate visual indicators of Drylands, the adaptation of the physical components of morphology, vegetation, texture and color of these lands is examined in (Table 2). According to Evaluation Table 2:

- 1) In Stewardship index, morphology does not match like other indicators except for the habitable places or their adjacencies.
- 2) In coherence index, morphology is compatible due to the possession of repetitive patterns in texture and color and structural unity as a result of phenomena. Vegetative cover is also compatible due to the possession of the repetitive patterns and structural unity based on the two patterns. Color and texture indicators also match due to the possession of a specific spectrum in the given regional scale.
- 3) The visual indicators are also found not matching the Disturbance index of the drylands like other indicators unless inappropriate human interventions are made therein.
- 4) As for the Historicity, the three indicators of morphology, vegetative cover and texture match is found not matching due to the possession of climatic-temporal



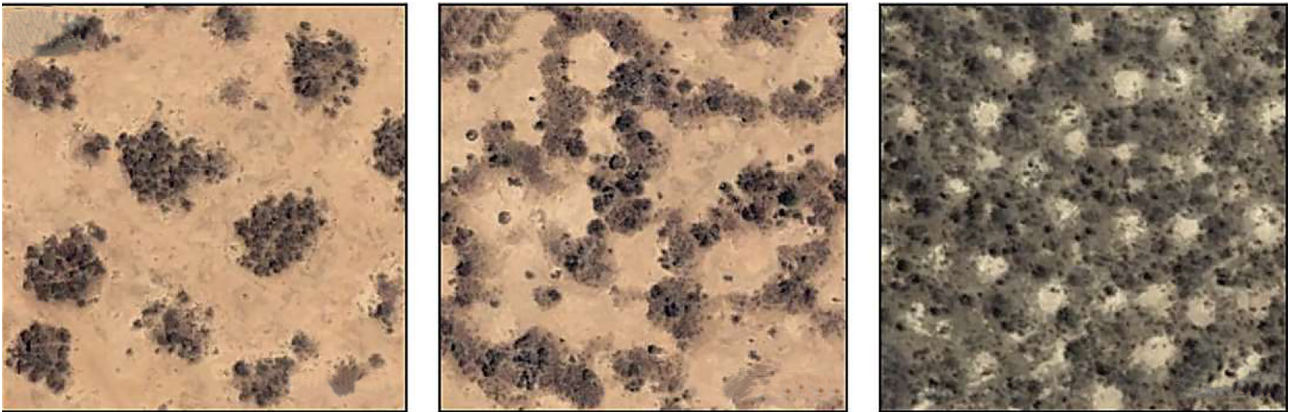


Fig. 9: Vegetative cover patterns in satellite images, Left: spots, middle: labyrinth, Right: gaps. Source: Mande et al., 2017.



Fig. 10: Various kinds of fine-grained and coarse-grained and vertical and horizontal textures in arid regions. Source: Ferrenberg et al, 2017.



Fig. 11: Color tonality in arid grounds: A: Hormuz Island, B: Kalat Shahdad. Source: [www.karnaval.ir](http://www.karnaval.ir).



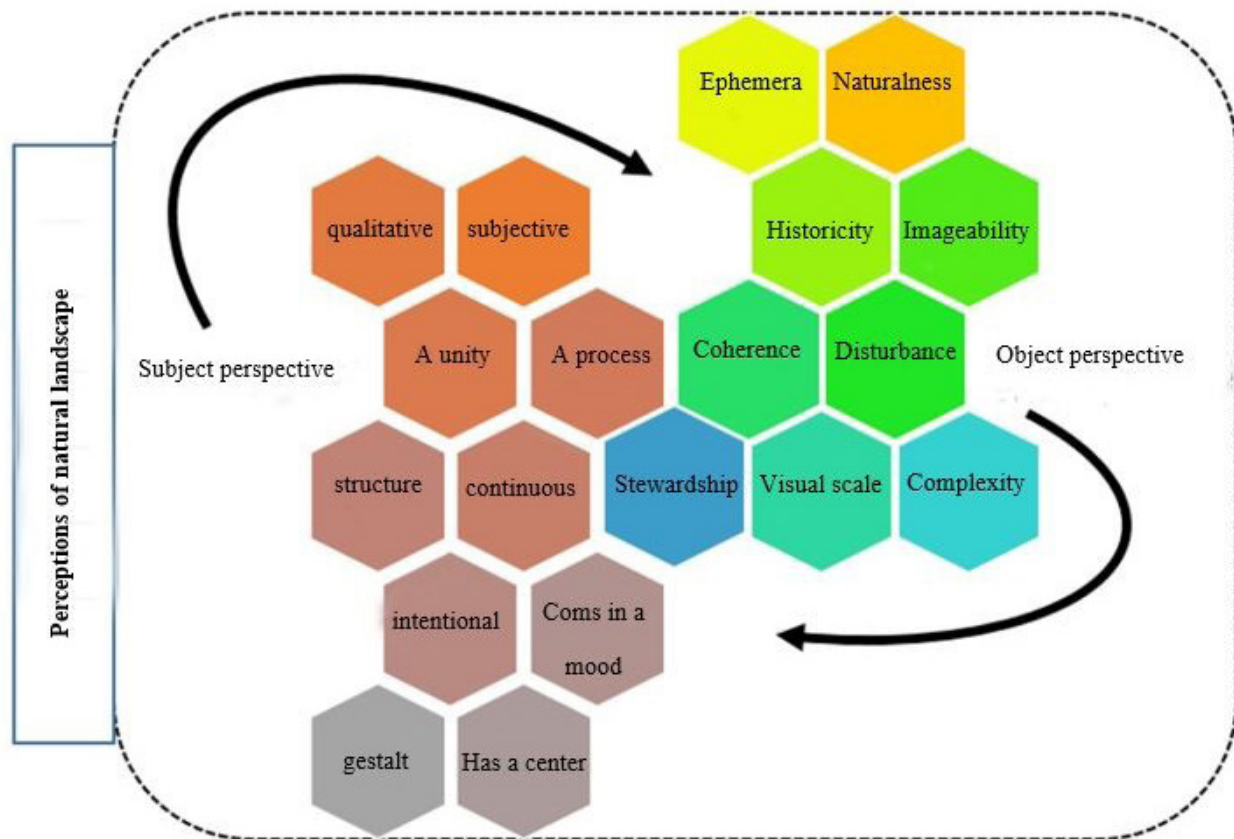


Fig. 12: landscape perception happens through concomitant comprehension of the visual and mental indices. Source: Authors.

Table 2: Visual evaluation (matching the visual indices with visual indicators of arid grounds. Source: authos.

Indicator	Stewardship	Coherence	Distur- bance	Historicity	Visual scale	Complexity	Natural- ness	Image- ability	Ephemera
<b>Morphol- ogy</b>	Mismatch	Applicable (A)	Mismatch	Match	Match	Match	Match	Match	Match
<b>Vegetative cover</b>	Mismatch	Match	Mismatch	Match	Match	Match	Match	Match	Match
<b>Texture</b>	Mismatch	Match	Mismatch	Match	Match	Match	Match	Match	Match
<b>Color</b>	Mismatch	Match	Mismatch	Mismatch	Match	Mismatch	Match	Match	Match

layers in their structure and color.

5) All four indicators have structural patterns in the form of perceptual units as a result of the phenomena; due to the same reason, they are found matching with the visual scale index.

6) In the evaluation of the complexity index, it can be stated that all of the indicators except color have structural diversity and elemental richness. In regard of morphology and texture, compatibility occurs in the form of native physical structures. Compatibility also occurs for vegetative cover due to the vernacular species.

7) Drylands have unique and distinguishable structures in their indicators due to the special effects of the climatic phenomena. These indicators are visually very strong and

emphasize their own grounds and this makes them in consistent with imageability index. It is worth mentioning that it is possible to foreground the grounds through vegetative cover and water due to the neutrality of the grounds in these regions so the road is paved for their acceptance of roles.

8) It has to be stated in the end that these drylands like the other natural grounds are compatible as a result of such seasonal and natural phenomena as irregular and seasonal precipitations in terms of naturalness and ephemerality, especially in their vegetation and water institutions.

On the other hand, it is clear in an evaluation of the drylands' mental indices that have been given in Table 3 that the drylands are essentially consistent in some of

their indices like permanence and intentionality like any other natural environment. As for the other indicators, as well, consistency comes about in a unique manner in the audience through experiences and preferences and so forth and some examples of such an accord have been presented in this table for better perceiving the subject.

## Conclusion

Based on what was generally investigated in three approaches in the study background section, it can be stated that the geographical definitions that have unidirectional approaches towards precipitation in their analyses and descriptions of aridity and dryland are solely based on climate; hence, it is not possible to offer a comprehensive definition of the aridity and drylands and no border can be delimited for it.

But, the environmental perspective goes beyond such an element as water and realizes drylands as identifiable in ecological mosaics and gives them physical properties specific to them. Therefore, in this perspective, not only drylands are demarcated but also morphological scales are applied in addition to the climatic criteria for describing them. It seems that drylands follow identical rules featuring different qualities in the structures of their ecological network subject to the effect of natural phenomena. Due to the same reason, they have diverse properties in their threefold institution. In this approach, the relationship between the audience and the arid ecosystems has been explored only in the area of environmental pathology and economy and this has per se led to the negligence of

the perceptual effect of these grounds on the minds of the audience and the currently bilateral and undeniable relationship between the human beings and the nature. However, such a lack has not only been correctly posited in the landscape of the observers through taking the effective and unique properties of these landscapes into account but the attentions to the climatic perceptions also go beyond the objectivity and examine the mental perceptions that are specific to these landscapes, as well, and a combined landscape influenced by the constant interaction between the physical landscape, ecosystem and human beings is put forth. Such a perspective can form a basis for producing form and content within the format of landscape change and difference due to its comprehensiveness and this per se results in the designing and revitalization of these grounds towards sustainable development of a social and economic living environment (Fig. 13).

On the other hand, it can be observed in an investigation of the visual and mental indices of landscape in the drylands and in an evaluation of the properties of the drylands through visual indices within the framework of visual lands that these arid regions are compatible in most of their characteristics to these indices and that they can be studied in the area of a visual landscape. This same issue also occurs for the case of the mental indices proposed in the theory by Jacobs (2006) and the ground is set for investigating the mental landscape consequently. Thus, the grounds of the hot and arid regions can be realized as objective-subjective landscapes and explored them within the framework of the observer's landscape.

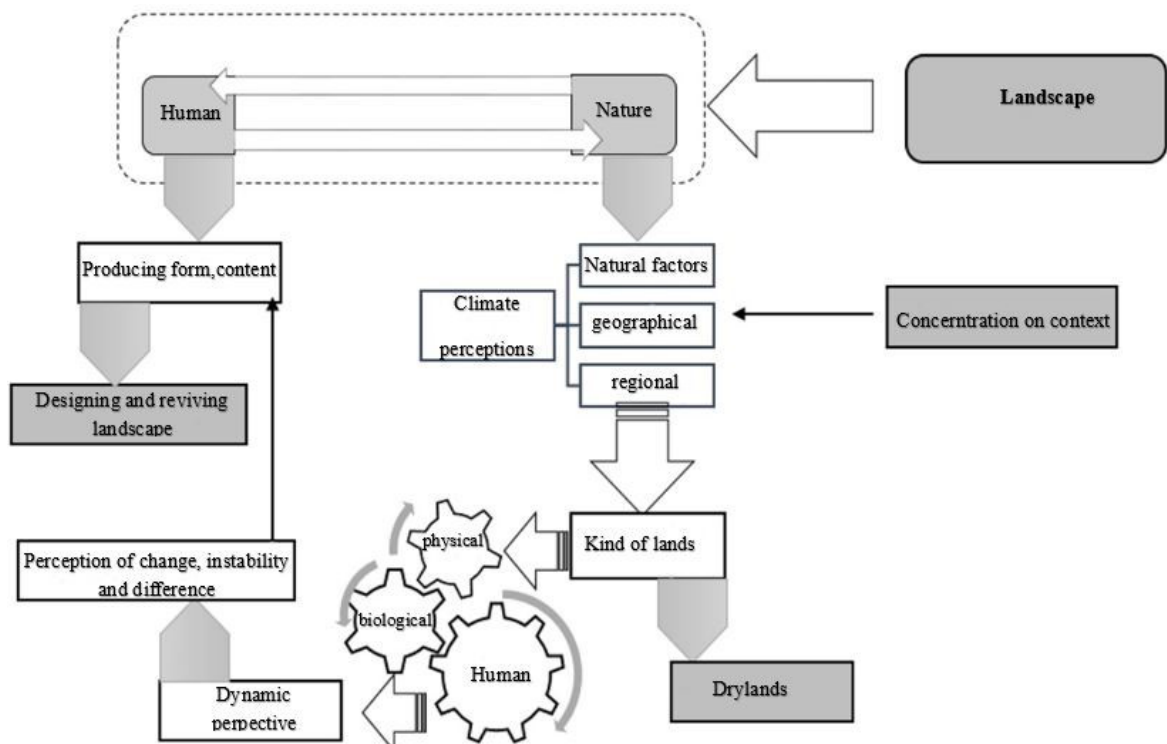


Fig. 13: combined perspective towards landscape in respect to the relationship between the human beings and the drylands. Source: Authors.

Table 3: mental evaluation (matching the mental indices of the drylands). Source: Authors.

Perceptual perspective	Match	Explanations
subjective	Yes	Unity/sense of belonging/necessity/eternal order/huge and unexampled value of the cloudless sky (that is rarely experienced amongst the rocks and trees); scorching sun that causes little shade availability and hot and arid weather that tells us how important is respiration for experiencing the place (Noghrekar, Dehghani Tafti & Hamzehnejad, 2012, 27, 29, 30). In addition, the audience's perception of water and rain is very different in the arid regions than those in the humid region. Thus, the water perception reality would be different in environments with different climates.
Qualitative	Yes	Simple and few phenomena/continuous nature/vivid absolute and eternal order/persistence and structure/abstract order (Noghrekar et al., 2012, 29-30). It is the aridity that causes the plants to evolve like statues in lieu of a surficial grassland (Stegner, 1992, 46).
A Unity	Yes	It is in the arid regions that causes an accentuated feeling of the wind that passes over a hill and makes all the various aspects of an instant be uniquely experienced (Calleja, 2015).
A process	Yes	We adapt to the seasonal changes and our perceptual realities advance us in line with the natural environment (Calleja, 2015, 31). The goal of the audience's experience is identical (Stegner, 1992).
continuous	Yes	Spatial experience is formed for the audience continuously since the time they attend the drylands and/or since they appear to them.
Structural	Yes	As it was investigated, the perceptual index holds true for the physical indicators of the arid landscape due to their uniqueness. Uniformness and absolute order/blending of the logical system/rationality and abstractness/not imaginary and not compromising/static and not dynamic/distant/disclosing of a hidden order/uniform and isotropic/meandering labyrinth spaces/geometrical space/geometrical complexity/pure color and scarce vegetative cover and water shortage (Noghrekar et al., 2012, 29-30).
Intentionality	Yes	There is no possibility for stopping the experience.
Coms in a mood	Yes	In these regions, we can witness a more complicated and changeable human-herd specific transformation and distributed biomass in an unequal manner (Mohammadi, 2011, 10; Dresch, 1994). Individuals usually put on clothes with light colors.
attention center	Yes	As it was examined, water is the key and effective element in the formation of drylands. Thus, water can be the focal point of attention in perceiving aridity. Water is always existing on earth and in the sky even in the driest places (Peel, 1965, 1).
Gestalt Structure	Yes	The landscape itself does not inherently possess perceptual properties and it is the living beings only that grant it a value. Therefore, the individuals who experience the aridity effect would be surely better capable of defining the dryland.

## Endnote

\* This article is taken from the "Mina ghassee" Master thesis entitled "Dry landscape (Ecological Restoration the shiraz khoshk river)". This was done under the guidance of Dr. Mehdi Sheybani and Dr. Amin Habibi, and the consultation of Dr. Ali Goli. on the date of November 27, 2019.

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