SUSTAINABLE LANDSCAPE DESIGN IN ARID CLIMATES

THE AGA KHAN TRUST FOR CULTURE

A SYMPOSIUM

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SUSTAINABLE
LANDSCAPE DESIGN
IN ARID CLIMATES

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" IRANIAN GARDENS ARE HISTORICALLY RENOWNED. THE IDEA OF A GARDEN AS PARADISE IS CENTRAL TO THE CONCEPTION OF THE PERSIAN GARDEN, AS WELL AS TO GARDENS AND PARKS AROUND THE WORLD. "

SUSTAINABLE DEVELOPMENT IN TEHRAN

Gholam Reza Pasban-Hazrat

Iran is comprised of mountainous regions, deserts, and foothills. High mountains surround it on three sides and in the centre of the country there is a vast desert. Many major cities are situated along the margins of this mountainous crescent encompassing a large circular area of desert, the *dashte Kavir*; Tehran is one such city.

Through thousands of years of history, Iran has had to deal with environmental problems resulting from its natural environment, including water shortage, drought, and mountain floods. The significance and value of water is reflected in all the religions that have prevailed in Iran. Water is considered sacred.

BAGH SANGI JAMSHIDIEH, TEHRAN, IN IRAN, AN EXAMPLE OF A NATURAL MOUNTAINOUS GARDEN, WHICH INCORPORATES CONCERNS FOR SUSTAINABLE DEVELOPMENT.

Iranians have been very inventive in tapping water resources and have made optimum use of underground waters. An Iranian engineering innovation, the *tar* system, was a means of conducting water, without using any mechanical equipment, via tunnels dug deep underground through which water was conducted by using the force of gravity. *Qanats* brought water from the mountains and foothills tens of kilometres away into waterless regions. The survival of many villages and cities in Iran, including Tehran, depended on these *qanats*. Some have been in use for hundreds of years. One such example is the Dowlat Abad *qanat* in Yazd, which is 64 kilometres long. Historically, Iranians created exclusive orchards and gardens at the source of each *qanat* and spring so that not one drop of water would be wasted.

Iranian gardens are historically renowned. The term *pardons,* or paradise, has an Iranian origin and the idea of a garden as paradise is central to the conception of the Persian garden, as well as to gardens and parks around the world. The present paper will concern itself with Tehran and its problems of green space.

TEHRAN'S RAPID EXPANSION IS A SERIOUS DANGER TO THE ECOLOGICAL BALANCE AND NATURAL HERITAGE WHICH SURROUND THE CITY.

Tehran is an exceptional case as far as natural conditions are concerned. Situated on the foothills of the Alborz Range, it is bounded by mountains, except to the south where an expansive area of wasteland lies. The volcanic mountain peak of Damavand (5,671 metres high) can be seen from the city, when the pollution index is low, as can the Towchal mountains (4,100 metres) and the Kolakchal (3,200-3,400 metres). A unique characteristic of Tehran are the numerous valleys through which water flows from *qanats* and springs originating in the Alborz. The valleys and mountain ranges located in the northern sector of the city, in the region of Shemiran, have always been part of the natural riches of Tehran. Once a separate town, the *yeylaq,* or summertime resort of the city, the area has now become its northern extension with a very large percentage of the population living there year round.

Today, the population of Tehran, excluding peripheral towns, is estimated to be seven million. If the present trend of development continues, it will become either the fifth or sixth most populous city in the world. Tehran's rapid expansion during the last two to three decades is a serious danger to the ecological balance of the mountains,

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valleys, and gardens of northern Tehran and Shemiran. Soil and water, the two vital elements of ecological balance, became subject to daily abuse and waste. Fortunately, these deteriorating conditions were highlighted by both naturalists and the general population. To prevent the destruction of this natural heritage, various ideas and solutions were proposed by both scientists and laymen. Tehran's municipality has taken some measures to find solutions for some of these problems.

My colleagues in Baft-e-Shahr Consulting Architects, Urban Planners, & Landscape Architects, have proposed two concepts for the sustainable development of Tehran. These notions originate from an earlier project implemented 20 years ago at the mouth of the Jamshidieh valley in the foothills of the Alborz. The premise was to protect the valley from urban sprawl.

The first concept is the protection of the zone at the foothills of the Alborz range. Four valleys are situated north of Tehran in the foothills of the Kolakchal Heights: the Dar-abad, Jamshidieh, Tang Hesark, and Golabdarreh valleys. Plans have been prepared to preserve the heights and valleys against Tehran's urban expansion. Part of this plan is currently being implemented.

The key to this concept is the zoning of an area with an approximate width of six kilometres and depth of two kilometres that is sandwiched between the urban fringe of the urban built area and the mountains.

The four zones in this area comprise:

1. The physical limit of the city. The last boundary where the city can expand is formed by natural or built elements such as a foot route with trees. This limit ranges between 1,800 and 1,850 metres in altitude.

2. The natural urban park area. Between the physical fringe of the city and the natural edge of the mountains, natural urban parks are cre-

FOOTHILLS NEAR THE CITY OF TEHRAN ARE PART OF THE CITY'S RECENT ZONING PLAN TO PROTECT AND SUSTAIN THE NATURAL ENVIRONMENT.

ated (such as Jamshidieh park), or appropriate indigenous plantations of mountainous regions are planted. These parks are equipped with installations and facilities to provide services for people. They are places where citizens can spend their leisure time and the young can begin to learn mountain-climbing. These parks are located between, 1,850 and 1,950 metres.

3. The transition zone between the man-made and the natural. This comprises the trails and access routes through the mountains up to a height of 2,000 metres, used principally for recreational walking and mountain climbing. For green cover, plants and thickets resistant to the mountain climate are cultivated. The young and middle-aged will be the users of this area, which includes Ferdowsi Boustan and heights north of Jamshidieh park. These areas are located at altitudes between 1,900 and 2,100 metres.

4. Virgin territory. This includes the routes through arduous and high

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mountain passes. No buildings or installations will be built in this area and the routes are designed for young hikers, professional mountaineers, and mountain sports. It is located at altitudes of 2,000 metres and higher.

These zones characterise the limits of the ecological potential of each mountain and valley as well as their future function. The focal points have presently been identified to prevent and control the city's destructive encroachment on nature. Using sustainable and non mechanical devices, water will be channelled from valleys as the optimal irrigation method to develop green space. The soil will be stabilised and resistant; vegetation native to the mountainous region will be identified and cultivated.

The second concept implies the extension of the valleys into urban areas by restoring paths continuing into the city in order to form new green spaces. This concept has also been approved, and the plan for the first route will gradually be implemented along the Chamran Expressway (and Darakeh Valley). This route, 12.5 kilometres long and approximately 250 metres wide, will extend from the Alborz valleys into the heart of the city. The intention is to restore what had been destroyed in the past and to re-establish the city's connection with nature by providing paths, waterways, and gardens in the area. Since several neighbourhoods exist alongside this green route, the green bed will also function as a non-vehicular connecting path between them.

By implementing these concepts, the destructive trend of the city will hopefully be curbed and the northern belt of Tehran will be transformed into a protected green zone for use as a place of leisure and mountain sports. The plans for Darakeh and Jamshidieh valleys have already been prepared as well those for the northeast route of Tehran. At present our firm is studying and planning the fourth route along another valley known as Farahzad valley, which extends 10 kilometres.

in 1977, design and implementation of the Bagh Sangi Park were undertaken. Since there were rocks, tree roots, and natural features in the area, full-scale sketches were drawn on-site, similar to traditional Iranian methods. Step-by-step drawings were made only upon completion of each section of the garden. The overall work plan was only drawn in 1978, after completion of the whole project in April of that year.

As suggested by its name, which translates as "stone garden", the park was designed around the theme of stone. It is built on steeply sloping land with an inclination of about 30 degrees from one end to the other. Triangular in shape, the garden narrows towards the south and its northwestern section is treated as a terrace and held by a substantial retaining wall. Various water channels have been constructed on the site and are connected to a man-made pool at the uppermost level, which in turn receives water from natural brooks coming from mountain sources.

The park covers an area of 70,000 square metres, and is now being expanded by 300,000 square metres towards the north. Within the park, there are five small buildings with a total area of about 2,000 square metres. There is a restaurant, located at the higher level on the northeast corner, an administration building near the entrance from the west, a children's library on the southwest corner and a

LANDSCAPING OF THE PARK WAS DESIGNED AROUND THE THEME OF STONE.

gatehouse at the main entrance at the southeast corner. Toilets are located below ground level in three of the buildings (restaurant, administration, and children's library).

The restaurant is designed as a pentagonal building with a daring steel structure inspired by indigenous house design in northern Iran. Beside these built elements, the park was fitted with ten, stone or metal sculptures and consists of various thematic areas for different kinds of use, such as a playground for children, bird cages, an area for private recreation, a public arena, and an amphitheatre for public performances.

For landscaping, scattered loose rocks were used to create natural waterfalls, terraced enhancements, streambeds, and paving. Existing trees were preserved and new ones added. The existing pathways were revitalised to create three major axes running from north to south. The eastern axis lined with old plane trees (*Platanus orientalis*) is the largest and most prominent, descending smoothly and bordered on both sides by running brooks.

The central axis was also revitalised from an old path. The stone steps were pierced by a central water channel which creates a playful sound as water passes through and falls, before disappearing into a pond at the south end of the park. To supply water to the park, the old rectangular water reservoir at the highest level of the old orchard was enlarged to create a small lake with an artificial waterfall.

The western axis, diverging from the central one and terminating at the western entrance, is shorter and leads to a mountain-hiking path. Among the trees that were saved from the old orchard, the most impressive are the huge ash trees (*Fraximus excelsior*). The evergreens (*Cypressus arizonica* and *Cedrus deodora*) as well as the weeping willows and flowering varieties, such as cherry and plum trees, were planted anew, along with *forsythias, prunus mahaleb*, crape myrtles, and other shrubs and ground covers for summer flowering.

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The buildings that have been erected in the park are of secondary importance in comparison to the landscaping. Except for the restaurant, all other buildings are inconspicuous and located in remote corners and generally concealed by dense foliage. The setting is particularly convenient, for the toilet facilities and other built elements that are clearly hidden from the eye.

It is to be hoped that the implementation of these programmes will curb the destructive trends at work, and that Tehran's northern belt will be transformed into a protected green zone for use as a place of leisure and mountain sports, as green areas are extended into the city.