



THE AGA KHAN TRUST FOR CULTURE

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Historic Cities Support Programme



THE REVITALISATION OF THE  
GARDENS OF EMPEROR HUMAYUN'S TOMB, DELHI, INDIA

PROGRAMME BRIEF

*April 2003*



## INTRODUCTION

The first privately funded restoration of a World Heritage Site in India was completed in March 2003 through the joint efforts of the Aga Khan Trust for Culture (AKTC) and the Archaeological Survey of India (ASI), under the aegis of the National Culture Fund.

The objective of the project was to revitalise the gardens, pathways, fountains and water channels of the *chahâr-bâgh*, or four-part paradise garden surrounding Humayun's Tomb in Delhi, according to the original plans of the builders.

The preservation of historic gardens requires close attention to the living and renewable landscape elements. Currently a management plan is underway for the long-term sustainability of the enhanced site.

## HISTORY

The tomb of the second Mughal Emperor Humayun, one of the 23 World Heritage Sites in India, was the first of the monumental mausoleums to be built in the country. The *chahâr-bâgh*, or four-part paradise garden, is the earliest existing example of the Mughal garden tomb. The tomb and gardens are considered one of the precursors of the Taj Mahal.

Emperor Humayun was the son of Babur, the founder of the Mughal Empire. His tomb was built over nearly a decade beginning around 1565 (AH 973). The tomb contains over 100 Mughal graves.

Influenced by Persian architecture, the tomb stands on a platform 120 metres square and reaches a height of 47 metres. Its construction was probably overseen by the Emperor's grieving widow, Haji Begum, during the reign of Emperor Akbar, at an estimated cost of 15 lakhs (1.5 million rupees). The architect, Mirak Mirza Ghiyas, was a Persian from Herat, in current-day Afghanistan. Built of rubble masonry, the structure is the earliest example of the use of red sandstone and white marble in such great quantities.

The gardens are laid out in classical *chahâr-bâgh* pattern. They are divided into quarters by raised causeways. The quadrants are divided, in turn, into eight plots, each with walkways. At the intersection of these walkways are octagonal or rectangular pools.

## OBJECTIVES AND IMPLEMENTATION

Site works encompassed a variety of disciplines, including archaeological excavation, the application of conservation science and hydraulic engineering.



The project's implementation phase began when the Trust began work on the 12 hectare (30 acre) garden site in 2000. Working under the aegis of the National Culture Fund and in collaboration with the Archaeological Survey of India (ASI), the Trust undertook the first privately funded restoration of a World Heritage Site in India. Work was completed in March 2003.

The US\$ 650,000 restoration project has featured:

- Removal of 3,000 truckloads of earth (12,000 cubic metres),
- Planting of 12 hectares (30 acres) of lawn,
- Re-setting and alignment of over 3,500 kilometres of path kerbstones,
- Preparation by some 60 stonecutters of 3,000 metres of hand-dressed red sandstone slabs (to edge the channels),
- Creation of 128 ground-water recharge pits and the de-silting and creation of other wells as part of the largest rainwater-harvesting system scheme in any heritage site in India,
- Creation of a site exhibition,
- Planning and installation of a new water-circulation system for the walkway channels,
- Planting of 2,500 trees and plants, including mango, lemon, neem, hibiscus and jasmine cuttings, according to Mughal texts,
- Repair of fountains, wells and rainwater-harvesting systems,
- Provision of wheelchair access to a significant part of the site.

#### A MULTI-DISCIPLINARY APPROACH

The revitalisation of the gardens required a variety of activities, from masonry to archival research, and included the following:

##### Excavations

A series of systematic excavations were carried out to understand better the garden and its relationship to the building and adjoining features, such as the river. Amongst key features discovered were aqueducts, terracotta pipes, fountain mechanisms, wells, siphons and copper pipes. These features, among other factors, formed the brief of the project as they indicated original garden levels and water movement patterns.

##### Archival Research

A sustained programme of archival research in Delhi, Agra, Dehradun, the UK, the USA and Canada revealed valuable information that informed project implementation. This included early 19<sup>th</sup> century drawings, visitor comments from the early 17<sup>th</sup> century, an almost





was excavated to its original depth of 12 metres. Two additional wells outside the enclosure walls, that feed the garden were also de-silted.

### Benches

Forty sandstone benches, of a design first procured in 1917 at a cost of 55 rupees each, have now been placed in the walled garden. These have been made using traditional tools and techniques. In addition, nine cast-iron benches have been repaired and placed in the garden.

### Craftsmanship

The project has emphasised the need for excellence in craftsmanship. Two essential areas of craftsmanship were nurtured: stone carving and preparation of lime mortar for masonry.



**Lime:** Lime mortar was used for all masonry work carried out as part of the collaborative project. The pathways, channels, platforms, minor structures and wells were all repaired using lime mortar mixed with traditional materials such as gur (molasses), bel-giri (fruit pulp), surkhi (brick dust), in addition to coarse sand. The lime was also prepared and cured using traditional techniques, such as the lime wheel, for compaction. The extensive use of this material was also used as a training ground for masons.



**Sandstone:** Red sandstone from selected quarries in the Agra region was used for a variety of purposes as part of the project. The essential use was for the water channels. Over 3,000 metres of sandstone was hand-chiselled using traditional tools and techniques. In addition, the signage system, benches, waterfalls and fountains have all been hand-crafted in sandstone. Over 50 stonecutters have worked continuously for almost two years to prepare the sandstone elements. An additional ten craftsmen were trained.

### Minor Structures

Minor structures on the grounds have been surveyed and repaired. Of these, three of the more significant are the Octagonal Platform, Wall Mosque and Grave Platform.



**Octagonal Platform:** On the northeast corner of the garden stands an octagonal platform that could have been used for a ceremonial royal tent. Constructed of local, dressed quartzite stone - one of the hardest stones known, the platform was in a state of dilapidation with the top two courses largely missing. These have now been restored using traditional tools and employing techniques in which the craftsmen were trained.

## Wheelchair Access

For wheelchair users, a comfortable, sensitively designed ramp has been provided at the entrance to the garden. In addition, in order to make a significant part of the garden accessible to wheelchair users, bridges have been placed across the water channels in key locations.

## Children's Workshop

As part of an outreach and awareness campaign, several workshops have been held with school children at Humayun's Tomb. The primary objectives were to introduce the children to the significance of their heritage, to make each child understand the need and benefits of conservation and to make the study of history and architecture interesting. Aspects of archaeology, architecture, nature, conservation, history and geology were discussed with the children. These workshops, which were held with a variety of Delhi schools, featured children from all sections of society.

## Illumination

The Oberoi Group supported a carefully designed lighting system. The white light is designed to enhance the effect of moonlight, making the grand dome visible on the night skyline. The light fixtures are located at a distance of over 90 metres from the mausoleum, with the cables all laid underground. The light fixtures are themselves free standing, requiring no permanent attachment to the historic buildings.

## Documentation

An extremely high level of documentation, to internationally accepted standards, has been maintained. This has included a detailed garden survey with each plant and every species marked on a digitised plan. In addition, each stone in the channels and pathways has been individually plotted. A comprehensive measured drawing of the tomb itself has also been prepared. In addition to the drawings, over 1,000 rolls of film have been taken and continuous video documentation of the project has been carried out.

## Wells

Three wells that had been completely filled in and covered over were discovered during the course of the works. Two wells four metres in diameter were found in the sunken area to the east and these were desilted to a depth of 15 metres. They now hold about six metres of standing water. Another well was discovered in the southwest quadrant after an excavation was carried out in its locale. This well, of narrower diameter,





continuous record of pictures from 1849 onwards, planting plans of the 1880's and early 20<sup>th</sup> century and a detailed record of the significant work done in the garden in the period 1903-11.

### Earth Removal

Over 12,300 cubic metres (3,000 truckloads) of excess earth were removed from the garden in order to restore the original plot levels and the relationship between the pathways and garden plots. The earth was removed manually, either through head load or cycle rickshaws, and then taken outside the garden complex (in order to ensure that no underlying archaeology was damaged). It was then transported to various other gardens by trucks.

### Pathway Repair

Pathway repair involved two very distinct features: the pathway surface and the edging.

**Pathway surface:** Over 25,000 square metres of pathways in the garden enclosure needed to be repaired. A 10-centimetre layer of brick aggregate was provided with *mooram* (coarse sand) infill. The pathways were manually compacted using heavy iron rollers during a six-month period. It is recorded that the pathways have been treated this way since the 1903 intervention.

**Edging stones:** 3,200 metres of the large, Delhi quartzite, pathway-edging stones were reset. This required the manual dismantling of the existing edging and the laying of a lime concrete base, followed by resetting and aligning. The stones, some of which weighed over 800 kilograms, needed to be moved manually. Only about 70 percent of the total pathway edging needed to be reset since minor undulations were retained, in keeping with a sensitive conservation philosophy.

### Planting

The choice of plants and planting patterns was derived from a combination of factors, including their mention in Mughal chronicles, as well as through pollen analysis tests, archival material, visitor accounts, and soil and climatic conditions in the Humayun's Tomb gardens.

Along the periphery of the garden large shade trees such as Mango and Neem were planted. Over 300 plants of lemon and orange, said to have been favoured by Humayun, were planted along the outer pathways. Similarly, over 500 saplings of Pomegranate were planted in the sunken area towards the east. Over 2,000 flower-bearing and sweet-smelling plants such as the Hibiscus (recorded in the Akbarnama to have been planted here), Chandni, Harsingar, Motia and Mogra have also been planted.

**Wall Mosque:** Along the southern enclosure wall of the garden, stands a wall mosque possibly dating from the 18<sup>th</sup>-19<sup>th</sup> century. Conservation work was undertaken on this mosque, which was in a dangerous state of structural instability.



**Grave Platform:** In the northwest quadrant, a rather large platform features several gravestones. Seemingly built in three distinct phases, this platform was almost reduced to rubble. The platform has been carefully and scientifically conserved. It now adds to the character of the garden.

#### SUMMARY

Work was completed in March 2003. In addition to the National Culture Fund and the implementing organisations – ASI and the Trust – two other parties also played a role: the Indo-British Fiftieth Anniversary Trust and the Oberoi Group of Hotels.

The rehabilitation project included the following main elements:

- Reinstating the walkways and conserving the edging stones,
- Repair, extension and reactivation of the irrigation system,
- Establishing water sources for the water channels and irrigation system, including a pump station for a water-recycling system,
- Conserving, repairing and rebuilding the water channel system,
- Re-levelling the planted zones and revitalising them with species and arrangements that conform to the customs and patterns of Mughal sources, and
- Support for research that informs the conservation and restoration process, contributes to the development of educational materials for use in schools of architecture, conservation and heritage management, as well as for visitors to the Tomb.



## ABOUT THE AGA KHAN TRUST FOR CULTURE

The Aga Khan Trust for Culture is involved in the revitalisation of another Mughal paradise garden, Babur's Garden in Kabul, as part of a broad, multi-sectoral development programme for Afghanistan. The Trust has also created the 30-hectare Azhar Park in Historic Cairo, restored parts of Aleppo's Citadel, and rehabilitated landmark buildings, traditional dwellings and urban spaces in Zanzibar. Please see the brief on the Historic Cities Support Programme for more information.

The Aga Khan Trust for Culture is an agency of the Aga Khan Development Network, a group of a private, non-denominational development agencies founded by His Highness the Aga Khan. The Network works in a number of Indian states to address natural resource problems, agricultural productivity, income growth, health, education, as well as the rehabilitation, in collaboration with the European Union, of earthquake-damaged villages in Gujarat.

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