# Providing technical inputs for the upkeep and maintenance of the sacred tree, Bodhivrikhsa (*Ficus religiosa* - Peepal) at Bodhgaya and for beautification of the temple complex

## Final Technical Report

## (Nov. 2007 – Oct. 2009)

**Forest Research Institute**
**(Indian Council of Forestry Research & Education)**
**P.O. New Forest**
**Dehradun-248006**
**Uttarakhand, India**

**Project Title: Providing technical inputs for the upkeep and maintenance of the sacred tree, Bodhivrikhsa (*Ficus religiosa* – Peepal) at Bodhgaya and for beautification of the temple complex**

**Duration: No. 2007-Oct. 2009.**

**Client:** The Bodhgaya Temple Management Committee, Bodhgaya, Gaya, Bihar, Post Box. No. 2, Buddhagaya-824231, Gaya, Bihar

**Implementing Agency:** Forest Research, Institute, P.O. New Forest, Dehradun-248006

**About Bodhgaya and Bodhivriksha**

Bodhgaya is situated 110 Kms south of Patna in the Bihar state of India and is the holiest place for the Buddhists. Apart from being a significant archaeological site, it is also a vital Buddhist centre. The place in ancient times was called URUVELLA, and famous for being a place of PEACE, REALISATON AND ENLIGHTENMENT. The popularity of the place arises due to the enlightenment of Lord Buddha here more than 2500 years ago. Devout Buddhists and tourists from all over the world visit Bodhgaya, to study Buddhism and the art of meditation, or to simply absorb the aura of solemn grandeur that surrounds the place.

In the 6$^{th}$ century B.C. Prince Siddhartha Gautama attained Supreme Enlightenment at this Holy place and became the Buddha. In commemoration thereof, Emperor Ashoka set-up the Vajrasana (Diamond Throne) of polished sandstone representing the seat of Enlightenment in the 3$^{rd}$ century B.C. Thereafter he built a stupa in veneration of the Buddha which remained there up to the 2$^{nd}$ century A.D. The original structure of Mahabodhi Mahavihara temple was completed in 7$^{th}$ century A.D. during the reign of Gupta kings. The temple underwent several restorations, renovations and repairs in subsequent period in which the Burmese greatly contribute. In 1883, a thorough and scientific renovation of the Temple was done under the supervision of the British Archaeologist Sir A. Cunningham and J.D.M. Beglar and the Indian Archaeologist Dr. Rajendra Lal Mitra. Again in 1956, on the occasion of 2500$^{th}$ Buddha Jayanti celebrations, the Govt. of India did some repair works and enlarged the premises of the Mahabodhi Mahavihara. This is the most sacred place of Buddhist Pilgrimage in the world.

The gold painted statue of Buddha in the sanctum shrine of the Temple is made of Black stone built by the Pala kings of Bengal. The Buddha is seen seated in the Bhumisparsa Mudra or the Earth touching posture. The Mahabodhi Mahavihara has now been declared a World Heritage Site by the UNESCO on the 27$^{th}$ June 2002.

**The sacred Bodhivriksha**

The Under the shade of this tree the Siddhartha Gautama meditated and attained Enlightenment on the full Moon day of Vaisakh Purnima (May month). This is a peepal tree with botanical name *Ficus religiosa*. It was under this tree that the Buddha spent the first week in meditation after attaining Enlightenment. The present tree is probably the fifth succession of the original tree which was earlier destroyed several times by man-made misery and natural calamities.

**Meditation Park**

The park situated at the south–east of the temple is newly developed as a Meditation park. It has facilities for meditation huts, congregation and discussion courts and two huge prayer bells and two water fountains besides a lotus pond.

**Background**

On the request of the District Magistrate of Gaya a team of scientists visited Bodhgaya in June 2007 to deal with the matter related to the cutting of a branch of the sacred Bodhivriksha. The scientists observed that the *Bodhivriksha* had undergone some form of stress then, which was being reflected by somewhat scanty and light green leaves in the crown and damaged roots and bark, as compared to the other two peepal trees growing nearby. The reasons attributed to this stress were due to:

- Copper toxicity due to repeated application of Bordeaux paste on the stem and branches as informed.
- Excess moisture in the soil causing asphyxiation (suffocation) of the roots as observed in the nearby-irrigated areas.
- Heat injury due to reflection of solar radiation from the temple structure, which is quite close to the tree.
- High intensity electric lights causing hindrance to the respiration process in the night.
- Soil compaction due to trampling under human feet in nearby areas.
- Aging of the tree slowing down the physiological processes.
- The metallic props erected for the support of the branches were noticed causing injury to the bark and tissue, which was seen as dropping of latex on the props.
- Lighting arrangement of the *Bodhivrikhsha* in the night, the intensity of the light and heat generated to the nearby branches by the lamp shades, reflectors and bulbs installed may be causing damage to the tree.
- Lighting of lamps and candles, spilling over of oil and ghee, and wrapping of the stem by clothes by the devotees.

Corrective measures were then recommended for restoring the health of the Bodhivriksha and current consultancy project was then came underway on the request of the Bodhgaya Temple Management Committee (BTMC) after signing an MoU between

the Bodhgaya Temple Management Committee and Forest Research Institute (FRI). The following were the objectives and scope of the project:

**Objectives of the project**

1. Providing technical advice, support and back-up by FRI Dehradun for the upkeep and maintenance of the Bodhivriksha and for beautification of the temple premises.
2. Evaluation of the health status of the tree for the physiological, pathological, entomological and soil aspects.
3. Conducting half-yearly visits for study of the health status of the Bodhivriksha and other tree species.

**Scope of the project**

(a) FRI shall provide all necessary technical advice to the Temple Committee for the management and maintenance of the Bodhivriksha and other tree species in the temple premises.

(b) FRI scientists under the supervision of Group Coordinator Research, FRI, Dehradun shall be responsible for rendering technical consultancy a Bodhgaya Temple Management Committee, Bodhgaya for the proposed activities.

(c) FRI shall take up soil testing, suggest appropriate site specific plant species, DNA finger printing of the Bodhivrikhsha and other adjacent pipal (*Ficus religiosa*) trees besides providing technical guidance to Bodhgaya Temple Management Committee, Bodhgaya in soil working, soil and moisture conservation measures, preparation of pits, soil amendments and treatment of soil/plants for diseases and insect pests. All testing will be done at FRI facilities.

(d) Half-yearly reports will be submitted by FRI to Bodhgaya Temple Management Committee, Bodhgaya in respect of works proposed.

**Works done**

**1. VISITS MADE**

Five visits were conducted by specialists from FRI, in Nov. 2007, May 2008, Feb. 2009, May 2009 and Oct. 2009 and detailed studies as per work plan were carried out.

**I. Health Status of Bodhivriksha from Nov. 2007 to Oct. 2009**

During the first visit made in June 2007, the tree exhibited somewhat scanty and light green leaves in the crwon and damaged roots and bark. The bark of the tree

exhibited grayish green appearance due to the repeated application of copper sulphate. Corrective measures were suggested which were adopted and followed by BTMC.

**1. First visit**

Under the project given by BTMC to FRI first visit was made in Nov. 2007. The results of corrective measures suggested and followed were quite apparent in Nov. 2007 when the sacred Bodhivriksha, was noticed in better condition and growth as witnessed by greener leaves and fuller canopy. New root growth at the base was also observed. White mealy bug attack was altogether cured due to timely treatment as recommended. It was noticed that:

- Concrete wall around the tree base had been removed.
- Excess watering had been checked.
- Application of Bordeaux paste had been stopped.
- High intensity lights had been regulated and not put on throughout the night and it was assured that they would soon be replaced with small distant lights.
- Wrapping with clothes and burning of lamps, candles and incense sticks had been stopped at the tree base.

Besides some urgent actions to be taken were suggested in Nov. 2007, which were as follows:

1. Treatment of cut ends of branches on Bodhivriksha by wax or a paste of Bayleton (Tridemefon) in linseed oil (40 g/ litre).
2. Packing by rubber or foam cushion below branches and metallic props to avoid injury to tissues.
3. Arrangement of proper lights.
4. Regulation of number of devotees at a time in the temple premises so as to reduce pressure on soil and avoid injuries to the tree.
5. Pruning and removal of dead branches from the older pipal tree at the right side of the temple.

**2. Second visit**

Bodhgaya Temple Management Committee (BTMC) had requested that the recommendations made by FRI earlier need to be implemented in the presence of the FRI team. Accordingly the visit was made and status of the tree was examined in May 2008, which was found in good condition and growth.

A meeting was held with Shri Sanjay Singh, DM, Gaya and Chairman, BTMC along with Shri Rai Madan Kishore, ADM, Gaya and Incharge, Bodhgaya Temple and SDM, Gaya to apprise the condition of the Bodhivriksha and operations to be carried out on it.

It was also brought to the notice that few branches, which are dead and rotting need to be removed, otherwise they may fall on devotees and cause injuries. It was told that already a dead branch had fallen in the past from the other pipal tree nearly causing injury to a child. It was resolved that since the issue of removing branches is attached to the religious sentiments of the Buddhists and already in the past there was some controversy in this matter, this operation will be carried out in the presence of the representatives of various monasteries existing in Bodhgaya, along with representatives of the district administration, police, local people and monks.

Accordingly a meeting with the representatives of Monasteries, monks, local people, media persons and local administration was arranged by the ADM Gaya at BTMC office and at site. The team from FRI had informed the gathering about the health status of the Bodhi Vriksha. The status of the tree was explained and queries raised by those present were duly addressed. The doubts and misconception about the tree and operations to be carried were addressed to satisfy the gathering. It was clearly told to those present about the plan of removal of dead and rotting branches of the Bodhivriksha and the reasons for doing so. The whole exercise was done to take people in confidence and to sensitize them about the issue. After this following operations were carried out:

**Removal of dead and rotting branches**

All the people present were taken to the site to witness the operations to be carried out. The four branches, which needed to be removed, were shown to the representatives and possible hazards were brought to the notice. It was also explained that the protective measures, which will be taken up would be for the better health of the tree. The people consented with the plan and approach for executing it. The dead and rotting branches were cut and cut ends were treated with Chaubatia paste. One of the four branches was in such a bad rotting condition that as it fell on the floor, it broke into pieces and powder. Parts of the other two branches fell on their own while being cut. All the cut branches exhibited advance decay in them. The cut branches and their pieces were then collected, measured and kept in safe custody at BTMC office.

**Spraying of micronutrient solution**

To meet the micronutrient deficiency in the tree, a light dose (0.005%) of Agromin (B, Zn, Mg, Mn) was sprayed on the foliage by using a Guttor sprayer.

**Padding with rubber and foam between the branches and props**

Pieces of foam and rubber (30 – 45 cm in length, 15 – 25 cm in breadth, 5 – 10 mm in thickness) were carefully inserted below the branches to save them from injuries by metallic props, by raising the branches with the help of jack and manpower. In two branches the metallic straps put up over the branches were removed along with nails. The injured areas of the branches were also treated with 0.1 % Bayleton solution and Chaubatia paste. In case of three thicker branches, padding could not be inserted because

they could not be raised to make space under them. In one branch metallic prop had made deeper injury and raising the branch could have snapped it, therefore, padding was not inserted under it.

It was recommended that in future, if props are required to be put up for supporting the branches, care should be taken to provide padding with foam and rubber below the branches to avoid any mechanical injury to the tree. Metal straps to hold the branches on the props should not be used. Nailing in the tree should strictly be prohibited. The props should be aesthetically correct to match the ambience of the site.

**Painting of cut ends**

The existing cut ends on the Bodhivriksha were painted with Chaubatia paste. The field staff of BTMC was trained for painting of cut ends. It is recommended that painting on cut ends should be repeated after six months.

The sacred Bodhivriksha was observed in better shape and growth in May 2008 as witnessed by greener leaves and fuller canopy. Attack of mealy bug was altogether absent. Vediography of the Bodhivriksha was done by hiring a local camera man as envisaged in the project activities. Two types of leaves were noticed on Bodhivriksha during this visit which is known as 'leaf dimorphism' which is a natural phenomenon found in perennial species also known as 'seasonal dimorphism' i. e. developing smaller leaves in summer and larger leaves in winter.

**3. Third visit**

As agreed with the Bodhgaya Temple Management Committee (BTMC), proposed quarterly visit was made in Feb 2009 to examine the status of Bodhivriksha. Normal winter leaf fall was observed in Bodhivriksha and in nearby peepal trees. The tree was noticed in sound health and satisfactory condition. Following observations were made:

**Light system**

The lighting arrangement made to illuminate the temple was examined in the night to observe whether the same is disturbing the tree or not. It was observed that the new lighting arrangement is illuminating the temple from a distance and no direct light is focused on the tree. This is in accordance to the recommendations made by FRI earlier. The old fixtures of light have been removed along with their stands from the walls.

**Watering**

It was noticed that irrigation at the base of the Bodhivriksha was being done and asked to be stopped. Direct irrigation at the base of the tree is not desired but only from the open surfaces outside should be done as prescribed.

**Examination for soil compaction**

It was noticed that BTMC has made arrangements of the raised wooden platforms over the exposed soil surfaces (meant for irrigation of Bodhivriksha) for the devotees during the pujas, as advised by FRI earlier to avoid soil compaction. The soil under the platforms was examined for compactness and root growth and found in satisfactory condition.

**Manure application**

Cow dung manure was procured and application method was demonstrated to the workers of the BTMC. In future applications, the top soil in the two open surfaces should be raked up slightly as demonstrated and then the manure should be mixed and spread with a rake throughout. This should be followed by light watering preferably with a flowered can. The watering should be followed after 7-10 days again. Flooding of the irrigation areas should be avoided.

**Operations on the Bodhivriksha**

A dead branch (due to wire support) pruned earlier and treated, was showing bark splitting. The dead bark was carefully removed and branch was painted with bayleton (tridemefon). The collected dead parts were then stored with the BTMC.

One branch was showing exudation of some sap, possibly due to insect attack. Spraying with Spark 36 EC (triazophos 35% + deltamethrin 1%) was done as a preventive measure on this branch.

**4. Fourth visit**

Next quarterly visit was made to examine the status of Bodhivriksha and other proposed activities of the project in May 2009 along with Dr. S. S. Negi, Director, FRI, who was briefed about the project work and activities conducted like treatment of cut ends, pruning of dead branches, prop supports, soil aeration, lighting arrangement, watering, etc. Following works were carried out during this visit:

**Status of Bodhivriksha**

New flush of leaves was observed on the Bodhivriksha and other peepal trees. The tree was noticed in normal health. No foliar infection and insect pests were noticed on the tree. It was informed that irrigation at the base of the Bodhivriksha has been discontinued as advised. Irrigation from the open surfaces outside was being done at fortnightly intervals.

**Examination for soil compaction and manuring**

Due to the arrangements of the raised wooden platforms made over the exposed soil surfaces (meant for irrigation of Bodhivriksha) for the devotees during the pujas, soil compaction had been avoided. The soil supported grass growth and root growth of the tree was found in satisfactory condition.

Cow dung manure had been applied as advised and which had made the soil porous and supportive to vegetation.

**Marble tiles flooring**

During the visit the Director, FRI suggested that the marble tiles flooring outside the Bodhivriksha need to be removed and if possible grass growth be encouraged. He was informed that the work is under active consideration of Archaeological Survey of India which proposes to replace them with sandstone tiles. He suggested that if the authorities decide to install sandstone tiles then space between sandstone tiles may be left and allowed to be covered with grass to provide better aeration to the roots.

**Temple Premises and Meditation Park**

Health of the trees and other plants in the temple premises and Meditation Park area were examined and found satisfactory. Dr SAS Biswas, expert in botanical lay outs and beautification had studied the present arrangement of plants and worked out for a thematic lay out of ornamental and other plants for beautification and greenery.

**Meeting with officials of BTMC**

The Director, FRI had a discussion with Shri N. Dorjee, Secretary and other members of the Bodhgaya Temple Management Committee to take the feedback about the services being rendered by FRI and also gave his suggestions and advice for the upkeep and maintenance of the Bodhivriksha.

It was also suggested that FRI team may examine tree conservation practices being adopted in similar situations elsewhere.

**5. Fifth visit**

Next visit was made in Oct. 2009 and following observations and works were carried out:

**General inspection of the health status**

Bodhivriksha was found in sound health showing good foliage colour. Few twigs were found dried and will be removed. The process of drying of twigs is natural.

Micronutrient treatment of the foliage and treatment of cut ends with Chaubatia paste was carried out.

**Removal of dead branches from the older peepal tree situated on the northern side**

Few dead branches were noticed on the tree which would have fallen and injured the devotees. These branches were carefully removed under our supervision.

**II. Other peepal trees near to Bodhivriksha**

The peepal tree on north side of the temple, which appears to be older, was apparently under stress and showing dying of branches and reduced canopy. The reasons may be the old age of the plant besides tiled/concrete floor around the basal area, which does not allow percolation of water and aeration to the roots.

It was suggested that the basal area should be uncovered at least about 3-4 meter towards open space. Besides a barricade may be raised to check the movement of the people to the base of the tree. At present devotees are offering lamps and clothes around the tree and some of them were seen doing meditation under it by tying mosquito nets on the lower branches of the tree. Some of the top branches were already dead and decaying, which needed pruning and removal to avoid any untoward accident to the devotees and visitors by falling of them. Some of the branches posing danger to devotees were removed during the visit made in Oct. 2009.

The peepal tree at the back of the temple is comparatively younger and exhibits good form and growth. The cement structure entrapped by the roots of the tree had been carefully removed in the presence of FRI team.

## 2. INVENTORIZATION OF TREES IN TEMPLE COMPLEX

Following trees growing in the campus were identified:

**Trees in temple complex:**

| Sl. No. | Common name | Botanical name |
|---|---|---|
| 1. | Satparni | *Alstonia scholaris* |
| 2. | Supari | *Areca catechu* |
| 3. | Bottle brush | *Callistemon viminalis* |
| 4. | Amaltas | *Cassia fistula* |
| 5. | Jav-ki-Rani | *Cassia javanica* |
| 6. | Kassod tree | *Cassia siamea* |
| 7. | Gulmohar | *Delonix regia* |
| 8. | Eucalyptus | *Eucalyptus hybrid* |
| 9. | Peepal | *Ficus religiosa* |
| 10. | | *Ficus retusa* |
| 11. | Rajaytan | *Ficus* sp. |
| 12. | Phurush | *Lagerstroemia indica* |
| 13. | Khirni | *Manilkara hexandra* |
| 14. | Molsari | *Mimusops elengii* |
| 15. | Harsingar | *Nyctanthus arbortristis* |
| 16. | Drooping ashok | *Polyalthia longifolia* var. *pendula* |
| 17. | Ashok | *Polyathia longifolia* var. *longifolia* |
| 18. | Marorphali | *Pterospermum acerifolium* |
| 19. | Kichula | *Strychnos nuxvomica* |

**Trees in Meditation Park:**

| Sl. No. | Common name | Botanical name |
|---|---|---|
| 1. | Siris | *Albizia lebbek* |
| 2. | Satparni | *Alstonia scholaris* |
| 3. | Kadamb | *Anthocephalus kadamba* |
| 4. | Neem | *Azadirachta indica* |
| 5. | Kachnar (lal) | *Bauhinia purpurea* |
| 6. | Kachnar | *Bauhinia variegata* |
| 7. | Kapok | *Ceiba pentandra* |
| 8. | Shisham | *Dalbergia sissoo* |

| | | |
|---|---|---|
| 9. | Gulmohar | *Delonix regia* |
| 10. | Bamboo | *Dendrocalamus strictus* |
| 11. | Aonla | *Emblica officinalis* |
| 12. | Indian rubber plant | *Ficus elastica* |
| 13. | Khamer | *Gmelina arborea* |
| 14. | Phurush | *Lagerstroemia indica* |
| 15. | Litchi | *Litchi chinensis* |
| 16. | Mango | *Mangifera indica* |
| 17. | Champa | *Mechelia champaca* |
| 18. | Bakain | *Melia azedarach* |
| 19. | Molsari | *Mimusops elengii* |
| 20. | Munga/Sahjan | *Moringa pterygosperma* |
| 21. | Palm | *Phoenix* sp. |
| 22. | Copper pod | *Peltoforum pterocarpum* |
| 23. | Badam | *Prunus amygdalus* |
| 24. | Drooping Ashok | *Polyalthia longifolia* var. *pendula* |
| 25. | Guava | *Psidium guajava* |
| 26. | Jamun | *Syzygium cumini* |
| 27. | Teak | *Tectona grandia* |
| 28. | Arjun | *Terminalia arjuna* |

## 3. CATALOGUING OF CUTS AND DEAD BRANCHES IN BODHIVRIKSHA

A local cameraman was hired at Bodhgaya and whole tree was vediographed to record all the cuts and dead branches existing in Bodhivriksha. CDs were prepared along with the master copy in a video tape. This had been done with a view to prepare a record to deal with complaints of illicit lopping of branches, if any, as there was a controversy in the past regarding cutting of a branch. A copy of the CD had been submitted to BTMC.

## 4. DNA FINGERPRINTING

Samples were colleted from the Bodhivriksha and two peepal trees in the campus, one older tree existing at the north side of the temple and other younger one on the backside. There is resemblance between the DNA fingerprints of the older tree at the north side of the temple with that of the Bodhivriksha while the younger tree at the back side has different DNA fingerprints than the Bodhivriksha. It may be conjectured that it is quite likely that the older pipal tree may have originated from the remains (roots) of the original Bodhivriksha (which was believed to be taken to Sri Lanka as a branch from original tree and the existing Bodhivriksha is believed to be brought from Sri Lanka as a branch).

## 5. VIRTUAL MODELING OF BODHIVRIKSHA

The work is being carried with the help of a professional IT person and a three minute visual is proposed to be uploaded in the website of the BTMC for the benefit of devotees world over.

## 6. BEAUTIFICATION OF TEMPLE PREMISES

There are sufficient potted plants in the premises. Some of the potted plants have overgrown and appear unruly, besides mismatching with the surrounding. The plants which have overgrown are required to be transferred to bigger size pots. The following plants may be raised in the pots and put according to the location as suggested in Fig 1 (Lay out plan of Mahabodhivihara as A1…….H, the site photographs have been marked as A1, A2, ……H, with circles showing the suggested placements of the pots/plant):

**1. Mussaenda (White, Pink and Yellow):** Earthen pot of 20-30 inches size with pot mixture of compost, sand and soil in proportion of 3:1:3, to be placed in semi shade aspect.

**2. Tabernaemontana (Dwarf variety of Chandni):** Earthen or cemented pots of 15-20 inches size with pot mixture of compost, sand and soil in proportion of 3:1:3, to be placed under exposed aspect.

**3. Croton (different varieties)**: To be placed in sunny and warm aspects of the temple. Potted plants should be nursery picked up. Watering should be every two days.

**4. Cordaline (different shades)**: Earthen pot of 20-30 inches size with pot mixture of compost, sand and soil in proportion of 3:1:3, to be placed in semi shade aspect.

**5. Rhoeo (recent varieties with light and dark purple shades with streaks):** Earthen pot of 10-20 inches size with pot mixture of compost and soil, to be placed in shadier aspect.

**6. Golden Money Plant**: To be supported by moss sticks. A row can be made with pots of varying size. Water to be given in the morning and the moss is to remain moist.

**7. *Euphorbia milli* (large variety with deep to light shade of flowers):** Earthen pot of 20-30 inches size with pot mixture of compost and soil in proportion of 30:70, to be placed in semi shade aspect.

**8. Hibiscus (large flowered variety with light mauve, saffron, bright yellow, etc,):** Earthen pot of 20-30 inches size with pot mixture of compost, sand and soil in proportion of 3:1:3, to be placed in semi shade aspect.

**9. Poinsettia (Fire Ball, pale and pink varieties):** Earthen pot of 30-50 inches size with pot mixture of compost, sand and forest soil in equal proportions, to be placed in exposed aspect. Fire ball variety can be placed in smaller size of potted plants.

**10. Golden Philodendron**: To be supported by moss sticks. A row can be made with pots of varying size. Water to be given in the morning and the moss is to remain moist.

**11. Bougainvillea (Variegated foliage, bicolor, Lady Marybering):** Earthen pot of 20-30 inches size with pot mixture of compost, sand and forest soil in equal proportion, to be placed in open aspect.

**12. Phoenix (Dissected foliage) cultivated varieties available in nursery**: Earthen pot of 20 -30 inches size with pot mixture of compost, sand and soil in proportion of 3:1:3, to be placed in exposed to semi shade aspect.

## 7. VISIT TO ANURADHAPURA, SRI LANKA FOR COMPARISON OF CONSERVATION PRACTICES

### Background

It was suggested during the visit by the FRI team to Bodhgaya in May 2009 that the team may examine tree conservation practices being adopted in similar situations elsewhere for growth and longevity of the Bodhivriksha. In this context possibilities were explored to visit Anuradhapura, Sri Lanka, where the oldest Bodhi tree is situated. Through the efforts of Bodhgaya Temple Management Committee, Bodhgaya and Mahabodhi Society of India, Bodhgaya and accordingly permission was obtained from the Ministry of Environment and Forests and Ministry of External Affairs, Govt. of India; High Commission of Sri Lanka at New Delhi, and Atmasthanadhipathi Venerable Dr. Pallegama Sirinivasa Nayake Thero, Bodhi Tree Temple Committee, Anuradhapura to visit Anuradhapura.

### Meeting with the Director General, National Botanic Garden, Peradeniya, Kandy

Meeting was held with the Director General of National Botanic Garden, Peradeniya, Kandy, Dr. D. S. A. Wijesundara; who was looking after the upkeep and maintenance of the sacred Bodhi (Bo) tree at Anuradhapura. First hand information about the status of the sacred tree and the measures adopted by them was obtained. The measures being adopted at Bodhgaya for the Sacred Bodhivriksha by Forest Research Institute, Dehradun were also shared. It was agreed that both the organizations will work in collaboration to conserve and maintain the sacred trees both at Bodhgaya and

Anuradhapura, for which necessary codal formalities would be drawn. Later on the National Botanic Garden was also visited with Dr. Wijesundara, which is being maintained as per the international norms.

**Visit to Anuradhapura**

Dr. Wijesundara kindly accompanied the team to Anuradhapura and Atmasthanadhipathi Venerable Dr. Pallegama Srinivasa Nayake Thero, Bodhi Tree Temple Committee, Anuradhapura was kind enough to give an audience to the team. He was briefed about the purpose of the visit of the FRI team and also about the work done at Bodhgaya for the conservation, upkeep and maintenance of the Bodhivriksha.

**Observations at sacred Bo tree at Anuradhapura**

The Director General, Royal Botanical Garden, Dr. Wijesundara briefed about the details of the tree at site. Following observations were made:

- The Bo tree was growing on a platform at the height of 21 ft. from the ground raised by three supporting walls of 10 ft., 5 ft. and 6 ft. forming three enclosures.
- There were 40 family trees of Bo Tree (*Ficus religosa,* peepal) growing in the premises.
- Bo tree was thinner, bent, and partly horizontal and supported by six metallic props.
- The foliage colour of the Bo Tree was pale green as compared to adjacent family trees.
- The family tree close to Bo tree was supported by a green colour prop which was partly embedded the bark of the tree.
- If proper cushioning is done between props and branches injuries to the tree can be minimized.
- The coarse sand was spread over two outer platforms of Bo tree, which was very hot during the day time.
- Soil moisture condition of the Bo tree surrounding soil appears to be poor.
- The cut ends of some branches as well as cavity was cemented.
- The fern wall around the platform of Bo tree (1.5 ft. high) was found dried.
- It was noticed that there was no touching of tree and plucking of leaves.
- Lighting of lamps was prohibited.
- Offerings are allowed within the first enclosure. Mainly Lotus flowers are being offered.
- It was told that cloths were offered to the Bo tree. They are not tied but only put on the main trunk of Bo tree and then subsequently removed.
- The team was informed that saplings are raised from the seeds of Bo tree at National Botanic Garden, Peradeniya and provided to the selected dignitaries by the Committee.

It is proposed that a functional collaboration between the National Botanic Garden, Peradeniya and Forest Research Institute, Dehradun would be worked out for the conservation, upkeep and maintenance of the two sacred Bodhi trees. This will involve experience sharing and knowledge generation.

**Suggestions**

Few suggestions have been made for the betterment of growth environment of the Bo tree:

- The sand placed over the platforms and outside may be replaced with soil as the sand gets too hot during day time and may cause scorching to the tree surface. After soil fill same may be covered with local grass species to give an aesthetic look as well as moisture conservation. The grass then can be irrigated regularly using sprinklers.
- Proper cushioning using rubber and polyurethane foam between metallic props and branches will help in checking the injuries to the stem and branches. Similarly the clamps over the branches should be removed as they may cause girdling and death of the branch.
- Treatment of cut ends and cavity with cement should be discontinued.

**Comparison between conservation practices of Bodhivriksha at Bodhgaya and Bo Tree at Anuradhapura**

The organizations involved (FRI, Dehradun and National Botanic Gardens, Peradeniya) in the conservation of both the revered trees are working in different climatic conditions.

**Similarities**

1. Both the trees belong to same species *Ficus religiosa.*
2. Both the trees are growing in a closed raised platform.
3. Public is not allowed in going near the trees and to touch them.
4. Supports as props have been provided to the leaning branches.
5. Periodic inspection of both the trees is done by the experts.
5. Periodic irrigation is done to both the trees.

**Dissimilarities**

1. There is sand around the Bo tree at Anuradhapura along with some family trees goring, whereas at Bodhgaya there is marble flooring outside the Bodhivriksha enclosure; and lawns, flower beds, ornamental plants and trees growing all around. The latter improves the microclimate around the Bodhivriksha.
2. The canopy of Bodhivriksha at Bodhgaya is full grown and spread whereas that of Bo tree at Anuradhapura is represented by a single branch growing.

3. Cut branch of Bo tree has been closed with cement at Anuradhapura, whereas at Bodhgaya cut ends have been treated with Chaubatia paste.
4. Periodic sprays of micronutrient solutions and application of cow dung manure has been done on Bodhivriksha whereas such information about Bo tree at Anuradhapura is not known.
5. Measures have been adopted to avoid soil compaction around Bodhivriksha at Bodhgaya whereas there is no such problem of soil compaction at Anuradhapura.

## 8. GIST OF FOLLOW UP ACTION ON THE ADVICE OF FRI

| S. No. | Recommendations given by FRI | Action taken by BTMC |
|---|---|---|
| 1. | Remove carefully the cemented wall near the base without damaging the roots underneath it. | Removed |
| 2. | Cover exposed roots with soil. | Covered |
| 3. | Prune dead branches | Done in presence of FRI scientists, local administration, representatives of various maths, monks, and local people |
| 4. | Dressing of cut ends and wounds | Done in presence of FRI scientists |
| 5. | Between the props and branches insert packing for cushioning and avoid injury the bark and tissues | Done in presence of FRI scientists |
| 6. | Remove metal halide lamps and other lights, which are close to the tree | New lighting arrangement from distance is in operation |
| 7. | Avoid wrapping of cloth around trees | Stopped around Bodhivriksha |
| 8. | Stop application of Bordeaux paste on tree | Stopped |
| 9. | Regulate watering | Being done |
| 10. | Avoid burning of oil lamps and incense sticks near the trees | Separate provision has been made at a distant place in the campus. |
| 11. | Avoid soil compaction | Raised wooden platforms are being used during Pujas and gatherings over the exposed soil surfaces meant for watering. |
| 12. | Apply manure | Well digested cow dung manure applied on exposed soil surface meant for irrigation after raking of soil surface |
| 13. | Remove dead and decaying branches | Done in presence of FRI scientists |
| 14. | Remove entrapped cement wall piece from the roots of other peepal tree carefully | Done in presence of FRI scientists |
| 15. | Stop pouring of water, milk, ghee, sugar, sweets, etc. to the Bodhivriksha | These are stopped |
| 16. | Stop tying of cloth on main stem of Bodhivriksha | Cloth being offered on outside Ashok wall and removed next day |

## 7. Information under Right to Information

Six inquiries were received under RTI Act regarding Bodhivriksha during the project period, which were suitably and timely replied.

## 8. Attending the Public Interest Litigation

A PIL was filed at Hon. Patna High Court regarding issues related to Bodhivriksha in which FRI was a party. The same was attended in Feb. 2009 and suitable reply was put up before the Hon. High Court through affidavit as well as in person. The Hon. High Court took cognizance of the report and advice of the experts from FRI in the issues raised and the PIL was disposed off.


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