

Ownership-based, action-oriented afforestation program

Prepared for
MoEF
(Ministry of Environment and Forests)
Government of India



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Table of Contents

1. EXECUTIVE SUMMARY	1
2. BACKGROUND	2
3. INTRODUCTION	3
Rationale.....	3
Program objectives.....	4
Program concept	4
Unique approach of the program	5
Program activities	5
4. PROJECT ACTIVITIES.....	6
Afforestation.....	6
List of trees species planted	7
Glimpse of the afforestation activity	8
Awareness workshops and site inspection visits.....	12
Second awareness workshop	16
Essay and painting competition	18
Glimpse: Uran Depot, Uran (24.02.2013)	19
Glimpse: Thane Depot, Thane (24.03.2013)	22
Quiz competition	24
Closing ceremony	25
5. OBSERVATIONS AND IMPACT.....	27
Initiatives: Afforestation	27
Initiatives: At personal level	31
Status of plantation on July, 2013	32
Plantation at Wada Gram Panchayat	35
Outcome of the program	38
Scoring system.....	39
Activities and score.....	40
6. ANNEXURES	41
Annex-1: Letter issued by MoEF to TERI	42
Annex-2: MoU between MSRTC and TERI	43
Annex- 3 : Participants at afforestation activity.....	48
Annex-4: Presentation	49
Annex-5: Agenda of the workshop.....	55
Annex- 6 : Publicity material used for drawing and painting competition.....	56
Annex- 7: Sample essays	57
Annex- 8: Winners of drawing and essay competition:	58

Annex- 9: Certificate presented to the winners of drawing and painting competition	59
Annex – 10: Quiz Competition on afforestation	60
Annex- 11: Activity sheet	66

List of pictures

Picture No. 1: (From left to right) Dr. Anjali Parasnis, Associate Director, TERI; Mr. Prashant Potdar, Executive Engineer-Civil, MSRTC; Mr. J. N. Supnekar, Divisional Engineer of MSRTC , Shri. Deepak Kapoor, Ex-MD and VC, MSRTC; Mr. Ravindra Dhongde, Chief Financial Officer, MSRTC.....	2
Picture No. 2: Site preparation at the Thane & Uran depots; A & C, existing pit on the site; B & D, Saplings provided by TERI.....	6
Picture No. 3: <i>Mr. Shailesh Chavan</i> , Divisional Controller, MSRTC planting a sapling at the Uran depot campus.....	8
Picture No. 4: Dr. Anjali Parasnis, Associate Director, TERI planting a sapling at the Uran depot campus.....	8
Picture No. 5: Mr. Narayan Shinde (Asst. Traffic inspector), planting a sapling at the Uran depot campus.....	9
Picture No. 6: Mr. Prakash Sawant (Depot Manager), planting a sapling at the Uran depot campus.....	9
Picture No. 7: <i>Mr. Vineet Kulkarni</i> , Executive engineer, MSRTC, planting a sapling at the Khopat depot campus.....	10
Picture No. 8: <i>Mr. P. B. Jagtap</i> , Divisional Controller, MSRTC, planting a sapling at the Khopat depot campus.....	10
Picture No. 9: Employees of MSRTC planting a sapling at the Kalwa bus depot, Thane	11
Picture No. 10: Late <i>Mr .Nikam</i> , Mechanical Engineer, MSRTC, planting a sapling at the Kalwa depot, Thane	11
Picture No. 11: Dr. Anjali presenting a memento to <i>Mr. Shailesh Chavan</i> , Divisional Controller, MSRTC, GoM.....	13
Picture No. 12: Mr. Shailesh Chavan addressing the employees of MSRTC during the workshop.....	14
Picture No. 13: Showcasing of the movie at the workshop.....	14
Picture No. 14: <i>Ms Swati Tomar</i> , Research Associate, TERI interacting with the employees at the Kalwa depot, Thane.....	15
Picture No. 15: <i>Ms Swati Tomar</i> , Research Associate, TERI interacting with the employees at MSRTC Depot, Thane	15
Picture No. 16: <i>Ms. Swati Tomar</i> , Research Associate, TERI explaining the project and taking an overview of the eco-friendly initiatives adopted by the officials.....	16
Picture No. 17: <i>Mr. Aditya Khandekar</i> , Trainee, TERI explaining the importance of renewable energy at the Uran depot.....	17

Picture No. 18: Ms. Swati Tomar, Research Associate, TERI during the second awareness workshop at Kalwa depot, Thane	17
Picture No. 19: Students during the drawing competition at Uran	19
Picture No. 20: Ms. Swati Tomar, Research Associate, TERI, presenting the program overview and objectives to the children and their parents	19
Picture No. 21: Winning entries at the Uran depot, Uran	20
Picture No. 22: Prize distribution ceremony at the Uran depot	21
Picture No. 23: Winners at the Uran depot	21
Picture No. 24: Ms. Swati Tomar, Research Associate, TERI, presenting the program overview and objectives	22
Picture No. 25: Students during the drawing competition at Thane	22
Picture No. 26: Few selected entries of the competition at Thane	22
Picture No. 27: Prize distribution ceremony	23
Picture No. 28: Winners at Thane depot along with MSRTC and TERI employees	23
Picture No. 29: Winners of quiz competition and depot managers with Shri Deepak Kapoor, Ex-MD and VC, MSRTC (7 th from L) and TERI officials (2 nd and 4 th from L)	24
Picture No. 30: Sh. Deepak Kapoor, Ex-MD and VC, MSRTC presenting a solar torch and certificate to Mr. Nagesh Kulkarni, Divisional Engineer (C), Civil Engineering Dept. MSRTC in Mumbai	25
Picture No. 31: Shri. Deepak Kapoor, Ex- MD and VC, MSRTC presenting a memento to Mr. Prakash Sawant, Depot Manager, Uran Depot, Uran	26
Picture No. 32: Shri. Deepak Kapoor, Ex- MD and VC, MSRTC presenting a memento to Mr. Pardeshi, Depot Manager, Kalwa, Thane	26
Picture No. 33: Use of plastic pet bottles for drip-irrigation at the Uran depot	27
Picture No. 34: Installation of tree guards at the Uran depot	27
Picture No. 35: Installation of tree guards and thorny bushes for protection of the plants from grazing animals	28
Picture No. 36: Use of red soil at the Thane depot	29
Picture No. 37: Brake liners	29
Picture No. 38: Following the principle of Recycle and Reuse, use of brake liners for the boundary of the plants	30
Picture No. 39: Status of plantation at Thane depot	32
Picture No. 40: Status of plantation at Uran depot as on July 2013	33
Picture No. 41: Matured and grown up trees at Uran Depot after one year of the plantation	34
Picture No. 42: <i>Albizia lebeck</i> (Shirish) tree at Khaniwali village, Wada	35
Picture No. 43: Status of plantation at Khaniwali Gram Panchayat, Wada in September, 2013 (4 months after plantation)	36

Picture No. 44: Status of plantation at Khaniwali Gram Panchayat, Wada in November, 2013
(6 months after the plantation) 37

List of Figures

Figure No. 1: Share of GHG emissions by various modes of transport sector in India in 20074
Figure No. 2: Analysis and impact of TERI's program at all the locations..... 31

List of Tables

Table No. 1: Different activities during the project 12
Table No. 2: Standard scoring format adopted by TERI 39
Table No. 3: Different activities and scores 40

Abbreviations

CFL	Compact Fluorescent Lamp
CO ₂ eq	Carbon dioxide equivalent
GHGs	Greenhouse gases
GoM	Government of Maharashtra
MD	Managing Director
MoEF	Ministry of Environment and Forests
MoU	Memorandum of Understanding
MSRTC	Maharashtra State Road Transport Corporation
POP	Plaster of Paris
RRR	Reduce Reuse and Recycle
TERI	The Energy and Resources Institute
TZP	Thane Zilla Parishad
VC	Vice Chairman

1. Executive Summary

Afforestation is one of the most widely-undertaken, pro-environment initiatives in India. However, the survival rate of the saplings planted during the afforestation drives is only 30 percent on an average. This could be majorly attributed to the lack of technical knowledge, scientific planting of the trees/saplings and appropriate nurturing of the saplings, until they are stabilized. To address this concern, TERI in collaboration with MSRTC (Maharashtra State Road Transport Corporation) and MoEF (Ministry of Environment and Forests) implemented a project titled "Ownership-based, action-oriented afforestation program".

The primary objective of the program was to ensure maximum survival rate of the afforested plants by instilling a sense of ownership. The second objective of the program was to generate awareness on sustainable practices, which could be implemented at individual level. Since the transport sector is a major contributor to global emissions, awareness of environmental issues amongst the stakeholders of transport sector at grass root level is of utmost importance. Hence, the whole exercise was undertaken with active involvement of officials from the MSRTC.

After the launch of the program in October 2012, three bus depots of MSRTC at two locations, Thane (Kalva and Khopat) and Uran, were shortlisted and selected for project implementation. A total of 225 trees were planted at these locations with "One Employee One Tree" approach for adoption of the saplings. Apart from this, more than 500 trees were distributed amongst the MSRTC employees and they were advised to plant the saplings in the backyards of their homes or in their hometowns. Owing to lack of space at the depots, more than 750 saplings were provided to the Khaniwali gram-panchayat of Wada. A total of 1500 trees were afforested under this project. TERI's team visited the plantation sites after every two months to record the status of the saplings.

In order to make the program more effective and to inculcate a sense of responsibility in every participant while ensuring maximum survival rate of the plants, a competition between the two locations was organized. Further, to induce mass awareness and involve maximum participation in the program, TERI conducted a series of workshops for the senior officials of MSRTC. TERI also conducted an online quiz, and organized, essay and drawing competitions as part of the project.

It was heartening to note that the survival rate of the saplings was almost 100 percent as the plants were consciously nurtured at the locations. Taking a cue from the project concept, MSRTC officials at the Uran depot started a small composting unit within their premises. At the Thane depot, employees used worn-out brake liners to make a hedge to protect the saplings. Innovative techniques like drip irrigation using waste pet bottles were also adopted, especially during summer. TERI's project management team visited the sites periodically throughout the year to check the status of the saplings.

Since the employees at all the three depots opted for eco-friendly initiatives at personal level and had also adopted unique initiatives to make the activity a success, it was difficult to decide between both the locations for a better performer. Hence, Shri Deepak Kapoor, Ex-MD of MSRTC presented a token of appreciation to all the three depots on August 1, 2013. The winners of the online quiz competition were also felicitated during the closing ceremony.

2. Background

TERI submitted a proposal to MoEF (Ministry of Environment and Forestry) against their invitation of proposals released on February 24, 2012 for the implementation of a project titled *“Ownership-based and action-oriented afforestation program”* in collaboration with MSRTC (Maharashtra State Road Transport Corporation), GoM (Government of Maharashtra). Subsequently, MoEF issued a letter accepting the proposal and stating that the project has been sanctioned for financial assistance. (Annex 1)

To initiate the program, TERI signed a MoU (Memorandum of Understanding) with MSRTC (Annex 2) on October 16, 2012. The project partners were:

1. MoEF (Ministry of Environment and Forests, Government of India)
2. MSRTC (Maharashtra State Road Transport Corporation) &
3. TERI (The Energy and Resources Institute)



Picture No. 1: (From left to right) Dr. Anjali Parasnis, Associate Director, TERI; Mr. Prashant Potdar, Executive Engineer-Civil, MSRTC; Mr. J. N. Supnekar, Divisional Engineer of MSRTC , Shri. Deepak Kapoor, Ex-MD and VC, MSRTC; Mr. Ravindra Dhongde, Chief Financial Officer, MSRTC

3. Introduction

Rationale

Earth's climate is a lot more fragile than what it was a few decades ago. Leading climate scientists attribute this fragility to anthropogenic activities which is known to cause global warming. The impact of human activities on climate and climate systems has led to an increase in the concentration of GHGs (greenhouse gases) such as carbon dioxide, methane, nitrous oxide, water vapour and so on.

According to a report entitled '*Economics of Global Climate Change*'¹, continuous emission of greenhouse gases will further accumulate in the Earth's atmosphere and cause warming, eventually disturbing the climate-dependent natural cycles. The greenhouse gases, however, are an integral part of our climate system as they absorb infrared radiations from the sun help to trap and hold heat in the atmosphere. Heat is essential to maintain temperature on Earth. The removal of GHGs from the environment doesn't serve as a solution because their absence causes a huge imbalance in the atmosphere. The remedy is to maintain a balance between the components contributing to GHGs.

Countries across the world are taking various steps to maintain a balance between factors that impact the Earth's atmosphere. The Kyoto Protocol has suggested afforestation as a strategy to mitigate the impact of global warming. Afforestation is a simple, easy, cost effective and economical method of reducing the atmospheric greenhouse effect. It plays an important role in sequestering and storing carbon, thus reducing the carbon content in the atmosphere. The carbon-dioxide absorbed by plants during the process of photosynthesis, is later converted into stored carbon, hence trees are often referred to as 'carbon sinks'².

Increasing number of afforestation drives are being undertaken globally. According to surveys and studies, it has been proven that afforestation drives in India have not achieved the expected level of success. In fact, from the total number of plants planted under the afforestation program, only 30 percent³ or even less survive through the first year of plantation due to lack of post-plantation care.

It is alarming to note that transport contributes to almost 22 percent of global GHG emissions from combustion of fossil fuels for road, rail, air, and marine transportation globally. Almost all (95 percent) of the world's transportation energy comes from petroleum-based fuels, mainly gasoline and diesel.⁴

In India, the energy sector comprising of emissions from electricity generation, petroleum refining, transport, residential, commercial sectors and so on, contributes to more than 58 percent of the emissions. Of the emissions from transport sector in India, the share of the emissions from roadways is the highest i.e. 87 percent followed by air, rail and water as seven, five and one percent respectively (Figure No 1).⁵

¹ http://ase.tufts.edu/gdae/publications/textbooks/global_climate_change.pdf

² <http://www.carbonfootprint.com/plantingtrees.html>

³ A news report by Times of India

⁴ <http://www.epa.gov/climatechange/ghgemissions/global.html>

⁵ http://moef.nic.in/sites/default/files/Report_INCCA.pdf

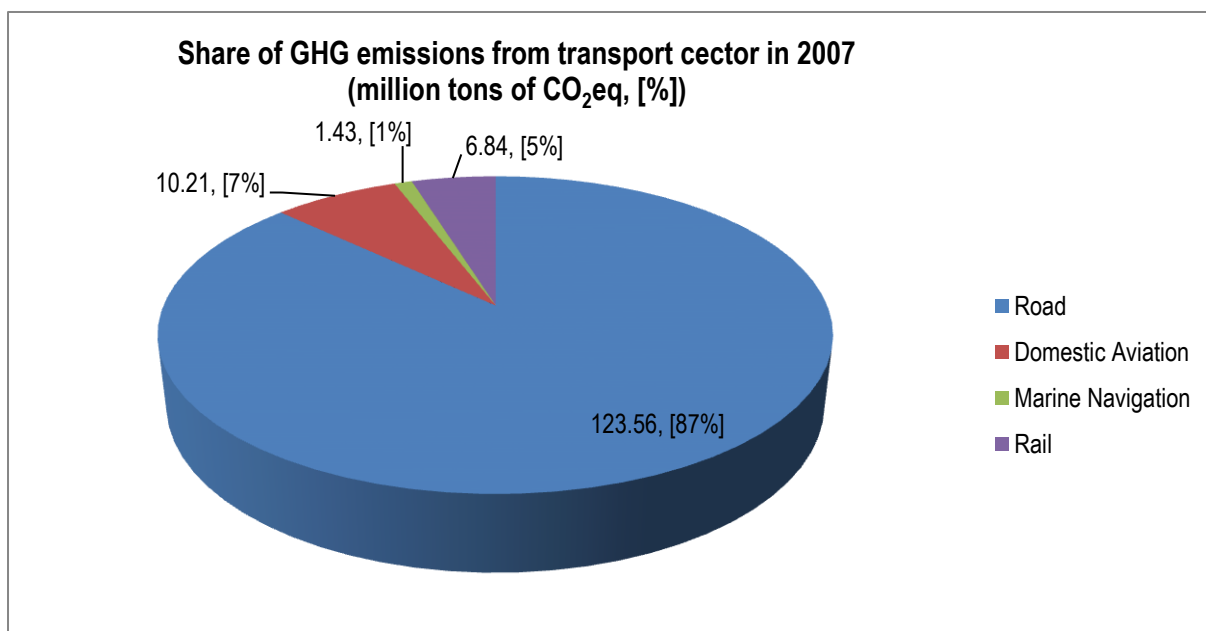


Figure No. 1: Share of GHG emissions by various modes of transport sector in India in 2007

Given the above fact, the main objective of the project was to actively involve the stakeholders of the transport sector and create awareness on afforestation and pertinent environmental issues. A unique concept was designed by involving the officials and employees of MSRTC, the apex body for public road transport in Maharashtra, with the following main objectives:

Program objectives

- To ensure maximum survival rate of the saplings through action-oriented strategies
- To encourage ownership-based participation in the afforestation program
- To sensitize and spread awareness about significance of afforestation and key environmental issues

Program concept

The program involved introducing the concept of tree adoption to ensure maximum survival rate of the saplings. MSRTC depots were introduced with the ideology of “One tree one employee”. The owner of a particular tree was responsible for nurturing and maintaining the saplings by watering and protecting the plant, until it had stabilized and matured. For the pilot project three bus depots, two at Thane (Kalva and Khopat) and one at Uran, were short-listed.

The project further involved various components like sensitization workshops, awareness programs, quiz, competitions, capacity building and so on for the officials of MSRTC and their families. TERI also organized awareness programs, especially tailor-made for the transport sector on the significance of afforestation and key environmental issues.

Unique approach of the program

- Innovative methods to encourage participation of employees and their families.
- Identification of locations with assured resources like land, water and manpower.
- Emphasis on higher survival rate of the plants through constant monitoring.
- Maintenance by encouraging voluntary participation.
- Scientific and systematic tree plantations.
- Healthy competition among employees to instill competitive spirit and motivation to undertake active part in the afforestation program.
- Awareness on key environmental issues like GHG emissions, its impact on environment, climate change, non-conventional fuels and so on.

Program activities

1. Afforestation drive
 - *Site preparation*
 - *Afforestation and orientation of MSRTC employees to undertake tree plantation using scientific approach*
 - *Periodic visits for assessment*
 - *Guidance in implementing result and action-oriented environmental programs.*
 - *Competitive spirit instilled by awarding credit points for successful implementation of afforestation program and active participation.*
2. Awareness programs
 - *Guidance in implementing result and action-oriented environmental programs*
 - *Tailor-made workshops and presentations focusing on transport sector*
 - *Screening of appropriate audio-visuals*
3. Sensitization and project outreach
 - *Drawing and essay competition*
 - *Online quiz on environment*
4. Closing ceremony

4. Project Activities

A standard format was designed by TERI for the complete program and awareness workshops. The same format was replicated at all the project locations⁶.

Afforestation

Afforestation activities:

- Short listing of the project sites in coordination with MSRTC
- Site preparation and co-ordination with MSRTC employees
- Short listing, purchase and delivery of the saplings at project sites
- Program briefing for the senior officials and employees
- Plantation of saplings at the hands of senior officials and employees (*List of the attendees is presented in Annex- 3*)



Picture No. 2: Site preparation at the Thane & Uran depots; A & C, existing pit on the site; B & D, Saplings provided by TERI

⁶ (List of participants and the type of trees with their scientific names planted at both locations is provided as Annex-3).

List of trees species planted

Sr. No.	Common Name	Scientific Name	Number of trees
1.	Neem	<i>Azadirachta indica</i>	250
2.	Mango	<i>Mangifera indica</i>	150
3.	Gulmohar	<i>Delonix regia</i>	150
4.	Coconut	<i>Cocos nucifera</i>	100
5.	Shirish	<i>Albizia lebeck</i>	600
6.	Ashok	<i>Saraca asoka</i>	100
7.	Jamun	<i>Syzugium cumini</i>	100
8.	Avla	<i>Phyllanthus emblica</i>	50
Total			1500

Note:

* Some saplings were purchased from local nurseries and some were procured from government nurseries.

Panchayat samiti under the Zilla Parishads are responsible to run and maintain these government nurseries. TZP (**Thane Zilla Parishad**) extended generous support by providing saplings for afforestation at the Kalva and Khopat bus depots and Khanivali village in Thane district. The Panchayat Samiti employs local tribals at these government nurseries. The saplings were procured from these nurseries to support the tribes.

Glimpse of the afforestation activity

Uran



Picture No. 3: *Mr. Shailesh Chavan, Divisional Controller, MSRTC* planting a sapling at the Uran depot campus



Picture No. 4: *Dr. Anjali Parasnis, Associate Director, TERI* planting a sapling at the Uran depot campus



Picture No. 5: Mr. Narayan Shinde (Asst. Traffic inspector), planting a sapling at the Uran depot campus



Picture No. 6: Mr. Prakash Sawant (Depot Manager), planting a sapling at the Uran depot campus

Thane



Picture No. 7: *Mr. Vineet Kulkarni*, Executive engineer, MSRTC, planting a sapling at the Khopat depot campus



Picture No. 8: *Mr. P. B. Jagtap*, Divisional Controller, MSRTC, planting a sapling at the Khopat depot campus



Picture No. 9: Employees of MSRTC planting a sapling at the Kalwa bus depot, Thane



Picture No. 10: Late Mr .Nikam, Mechanical Engineer, MSRTC, planting a sapling at the Kalwa depot, Thane

Awareness workshops and site inspection visits

Table No. 1: Different activities during the project

Sr. No.	Activity	Venue & Date	
		Uran	Thane*
1.	Launch and afforestation activity	06/12/12	08/02/13
2.	First awareness workshop	06/12/12	06/03/13
3.	First inspection visit	07/01/13	06/03/13
4.	Second awareness workshop	23/01/13	16/03/13
5.	Second inspection visit	20/02/13	16/03/13
6.	Essay and painting competition	24/02/13	24/03/13
7.	Third inspection visit (post-monsoon)	25/07/2013	24/07/2013
8.	Closing ceremony	01/08/2013 at MSRTC's Head Office	

* Includes Kalwa and Khopat depots

TERI developed customised program to conduct awareness campaign for the employees of MSRTC. A brief outline of the program is given below. The same program was replicated at various MSRTC workshops:

Program outline:

- TERI developed a small presentation (Annex-4) to sensitize MSRTC officials and employees about the project. The presentation further highlighted on
 - Pertinent environmental issues like climate change, deforestation, pollution and so on
 - The adverse effects of pollution caused by vehicular traffic. Reasons why TERI chose the involvement of the transport sector
 - The theory of 4 Rs' - Retain, Reduce, Reuse and Recycle. The participants were also informed about the various eco-friendly initiatives they can take at an individual level to conserve energy, water and other natural resources.
 - Benefits of planting trees in MSRTC's premises were also explained. TERI made an appeal to employees of MSRTC to participate sincerely and also involve families and neighbourhoods.

- Following the presentation, an audio-visual (documentary film⁷) entitled “**The Green Warriors of Thar**”, developed by TERI was showcased. The audio-visual highlights the efforts taken by the Bishnoi community, the tribals of Jodhpur in Rajasthan, for the protection of trees.
- This was followed by an open discussion with the employees. TERI encouraged them to share their personal experiences on afforestation and environment-related problems.
- The employees were further informed that there shall be a competition between Uran and Thane depots through a scoring system and the winning team (depot) shall be awarded, based on the points earned collectively by the teams.

Workshop at Uran



Picture No. 11: Dr. Anjali presenting a memento to Mr. Shailesh Chavan, Divisional Controller, MSRTC, GoM

⁷ http://www.youtube.com/watch?v=ILz_H8Zlg5Y



Picture No. 12: Mr. Shailesh Chavan addressing the employees of MSRTC during the workshop.



Picture No. 13: Showcasing of the movie at the workshop

Workshop at Thane (Kalva and Khopat)



Picture No. 14: Ms Swati Tomar, Research Associate, TERI interacting with the employees at the Kalwa depot, Thane



Picture No. 15: Ms Swati Tomar, Research Associate, TERI interacting with the employees at MSRTC Depot, Thane

Second awareness workshop

A team from TERI visited both the depots on the respective dates (Table No. 1) to interact with the MSRTC officials/employees and get feedback on the project developments.

TERI team members once again explained the benefits of increasing the green cover within MSRTC's premises and requested employees to participate sincerely in the program. The concept of reuse, recycle and creating greener environment, which could be implemented at their households and neighbourhoods, was explained.

Following this brief orientation, there was an interactive session in which feedback was taken from the attendees on how they had incorporated TERI's suggestions into their daily lives. Many employees stated they had changed their domestic lighting systems to more energy-efficient CFL lights. Few of the participants said they had stopped the use of plastic within their households. They expressed an interest in planting saplings not only within MSRTC premises but also in and around their houses. Accordingly, TERI provided a list of sapling species and the participants were asked to choose and convey the species and number of saplings desired by them.

A small session on how it might be possible to incorporate renewable energy systems at household level was also explained. Organisers cited examples of gadgets like solar torches and solar lanterns to explain the simplicity with which these systems can be incorporated in our daily lives. The participants were very enthusiastic in their response and they wanted to use solar torches and lanterns in their households.

The session concluded with the participants promising they would spread this message amongst their colleagues, to increase participation in the program.



Picture No. 16: Ms. Swati Tomar, Research Associate, TERI explaining the project and taking an overview of the eco-friendly initiatives adopted by the officials



Picture No. 17: *Mr. Aditya Khandekar, Trainee, TERI explaining the importance of renewable energy at the Uran depot*



Picture No. 18: *Ms. Swati Tomar, Research Associate, TERI during the second awareness workshop at Kalwa depot, Thane*

Essay and painting competition

The project also entailed sensitizing the families of the employees. So, an essay and painting competition was organized for the children of MSRTC's staff and the students of the neighbouring schools in Uran and Thane bus depot. More than 100 children in the age-group of 8 to 15 participated in the events at both the locations.

The theme of the painting competition was "*Clean city, beautiful roads*" and "*My father's bus*". For the essay competition, the theme was, "*How to make our environment more beautiful: My thoughts*". The agenda of the program and the pamphlet designed for the publicity is attached as Annexure 5 and 6 respectively.

The program started by presenting an overview of the project and its objectives amongst the employees, their family members and other students present on the occasion.

The young crusaders, who participated in the essay competition, expressed their thoughts in a very vivid, lucid and thoughtful manner. It became apparent that they are attached to Mother Nature and all of them are motivated to protect and conserve the environment. One of the essays shared the thoughts of Sant Dyaneshwar, the great sage of Maharashtra. It stated that every person should live in harmony with nature for a sustainable development. The jury selected the three best essays and paintings from each depot. A snapshot of a few essays is presented in Annex 7. The name of the winners at both the locations is attached in Annex-8. As a token of appreciation, TERI presented a certificate (Annex-9) to every participant along with a small gift.

Uran

Essay Competition

First prize:

Ms. Hemangi Vilas More

Drawing Competition

First prize:

Mst. Ghosh Ratul Jayadev

Thane

Essay Competition

First prize:

Mst. Sambhaji Jayaram Jadhav

Drawing Competition

First prize:

Ms. Bharti Bhagat

Glimpse: Uran Depot, Uran (24.02.2013)



Picture No. 19: Students during the drawing competition at Uran



Picture No. 20: Ms. Swati Tomar, Research Associate, TERI, presenting the program overview and objectives to the children and their parents



Picture No. 21: Winning entries at the Uran depot, Uran



Picture No. 22: Prize distribution ceremony at the Uran depot



Picture No. 23: Winners at the Uran depot

Glimpse: Thane Depot, Thane (24.03.2013)



Picture No. 24: Ms. Swati Tomar, Research Associate, TERI, presenting the program overview and objectives



Picture No. 25: Students during the drawing competition at Thane



Picture No. 26: Few selected entries of the competition at Thane



Picture No. 27: Prize distribution ceremony



Picture No. 28: Winners at Thane depot along with MSRTC and TERI employees

Quiz competition

An online quiz competition⁸, open for all, on afforestation was uploaded on MSRTC's website on 11th February, 2013. To encourage more participation, advertisement about the quiz was published on various social networking sites and online environment portals.

It was encouraging to learn that more than 50 participants from all over the state participated in the competition. The main objective of the quiz competition was to highlight the significance of protecting environment and natural reserves, maintaining ecological balance, reducing GHG emissions, global warming and its effects and to sensitize people in this regard to build a better and sustainable society. Keeping this objective in mind, a quiz was developed and the web-links to various articles, referring the afforestation activities were uploaded on MSRTC's website. Please refer Annex 10 for more details.

The response to the quiz competition was encouraging as participation was from across the state. The names of the winners are as follows:

First Prize: Mr. Nachiket Mahamuni, Student, Dr. D. Y. Patil Engineering college Talegaon, Pune

Second Prize: Mr. Nagesh Kulkarni, Divisional Engineer(C), Civil Engineering Dept. of MSRTC, Mumbai

The winners received a solar torch and subscription of Terra Green⁹, a monthly magazine published by TERI for three years and one year respectively.



Picture No. 29: Winners of quiz competition and depot managers with Shri Deepak Kapoor, Ex-MD and VC, MSRTC (7th from L) and TERI officials (2nd and 4th from L).

⁸ http://www.msrtccontent.in/Content/PDF/QUIZ_MSRTC.pdf

⁹ TerraGreen is dedicated to disseminating information and knowledge on issues of environment, energy and sustainable development. It brings in-depth stories from across the world on water, climate change, pollution, natural disasters, conservation measures, environment-friendly technologies and products, recent path-breaking developments and related topics. TerraGreen also contains information useful for competitive examinations and helps students increase their 'green IQ' and general knowledge.

Closing ceremony

The grand finale was held on August 1, 2013 at the head office of MSRTC in presence of Mr. Deepak Kapoor, Ex-MD and Vice-Chairman of MSRTC. Dr. Anjali Parasnis, Associate Director, TERI welcomed the government officials and highlighted the theme and status of the project. Dr. Parasnis provided a complete overview of the project to all the participants. Mr. Kapoor appreciated TERI's initiative and painstaking efforts and requested TERI to revisit the sites as and when possible, even after the completion of the project. He also asked TERI to encourage the officials to take care of the plantations. Ms. Swati Tomar provided an overview of several workshops conducted for MSRTC's employees to sensitize them on environmental issues.

After the presentation, a small prize distribution ceremony was organized for the winners of the quiz competition and to appreciate the participation of the various depots.



Picture No. 30: Sh. Deepak Kapoor, Ex-MD and VC, MSRTC presenting a solar torch and certificate to Mr. Nagesh Kulkarni, Divisional Engineer (C), Civil Engineering Dept. MSRTC in Mumbai



Picture No. 31: Shri. Deepak Kapoor, Ex- MD and VC, MSRTC presenting a memento to *Mr. Prakash Sawant, Depot Manager, Uran Depot, Uran*



Picture No. 32: Shri. Deepak Kapoor, Ex- MD and VC, MSRTC presenting a memento to *Mr. Pardeshi, Depot Manager, Kalwa, Thane*

5. Observations and Impact

TERI officials regularly visited the sites for inspection of saplings. During every inspection, it was very heartening to observe that all the planted saplings were well maintained by the officials and the employees of MSRTC. Apart from the fact that, every employee was responsible for the tree adopted by them they also undertook many unique initiatives to protect them. Some of the observations have been discussed in the following section.

Initiatives: Afforestation

Uran depot

1. Since the soil at Uran was not very fertile, the depot had purchased red soil from Kurla to cater to the growth requirements of the trees.
2. The saplings were fenced with thorny shrubs to protect them from grazing animals.
3. The plastic pet bottles were used for drip-irrigation keeping the principles of “RRR (Reduce Reuse and Recycle)” in mind. (Picture 33)
4. Tree guards were installed to protect the saplings (Picture No. 34).



Picture No. 33: Use of plastic pet bottles for drip-irrigation at the Uran depot



Picture No. 34: Installation of tree guards at the Uran depot



Picture No. 35: Installation of tree guards and thorny bushes for protection of the plants from grazing animals

Thane depot

1. At Thane depot, the top soil was rocky and not fertile. Hence, the staff had to specially procure fertile red soil to support the saplings.
2. Following the principle of RRR, hedging was done around the plants using old and worn-out brake liners. This was a very innovative idea (Picture No. 37).



Picture No. 36: Use of red soil at the Thane depot



Picture No. 37: Brake liners



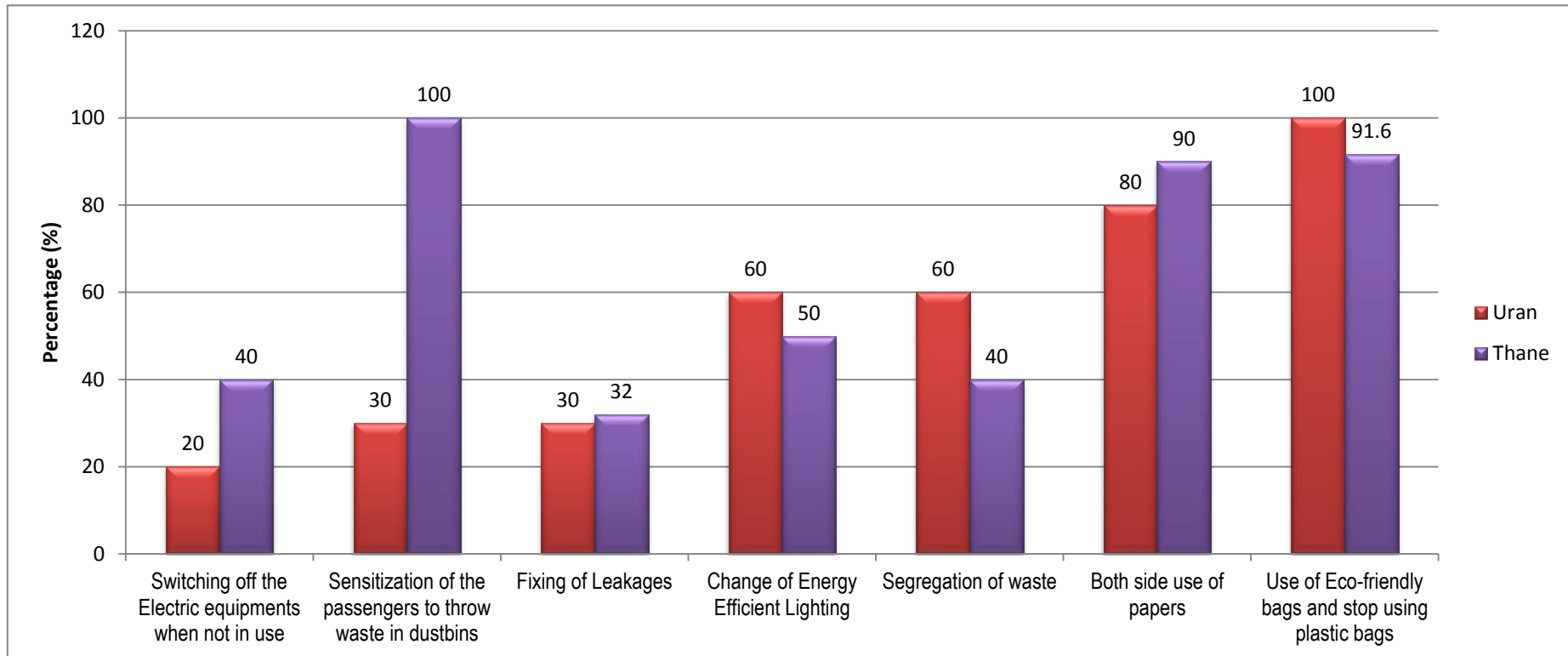


Picture No. 38: Following the principle of Recycle and Reuse, use of brake liners for the boundary of the plants.

Initiatives: At personal level

At different awareness and inspection workshops conducted periodically at various depots, TERI always emphasized upon implementing various green and eco-friendly initiatives by the employees at a personal level. To check and analyse the impact of the program, TERI had circulated an activity sheet (Annex 11) amongst the MSRTC's employees. Total number of employees at Uran and Thane were 400 and 800 respectively. However, the numbers of participants were 250 and 500 respectively. It is observed from Figure No. 2 that around 60 percent of the employees had started consciously switching off lights while leaving a room whereas 100 percent employees endorsed on the concept of waste disposal in the bins by passengers and agreed to create awareness of the same during their working hours. It was interesting to note that concepts like use of eco-friendly bags and conservation of paper were not only well appreciated by most of the employees but also put to practice by them in daily life.

Figure No. 2: Analysis and impact of TERI's program at all the locations



Status of plantation on July, 2013

Thane depot

All the trees were planted between December 2012 and March 2013, before the onset of the monsoon. At the time of plantation, the height of the saplings was 2-3 feet. Post 5-6 months of the afforestation drive, it was very encouraging to note that all the trees grew to 4-6 feet and were in considerably good condition.



Picture No. 39: Status of plantation at Thane depot

Uran depot



Picture No. 40: Status of plantation at Uran depot as on July 2013

Uran Depot: December 17, 2013



Picture No. 41: Matured and grown up trees at Uran Depot after one year of the plantation

Plantation at Wada Gram Panchayat

The project commitment was to plant 1500 trees, but one of the major constraints of Mumbai and its nearby areas is lack of open spaces. The same problem was faced by most of the depot managers. Although they were keen to implement the program, lack of space within their depot area was a major constraint.

During TERI's visit to the Wada area in Thane, the Khaniwali gram panchayat expressed interest in planting trees but they didn't have enough funds to undertake the afforestation program. Hence the gram panchayat approached TERI to undertake afforestation activity in their village. The village is located on the state highway and there are many state transport and private buses passing by regularly through the region.

Keeping both the points in mind, TERI decided to plant trees in and around Khaniwali village as a part of this project. Initially, 500 saplings before monsoon and 250 more saplings post-monsoon were provided to Khaniwali gram panchayat along with the tree guards. After the plantation, TERI inspected the sites to check the status of the saplings. It was noted that all the plants had survived post monsoon and were growing luxuriantly.



Picture No. 42: *Albizia lebeck* (Shirish) tree at Khaniwali village, Wada



Picture No. 43: Status of plantation at Khaniwali Gram Panchayat, Wada in September, 2013 (4 months after plantation)



Picture No. 44: Status of plantation at Khaniwali Gram Panchayat, Wada in November, 2013 (6 months after the plantation)

Outcome of the program

Sr. No.	Objectives	Result
1.	To ensure maximum survival rate of the plantations through action-oriented strategies	Total 1500 trees have been planted in Thane, Uran and Khaniwali village, Wada area. All trees are guarded by proper tree guards and are owned by MSRTC officials and villagers of Khaniwali Gram Panchayat at Wada block, Thane.
2.	To encourage ownership-based participation in afforestation program	More than 300 employees of MSRTC and 800 locals of Khaniwali Gram Panchayat participated in the afforestation drive and other activities of the programs.
3.	To sensitize and spread awareness about significance of afforestation and key environmental issues.	<ul style="list-style-type: none">• More than six workshops have been organized for the employees at different locations.• Families and children of the employees were also involved and drawing, painting and essay completion were organized.• Quiz competition involved participants from all over Maharashtra.

Scoring system

Table No. 2: Standard scoring format adopted by TERI

Criteria	Range	Maximum score	Obtained score	
			Uran	Thane
Percentage of trees survived				
	95 – 100%	10		
	80 – 95%	9	✓	✓
	50 – 80%	8		
	30 – 50%	5		
Participation in awareness program and taking up eco-friendly initiatives				
	30 – 50%	5		
	50 – 80%	8		✓
	80 – 95%	9	✓	
	95 – 100%	10		

As observed from the above table, the score obtained by Uran and Thane was 18 and 17 respectively, but the efforts taken by both the depots have been appreciated. Hence, a token of appreciation was presented to both the depots.

Activities and score

Table No. 3: Different activities and scores

Office level (10 points / activity) A	Individual level (10 points / activity) B	Social level (15 points / activity) C	Special projects (20 points / project) D
Save paper	Use of CFL	Awareness programs in schools / colleges	Practice rainwater harvesting, use this water for gardening, flushing
Save water	Switching over to metal idols of Ganesh instead of POP	Campaign against noise and air pollution during Diwali	Landscaping, grow medicinal plants around the campus
Save electricity (demonstrate reduced energy consumption by comparing electricity bills)	Avoid the use of plastic bags	Awareness campaign for motorists for safe and fuel-efficient driving practices	Prepare posters for saving fuel while driving
Segregate and reduce waste	Avoid the use of paper napkins	Develop skit(s) giving environmental message(s)	Composting of organic waste within the campus
<ul style="list-style-type: none"> Keep the campus clean & free of litter Do not use non-biodegradable material for decoration during festivals, prefer natural / organic material 		* Any other activity	Organize nature appreciation walks for the executives
Discourage the use of high-decibel noise crackers during Diwali		Awareness programs using the mass media (TV, FM radio & print)	
'Environment News' board in the campus for public awareness	Avoid buying items with excess of packaging material	Demonstrate advantages of using alternate fuels like biodiesel and ethanol, and electrically-charged vehicles	
Film screening / slide show for executives	Repair / replace all the leaking taps at home		** Any other project

6. Annexures

1. Letter received from MoEF
2. MoU between TERI and MSRTC
3. Participants present during afforestation activity
4. Presentation given to the officials
5. Agenda of the workshops
6. Publicity material for the drawing and painting competition
7. Few selected winning essays
8. Winners of the drawing and painting competition
9. Certificate presented to the winners
10. Quiz on afforestation
11. Activity sheet filled by MSRTC's employees with few filled samples

Annex-1: Letter issued by MoEF to TERI

By Speed Post

**File No. 15-21/2012-EE
Government of India
Ministry of Environment & Forests
(EE Division)**

Paryavaran Bhavan,
CGO Complex, Lodi Road,
New Delhi-110 003.
Dated: 7th September, 2012

To,

Dr. Anjali Parasnis,
Head-Western Region,
The Energy and Resources Institute (TERI),
318, Raheja Arcade, Sector-11,
CBD Belapur,
Navi Mumbai- 400614.

Sub: Financial assistance to The Energy and Resource Institute (TERI), Navi Mumbai, Maharashtra for organizing awareness programme on ownership based and action oriented a forestation programme for MSRTC (Maharashtra State Road Transport Corporation) from 5th June, 2012 to 5th June, 2013 at MSRTC.

Sir,

Please refer to your letter No. **Nil** dated 24.02.2012 on the subject mentioned above. It is to inform that the proposal of The Energy and Resource Institute (TERI), Navi Mumbai, Maharashtra has been considered in the Ministry and on examination, it has been found that the event is given from 5th June, 2012 to 5th June, 2013 at MSRTC. Since the date of the event is crossing the financial year 2012-13, you are requested to restrict event date within one financial year i.e. 2012-13. Please inform the confirmed date of the programme and if it is started, then following documents may be furnished once the event is over. :

1. Expenditure statement in duplicate, duly forwarded by the competent authority (To be signed by the auditor/chartered accountant in case of an NGO).
2. Audited utilization certificate in the enclosed format (in duplicate)
3. A detailed report on the event along with photograph.
4. A full set of entire material distributed at the time of registration.
5. Information in respect of the organization in the enclosed format.

It is also requested to furnish the following information:

- Detailed plan of implementation to cover the activities.

Encl: As above

Yours faithfully,

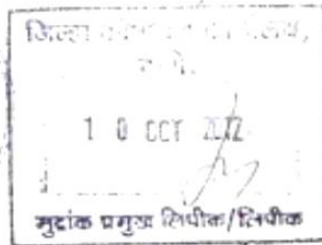


(M.K. Prabhat)
Section Officer

Annex-2: MoU between MSRTC and TERI



महाराष्ट्र MAHARASHTRA



1270 U
GE 478621
राज्य सरकार के लेटर
क्र. 49499
16 OCT. 2012
MUMBAI OFFICE
Prakash
Om
रा. प्र. वि. रा. वि.
पुस्तक विभाग-08

Memorandum of Understanding

"Action Oriented and Ownership Based Afforestation Programme at Selected Bus Stations and Bus Depots of Maharashtra State Road Transport Corporation"

This agreement made at Mumbai on the Sixteenth day of October in the year Two Thousand Twelve between MSRTC (**MAHARASHTRA STATE ROAD TRANSPORT CORPORATION**), a state government undertaking established by Government of Maharashtra as per the provision in Section 3 of RTC Act 1950. The undertaking is operating stage and contract carriage services in the entire area of the state of Maharashtra except S.T. (State Transport) undertaking defined under Section 68 A (b) of M. V. Act and other exception published in the scheme. The MSRTC operates its services by the approved scheme of Road Transport Published vide Notification MVA 3173/30303-XIII dated 29.11.1973 in the official

Page 1 of 5

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gazette from their registered office at, M. V. Bhavan, Dr. A. N. Marg, Mumbai 400 008 hereafter referred to as "MSRTC" and of the one part

And

TERI (THE ENERGY AND RESOURCES INSTITUTE), a Society registered under the Societies Registration Act, 1860, having its Regional Office at 318, Raheja Arcade, Sector-11, Belapur, Navi Mumbai - 400614 and its registered office at Darbari Seth Block, IHC Complex, New Delhi - 110003, hereinafter referred to as "TERI" and of the other part
WHEREAS,

TERI, on December 8, 2011 submitted a proposal to MSRTC to render the consultancy services for undertaking action oriented and ownership based afforestation programme and sensitize MSRTC officials about key environmental issues.

MSRTC issued a letter to TERI on December 8, 2011 expressing their interest to participate in the programme and engage its services and employees as per the proposed programme.

TERI, in continuation, submitted a proposal to Ministry of Environment and Forests, hereafter referred as MoEF, requesting financial assistance towards the manpower cost and planting material for the programme and received a sanction letter from MoEF for the same. (Copy enclosed as exhibit)

NOW THIS AGREEMENT WITNESSETH and it is hereby agreed and declared by and between the two parties hereto as follows:

1 To undertake the following

- 1.1 Action Oriented and Ownership Based Afforestation Programme at Selected Bus Stations and Bus Depots with the objectives as follows:
 - To ensure higher survival rate of the plants through constant monitoring, maintenance and by encouraging voluntary participation.
 - To introduce a unique strategy to motivate the concerned units to undertake active part in the afforestation project.
 - To undertake afforestation in a systematic manner;
 - To conduct periodic surveys
 - To document survival of the plants at the end of the project.
 - To ensure protection of the trees post-project completion.
- 1.2 Orientation Workshops for MSRTC officials
- 1.3 Online quiz on environment related issues.
- 1.4 A scoring system for afforestation activity and online-quiz to instill competitive spirit and motivate the officials.

2. Action plan

- 2.1 TERI agrees to organize a launch program followed by the orientation workshop for MSRTC officials of selected sites.

Page 2 of 5



- 2.2 MSRTC agrees to provide in kind support to TERI towards all the logistic facilities like venue, refreshments, tree guards M.S.R.T.C. shall not bear any expenditure other than this for the purpose and towards this M.O.U.
- 2.3 At the workshop TERI shall explain the details of implementation of the programme along with the plantation of the saplings.
- 2.4 TERI will design the questionnaire for the environment related quiz which will be uploaded on MSRTC website.
- 2.5 The executives trained in the orientation workshop would undertake tree plantations and encourage the officials to take ownership of the saplings to ensure maximum survival, as well as to implement eco-friendly activities at personal and/or group level.
- 2.6 Interim review meeting to evaluate the progress with the presentation made by executives on activities & actions undertaken so far for project success.
- 2.7 TERI shall do periodic site visits and inspection so as to interact with the executives to get an overview about the progress.
- 2.8 Final review meeting, presentation by concerned officials of the activities & projects undertaken along with open discussion.
- 2.9 TERI and MSRTC shall organize a Grand Finale event. It will include quiz results, announcement of the winner group, prize distribution at the hands of V.C. (Vice Chairman) & M.D. (Managing Director)/ Chief Guest etc.
- 2.10 TERI shall prepare and submit a project evaluation report.

2. Roles and Responsibilities

Activity	TERI	MSRTC
Launch Event	<ul style="list-style-type: none"> To give orientation about the afforestation programme. To sensitize the officials on key environmental issues related to transport. 	<ul style="list-style-type: none"> To provide logistic support for the event like venue, refreshments etc. To invite a liaison officer from each shortlisted bus stand and bus station.
Afforestation	<ul style="list-style-type: none"> To provide the planting material like sapling, fertilizer etc. To train the officials on sustainable and eco-friendly methods of afforestation. 	<ul style="list-style-type: none"> To provide tree-guards for the saplings. To depute one employee each for nurturing one sapling.
Online Quiz	<ul style="list-style-type: none"> To design the questionnaire. To submit it to the MSRTCs concerned department. To continuously check the performance of the participants and update MSRTC about the same. 	<ul style="list-style-type: none"> To upload the quiz on the website. To encourage officials from all over Maharashtra to attempt the quiz.
Review meetings and periodic visits	<ul style="list-style-type: none"> To organize periodic meetings with the concerned officials to get an overview of the project. To pay regular site visits to check the 	<ul style="list-style-type: none"> To invite concerned officials for the meetings. To arrange the site visit for TERI's officials.

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	progress and condition of the planted saplings.	
Grand Finale event	<ul style="list-style-type: none"> To conceptualize and organize the event. To select the best group among the different implemented sites. To select the quiz winner. To issue certificates/ prizes to the winners. 	<ul style="list-style-type: none"> To provide logistic support for the event like venue, refreshments etc. To help in selecting the best team
Report preparation and submission	<ul style="list-style-type: none"> To evaluate the complete project proceedings and prepare a report based on the observations To analyze the survival rate of the plantation 	<ul style="list-style-type: none"> To help TERI in assessing the success rate.
Mobilization	<ul style="list-style-type: none"> To enter into an agreement with MSRTC for implementing the project. To depute a liaison officer for the project. 	<ul style="list-style-type: none"> To enter into an agreement with TERI for implementing the project. To depute a liaison officer for the project.

3. Timeline

Activity/Months	M1	M2	M3	M4	M5	M6
Launch Event						
Online Quiz						
Review meetings and periodic visits						
Grand Finale event						
Report submission						

4. Amendment to the Agreement

Amendment to this Agreement shall be made by mutual consent of the parties in writing. No variation in terms of scope of this Agreement shall be valid or be a binding unless previously agreed upon in writing between the parties in the form of a letter entitled "Amendment to Agreement".

5. Entry into Force and Term

- The collaborative activity indicated in this MoU is subject to budgetary appropriations available to each party and applicable laws and regulations of each party.
- This Agreement shall enter into force upon signature by the parties. It may be amended by mutual agreements of the Parties.
- The validity of this agreement shall be for 6 months and may be renewed or extended by mutual agreement.



Page 4 of 5



6. Settlement of Disputes

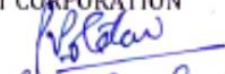
Any dispute or difference, which shall arise between parties hereto, whether in relation to interpretation of this Agreement or to any act or omission by either party to the dispute or as to any act which ought to be done by the parties in dispute or either of them or in relation to any other matter whatsoever touching upon this Agreement shall be referred to the V.C. & M.D. of the MSRTC whose decision shall be final and binding on both the parties. However, this will not be treated as Arbitration under the provisions of Arbitration and Conciliation Act, 1996.

This MOU is signed on the Sixteenth day of October in two originals in English language, both texts being equally authentic.

IN WITNESS WHEREOF THE COMMON SEAL OF THE AUTHORITY HAS BEEN HEREUNTO AFFIXED AND THE COMMON SEAL OF TERI REGIONAL OFFICE, MUMBAI HAS BEEN HEREUNTO AFFIXED THE DAY AND YEAR FIRST HEREIN ABOVE WRITTEN.

FOR THE MAHARASHTRA STATE ROAD TRANSPORT CORPORATION

Signed:



Name:


Prashant Potdar

Designation:

Executive Engineer

Date:

16/10/2012


J.N. Supnekar
Divisional Engineer
M.S.R.T. Corporation

Signed:



Name: Dr. Anjali Parasnis

Designation: Associate Director



Swati Tomar
Research Associate, TERI

Annex- 3 : Participants at afforestation activity

Participants at Uran:

Time: 10.00 am- 12.00pm

TERI (WRC), Mumbai

Dr. Anjali Parasnis

Ms. Swati Tomar

Ms. Zenobia V. Motivala

Venue: Uran Depot

MSRTC

Mr. Shailesh Chavan (Divisional Controller)

Mr. Prakash Sawant (Depot Manager)

Mr. More (Divisional Engineer)

Mr. Narayan Shinde (Asst. Traffic Inspector)

Mr. Chandrakant Anande (Asst. Traffic Superintendent)

Mr. D. Renose (Asst. Workshop Superintendent)

30 Engineers/Mechanics/Technicians/Support Staff

Participants at Thane:

Afforestation Activity 1

Time: 10.00 am- 12.00pm

Participants:

TERI (WRC), Mumbai

Dr. Anjali Parasnis

Swati Tomar

Venue: Khopat, Thane, Depot -2

MSRTC, Thane

Mr. P.B. Jagtap (Divisional Controller)

Mr. Pratap Sawant (Regional Manager)

Mr. Vineet Kulkarni (Executive Engineer)

Mr. R. G. Pardeshi (Depot Manager)

Mr. J. E. Kamble

20 Engineers/Mechanics/Technicians/Support Staff

Afforestation Activity 2

Time: 2.00 pm – 3.30pm

Participants:

TERI (WRC), Mumbai

Ms. Swati Tomar

Mr. Prathmesh Chourey

Venue: Kalwa Depot, Thane

MSRTC, Thane

Late Mr. Nikam (Mechanical Engineer)

30 Engineers/Mechanics/Technicians/Support Staff

Annex-4: Presentation

Ownership based and action oriented afforestation program



Project partners

 MoEF
 (Ministry of Environment and Forests)

 MSRTC
 (Maharashtra State Road Transport Corporation Ltd.)

 TERI
 (The Energy and Resources Institute)


Project objectives



1. To undertake afforestation program with active involvement of the concerned officials of MSRTC at selected locations in Maharashtra.
2. To sensitize the MSRTC officials about significance of afforestation and key environmental issues.
3. To encourage ownership based participation.
4. To ensure maximum survival rate of the plantations through action oriented strategies.

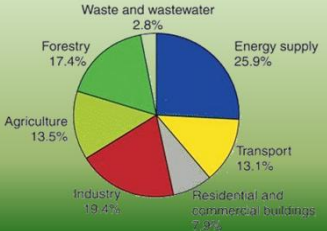


Why Transport Sector?



- Transport sector is estimated to be the source for 60% GHG (Greenhouse Gas) emissions world-wide between 2002-2025.
- Correlation between the vehicular pollution and its impact on local and global environment needs to be emphasized.
- Therefore, undertaking afforestation drives at places such as bus depots would help to highlight this correlation.


Figure 1: Total greenhouse gas emissions by sector, 2004.



Sector	Percentage
Energy supply	25.9%
Industry	19.4%
Agriculture	13.5%
Transport	13.1%
Forestry	17.4%
Residential and commercial buildings	7.9%
Waste and wastewater	2.8%

<http://www.wri.org/images/2009dec/t21-clim-480.jpg>

Contd...



Why Transport Sector?



- By ensuring active involvement of MSRTC officials, the number of trees surviving at the end of the year through this drive could be maximized.
- Sensitization on current issues related to GHG emissions, its impact on environment, climate change and new generation fuels is necessary.
- Therefore an awareness program especially tailor-made for the transport sector would be beneficial.



Project outreach

- Officials of various departments of MSRTC;
- General public

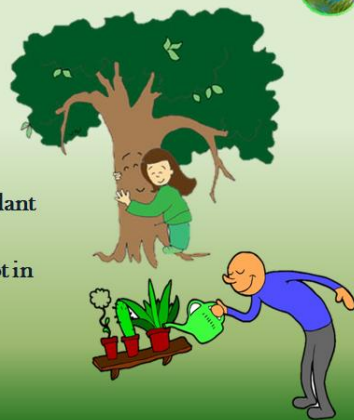
Project duration

October 2012 – March 2013



Ownership approach

- Adopt a tree
- Daily supervision
- Regular watering of the sapling (once in two days)
- Clearing of debris around your plant (plastic/paper)
- Report to TERI if the plant is not in proper condition



Project Activities

- Orientation program to undertake tree plantation using scientific approach for the officials of MSRTC.
- Guidance in implementing result & action-oriented environmental programmes.
- Periodic surveys by TERI officials to assess and document survival rate of plantations.
- Workshops, screening of audio-visuals & slide shows on pollution, environmental issues and significance of afforestation.
- Competitive spirit instilled by awarding credit points for successful implementation of afforestation program and active participation.
- Online Environment Quiz on MSRTC's website.
- Grand finale on **World Water Day 2013**.



Why there is a need of such activities?



Main problem....

Expansion of human activities like industries, transport, amenities etc. → Expansion of global environmental problems

WHY is there a need to save EARTH?

The reason for this sudden global call to save earth is the destruction that has changed the face of earth. Problems like global warming, pollution, overuse of minerals, deforestation and natural calamities like volcanic eruptions, tsunamis, earthquakes, etc. have caused destruction on earth.

WHO is responsible for this SITUATION

Is This **GROWTH** Or... **DESTRUCTION**

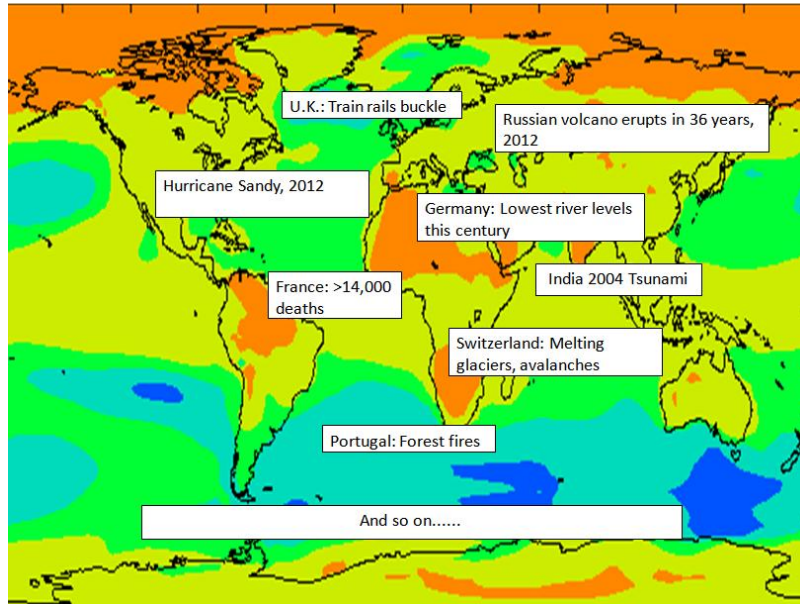
Why should we care?

Present Day (1990s) vs Possible Future (2090s)

°F	-4	25	32	39	46	54	61	68	72	75	79	82	86	90	97
°C	-20	-4	0	4	8	12	16	20	22	24	26	28	30	32	36

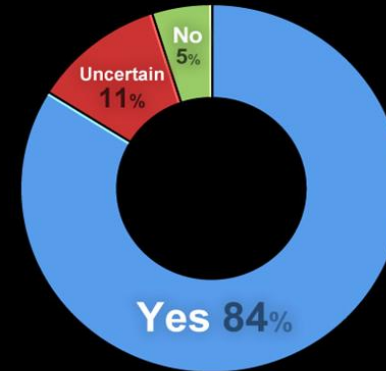
Surface Air Temperature

NCAR



What do climate scientists really think?

Climate Scientists: Are humans responsible for observed warming?



The COMET Program / Statistical Assessment Service at George Mason University

HOW to Save the EARTH

The Mantra is...

RETAIN
REDUCE
REUSE
RECYCLE

Why Afforestation?

Trees play many critical roles like:

- preservation of soil run-off and erosion, maintains the fertility of the soil,
- conservation of water resources
- contribute to maintain biodiversity
- important role in the regulation of the climate.
- Sinks of carbon i.e. they absorb and assimilate carbon dioxide, and help prevent **Global Warming**.



Hence, forests are necessary for environmental conservation & for development of the community.

In short Afforestation is necessary if we want to save the EARTH!!!

Unique Features of this Afforestation Program

- Higher survival rate of the plants through:
 - Constant monitoring, maintenance and
 - By encouraging voluntary participation.
- Motivating the concerned units to undertake active part in the afforestation project.
- Tree plantation in a systematic manner;
- Periodic surveys would be conducted
- Survival of the plants at the end of the year will be documented
- Strategy to protect trees post plantation
- A scoring system to instill competitive spirit and motivate the officials.



Other Activities and scores for them!!!

Simple & small steps by you for environment protection....
To make a big difference...

Office level (10 points / activity) A	Individual level (10 points / activity) B
Save Paper	Use of CFL
Save Water	Switching over to metal idols of <u>Ganesh</u> instead of POP
Save Electricity (demonstrate reduced energy consumption by comparing electricity bills)	Avoid the use of plastic bags
Segregate & Reduce Waste	Avoid the use of paper napkins
<ul style="list-style-type: none"> • Keep the campus clean & free of litter • Do not use non-biodegradable material for decoration during festivals, prefer natural / organic material 	
Discourage the use of high-decibel noise crackers during Diwali	
'Environment News' board in the campus for public awareness	Avoid buying items with excess of packaging material
Film Screening / slide show for executives	Repair / replace all the leaking taps at home

Social level (15 points / activity) C	Special projects (20 points / project) D
Awareness Programmes in schools / colleges	Practice rainwater harvesting, use this water for gardening, flushing
Campaign against noise & air pollution during <u>Diwali</u>	Landscaping, grow medicinal plants around the campus
Awareness campaign for motorists for safe and fuel-efficient driving practices	Prepare posters for saving fuel while driving
Develop skit(s) giving environmental message(s)	Composting of organic waste within the campus
* Any other activity	Organize Nature Appreciation Walks for the executives
Awareness programmes using the mass media (TV, FM radio & print)	
Demonstrate advantages of using alternate fuels like biodiesel & ethanol, and electrically-charged vehicles	
	* * Any other project

Proposed scoring system



Criteria	Range	Score
Percentage of trees survived	30 - 50%	5
	50 - 80%	8
	80 - 95%	9
	95 - 100%	10
Participation in awareness program and taking up eco-friendly initiatives	30 - 50%	5
	50 - 80%	8
	80 - 95%	9
	95 - 100%	10



Benefits of the project



MSRTC

- Greening of MSRTC premises.
- Training and motivation to MSRTC staff to maintain the plantation at early stages to ensure higher survival rate by nurturing the plantation.
- Motivation to carry out pro-environmental initiatives.
- Trained staff could further spread awareness among other colleagues, family members and other social units.



Benefits of the project



Region

- Project shall contribute to urban tree cover and increase in the carbon sequestration potential as almost 500 trees would be planted in MSRTC premises.
- Increased awareness amongst the MSRTC officials as well as citizens on the importance of afforestation, especially in the urban areas.
- Online quiz on MSRTC's website to maximize project outreach.
- Scalable and replicable model relying on ownership based and action oriented approaches.



Annex-5: Agenda of the workshop

Orientation and awareness program

“Ownership-based and action-oriented afforestation program for MSRTC
(Maharashtra State Road Transport Corporation) officials”

February 24, 2013 (Uran)

March 24, 2013 (Thane)

Time: 10.00 am – 01.00 pm

Program agenda

Time	Sessions
09.00 am – 10.00 am	Registration
10.00 am – 10.05 am	Welcome <i>Depot Manager</i>
10.00 am – 10.20 am	Project overview <i>Ms. Swati Tomar, Research Associate, TERI</i>
10.20 am – 10.30 am	Film screening related to Environment and Afforestation
10.30 am- 11.30 am	Painting competition (age group 10-12 years) Duration – 1 hour
11.30 am – 11.45 am	Break and refreshments
11.30 am – 12.00 pm	Results announcements and prize distribution
12.00 pm – 12.05 pm	Vote of thanks.

Venue: MSRTC Depot



MoEF

(Ministry of Environment and Forests)



MSRTC

(Maharashtra State Road Transport Corporation Ltd.)



TERI

(The Energy and Resources Institute)



Annex- 6 : Publicity material used for drawing and painting competition

एस. टी. महामंडळ आणि टेरी यांच्या संयुक्त
विद्यमाने राबविण्यात आलेल्या वृक्षारोपण प्रकल्पा
अंतर्गत

कृती कार्यक्रम व निबंध स्पर्धा

दिनांक: २४ फेब्रुवारी, २०१३
वेळ : सकाळी १०.०० ते दुपारी १.००
स्थान : एस. टी. डेपो, उरण

वयोगट : वर्ष १२- १५

विषय

माझे विचार - सुंदर बनवू आपले पर्यावरण

स्पर्धकांना सूचना

- निबंध २० फेब्रुवारी, २०१३ पर्यंत उरण आगार मध्ये अगारला सुपूर्त करण्यात यावेत.
- निकाल २४ फेब्रुवारी, २०१३ रोजी जाहिर केले जातील.
- स्पर्धकांना व विजेत्यांना आकर्षक बक्षिसे व प्रशस्ति पत्रके दिली जातील.

अधिक माहितीसाठी संपर्क : स्वाति तोमर (०२२-२७५८००२१)

teri



एस. टी. महामंडळ आणि टेरी यांच्या संयुक्त
विद्यमाने राबविण्यात आलेल्या वृक्षारोपण
प्रकल्पांतर्गत

कृती कार्यक्रम व चित्रकला स्पर्धा

दिनांक: २४ फेब्रुवारी, २०१३
वेळ : सकाळी १०.०० ते दुपारी १.००
स्थान : एस. टी. डेपो, उरण

वयोगट : वर्ष ८-११

विषय :

१. माझे स्वप्न - स्वच्छ शहर, सुंदर रस्ते
२. माझ्या बाबांची बस

स्पर्धकांना सूचना

- चित्रकला स्पर्धे साठी लागणारे कागद, स्पर्धेच्या वेळी उपलब्ध करून दिले जातील.
- स्पर्धेसाठी लागणारे इतर साहित्य खडू, रंग, ब्रश इत्यादी स्पर्धकांनी स्वतःचे घेऊन यावेत.
- स्पर्धेचा कालावधी १ तास असेल (सकाळी १०.३० ते ११.३०)
- स्पर्धकांना व विजेत्यांना आकर्षक बक्षिसे व प्रशस्ति पत्रके दिली जातील.

अधिक माहितीसाठी संपर्क : स्वाति तोमर (०२२-२७५८००२१)

teri



Annex- 7: Sample essays

सुंदर वनवू आपणे पर्यावरण

पर्यावरण, पर्यावरण म्हणजे काय ही आपला परिसर स्वच्छ ठेवणे आज वास्तूचे नाचे स्वच्छ ठेवणे हाच वास्तूचे फुलवणे म्हणजेच पर्यावरण म्हणजेच पर्यावरण वृक्ष वळी आद्य सोयरे

वन वरी
असे मोठ्या आकाराने म्हणतो, जर हाड, वडी
जंगल पुरा
तर ते आपले
इतके निर्गम
वाढतीच ते

पाऊस
फळ भाज
वृक्षपर्ण
शोणवट
आजारी
वेळी
द्वारा

निर्गम
एक
क
पे

नाथ : संजोत कुलस इमा

उत्पत्ती : ८ वी तुळी : ३ तुळी क्रमांक : ५७

बोळा : मुन् . आय . उग .

निबंधाचे विषय : 'सुंदर वनवू आपणे पर्यावरण'

'सुंदर वनवू' - सुंदर वनवू आपणे पर्यावरण

आपला परिसर दूषित होणे म्हणजेच परिसरचे प्रदूषण घडते. समोहनत्व अदूषित होणे. मानव आणि इतर प्राणींचा राहणा प्रदूषणामुळे प्रचलित किंवा अप्रचलितपणे होणे पंचने. परिसरातील "अहितकरक" म्हणजे "प्रदूषण" असे वर्णवता म्हटले जाते.

जुमेचीच प्रदूषणांचे प्रमाण विकसितविसू वाढत राहिले आहे. कारखाने आणि वास्तू, या दोन कारणांमुळे प्रदूषण होतं. कारखाने आणि वास्तू, या दोन कारणांमुळे प्रदूषण होतं. कारखाने आणि वास्तू, या दोन कारणांमुळे प्रदूषण होतं. कारखाने आणि वास्तू, या दोन कारणांमुळे प्रदूषण होतं.

कारखाने आणि वास्तू, या दोन कारणांमुळे प्रदूषण होतं. कारखाने आणि वास्तू, या दोन कारणांमुळे प्रदूषण होतं. कारखाने आणि वास्तू, या दोन कारणांमुळे प्रदूषण होतं.

पर्यावरण

पर्यावरण हा माणसाच्या जिवनातील प्रमुख घटक आहे. पर्यावरणामध्ये झाडे, वात, प्रवाण, सजीव व निर्जीव यांचा समावेश होतो. व त्यांच्यावर आपला उदरनिर्वाह चालतो. पावसाच्या उपात अतिशय मोहून जाणारे वसुंधरे अतिशय सुंदर हि- प्रवाण निर्माण करतात. पावसाच्यामुळे वात फुलते, झाडांना पाने येतात, कळ्या फुलतात आणि उतरावकन अतिशय मोठे हावहावे पाहण्या मिळतात. उरणा हा निर्माण होतो अतिशय मोठे पर्यावरणाची वैशिष्ट्य आहे. जसाजसा मानवता उरतेती मुळे जंगलतेव झाली. त्यामुळे झाडांची संख्या- नकाल मानवच्या जवळ जवळ तोंडातून शोधा- ता सख्या वाढल्यामुळे होत, कचरा यचे प्रमाण- पाण प्रीत्य वापर केला तर. एकाक पदार्थ हा होऊ शकतो. वहावा जगासमोर धनकचरा निर्माण झाली आहे. त्यामुळे पाणी व जमीन उरताना- हास आणि ओरोश्याच्या समस्यया या- हे. त्यामुळे हा, पाणी व जमीन प्रदूषित- सावा होताना निर्माण झाला आहे. मोठ्या शहरांमध्ये धनकचरा निर्माण होत आहे. सुमारे सुमारे ५००० टन प्रमाणे महत्वाचे कचरा उद्योग्य धनकचरा करणे टाळले. जवळपास जाव्यासाठी आकरतो जावे किंवा सायकल वापरावी. शाजगी- तिक वास्तूक सेवामुळे धन, रेल्वेसारख्या हकारक गाडी वाजवणे वा फुफ्फू वाजवणे या- येतान्य व्यक्त होत. ते आपण बिरबरे पाठिने. हा विव्यांवरान्नी जवळपासच्या उघड्या बोउख्या शबबले पाठिनेत. ते सर्व कडीत वाढत तरी केले पाठिने; कचरा टाळा आपल्या चिन्हा प्ररन उरता राहिल्या आहे.

कुंपांतर
पर कुमी
य रित्या
म्हणजे
प्रायुचे

रसादी

केळसा व
नवाढ
प्रखीवर

शानंतर
ही उंच
कीच

शीषवा



Annex- 8: Winners of drawing and essay competition:

Uran

Essay competition

1st prize:

Ms. Hemangi Vilas More

2nd prize:

Mst. Omkar Rajaram Kharat

Ms. Mhatre Sanjana Sandeep

Consolation prizes

Ms. Trupti Harishchandra Bhoir

Mst. Omkar Sanjay Kirdat

Mst. Prasad Hanumantrao Jagtap

Drawing competition

1st prize:

Mst. Ghosh Ratul Jayadev

2nd prize:

Mst. Gaurav Sukhdev Mahajan

Mst. Sanjot Kailash Sharma

Mst. Shriram Praful Mali

Ms. Nikita Rajendra Gaikwad

Ms. Vimal Akshita Rambabu

Thane

Essay competition

1st prize:

Mr. Sambhaji Jayaram Jadhav

2nd prize:

Mst. Prasad Dayanand Mange

Drawing competition

1st prize:

Ms. Bharti Bhagat

2nd prize:

Ms. Sharvari Mohite

Ms. Krutika Mohite

Annex- 9: Certificate presented to the winners of drawing and painting competition

Certificate of Participation

This is to certify that Ms./Mr. _____ of class _____ from _____ school participated in the Essay/Painting Competition organized by The Energy and Resources Institute (TERI) as part of the project “Ownership based and action oriented afforestation program” in collaboration with the Ministry of Environment and Forests (MoEF), Government of India and the Maharashtra State Road Transport Corporation Ltd. (MSRTC), Government of Maharashtra.

Date : March 24, 2013 *Place: MSRTC Depot, Thana*

Dr. Anjali Parasnis
Associate Director, TERI

Shri R. G. Pardeshi
Depot Manager, MSRTC Thana

Ownership based and action oriented afforestation program

Quiz Questions

- 1. Products such as petroleum, diesel, and natural gas are all fossil fuels. When were these fossil fuels formed?**
 - a. Five hundred years ago
 - b. Thousand years ago
 - c. One lakh years ago
 - d. More than ten lakh years ago

- 2. Why are public transport systems important?**
 - a. It helps keep cars off the road and reduces traffic congestions
 - b. It conserves energy by using significantly less fuel per person than driving
 - c. It provides an affordable way for all citizens to get around
 - d. All of the above

- 3. Transport makes up ____% of the world's greenhouse gas emissions**
 - a. 13
 - b. 36
 - c. 52
 - d. 07

- 4. Bharat stage emission standards regulate output of air pollutants from internal combustion of fuels in engine equipment including motor vehicles. When was it first introduced in the country?**
 - a. 1990
 - b. 2000
 - c. 2005
 - d. 2010

- 5. Indian roads carry ____% of the country's passenger traffic.**
 - a. 10%
 - b. 30%
 - c. 60%
 - d. 90%

- 6. What are the sources of Ethanol which is used as a renewable fuel?**
- Sugar cane
 - Corn
 - Switch grass
 - Potatoes
 - All of the above
- 7. Which bus service has the honor for being the largest bus operator in the world with the largest fleet size?**
- APSRTC (Andhra Pradesh State Road Transport Corporation)
 - TNSTC (Tamil Nadu State Road Transport Corporation)
 - MSRTC (Maharashtra State Road Transport Corporation)
 - DRTC (Delhi State Road Transport Corporation)
- 8. MSRTC offers a facility for online booking of tickets for how many routes out of the total 17000 routes?**
- 15000
 - 16000
 - 5000
 - 17000
- 9. Which was the first route of the MSRTC?**
- Mumbai to Pune
 - Kolhapur to Mumbai
 - Pune to Ahmednagar
 - Thane to Mumbai
- 10. Which state emits maximum CO₂ emissions from transport sector in India?**
- Uttar Pradesh
 - Tamil Nadu
 - Maharashtra
 - Gujarat
- 11. Which is the first rapid transport system in India and when was it introduced?**
- Chennai Metro in 1995
 - Delhi Metro in 2002
 - Kolkata Metro in 1984
 - None of the above

12. Who designed and developed helicopter?

- a. Igor Sikorsky?
- b. Leonardo da Vinci
- c. The Wright Brothers
- d. Montgolfier brothers

13. Where was the first automobile invented and by whom?

- a. Oliver Write--England
- b. Henry Ford--The United States
- c. John Deer--Canada
- d. Harley Davidson—Germany

14. When was the first commercial rail line between Stockton and Darlington Railway built?

- a. 1825
- b. 1820
- c. 1830
- d. 1835

15. On an average, a hectare of a rainforest offsets the carbon emissions of how many cars?

- a. 5 cars
- b. 50 cars
- c. 150 cars
- d. 250 cars

16. The average-sized tree (such as Neem tree) planted will sequester about ___ of carbon in its lifetime.

- a. 0 - 5 tons
- b. 5 - 10 ton
- c. 10 - 15 tons
- d. 15 - 20 tons

17. Considering the harmful pollutants released in the atmosphere, which is the cleanest fuel out of the following?

- a. CNG
- b. Diesel
- c. Petrol
- d. LPG

18. When was the Indian Forest Act first enforced?

- a. 1927
- b. 1878

- c. 1981
- d. 1977

19. Which is the state with the largest forest cover in India?

- a. Arunachal Pradesh
- b. Maharashtra
- c. Madhya Pradesh
- d. Kerala

20. Which is the first national park of India?

- a. Sanjay Gandhi National Park in Maharashtra
- b. Jim Corbett National Park in Uttarakhand
- c. Kaziranga National Park in Assam
- d. Bandipur National Park in Karnataka

21. The national tree of India is:

- a. Mango
- b. Neem
- c. Banyan
- d. Peepal

22. What are the products of photosynthesis?

- a. Carbon dioxide and Water
- b. Oxygen and Glucose
- c. Hydrogen and sugars
- d. Carbon monoxide and carbon dioxide

23. Which of the following is the national rating system specifically designed for buildings constructed in India, and adopted by Ministry of New and Renewable Energy?

- a. GRIHA (Green Rating for Integrated Habitat Assessment)
- b. LEED (Leadership in Energy and Environmental Design)
- c. Green Star
- d. CASBEE (Comprehensive Assessment System for Building Environmental Efficiency)

24. World Environment Day is observed on:

- a. January 31
- b. June 5
- c. August 25
- d. October 31

25. Which of the following light bulb types use the least energy, and therefore result in fewer greenhouse gas emissions?

- a. Incandescent
- b. Compact Fluorescent Light (CFL)
- c. Light Emitting Diodes (LEDs)
- d. Halogen

26. Which country emits the most greenhouse gases?

- a. India
- b. China
- c. United States
- d. United Kingdom

27. Kyoto Protocol is meant to:

- a. Reduce greenhouse gas emissions
- b. Set GDP growth rates
- c. Define defense budgets
- d. Define FDI limits

28. The first wheels were made of

- a. Wood
- b. Stone
- c. Metal
- d. None of the above

29. The first balloon trip transported:

- a. Two French brothers
- b. An American circus family
- c. A duck, a sheep and a rooster
- d. A dog

30. _____ is the largest patch of mangrove forest in the world.

- a. New Guinea
- b. b. Taiwan
- c. Sunderbans
- d. Pichavaram

Please send your answers to:

Ms. Swati Tomar or MSRTC EDP Department

Through email on : swati.tomar@teri.res.in / msrtcedp@gmail.com

Or

You can courier/post it to:

The Energy and Resources Institute

318, Raheja Arcade, Sector 11,

Belapur CBD,

Navi Mumbai 400614

Maharashtra

****The winners will be selected by first cum basis.***

Last date of submitting the answers is March 15, 2013.

***Exciting prizes and Winners names will be published on MSRTC and
TERI's websites***

Hints and References

- <http://www.webmutations.com/energy/reports/past/repfossil.html>
- http://know.climateofconcern.org/index.php?option=com_content&task=article&id=54
- <http://pib.nic.in/newsite/erelease.aspx?relid=80170>
- <http://www.treehugger.com/natural-sciences/how-much-carbon-do-different-forests-store-what-size-offsets-your-driving-for-a-year.html>
- [http://wgbis.ces.iisc.ernet.in/energy/paper/IISc Emissions from Indias Transport sector/index.htm](http://wgbis.ces.iisc.ernet.in/energy/paper/IISc_Emissions_from_Indias_Transport_sector/index.htm)
- <http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/SOUTHASIAEXT/EXTSARREGTOPTRANSPORT/0,,contentMDK:20703625~menuPK:868822~pagePK:34004173~piPK:34003707~theSitePK:579598,00.html>
- [http://en.wikipedia.org/wiki/Bharat Stage emission standards](http://en.wikipedia.org/wiki/Bharat_Stage_emission_standards)
- <http://www.funtrivia.com/newflash/trivia.cfm?qid=276253>
- [http://en.wikipedia.org/wiki/Mangrove#Indomalaya ecozone](http://en.wikipedia.org/wiki/Mangrove#Indomalaya_ecozone)

Annex- 11: Activity sheet

नाम: _____

स्थान: _____

दूरध्वनिक्रमांक : _____ पद: _____

Activity/ कार्यकलाप	Status/ दशा (हां/नहीं)	When/कब	Where (Office/Home)/ कहां (दफ्तर/ घर)	Number /नंबर
क्या आपने दोनों तरफ से कागज प्रयोग करना शुरू किया?				
क्या आपने नलों का रिसाव ठीक करवा लिया?				
क्या आपने उर्जा बचाव के लिए कम उर्जा पर चलने वाले उपकरण प्रयोग करना शुरू किया?				
क्या आपने कपडों के थैले का प्रयोग करना शुरू किया?				
क्या आप सडक पर कूडा-कचरा फेंकते हो?				
क्या आपने सूखा व गीला कचरा अलग करना शुरू किया ?				
क्या आप आपके विद्युत उपकरण प्रयोग ना होने पर बंद करते हो?				
कुछ और कदम आपके या आपके परिवार के द्वारा?				

Sample activity sheets

एस. टी. महामंडळ, एम.ओ.ई.एफ., आणि टेरी यांच्या संयुक्त विद्यमाने राबविण्यात आलेल्या वृक्षारोपण प्रकल्प

नाम: ए.टी. एन. कोळी
 स्थान: उरगा आश्रम
 दूरध्वनि क्रमांक: 9167143767 पद: टी.टी.

Activity/ कार्यकलाप	Status/ दशा (हां/नहीं)	When/कब	Where (Office/Home)/ कहां (दफ्तर/ घर)	Number/नंबर
क्या आपने दोनों तरफ से कागज प्रयोग करना शुरू किया?	हाँ	आपके प्रोग्राम चालू होने के बाद	दफ्तर/ घर	हर दिन
क्या आपने नलों का रिमाव ठीक करवा लिया?	हाँ	—	—	2
क्या आपने उर्जा बचाव के लिए कम उर्जा पर चलने वाले उपकरण प्रयोग करना शुरू किया?	हाँ	—	—	4
क्या आपने कपडों के धूले का प्रयोग करना शुरू किया?	हाँ	—	—	हर दिन
क्या आप मडक पर कूड़ा-कचरा फेंकते हैं?	नहीं	—	—	—
क्या आपने मूखा व गीला कचरा अलग करना शुरू किया ?	हाँ	—	—	हर दिन
क्या आप आपके विद्युत उपकरण प्रयोग ना होने पर बंद करते हैं?	हाँ	—	—	हर दिन
कुछ और कदम आपके या आपके परिवार के द्वारा?				

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Activity/ कार्यकलाप	Status/ दशा (हां/नहीं)	When/कब	Where (Office/Home)/ कहां (दफ्तर/ घर)	Number/नंबर
क्या आपने दोनों तरफ से कागज प्रयोग करना शुरू किया?	हाँ	आपके प्रोग्राम चालू होने के बाद	दफ्तर/ घर	हर दिन
क्या आपने नलों का रिमाव ठीक करवा लिया?	हाँ	—	—	2
क्या आपने उर्जा बचाव के लिए कम उर्जा पर चलने वाले उपकरण प्रयोग करना शुरू किया?	हाँ	—	—	5
क्या आपने कपडों के धूले का प्रयोग करना शुरू किया?	हाँ	—	—	हर दिन
क्या आप मडक पर कूड़ा-कचरा फेंकते हैं?	नहीं	—	—	—
क्या आपने मूखा व गीला कचरा अलग करना शुरू किया ?	हाँ	—	—	हर दिन
क्या आप आपके विद्युत उपकरण प्रयोग ना होने पर बंद करते हैं?	हाँ	—	—	हर दिन
कुछ और कदम आपके या आपके परिवार के द्वारा?				

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The Energy and Resources Institute, commonly known as TERI (formerly Tata Energy Research Institute), established in 1974, is an independent, not-for-profit, research institute based in New-Delhi. TERI's research activities are focused on energy, environment and sustainable development, devoted to efficient and sustainable use of natural resources. In its 38 years of existence, TERI has completed more than 2600 projects and has about 20 divisions

According to Think Tanks and Civil Societies Program (TTCSP) at the International Relations Program, University of Pennsylvania, TERI was ranked 20 in the list of top global think tanks on environment and 16 in top global think tanks on science and technology.

Western Regional Centre, Mumbai

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