



FINISHING SCHOOL

K.J SOMAIYA AND MMR-EIS

Module 1- Environment Policy & Regulations & Module 4- Integrated Solid Waste Management|
Capacity Development Program in Environment Management|
December 2016 & February 2017

CONTENT

Introduction

Module I- Environment Policy and Regulations

Module Description

Module Objectives

Topics covered in Module I

Pedagogical Approach

Participants

Course Schedule

Proceedings

Learning Outcomes

Feedback

Module IV- Integrated Solid Waste Management

Module Description

Module Objectives

Topics covered in Module IV

Pedagogical Approach

Participants

Course Schedule

Proceedings

Learning Outcomes

Feedback

ANNEXURE

- I. Photographs
- II. List of Participants
- III. Module IV: Project Case Work Assignments & ISWM Plans submitted by participants

Introduction

K.J Somaiya College of Science and Commerce (K.J Somaiya) and Mumbai Metropolitan Region: Environment Improvement Society (MMR_EIS) have jointly developed a Diploma Course on **“Capacity Development Program in Environment Management”** with the objective of developing capabilities of local authorities, Engineers, Architects, Activists, NGOs, and other stakeholders in the areas of environmental protection, improvement and monitoring.

The Diploma course in total comprises of five modules covering different thematic areas on Environment, spread across a duration of 8 months for five days each. Ekonnnect Knowledge Foundation had partnered with K.J Somaiya and MMR-EIS for conducting and coordinating two out these five modules. The following table highlights the entire course structure and highlights the module conducted by Ekonnnect.

TOPIC/DATE	PROGRAM COORDINATOR	DESIGNATION
Environmental Policy and Regulations Sept 26-30, 2016	Dr. Prasad Modak and Ms. Lucille Andrade Adv.Pravartak Pathak	Director, Ekonnnect Knowledge Foundation A legal consultant, Bombay High Court
Urban Ecology Oct 17-21, 2016	Mr. Prashant Mahajan Mr. Rishi Aggarwal	Director, Somaiya center for experiential learning Researcher and Environmental Activist
Water Management at Local Level Nov 28-Dec 02,2016	Dr. Shyam Asolekar & Dr. Sanjay Joshi	Professor, CESE, IIT Bombay Director Enviro-Vigil.
Integrated Solid Waste Management Feb 6-10, 2017	Dr. Prasad Modak	Director, Ekonnnect Knowledge Foundation
Green Built Environment Mar 14-18, 2017	Mr. S. Srinivasan Dr. Shashidhar Kashyap	Deputy Executive Director, CII, Godrej-GBC Retd. Senior Manager, Purification systems, Eureka Forbes Ltd. Mumbai

Module I- Environment Policy and Regulations

Module Description

Policies and regulations form the foundation of Governance. In India, policies on the management of environmental and social aspects have been evolved following the principles of and the rights enshrined in our Constitution. The environmental governance was subsequently institutionalized and later structured under the landmark legislation: The Environmental Protection Act of 1986 that was framed after the Bhopal tragedy.

In the year 2006, the Ministry of Environment & Forests came up with the National Environmental Policy that presented an integration of the environmental and social governance with the economic development to address poverty and improve livelihoods of the people.

This module provided an overview and a narrative on the evolution of environmental policy and key regulations in India. The most recent amendments made were also covered. The institutional arrangements for implementation such as MoEF&CC, Departments of Environment and the Pollution Control Boards were described. Challenges faced in the implementation were also described in the form of case studies. Linkages between national regulations with multilateral environmental agreements (MEAs) and key international conventions were also brought out.

The module also covered provisions such as National Green Tribunal (NGT), Public Interest Litigation (PIL), Right to Information Act (RTI) and the Judicial Activism in India. Group work was conducted using real life case studies.

Finally, other forms of regulations especially those by the markets and investors were covered. These forms of regulations included topics such as Eco labels, equator principles and social codes of conduct.

Module Objectives

1. To create understanding of the framework of environmental governance
2. To develop deeper understanding of India's environmental policy and key regulations
3. To learn about the institutions that are responsible for the implementation.
4. To know the market based regulations as driven by consumers and investors

Topics Covered In Module I

1. National Environmental Policy of India
2. Water Act, Air Act, Environmental Protection Act and Various Key Rules
3. Wildlife Protection Act and forest conservation Act and Rules
4. Environmental Impact Assessment Notification, Coastal Regulation Zone Notification
5. Rules on waste management
6. Land Acquisition, Rehabilitation and Resettlement (LARR) and Social Impact Assessment
7. National Green Tribunal, PIL and RTI
8. Eco labels and Social Codes of Conduct
9. Equator Principles and Requirements of Private Sector Banks (e.g. International Finance Corporation) and Development Financing Institutions such as the World Bank, Asian Development Bank

Pedagogical Approach

The course was delivered through a mix of classroom lectures with case studies. There were discussion sessions and group work with opportunities to interact with experts from regulators, lawyers and managers of the corporate world.

Participants

The participants for Module I ranged from post graduate students, engineers, law students, architects, govt. officials and academicians.

Course Schedule

Day 1 – 26 th September, 2016 : Introduction to Environmental Governance					
9:30 – 10:00	10:00 – 12:00	12:00 – 13:00	13:00 – 14:00	14:00 – 15:00	15:00 – 17:00
Introduction to the Module <i>Prof. Sugandha Shetye</i>	Introduction to Principles of Environmental Governance <i>Dr. Prasad Modak, Ekonnect</i>	Evolution of Environmental Governance in India <i>Ms. Lucille Andrade, Environment Management Centre LLP</i>	Lunch Break	The National Environmental Policy <i>Mr. Rohit Pansare, Environment Management Centre LLP</i>	Group work on Comparative Assessment & Gap Analyses <i>Coordinated by Ms. Lucille Andrade and Mr. Rohit Pansare</i>
Day 2 – 27 ^h September, 2016: Early Regulations on Environment Protection					
9:30 – 11:30	11:30 – 13:00	13:00 – 14:00	14:00 – 16:00	16:00 – 17:00	
Regulations Governing Water, Air and Noise Pollution <i>Adv. Raghunath Mahabal, Legal Consultant</i>	Protection of Forests <i>Adv. Sadhana Mahashabde, Legal Consultant</i>	Lunch	Environmental Protection Act and Key Rules <i>Adv. Pravartak, Legal Consultant</i>	Session with an Expert from Pollution Control Board <i>MPCB Legal Cell – Dr. Deole</i>	
Day 3 – 28 ^h September, 2016: Project/ Industry based Regulations					
9:30 – 11:30	11:30 – 13:00	13:00 – 14:00	14:00 – 15:00	15:00 – 17:00	
Environmental Impact Assessment	Coastal Regulation Zone Notification and Clearance	Lunch	Land Acquisition, Rehabilitation and Resettlement	Group Work on a Case Study of Environmental Clearance	

Notification and Environmental Clearance <i>Ms. Lucille Andrade, Environment Management Centre LLP</i>	<i>Mr. Rohit Pansare, Environment Management Centre LLP</i>		(LARR) and Social Impact Assessment <i>Mr. Santosh Shidhaye, CSO- IL&FS</i>	<i>Coordinated by Ms. Lucille Andrade and Mr. Rohit Pansare</i>	
Day 4 – 29 ^h September, 2016: Residues and Legal Remedies					
9:30 – 11:00	11:00 – 13:00	13:00 – 14:00	14:00 – 15:30	15:30 – 17:00	
Key Rules on Management of Residues <i>Mr. Pranay Krishnan and Ms. Asha Panwar, Environment Management Centre LLP</i>	Group Exercise on a Comparative Assessment between the Waste Management Rules <i>Coordinated by Ms. Asha Panwar and Ms. Vibhuti Agarwal, Environment Management Centre LLP</i>		Legal Remedies for Environmental Protection <i>Adv. Warunjikar, Legal Consultant</i>	Discussion with NGT Lawyers <i>Coordinated by Adv Pravartak along with Sr. Adv. Gayatri Singh and Adv. Warunjikar, Legal Consultant</i>	
Day 5 – 30 ^h September, 2016: Market-based Regulations					
9:30 – 11:30	11:30 – 13:00	13:00 – 14:00	14:00 – 15:00	15:00 – 16:30	16:30 – 17:00
Introduction to Market based Regulations <i>Dr. Prasad Modak, Ekonnnect</i>	Eco labels and Social Codes of Conduct <i>Ms. Sonal Alvares, Ekonnnect</i>	Lunch	Environmental Social Governance at Financing Institutions <i>Ms. Lucille Andrade, Environment Management Centre LLP</i>	Panel discussion with Chief Sustainability Officers of Reputed Companies <i>Coordinated by Ms. Sonal Alvares</i>	Course Feedback <i>Prof. Sugandha Shetye</i>

Proceedings

Day 1: Participants were introduced with the entire course schedule and structure. The presentations on the first day were delivered by Dr. Prasad Modak, Director Ekonnnect Knowledge Foundation, Executive President, Environment Management Centre LLP; Lucille Andrade, Associate Vice President Environment Management Centre LLP and Mr. Rohit Pansare, Sr. Environmental Planner Environment Management Centre LLP on Introduction and Evolution of Environmental Governance.

- ✓ **Dr. Modak** in his session of '**Introduction to Principles of Environmental Governance**' discussed the Concept of Sustainable Development, Ecosystem and Natural Resources, Natural Resource Depletion and Degradation, Environmental Issues of Pollution and Global Issues like Climate Change.
- ✓ **Ms. Lucille Andrade** in her session covered "**Evolution of Environmental Governance in India**". She spoke about the initial efforts taken for establishing regulations and policies in environment, covering topics like Signing of MEA's.
- ✓ **Mr. Rohit Pansare** explained briefly in his session the constituents, critique and implementation measures of "**The National Environmental Policy**"
- ✓ The first day concluded with participants working in groups for "**Comparative Assessment and Gap Analyses**" exercise. Students were divided into 4 groups. Environment policies of four other countries across the globe were provided. Each group were given one other country Environment Policy to compare with India NEP and present at the end of the session.

Day 2: The second day covered key acts, rules and regulations concerned with Environment and Forests. The lectures were coordinated by Legal Consultant Adv. Parvartak and were conducted by active High Court Advocates and MPCB Legal Consultants.

- ✓ Adv. Raghunath Mahabal in his session covered key regulatory provisions of **Water Act, Water Cess Act and Air Act**. He discussed with the participants the Institutional arrangements and functions of Central Pollution and State Pollution Control Boards.
- ✓ Adv. Sadhana Mahashabhde in her session discussed and highlighted the key regulatory provisions of **Wildlife Protection Act and Forest Conservation Act**. She also explained the participants the protocols required for Wildlife and Forest Clearance processes.
- ✓ Adv. Parvartak in his lecture introduced the **Environment Protection Act** and key rules. He explained the process of drafting rules and notifications under the Act Standards.
- ✓ Dr. Deole in his session of sharing of experiences, explained the participants on how rules and regulations are implemented by the Pollution Control Board by providing examples.

Day 3: The third day sessions covered the Environment, Coastal and Social Clearances and Impact Assessments. The lectures on Environment Clearance and Coastal Regulatory Zone were covered by Environment Consultants viz; Ms. Lucille Andrade and Mr. Rohit Pansare. The session on Land Acquisition,

Rehabilitation and Resettlement (LARR) and Social Impact Assessment was conducted by Mr. Santosh Shidaye, Chief Sustainability Officer at IL& FS Infrastructure Ltd.

- ✓ The session on **Environmental Impact Assessment Notification and Environmental Clearance** conducted by Ms. Lucille Andrade covered the clearance procedures and major process steps, the timeline for the clearance process. It also highlighted the composition of the Clearance committees and public hearing sessions. Videos on public hearing were also shown to the participants and they were also briefed about the methods to follow while reading an Environment Clearance document.
- ✓ Mr. Rohit Pansare in his lecture highlighted the different aspects and procedures under the **Coastal Regulation Zone Notification and Clearance**. Mr. Santosh Shidaye spoke about the key regulations and procedures followed for **Land Acquisition, Rehabilitation and Resettlement (LARR) and Social Assessments** with examples and case studies.
- ✓ Participants in the concluding session worked in groups for the practical session on **“Analyzing different case studies on Environment Clearance”**. Draft EIA report and project pre-feasibility report were shared on the previous day for reading. Groups will be formed among students representing Expert Appraisal Committee (comprising of Experts in EIA, Environmental quality, Forestry, Life Sciences, Sector, Environmental Economics) and Project Proponent. Each group/person played their role during the Appraisal process.

Day 4: The sessions conducted on the fourth day highlighted the key rules and regulations on management of waste and residues. Sessions also covered legal remedies like NGT, RTI and PIL. The sessions were covered by consultants from Environment Management Centre LLP; Mr. Pranay Krishnan, Ms. Vibhuti Agarwal and IIT Research student Ms. Asha Panwar and active Advocates and Legal Consultants.

- ✓ Mr. Pranay Krishnan and Ms. Asha Panwar in their session covered **the latest waste management rules and regulations** on Hazardous Waste, E-Waste, Biomedical Waste, Municipal Solid Waste, Plastic Waste, C&D Waste.
- ✓ The participants in the second session were given a **“Group Exercise on a Comparative Assessment between the Waste Management Rules”**. A framework for comparison were provided, 6 groups will be formed, copy of the Rules were provided, and groups identified requirements of the regulation as per the framework. Differences between the Rules as per the comparison framework were discussed at the end of the session.
- ✓ The third and the fourth session covered the legal remedies for environment protection such as National Green Tribunal, right to Information Act, Public Interest Litigations, and Remedies from High Court and Supreme Court. The sessions were supported by various case studies on the same.

Day 5: The sessions fifth day covered the Market Based Regulations, Ecolabels and Governance at Financial Institutions and were conducted by Dr. Prasad Modak, Executive President Environment

Management Centre LLP; Ms. Sonal Alvares, Head, Ekonnnect Knowledge Foundation ; Ms. Lucille Andrade. The sessions were followed by panel discussions comprising of Chief Sustainability Officers of esteemed companies.

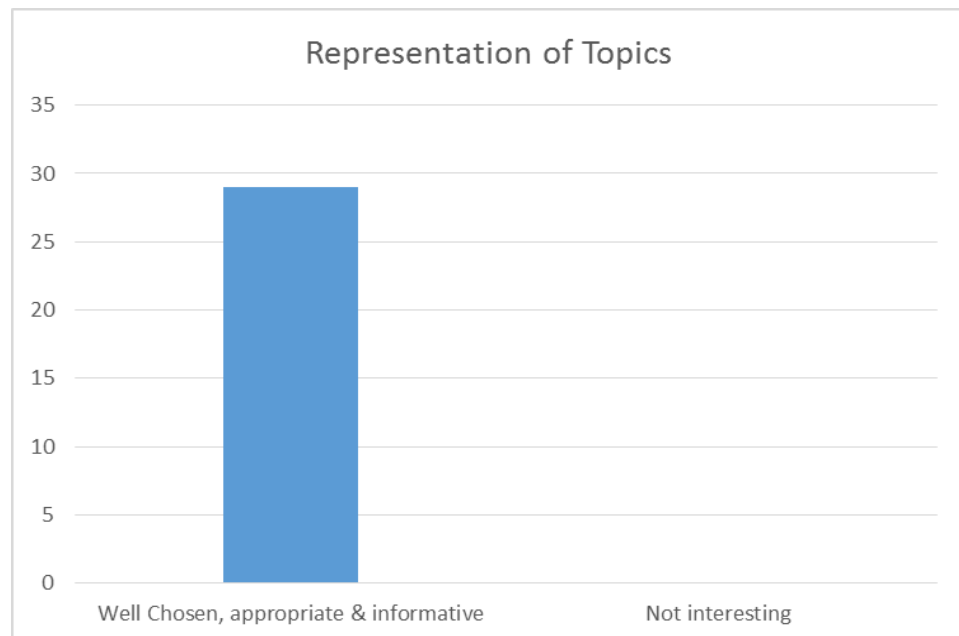
- ✓ The first session conducted by Dr. Modak covered topics like **ISO 14001, OHSAS 18001, and Emission Trading**. It was followed by a session on **Eco- Labels**, Types and Discussion conducted by Ms. Sonal Alvares. The participants were given various green products from different companies and were asked to analyse the eco-labels and environment Product declarations.
- ✓ Ms. Lucille Andrade in her lecture discussed International trends in Financial Institutions (FIs), Equator Principles, World Bank, ADB, DFIs, UNEPFI Safeguards, Elements of E&S Governance at FIs and Indian Scenario on ESG at FIs.
- ✓ The concluding session comprised of Panel Discussions. The panel was headed by Dr. Modak and the panelists were Mr. Suman Majumdar, CSO, JSW; Mr. Prashant Kokil, CSO, TATA Power and Mr. Umesh Joshi, General Manager, Mahindra and Mahindra. They discussed the various projects and programmes they have initiated in their companies on Environment and Sustainability.

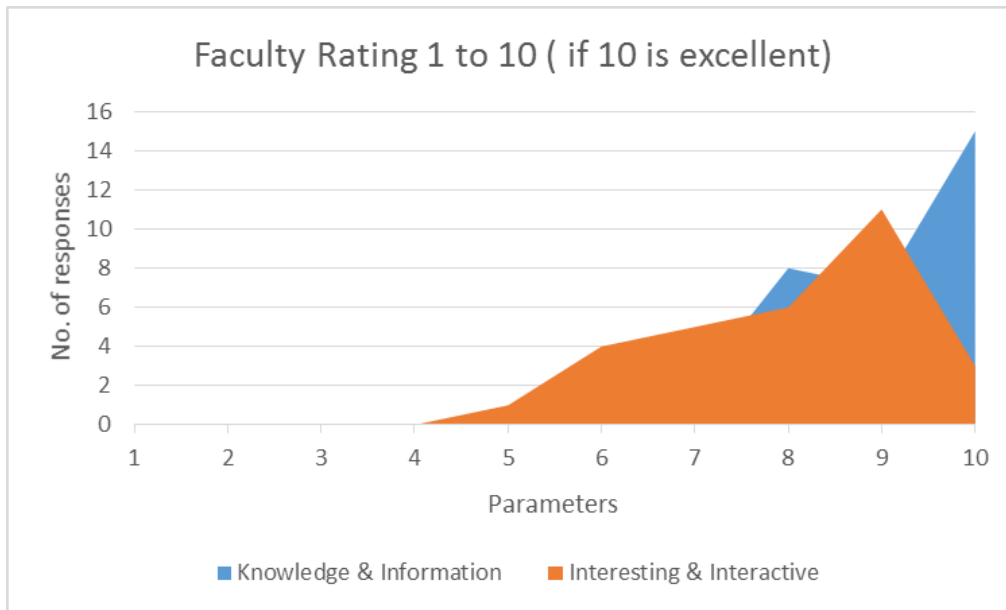
Learning Outcomes

On completion of the five day course the participants were able to appreciate and understand;

- Environmental and Social Governance presently practiced in India
- The National Environmental Policy, its purpose and limitations
- Regulations governing Water, Air and Noise Pollution
- Environmental Clearance procedure and its linkages with CRZ and forest clearance and LARR
- Legal remedies for environment protection
- Regulations on management of residues
- Market based instruments and requirements of the investors and expectations from the communities and consumers
- Review market based regulations and social codes of conduct
- The institutional arrangements and procedures for implementation

Feedback





Studying laws and policy became more interesting by this course.

I learned viewing scientific things from a legal perspective

All the acts concerning the environment are quite clear to me now.

I have learned how policies work, how rules are made and how it can work on ground zero.

Sustainability is key to better environment both ecologically and economically. Also I learned, the process of being environmentally friendly is lengthy and have a lot to consider.

Module IV- Integrated Solid Waste Management

Module Description

This module on ISWM was designed to run across five days, mapped with the Waste Management Cycle following the hierarchy of reduce to disposal. The module covered the best practices across the globe with local examples as case studies. Learning happened through the pedagogy of Project Case Work. At the end of the module, the participants came up with an Integrated Solid Waste Management Action Plan for the “problem or opportunity statement” provided. The plan included “solutions” and “innovations” for segregation of waste at source, recycling and reuse, collection & transport treatment and secured disposal.

Module Objectives

1. To provide the learner knowledge on governance and rules related to waste management
2. To build problem solving skills and stimulate planning for action for addressing challenges and opportunities in waste management
3. To understand working of centralized or decentralized waste management facilities through a field visit
4. To learn how to work in Teams and in Competition following the pedagogy of ‘Project Case Work.’

Topics Covered In Module IV

1. Hierarchy of Waste Management
2. Waste Governance
3. Overview of Various Waste Streams
4. Segregation, Sorting and Collection
5. Decentralized Waste Processing Techniques – Composting and Biogas
6. Centralized Waste Processing Waste to Energy (Thermal Routes)
7. Waste Disposal
8. Future Trends in Waste Management

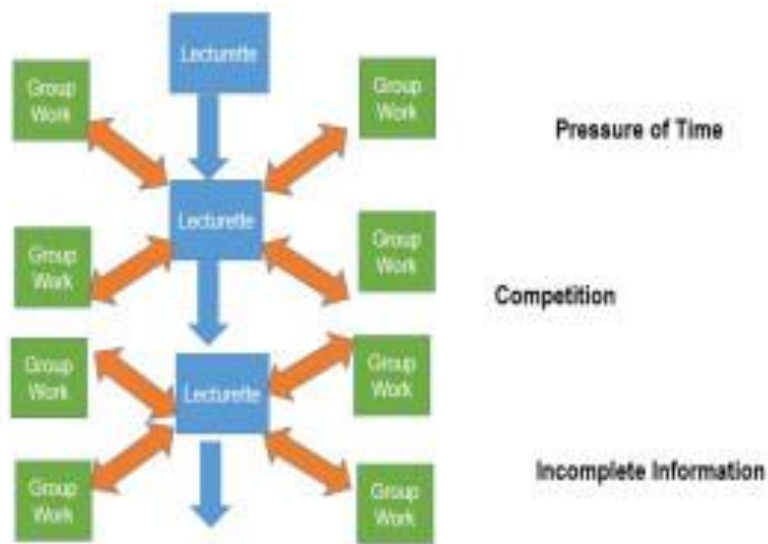
Pedagogical Approach

Based on Project Case Work

- Participants were given a problem statement. They were divided into 3 groups. Each group worked on the problem statement in separate classrooms. The problem-solving process was supported by a facilitator provided knowledge and guidance.
- There were short lectures in plenary sessions.
- Field Visit to understand the centralized or decentralized waste management was carried out followed by a session on experience sharing.
- Various tools were introduced for the analytical work

- Videos were screened to generate discussions
- A knowledge room was set up consisting manuals, books and resources on Waste Management. Internet access was provided.
- Participants were asked to give presentations at the end on the action plan that they developed. There was a jury or panel of a mix of faculty and externals who awarded the best project/presentation.

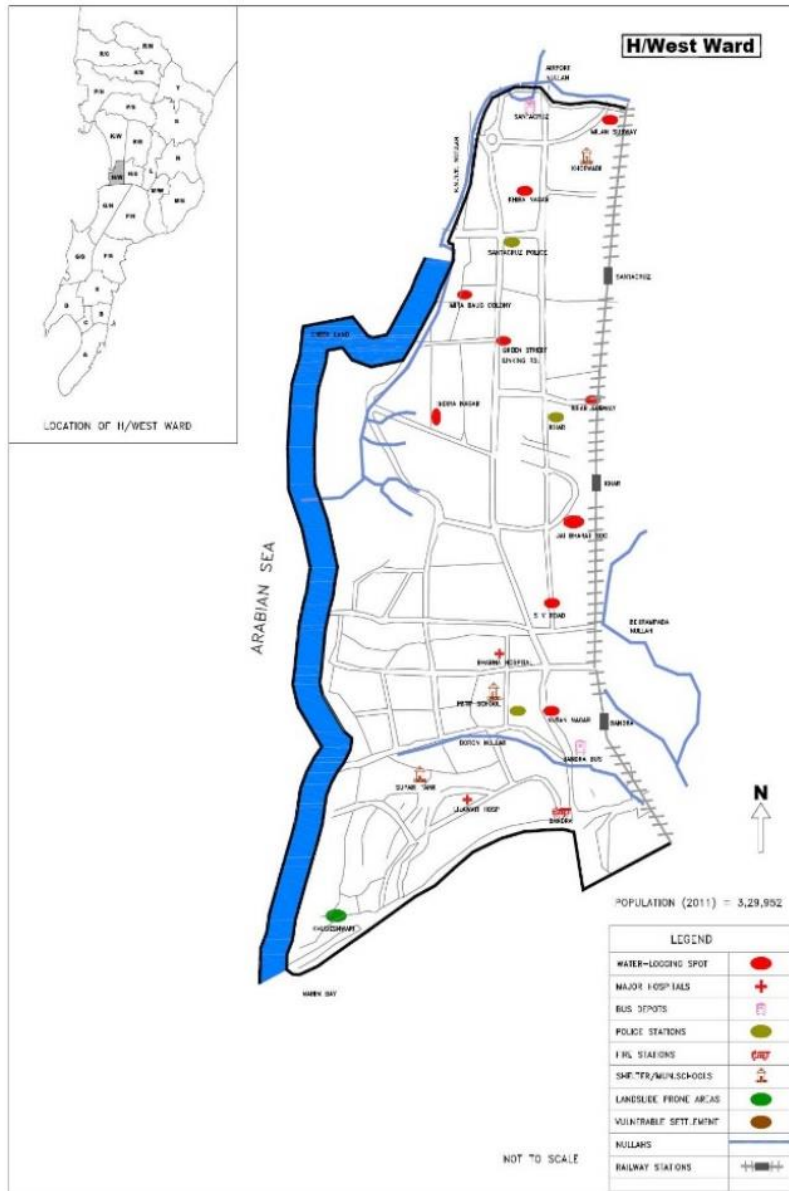
About Project Case Work (PCW)



PCW is a method of training participants through a semi-real situation. Participants are divided into groups of 6 -8 and are supported by a facilitator. PCW is all about “problem solving” over 5 days working in a group, under pressure of time, in competition and with limited information. Learning while doing is the principle.

<https://prasadmodakblog.wordpress.com/2015/10/24/the-project-case-work/> to know more about PCW.

Live-project: Bandra “H/West” Ward



Participants were introduced and presented the current waste management related situation and practices undertaken by municipal officials at Bandra H/West Ward. Data with maps were provided with a “problem and opportunity statement”.

Each team working on the PCW were given a task to find “solutions” for H/West Ward that helps them to reduce waste at source, improve on segregation, follow sorting, collection and decentralized processing techniques to reduce transport and burden to the landfill.

On Day-3 participants visited Bandra H/West ward to understand the entire process and cycle of waste management. They also got a chance to interact with the Municipal Corporation officials from other cities and other key stakeholders.

The entire PCW process was

facilitated. The participants were also provided with resources in the form of books & reports with access to the internet etc. The resources were kept in a separate room called ‘knowledge room’ for the entire course duration of five days.

At the end of the 5 days training, each team prepared and presented their “solutions” in form of Integrated Solid Waste Management Plan for Bandra H/West ward in front of an esteemed panel of judges comprising of BMC officials, experts and activists. The most innovative plan highlighting critical aspects and solutions was awarded.

Participants

The participants for Module IV ranged from post graduate students, engineers, architects, govt. officials and academicians.

Course Schedule					
Session	Day 1- 06/02/2017 (Mon)	Day 2- 07/02/2017 (Tue)	Day 3- 08/02/2017 (Wed)	Day 4- 09/02/2017 (Thurs)	Day 5- 10/02/2017 (Fri)
9:30 am- 11:00 am	Introduction and context setting Hierarchy of Integrated Solid Waste Management <i>Dr. Prasad Modak, Ekonnnect Knowledge Foundation</i>	Waste Segregation, Sorting and Collection <i>Mr. Chandrakanth Tambe, Junior Overseer H/West Ward SWM department.</i>	Visit to Bandra H/West Ward	Biomedical Waste Management <i>Mr.Sanjay Joshi, Envirovigil</i>	Waste to Energy and Future trends in Waste Management <i>Dr.Prasad Modak, Ekonnnect Knowledge Foundation</i>
11:00 am to 11:30 am	Tea Break			Tea Break	
11:30 am- 1:00 pm	Waste Governance <i>Ms. Asha Panwar, IIT Bombay</i>	Informal Waste Pickers: Challenges and Contributions <i>Mrs. Jyoti Mhapsekar, SMS</i>		Waste Processing Techniques: Biomethanation <i>Mailhem</i>	Group Work: Preparation of presentation on Worksheet 1,2,3 and Field Visit Experience
1:00-2:00 pm					
Lunch					
2:00 -3:00pm	Overview of various Waste Streams <i>Ms. Malavika Gopinath, (IIT Bombay)</i>	Sharing of Experiences on Decentralized Solutions <i>Monisha Narke: RUR</i> <i>Prof. Vidyadhar Walawalkar, Envirovigil</i>	Sharing of Experiences <i>Mr. Rajendra Jagtap, Asst. Municipal Commissioner, PMC</i>	Secured Waste Disposal: Landfills <i>Chetan Zaveri, AECOM</i>	Group presentations <i>Panel of Solid Waste Management Experts.</i>

3:00-5:00 pm	Group Work/Assignment on Waste Quantification (Worksheet 1)	Group Work/Assignment on Decentralized Waste Management (Segregation, Sorting and Collection) (Worksheet 2)	Practical Exercise on Home Composting Discussion on opportunities of Converting Waste to Resource	Waste Composting Techniques: <i>Organic Waste Convertor Model by Excel Industries.</i> Group Work/Assignment on Centralized Processing Technologies and Landfill (Worksheet 3)	Concluding session Valedictory <i>Dr.Sugandha/ Dr.Prasad Modak.</i>
--------------	---	---	--	---	--

Proceedings

Day 1: After the inaugural session by Dr. Modak, Ekonnnect and Dr. Sugandha Shetye, K.J Somaiya, first day lectures began at 10:00 am. The sessions of first day were conducted by Dr. Prasad Modak, Director, Ekonnnect Knowledge Foundation; Ms. Asha Panwar and Ms. Malavika Gopinath, IIT Research Scholar.

- ✓ Dr. Modak in his session presented the **Hierarchy followed in Waste Management** and the 360 degree approach of ISWM. He discussed the trends in waste generation, impacts of poor waste management and ISWM- towards Circular Economy. He explained the participants the Project Case Work Approach which was to be followed for the entire course duration.
- ✓ Ms. Asha Panwar in her session of **Waste Governance** covered the latest rules and regulations released for Municipal Solid Waste. She also discussed the other key regulations and aspects of waste and residue management.
- ✓ Ms. Malavika Gopinath in her session covered **Other Waste Streams than MSW**. She provided an overview of E-waste, Biomedical waste, Hazardous waste, Construction and Demolition, Non-Urban waste, Wastewater etc.
- ✓ **Project Case Work:** Participants were divided in to three groups and presented with the Bandra “H-West” Case study. They were given the necessary data, maps and tools to carry out their practical exercises. They were given three separate rooms and were moderated by Ms. Malavika for the entire duration of group work. The assignment for Day 1 was to calculate the total waste generated and collected in Bandra H-West ward from housing societies, commercial areas, hospitals, hotels etc.

Day 2: MCGM officials and NGO representatives represented the faculty for the second day. Topics like Sorting, Collection and Transportation, Informal Waste Pickers: Challenges & Contributions and Sharing of Experiences in Composting.

- ✓ Mr. Chandrakant Tambe, Junior Overseer-SWM, H-West Ward in his session of **Sorting, Collection and Transportation of Waste** presented challenges and issues faced by MCGM during collecting waste from various areas in H-ward. He also showcased videos on different vehicles and trucks which are currently being used by MCGM for waste collection. Participants got a chance to understand the ground reality of the issues faced by MCGM in waste management. The session also helped the participants in their Project Case Work.
- ✓ Mrs. Jyoti Mhapsekar, Founding Member, Stree Mukhti Sanghatana (SMS) discussed the different areas SMS organization works for the upliftment of waste pickers. She discussed the various **challenges and contributions of Informal sector**, which have a very important role in waste management. She discussed various business models of waste management which give an equal importance to Informal Sector.
- ✓ Ms. Monisha Narke, Founder, Reduce.Reuse.Recycle (RUR) shared her **experiences on home composting** and demonstrated the composter model developed by RUR organization.
- ✓ **Project Case Work:** Participants were provided land use maps of “H-West” ward highlighting the present 72 processing centres. They were given assignments of estimating the areas, types and capacities of potential decentralized processing centres that can be additionally developed for managing the current waste generation.

Day 3: Participants were taken for a field visit at a Multiprocessing Dry Waste Collection Centre near Bandra Reclamation Mumbai during from 10:00 am to 12:30 pm. The post lunch session was conducted by Mr. Rajendra Jagtap, Additional Municipal Commissioner of Pune Municipal Corporation. The participants were also given a practical exposure on Home Composting by Dr. Sanjay Joshi from Envirovigil.

- ✓ Mr. Chandrakant Tambe and Aastha Foundation led the **field visit in the Multi Processing Dry Waste Centre in Bandra Reclamation**. Through this field visit participants witnessed and understood the Composition of Urban Dry Waste, Techniques used for segregation, sorting, recycling of Dry waste, Understanding of Public-Private-Partnerships in dry waste collection and recycling centers, Key role played by Informal sectors in collection, segregation, sorting and disposal of different types of dry waste.
- ✓ The post-lunch session was conducted by Mr. Rajendra Jagtap who shared with the participants the **Pune Model of Integrated Solid Waste Management**. He discussed Different Models, Techniques, Scientific Approaches, Informal Sector Contribution in Waste Management currently active in the city of Pune.
- ✓ The day concluded with participants getting firsthand experience in Home Composting. The participants were taken to the Laboratory and with the help of composting experts taught on **how to set up their own compost bin**.

Day 4: The sessions on the fourth day were conducted by technology providers and practitioners in the field of Waste Management. Organizations such as Mailhem-Ikos, Excel Industries and AECOM represented the faculty on Day 4.

- ✓ Mr. Zahir Kapasi from Mailhem Ikos introduced the participant's different waste processing techniques. He discussed about "**Biomethanation Processes**" and different models of "Composters".
- ✓ Mr. Mundhe of Excel Industries pvt. Ltd. presented their model of **Organic Waste Composters** and demonstrated its functioning. He discussed the case studies of various installation sites and highlighted the advantages of OWC to the participants.
- ✓ M. Chetan Zaveri of AECOM industries, explained the technicalities behind **designing sanitary landfills**, the waste disposal site. He discussed the various tools, procedures and data needed for landfill designing.
- ✓ **Project Case Work:** Participants for their last day of practical exercises were given problems based on landfill designing, leachate treatment and GHG emissions.

Day 5: On the last day, a lecture on future trends in waste management was conducted for the participants by Ms. Asha Panwar, which was followed by participants presenting their plans to an expert panel headed by Dr. Prasad Modak.

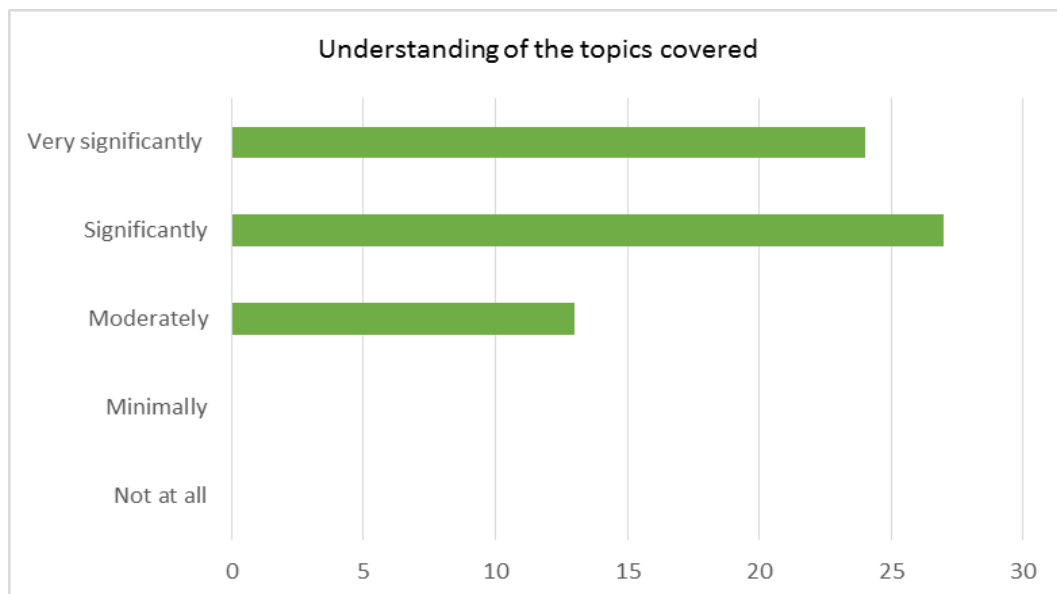
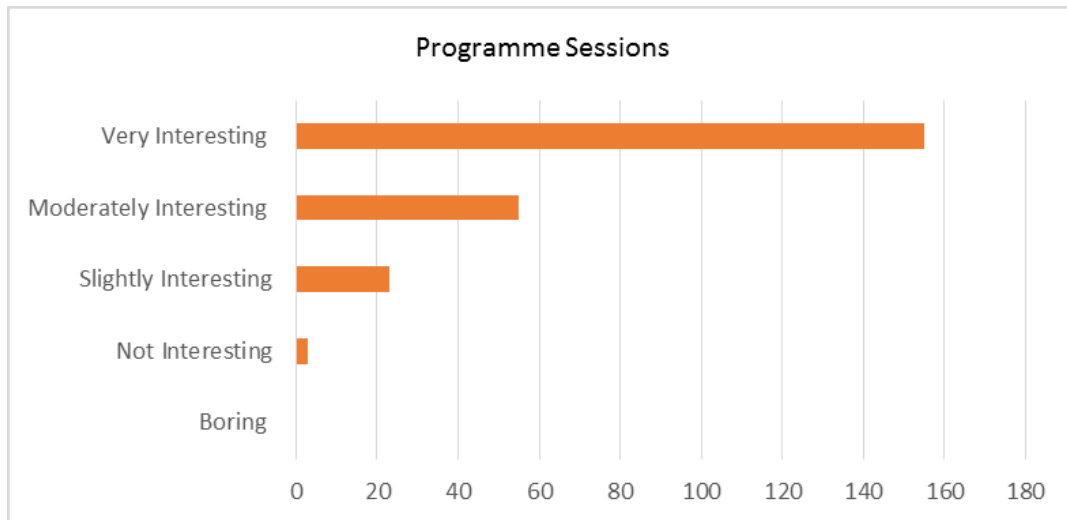
- ✓ Ms. Asha Panwar spoke about the **future trends in waste management** which included of concepts like Life Cycle Thinking, Zero Waste City, Inclusion of Informal Waste Workers, Participation of Private Sector, Participation of Community and Innovative Economic Instruments.
- ✓ The session was followed by participants working in groups and preparing their presentations on the outcomes of the exercises they performed for the four days on Bandra H-west ward case study in form of an Integrated Solid Waste Management Plan for the ward.
- ✓ The participants then presented their plan in front of the esteemed panel comprising of people from industry, educational institutes and media viz; Dr. Sneha Palnitkar, CEO & Member of All India Institute of Local Self Government; Mr. Dheeraj Kapoor, Sr. Manager, Essar Foundation and Mr. Virat Singh of DNA who critiqued and congratulated participants on their ISWM Plan outcomes.
- ✓ Dr. Modak concluded the session by speaking about how this course can be replicated at all wards in Mumbai and also in other cities and countries to train people from the Urban Local Body on the necessary interventions needed at the moment for Waste Management. He also invited participants to come forward and volunteer with Ekonnnect Knowledge Foundation for various surveys on waste management, beginning with Assessment of Compost & Biogas Solutions for Solid Waste Management.

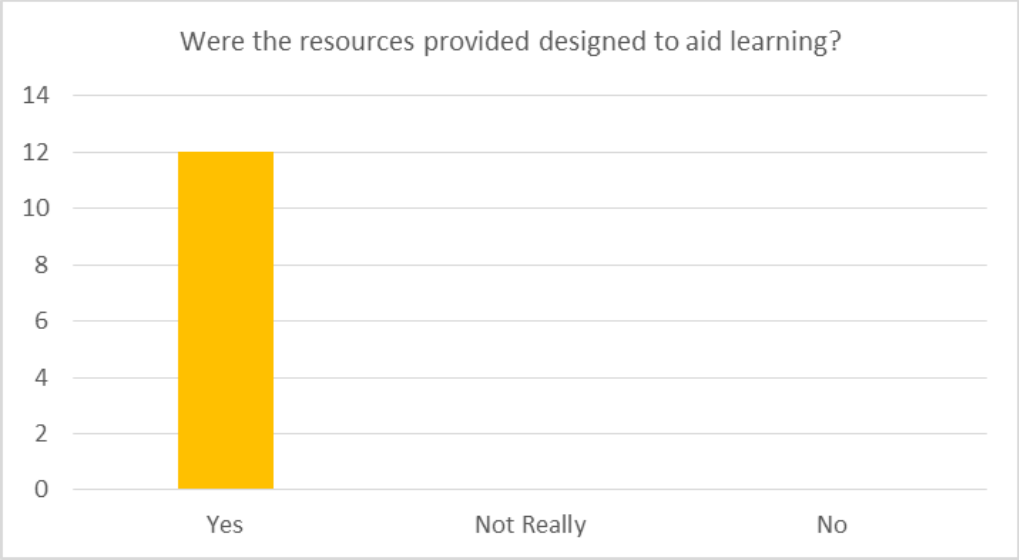
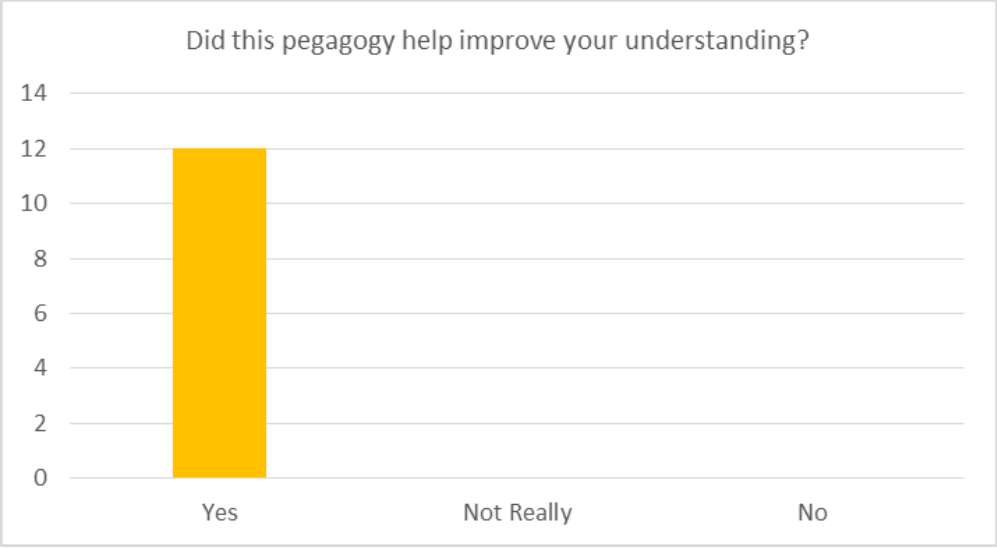
Learning Outcomes

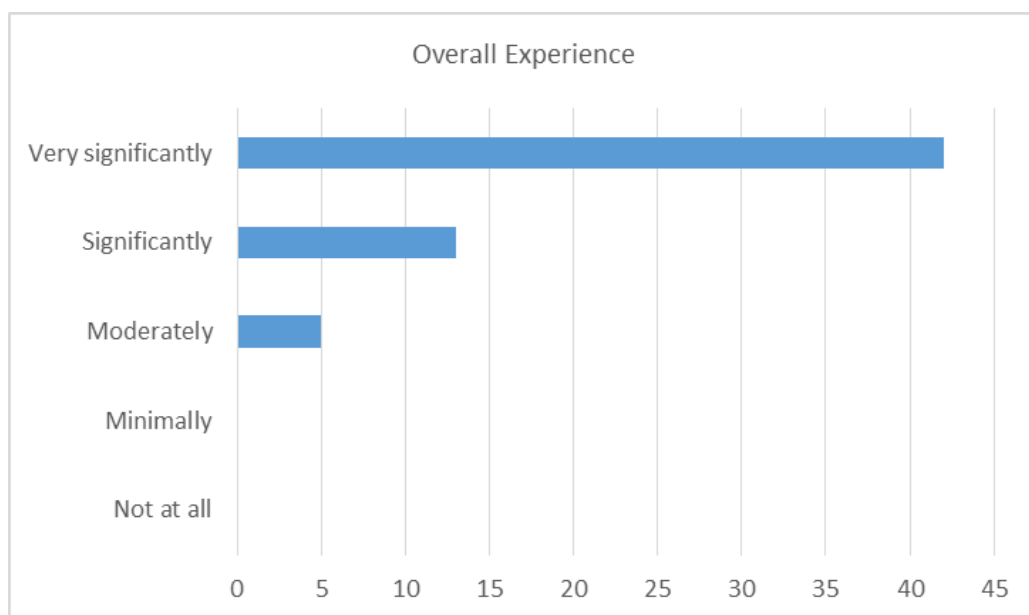
On completion of the five day course the participants were able to appreciate and understand;

- Trends in Waste Generation
- Waste Management Hierarchy
- Solid Waste Management Rules, 2016
- Overview of various waste streams: E-waste, Municipal Solid Waste, Biomedical waste, Hazardous waste, Construction and Demolition, Non-Urban waste, Wastewater etc.
- Waste Quantification: Tools and Techniques
- Waste Segregation, Sorting and Collection
- Challenges faced by MCGM
- Business Models in Solid Waste Management including the informal sector.
- Waste Composting Solutions for Housing Societies
- Waste Segregation, Sorting and Collection: Analysis and Mapping
- Understanding of Public-Private-Partnerships
- Key role played by Informal sectors in collection, segregation, sorting and disposal of different types of dry waste.
- Integrated Solid Waste Management of Pune City
- Biomedical Waste Management
- Waste Composting and Processing Technologies
- Biomethanation Process
- Landfill Designs and Techniques
- Future Trends in Integrated Solid Waste Management: Life Cycle Thinking ,Zero Waste City , Inclusion of Informal Waste Workers , Participation of Private Sector, Participation of Community , Innovative Economic Instruments.

Feedback







“All the learning sessions were interesting and the project work took the learning to a new level by us solving an actual problem.”

“The entire program was very interesting, right from the organizing committee, the co-ordinator, moderator and the experts involved.”

“Case work pedagogy, interacting with team mates was superfun; Watching segregation/sorting at work; Organization- Friendliness of facilitators, great food and some very good company.”

“Hands on experience on waste segregation and composting; The involvement of informal worker in SWM; Different Technical Aspects and Knowledge sharing were my key learnings.”

“‘MY ROLE’ in helping to solve the SWM issue; The hierarchial process of managing Solid Waste from ‘cradle to grave’ was very interesting.”

Way Forward

We wish to conduct similar courses across all wards of Mumbai and also in other cities and countries. We are getting enquiries from universities and organizations all across the globe to replicate such short training courses on Waste Management in their countries.

If you wish to actively participate and partner with us on such short training courses do write to us at sonal.alvares@ekonnect.net or disha.mahajan@ekonnect.net

You can view and download all the resources and training presentations from the following link;

<http://www.ekonnect.net/index.php/join-us/resources>

Annex I: Photographs

Module I- Glimpses of Sessions and Practical Exercises



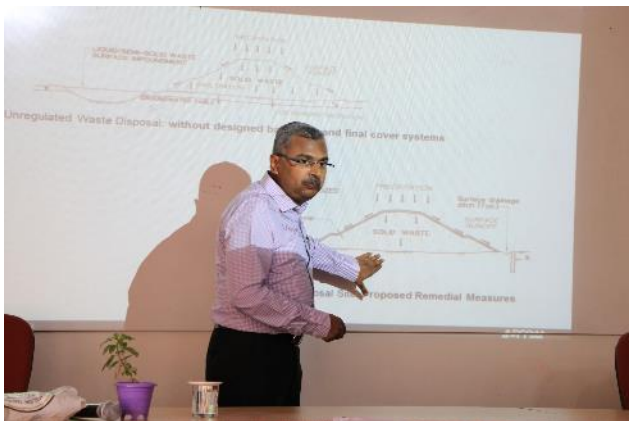


Module IV- Glimpses of Sessions, Field Visit and Practical Exercises











Annex II: List of Participants

Module I

Sr. No	Name	Organization/Institute	Email Address
1	Omkar B Jadhav	Bhaskar Jadhav & Associates	omkarjadhav7012@gmail.com
2	Vaishnavi Kalzunkar	VSK Architect & Interior Designers	theartofmusic222@gmail.com
3	Bhadra R Bhakti	K.J Somaiya	bhadrabhakti15@gmail.com
4	Dr. Chitra R Kamath	K.J Somaiya	chitra@somaiya.edu
5	Pratiksha N Chaike	K.J Somaiya	pratikshachalke@yahoo.com
6	Purva P Karmarkar	K.J Somaiya	purva2296@gmail.com
7	Mugdha S Gaonkar	K.J Somaiya	mugdhagaonkar20@gmail.com
8	Shreyas Khade	K.J Somaiya	shreyaskhade007@gmail.com
9	Pooja Chavan	K.J Somaiya	poojachavan79395@gmail.com
10	Pranali Shetty	K.J Somaiya	pranalishetty455@gmail.com
11	Seema G Golwad	K.J Somaiya	seema.gowad@gmail.com
12	Devanshi N Nirulkar	K.J Somaiya	devanshi.nirulkar@yahoo.com
13	Mokshada Thakur	K.J Somaiya	moksha2312@gmail.com
14	Shrutika B Pandit	K.J Somaiya	pshrutika31@gmail.com
15	Shilpa Nair	K.J Somaiya	nairshilpa94@gmail.com
16	Siddhesh Subramaniam	K.J Somaiya	sid104.sss@gmail.com
17	Tanvi A Patil	K.J Somaiya	tanviarvindpatil@gmail.com
18	Rajashree N Kamble	K.J Somaiya	kamble.rajashree2015@gmail.com
19	Megha S Chaugule	K.J Somaiya	meghachaugule61@gmail.com
20	Priyanka Mane	K.J Somaiya	priyankamane602@gmail.com
21	Hemali J Patil	K.J Somaiya	hemalipatil65@gmail.com
22	Gaurav Kashid	K.J Somaiya	gaurav.kashid29@gmail.com
23	Shivani Dixit	K.J Somaiya	dixitshivani820@gmail.com
24	Divesh Manchekar	K.J Somaiya	diveshmanchekar24@gmail.com
25	Akshay S Hindlekar	K.J Somaiya	akshayhindlekar24@gmail.com
26	Akshay Shinde	K.J Somaiya	shinde.akshay149@gmail.com
27	Abhijeet Paradkar	K.J Somaiya	paradkarabhijeet08@gmail.com
28	Vaishnavi Gujarathi	K.J Somaiya	vaishnavi.gujarathi9@gmail.com
29	Nitin M Wagh	K.J Somaiya	nitinwagh2011@gmail.com
30	Yadav Ramesh	K.J Somaiya	arjun.rajesh.yadav@gmail.com
31	Alisha Nair	K.J Somaiya	alishanair11@gmail.com
32	Shristi Jagannathrav	K.J Somaiya	shristiella1001@gmail.com
33	Shekhar B nagaral	K.J Somaiya	shekharnagaral@gmail.com

Module IV

Sr. No	Name	Organization/Institute	Email Address
1	Mr.Rahul Shinde	MCGM	rahulshinde23@yahoo.com
2	Ms.Shilpa Nair	Somaiya College	nairshilpa94@gmail.com
3	Ms.Shrutika Pandit	Somaiya College	pshrutika31@gmail.com
4	Mr Abhijit Paradkar	Somaiya College	paradkarabhijit@gmail.com
5	Mr Siddhesh Subramanian	Somaiya College	sid104.sss@gmail.com
6	Ms Sushama Parchure	MCGM	sushma.parchure@rediffmail.com
7	Ms.Vaishnavi Kalzunkar	Borivali College	theartofmusic222@gmail.com
8	Mr.Nitin Borse	MCGM	nit_borse@yahoo.com
9	Dr.Ketana Matkar	SIES IEM	ketnamatkar@gmail.com
10	Ms.Sonal Aphale	M.S.University of Baroda	sonalpb@gmail.com
11	Suvidha Patil	Building Environment India Pvt Ltd	16suvidha.beipl@gmail.com
12	Mr.Krishna Desai	EN-VISION ENVIRONMENTAL SERVICES	consent@en-vision.co.in
13	Dr.Pradip Pattajoshi	NALCO	pkpattajoshi@gmail.com
14	Mr.Ismat Imam	Auroville Consulting	ismatimaan@gmail.com
15	Sheetal Shewale	Mantras Green Resources LTD.	sheetal0431@gmail.com
16	Sambhaji Bile	Akshay Enterprises	akshayenterprises.mumbai@gmail.com
17	Ms.Amrita Kulabhi	Building Environment Pvt.LTD	moon.amrita@gmail.com

Annex III

Module IV: Project Case Work Assignments

Worksheet 1: Waste Quantification

The previous session discussed the various types of waste streams in an urban set-up. This exercise is intended to quantify MSW within the purview of an Urban Local Body. ULBs are mandated by law to report their annual MSW generation to the concerned State Pollution Control Board, every year. However, very often actual waste generation numbers are difficult to obtain. Here we will attempt to estimate the MSW generation in Bandra H Ward of Mumbai Suburban district, using waste generation factors and available data.

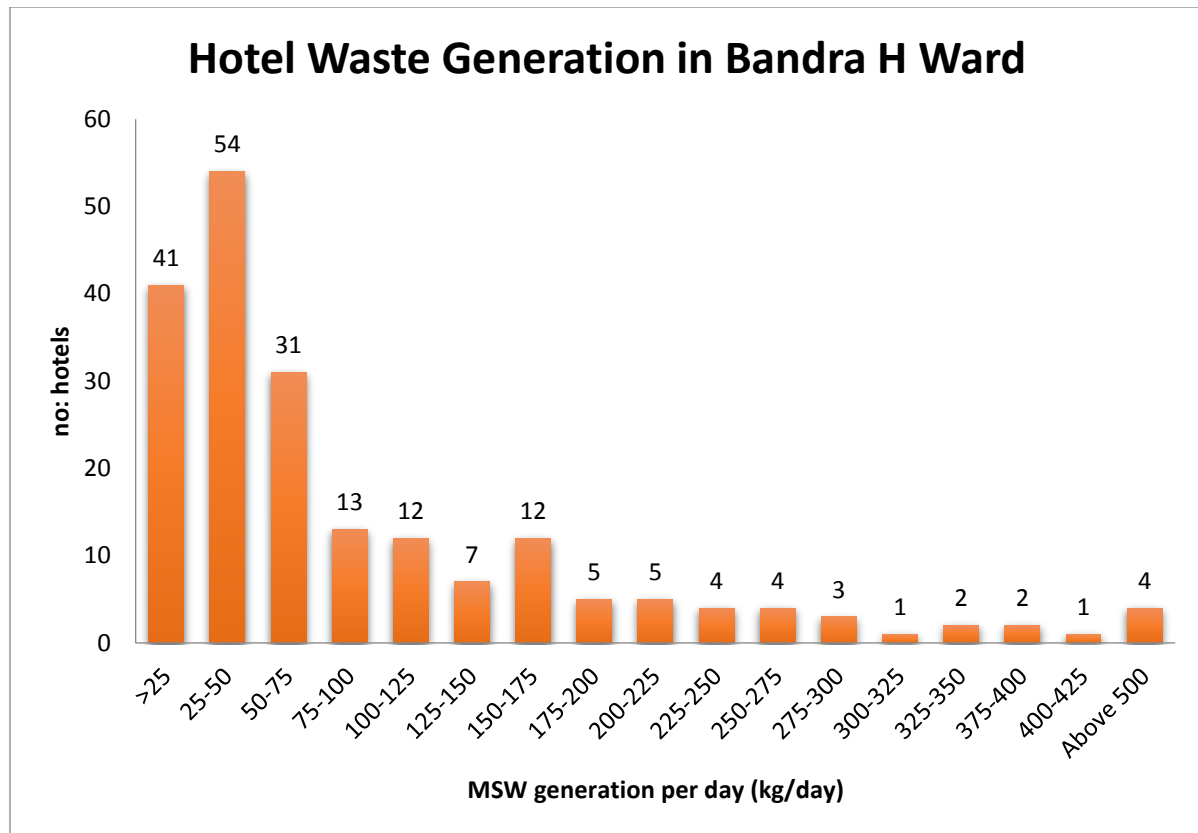
The table below provides the section-wise population within Bandra H- Ward.

Name of Section	Total Bldg	Total Flats	Population	Container bins	Community Bins	Slum Population	Gavthan population	Total Population
B - I	865	8525	40223		48	55646	8150	104019
B - II	555	2304	11525			10169	7337	29031
B - III	496	5189	20756				1280	22036
P / N	253	2507	12535			15544	8172	36251
P / S	683	7533	37665				1810	39475
K / C	672	5763	34571			11440		46011
K / W	916	5540	40263			3000	3530	46793
S - I	718	3047	50834			2500		53334
S - II	170	1117	26608			55000	4500	86108
Total	5328	41525	274980	8535	181	153299	34779	463058

According to MCGM, the per capita waste generation in Mumbai is 0.63 kg/day¹. In general, the per capita generation for slums are found to be lower than in residential areas with higher income groups (0.2-0.3 kg/per capita/day). The national per capita waste generation as per 2014 estimates is 0.11 kg/day².

Bandra H ward has 201 hotels/ restaurants. The daily waste generation from these establishments are shown in the graph below:

¹ https://www.mygov.in/sites/default/files/user_submission/1407227455.pdf



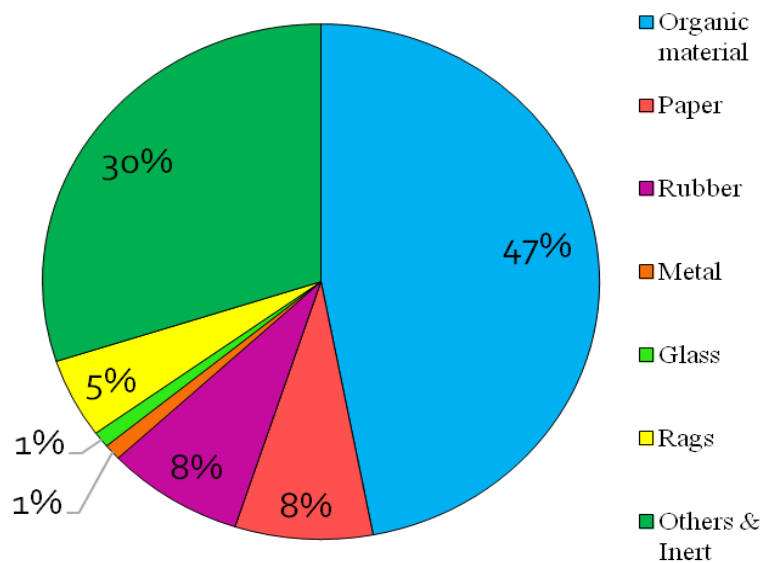
Markets and gardens generate around 15 tonnes and 8 tonnes of waste per day respectively. The data on MSW generation from hospitals is not available. The number of commercial establishments account to 7032, as per BMC estimates; however the data on waste generation from individual institutions is not available. The dry waste processed at sorting centres is between 15-20 tonnes/day. There is 100% coverage in terms of MSW collection in the ward.

Questions:

1. Use the available data to estimate overall MSW generation in the ward. Make suitable assumptions as required (please justify your assumptions).
2. How much of this is dry waste and wet waste? Is the potential for recycling being fully explored in the ward?
3. As per BMC estimates, C&D waste generation is around 55 metric tonnes /day. Compare this with the MSW generation calculated and make observations. Does this match with the national value for MSW: C&D ratio? If not, give possible explanation for the same.

Additional data:

1. No: hospital beds available/ 100000 population = 0.8 (for Mumbai)
2. Daily MSW generation/ bed = 0.3 kg/bed/day
3. Net MSW generation for India= 143000 TPD (2014)
4. Net C&D waste generation for India = 188000 TPD (2012)



MSW Composition for India
(CPCB, 2014)

Worksheet 2: Decentralised Waste Management

Part I:

The waste transportation details for Bandra H west ward are provided. Bandra H west ward uses three types of vehicles- large trucks (capacity 6MT), mini- compacter trucks (capacity 2.5 MT) and jeeps (capacity 0.5 T) for waste collection & transportation. They all use diesel as fuel, with an average mileage of 2km/litre. While the large trucks and jeeps collect and carry the waste all the way to the landfills either in Deonar (14 km from Bandra) or Mulund (25 km from Bandra), the mini-compactors carry the wastes only till the transfer station in Mahakali (16 km from Bandra). Using this data, calculate the daily costs of transportation (based on fuel consumption & employee wages), green house gas emissions from transportation as well as greenhouse gas emissions from waste treatment & disposal. You can take the help of the GHG emission calculation tool provided.

The large trucks employ 6 workers (average salary 20,000-25,000 pm) and 1 mukadam (average salary 25,000-35,000 pm). The mini-compactors and jeeps employ 4 workers and 1 mukadam and 2 labourers and 1 mukadam each.

Shifts	No: large trucks	No: mini-trucks	No: jeeps
Morning	26	11	21
Evening	5	2	9
Night	6	3	5

Part 2:

On day 1, we calculated the MSW generation for Bandra H west ward. There are 74 decentralized waste treatment facilities (for organic waste), as shown in the map provided (the detailed list is in the excel sheet provided). The combined capacity of these facilities amount to 5 tonnes /day. Compare this figure with the total MSW generation.

Devise a plan through which reduction of net waste sent to landfill can be reduced. The costing & sizing information for commonly available treatment technologies are provided below.

Organic Waste Treatment Technologies:

1. Biomethanation: Biomethanation or bio-gas production is the process of conversion of organic matter in the waste (liquid or solid) to methane and manure by microbial action in the absence of air/oxygen. The process is implemented through enclosed reactors called as digesters. Two technology variants in biomethanation are provided below:

a) Nisargruna Model

Sl No	Capacity TPD	Space required (m2)	Manpower	Avg life (years)	Capital cost (lakh)	Operating cost (lakhs/year)	Gas Output (kg/day)	Manure output (kg/day)	Retention time (days)
1	0.05	15	1	30	4	0.2	2	5	18-22
2	0.1	15	1	30	6	0.4	6	10	18-22
3	0.5	50	1	30	13	1.2	25	50	18-22
4	1	80	2	30	18	1.8	60	80	18-22
5	2	150	3	30	35	3	80	200	18-22
6	3	200	3	30	50	3.5	150	300	18-22
7	4	300	3	30	55	4	240	500	18-22
8	5	400	4	30	60	5	300	500	18-22
9	10	1000	4	30	120	10	600	1000	18-22
10	15	1500	4	30	180	15	900	1500	18-22
11	25	2000	4	30	280	25	1500	2500	18-22
12	50	4000	4	30	580	50	3000	5000	18-22

b) Mailhem Model

Sl No	Capacity TPD	Space required (m2)	Manpower (labour)	Avg life (years)	Capital cost (lakh)	Operating cost (lakhs/yr)	Gas Output (m3/day)	Manure output (kg/day)	Retention time (days)
1	1	65	1	20	22	0.4	80	30	28
2	2	250	2	20	40	0.6	160	65	28
3	3	350	3	20	60	1	240	90	28

4	5	500	4	20	90	1.3	400	165	28
6	20	4000	5	20	250	12	1200	3000	28
7	30	6000	5	20	300	12	1800	4000	28
8	50	15000	5	20	400	20	3000	7000	28
9	100	20000	6	20	700	70	6000	10000	28
10	200	30000	6	20	1000	120	12000	20000	28

2. Composting: Composting is a biological (aerobic) process of manure production through the decomposition and stabilization of organic matter present in MSW. Composting leads to reduction in size as well. If operated well, it does not lead to generation of offensive odours. The end product is used as organic manure, which is rich in plant nutrients (N, P, K) as well as the micro nutrients essential for plant growth. Two technology variants in composting are discussed below.

a) Tumbler model composting:

Sl No	Capacity (tonne/day)	Workers required	Total area (sq m)	Annual output (ton)	Total Capital cost	Total Operating cost / year
1	0.06	1	20	2	1.95	1.02
2	0.12	1	40	4	2.95	0.012
3	0.24	2	80	7	5.9	1.98
4	0.48	2	150	14	9.9	1.98
5	0.96	3	300	29	18.85	2.94

b) Organic Waste Converter:

Sl No	Capacity (tonne/day)	Workers required	Total area (sq m)	Annual output (ton)	Total Cap cost	Total Op cost annual/ year
1	0.1	2	10	3	4	1.5
2	0.2	2	20	6	8	3
3	0.4	3	40	12	16	6
4	0.6	3	60	18	24	9
5	0.8	4	80	24	30	12
6	1	4	100	30	35	15
7	2	6	200	60	40	30
8	2	8	300	60	10	27
9	5	8	750	150	50	67.5
10	10	10	1500	300	100	135
11	20	15	3000	600	200	270

Additional data:

1. Price of compost= Rs. 25/kg
2. Price of biogas= Rs. 35/kg
3. Density of biogas= 1.15 kg/m³

For any additional information, you can make use of the internet facility provided.

Worksheet 3: Landfill Design

A) Landfill sizing

We have already calculated the waste generation and the costs associated with waste management in Bandra H ward. This exercise attempts to understand the aspects of waste disposal. As you are aware, only a small MSW from Bandra H ward undergoes processing/treatment. Out of the 330 MT/day generation, close to 5 MT/day of organic waste undergoes treatment and close to 20 MT/day of recyclables get sorted and sent for recycling. The remaining waste is sent to landfills located at Mulund and Deonar.

Assuming that BMC is planning to dispose all the untreated MSW in a single new landfill, calculate the annual volume required for the landfill and the horizontal area covered by the solid waste. Also calculate the leachate formation and the GHG emissions from the proposed landfill.

The basic parameters for landfill design are provided in the sheets attached:

Additional data:

1. Mean density of refuse spread = 100 kg/m³
2. Thickness of uncompacted layer= 1.5 m
3. Thickness after compaction= 0.3 m
4. Soil thickness for daily cover= 0.15 m
5. An intermediate cover of 0.2 m is used to complete the cell and a final cover of 1 m over the stack of 2 cells is recommended.
6. Landfill depth= 4.5 m

B) Leachate calculation:

The leachate generated from the landfill site in different year can be calculated by :

$$\text{Leachate generation} = \text{runoff coeff.} * \text{operation area} * \text{effective rainfall}$$

where runoff coefficient for different type of landfill is assumed to be :

Table 5 Runoff Coeff. for Different Type of Landfill

Landfill Type	Runoff coeff.	Remarks
Active tipping face	1.00	100% of surface water infiltrated into leachate collection system of landfill
Temporary restored area	0.30	70% of surface water will be convey to surface channel / stormwater system
Permanent restored area	0.10	90% of surface water will be convey to surface channel / stormwater system

The table provides the total rainfall recorded at Santacruz weather station for the year 2015.

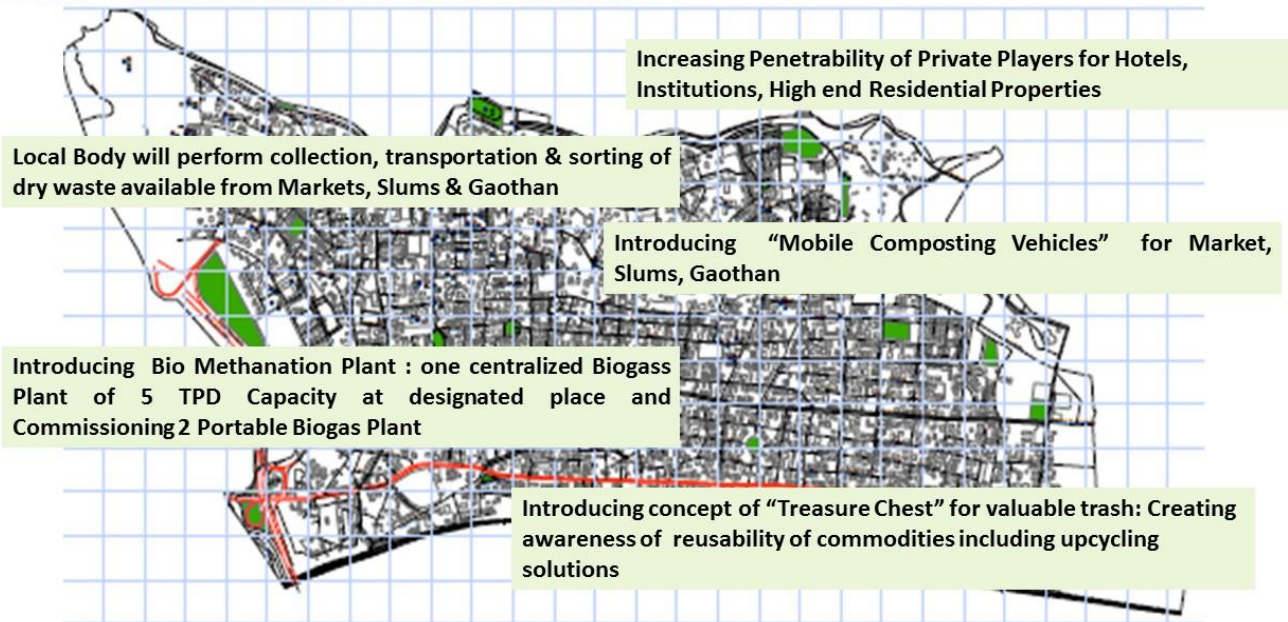
Month	Total Rainfall (mm)
June	1106.7
July	359.1
August	153.9
September	203.5

c) GHG emissions

Make use of the GHG emission tool provided on Day 2 for this section. Use the MSW composition that was provided on Day 1 and use “mixed waste landfilling” as the category.

Module IV: Participant Group Presentation Highlights

Group 1- Waste Management Plan Highlights



Group 2- Waste Management Plan Highlights

Selected Areas for Biogas Plants in H-West Ward



Group 2- Waste Management Plan Highlights

Areas for Biogas Plants in H-West Ward

	Capacity TPD	Space required (m2)	Manpower Salary (Lakhs)	Capital cost (lakh)	Operating cost (lakhs/yr)	Gas Output (m3/day)	Manure output (kg/day)
Per Day	20	2000	-	-	-	1600	660
Monthly	600	-	2.4	-	-	48000	19800
Annual	7200	-	28.8	360	5.2	576000	237600

Total Wet Waste Generated=154MT

Total Wet Waste treated currently= 05MT/day (~2%)

Initial Plan : 40 MT...can be replicated later.

4 plants of 5MT/day capacity installed in series at one location each.

Two decentralized locations selected having capacity of 20MT each.

Group 2- Waste Management Plan Highlights

Areas for Biogas Plants in H-West Ward

Waste Treated	Installation Cost (Lakhs)	Maintenance Cost (Lakhs)	Manpower Salary(Lakhs)	Biogas generated m3	Manure produced (kg)
14400 MT	360	10.4	9.6	11,52,000	475,200

Investment for 2 years: 390 Lakhs

Revenue Generated:

400 Lakhs worth Biogas + 117 Lakhs worth Compost/manure

Capital Recovery: 127 Lakhs in two years for 1 location treating 20MT/day

Savings for transportation of 40 MT wet waste to landfill per year = 225Lakhs

Group 3- Waste Management Plan Highlights

Selected Areas for Additional Decentralized Treatment Facilities in H-West Ward



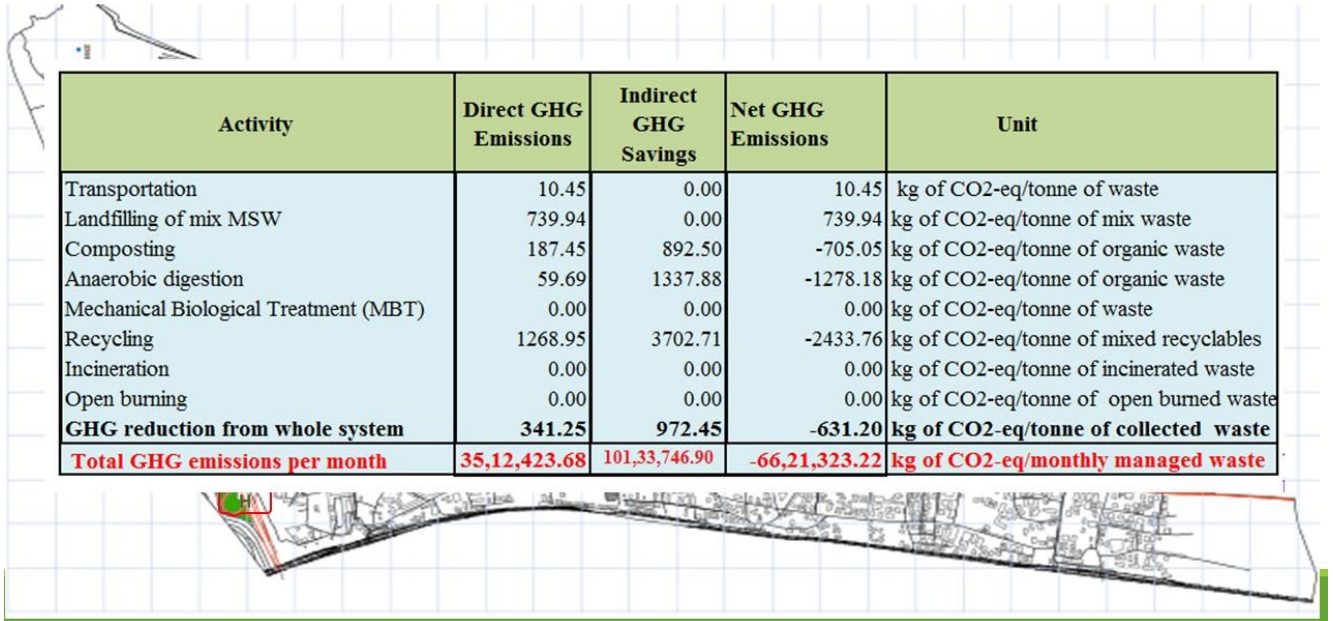
Group 3- Waste Management Plan Highlights

Additional Decentralized Treatment Facilities in H-West Ward

No.	Segmented zone	Available area	Suggested facility	Area requirement	Capacity	Manure output	Workers required
1	A	1000 sq. m	Biogas	1000 sq. m	10 MTD	1000 kg/day	4
2	B	3000 sq. m	Biogas	2000 sq. m	25 MTD	2500 kg/day	4
3	C	2000 sq. m	Compost	1500 sq. m	10 MTD		10+100
4	D	2000 sq. m	Compost	1500 sq. m	10 MTD		10+100
5	E	500 sq. m	Compost	300 sq. m	2 MTD		8
6	F	500 sq. m	Biogas	400 sq. m	5 MTD	500 kg/day	4
7	G	8000 sq. m	Biogas	2000 sq. m	25 MTD	5000 kg/day	8+250
8	H	4000 sq. m	Biogas	2000 sq. m	25 MTD	5000 kg/day	8+250
	Total				112 MTD	14000 kg/day	56+700

Group 3- Waste Management Plan Highlights

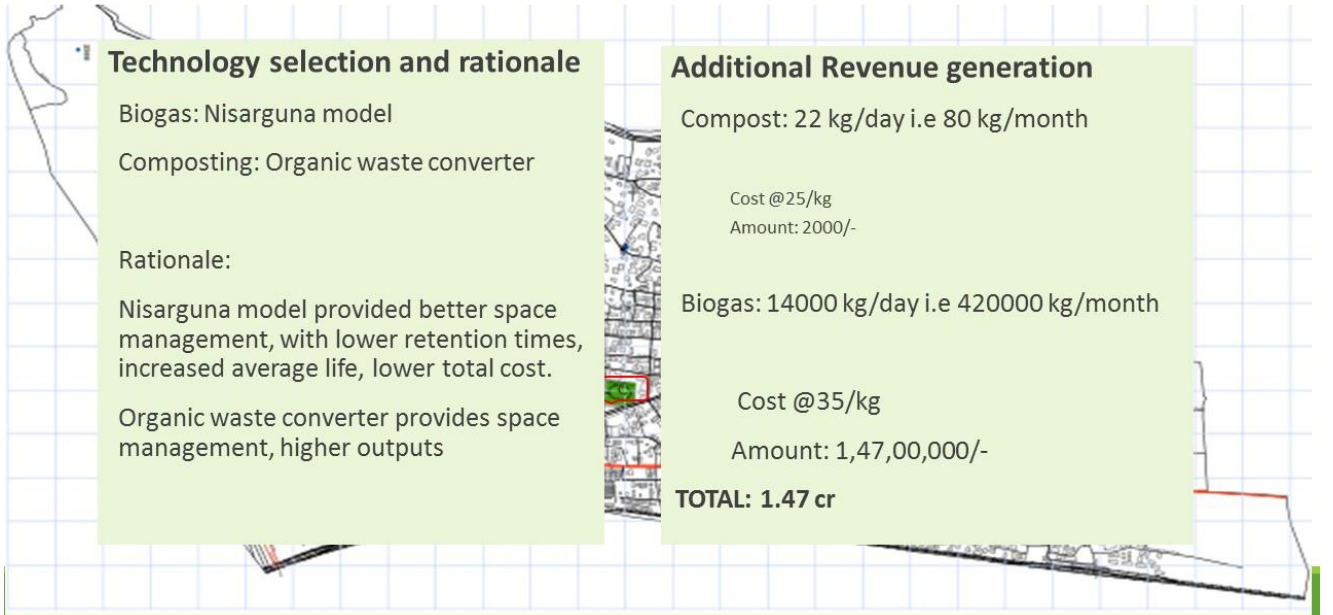
GHG Reductions due to Additional Decentralized Treatment Facilities in H-West Ward



Activity	Direct GHG Emissions	Indirect GHG Savings	Net GHG Emissions	Unit
Transportation	10.45	0.00	10.45	kg of CO2-eq/tonne of waste
Landfilling of mix MSW	739.94	0.00	739.94	kg of CO2-eq/tonne of mix waste
Composting	187.45	892.50	-705.05	kg of CO2-eq/tonne of organic waste
Anaerobic digestion	59.69	1337.88	-1278.18	kg of CO2-eq/tonne of organic waste
Mechanical Biological Treatment (MBT)	0.00	0.00	0.00	kg of CO2-eq/tonne of waste
Recycling	1268.95	3702.71	-2433.76	kg of CO2-eq/tonne of mixed recyclables
Incineration	0.00	0.00	0.00	kg of CO2-eq/tonne of incinerated waste
Open burning	0.00	0.00	0.00	kg of CO2-eq/tonne of open burned waste
GHG reduction from whole system	341.25	972.45	-631.20	kg of CO2-eq/tonne of collected waste
Total GHG emissions per month	35,12,423.68	101,33,746.90	-66,21,323.22	kg of CO2-eq/monthly managed waste

Group 3- Waste Management Plan Highlights

Additional Decentralized Treatment Facilities in H-West Ward



Technology selection and rationale	Additional Revenue generation
Biogas: Nisarguna model	Compost: 22 kg/day i.e 80 kg/month
Composting: Organic waste converter	Cost @25/kg Amount: 2000/-
Rationale:	Biogas: 14000 kg/day i.e 420000 kg/month
Nisarguna model provided better space management, with lower retention times, increased average life, lower total cost.	Cost @35/kg Amount: 1,47,00,000/-
Organic waste converter provides space management, higher outputs	TOTAL: 1.47 cr

About Ekonnect Knowledge Foundation

Mainstreaming environmental management & sustainability through education and training is the raison d'etre of Ekonnect Knowledge Foundation. Fuelled by the vision of Dr. Prasad Modak, who has made environmental education the work of his life. As faculty at the Centre for Environmental Science and Engineering (CESE) at IIT Bombay, Dr. Modak developed a strong passion and sense of commitment towards nurturing and mentoring students & young professionals in Environmental Management. Engaging with stakeholders ranging from students, young professionals and educational institutions, to government bodies and corporates, Ekonnect has delivered a range of training services including face-to face and blended learning training, training of trainers (ToT), curriculum design and career counselling in this domain. All programs are supported by Environmental Management Centre LLP, an environmental management consultancy in Mumbai.

More details at <http://www.ekonnect.net>