

Generation composition and management of solid waste- A case study of Nainital in Uttarakhand.

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Solid waste accumulation at a place full of inhabitations, water bodies and the natural scenic environment threatens the scenic beauty of the place & also poses a health hazard to the local inhabitants & live stock. The study pertains to the Nainital, the city of the lakes, one of the choicest tourist destinations

Broadly speaking anything that is left as refuse account as waste. the domestic waste garbage , polythene , medical waste etc. has become a menace of astronomical proportion, the additional factor of tourist influx further adds to the already existing compound problem. with the advent of time, population (settlers & floating) have taken its toll on both space & resources of this place of Uttarakhand & eventually its environment. Nainital is one of the sought-after tourist destinations in the state. Nainital is situated at a longitude of 29.38 N & 79.45 E and at an attitude of 1938 msl. The lake is pear shaped with a depth of 20m having a circumference of 2 miles. It is surrounded by mountains which are bestowed with the green gold . The total area of this hilly destination is about 11.73 sq km.

Ever since the English sat their foot on the Hills of Kumaon, they were astounded by the natural beauty & aura of the place. The eloquence of pristine beauty by Mother lured them to Conquer & establish their authority over the land of God. The hills have since then attracted most of the visitors solely towards its natural beauty & some for adventure too.

Nanital is no exception to above Consequences of index of human development & inhabitation .The casualness of tourists & of local residents too have already impacted the fragile ecosystem of this place & unchecked activity would eventually result in complete abrogation of nature & consequently traveler enthusiasm.

The waste accumulation, a potential threat to ecology of the place, especially its aesthetic beauty & human & animal resource.

The accumulation of solid waste brings about blockade of water Channels & nallas by Polythene & Garbage & result into an over flowing of unclean & filthy water to roads & lake (Naini) affecting its flora & fauna (Photo 1&2). It may also result in out break of different infection diseases which may ultimately lead to death of the faunal elements. Besides ingestion, polythene can also choke the air passage of the live stock.



Photograph 1. Water inlet into Naini Lake carrying the waste



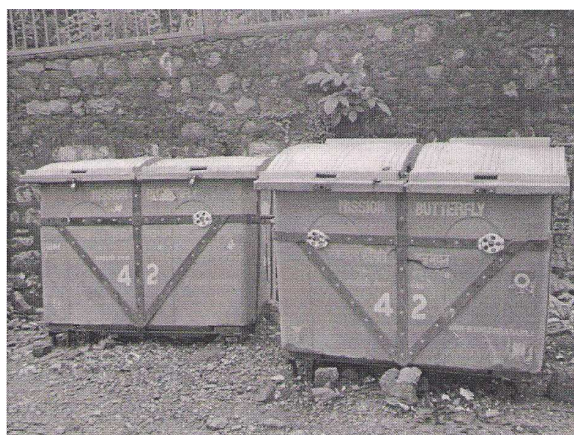
Photograph 2. Water pollution in the Naini Lake

Overflowing garbage also attracts stray animals that are menace to both tourists and locals. This alarming problem called for an action plan to address

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the issue of solid waste. Hence to educate the local populace and unknowing visitors, there was an urgent need to plan, develop promote and execute the (ISWM) integrated solid waste management programme with the view of addressing the solid waste management and an expression of interest for ISWM in the lake areas of Nainital was invited under PPP mode with a view to conserve the pristine environment of lake areas of Nainital under the National lake conservation project under the Ministry of environment and Forests Government of India expression of interests full for ISWM for the lake areas of Nainital were invited nationally by Nainital lake region special area development Authority.

An integrated solid waste management programme (ISWM) The Mission butterfly promoting the whole- of- life (Cradle to grave management of solid material wastes with strategies for recycling and minimization .Assuring its success, Mission Butterfly is owned and managed by the community notionally divided into clusters (Swacchtha-Samiti) of one thousand persons (about 250 families, photos 3, 4 & 5).

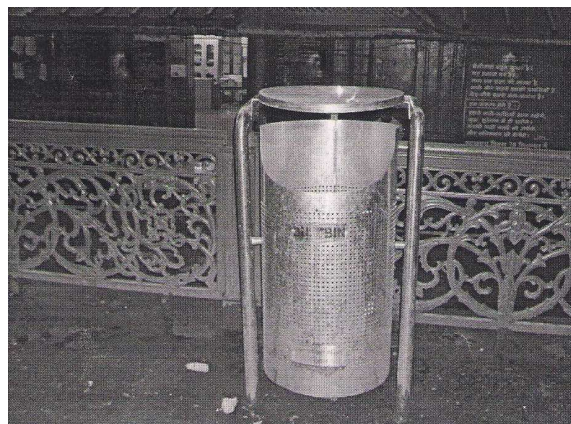


Photograph 3. Dust bins installed by Mission Butterfly



Photograph 4. Dust bins installed by the Municipal Board and Mission Butterfly

The Swacchtha samiti requires the collection, segregation and management of waste the use of composting vermicomposting and recycling facilities.



Photograph 5. Small dust bin installed ny Municipal Board at Mall Road

This cleanliness mission generates income from fee collection, the fee is for consultants and service providers the sale of resultant compost and the recyclables such as plastic metallic material and glass. To encourage wider participation and evolution of community spirit, the membership signs (Green Home Logo) are provided to signal household and institutional support.

The Mission Butterfly, the integrated solid waste management programme is managed by the Lok Chetna Manch as executing agency for a two year transition period before assumption by the Nainital Nagar Palika Parishad (Municipal Board-the Urban Local Body responsible for waste management) .The stake holders are:-

- 1 The citizens of Naini Tal (For whom this activity has been designed & is being pursued)
- 2 The Nainital Nagar Palika Parishad (Taking on the mantle of keeping its town clean).
- 3 The National River conservation Directorate, A unit of ministry of forest and environment govt. of India (Supporting the capital and project cost of Mission Butterfly).
- 4 The Nainital Lake region special area development authority (has been given the task of implementing the various schemes.
- 5 The various departments of the govt of Uttarakhand such as Revenue, Forests, pwd, kmvn, tourism etc. with the pivotal roles.
- 6 Lok Chetna Munch - The institution selected to execute mission butterfly in Nainital

Key features:

- Community information and mobilization.
- Segregation of domestic wastes.
- Collection of wastes.
- Sale of product (organic manure)
- The integrated solid waste management program is;

Financially sustainable:

Cost effective and cost saving

Involving community participation in planning

Providing information and training services to those involved with waste generation use & disposal including recycling.

Mission butterfly (ISWM) is effective in ways as under:

Income production:

The fee is collected from households, hotels & restaurants institution & others waste generators

The sales of composed shredded paper & recyclable waste (eg. plastic, glass & metallic material) the other sources such as data base of available construction materials , consultancy and training.

Normally the waste generators are grouped as:

Small generators: Mostly households the waste is collected & disposed at two types of cluster bins stationed at designated site.

Bulk generator: Includes commercial institution, offices, school & construction mixed waste from restaurant, hotels is collected and sorted by mission's collectors and separated and delivered to mission's supply bins.

Construction waste is sent for landfills and / or to traders interested in buying. Fee is levied on disposal of both kinds of waste to be paid by the generator.

Waste is collected and finally sent to composting pits (wet waste) where it is an anaerobically composted (photos 6 & 7) for 45 to 60 days and the final product is soled off to generate revenue. The drive waste is segregated into different grades of plastic, tin, glass, paper etc. It is washed, dried and sent to different end users.



Photograph 6. Composting pits filled with biodegradable waste at Narayan Nagar, Nainital.

The study was organized through surveys, first hand observation personal exchange with mission workers. First hand observation by visiting recycling

and composting sides. The photographs and details of execution, execution agencies was collected with the firsthand observation and interaction. The project is a welcome step in right direction and is of course significant given the huge tourist influx and is sure to bring fruitful results in time to come.



Photograph 7. Fully compost organic waste at Narayan Nagar, Nainital

The following recommendations have been concluded with the thorough study of the project in execution at Nainital in Uttarakhand.

- 1 Use of common incinerators working at thousand degree Celsius as this does not lead to emission of dioxins.
- 2 Adopting methodology of hydropulping/ disinfecting the medical waste with the application of 1 % bleaching powder.
- 3 Adopting superheated steam sterilization technology.
- 4 Though bins are seen at proper places and are replaced with empty once when filled (Normally every today) but this is entirely dependent on Nagar Palika employee who informs the mission. It would be better if telephone numbers are displayed next to bins so that any common man can help and contribute in keeping the area green and clean.
- 5 Installation of dustbins at the tourist spots like different lakes and city squares.
- 6 Involvement of teachers can also do wonders in mobilizing a change in the town.
- 7 Displaying of information suggesting visitors to dispose their portable waste at proper place would help immensely in the effort.
- 8 Sustainable use of resources.