



Conference Report

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LIST OF ABBREVIATIONS

JNNURM	Jawahar Lal Nehru National Urban Renewal Mission
GoUK	Government of Uttarakhand
IMI	Indian Mountain Initiative
RED	Regional Economic Development (RED)
UDD	Urban Development Department
ULBs	Urban Local Bodies
URDPFI	Urban Regional Development Planning Formulation & Implementation Guidelines
UUSDIP	Uttarakhand Urban Sector Development Investment Program

Acknowledgements

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Krishan Singh Rautela

Issues and Complexity of Urbanization in the context of Mountain states

As we have seen the status of urban development in Uttarakhand, the scenario of the mountain states in India is not very different. The trend of development around the world is today urban centric and mountain states have to develop sustainable city development framework instead of patch work arrangements. We have to acknowledge that at the moment our cities are plagued by following complexities:

- Lack of Master Planning & Unplanned development of housing
- No plans for basic necessities like drinking water, sewerage, drainage & solid waste management
- Population growth & Increase in the floating population out pacing development of physical infrastructure
- Disaster prone development near hazardous areas
- Lack of resources and capacity in urban local bodies & delays due to centralized planning/implementation
- No plan for Urban Transport

The urbanization agenda has been given prime space in 11th plan but the impact of efforts from central & state programs have not been visible in the mountain cities of Uttarakhand or elsewhere. This is mainly due to the following reasons:

- Lack of specific solutions for the mountain cities
- Lack of special norms for mountain cities leaves many cities out of the national programs (eg. JNNURM)
- State initiated urban development programs have lacked resources and capacity to make the difference.

Some of the mountain cities like Shimla, Gangtok etc. have been able to address a few of the problems but these have not been enough. The key steps required to change this status quo are:

- Explore and Understand the underlying issues
- Sensitize the planning and implementation machinery at the local, state and central level
- Bring together the stakeholders of all mountain cities from all the mountain states to ensure that solutions would find necessary economies of scale
- Find resources under the current planning mechanism to fund the above
- Catalyze creation of new policies and schemes which address the specificity of the mountain cities

Apart from the flagship program of JNNURM by the central government there have been multilateral agency funded state urban development programs which have so far worked on the same old solutions. It is important to find resources to fund exploration of new

solutions so that the central and state level programs could be made more effective. This could also be addressed under the central government initiated missions under National Action Plan for climate change. These mission are :

- National Solar Mission
- National Mission for Enhanced Energy Efficiency
- National Mission on Sustainable Habitat
- National Water Mission
- National Mission for Sustaining the Himalayan Eco-system
- National Mission for a Green India
- National Mission for Sustainable Agriculture
- National Mission on Strategic Knowledge for Climate Change

National Mission for Sustaining the Himalayan Eco-system is most directly related to the concerns related to urban development in this region but currently it has become restricted towards the science and environment concerns. It is important that stakeholders in the mountain states sensitize the mission agencies and influence them to ensure that the resources can fund exploration of new solutions which in turn would ensure success of the mission. Each of the above missions have direct impact on creating a sustainable urbanization the mountain states and thereby setting sustainable development in motion for these states.

Stakeholders and their roles

The stakeholders and central actors in the process of urban development are mainly :



Urban local body is at the nucleus of all this through which the implementation of the planned urban development has to take place but unfortunately it lacks the capacity and resources to do so.

The State governments have been the main actors in urban development space and have acted through the departments of housing, town and country planning etc. These departments however have confined themselves to state capitals mostly and have done very little to change the landscape. As the rural livelihood opportunities in the mountains have been dwindling over the years there has been outward migration into towns and cities. This has been accelerated in the post liberalization decades and urbanization really went out of control for economic reasons. The development of cities like Gurgaon is one of the most relevant examples for the pace and manner in which urbanization has grown in last two decades. This growth not only resulted in people moving from villages to cities in search of livelihoods but also cities moving into villages to fulfill the rapid increase in housing demand. In the mountain states such pressures have been faced by cities in foothills or terai areas but at slightly smaller scale the existing mountain cities also have faced smaller but proportionate growth. The lack of capacity and planning from the state government has resulted in lack of action from its end and also unwillingness to transfer powers to urban local bodies has not helped the matters. State governments need to work towards decentralizing the functions and provide resources to urban local bodies. This could be done in regional/cluster approach to ensure that solutions could find right scale for viability and would not result in fragmented response from the smaller urban local bodies. State government would have to act as aggregator & facilitator for these urban local bodies for an integrated response to the problems.

Central government has created many instruments like HADP etc. in the past but the emphasis has not been on the sustainable urban development. The mountain areas have always been viewed with prism of environmental conservation and rural development and the urban development was seen mostly in negative light to put it mildly. Even now when at national level urban development has been given prominent place in planning and implementation, mountain states remain at the margins as the planners and implementers are not sensitized to the special needs of these terrains. Central government needs to ensure that more consultations are done with stakeholders and planning should have a bottom up approach. Central government should also consider looking outside the country for solutions and involve the states in such an exercise.

Multilateral agencies have wealth of experience from multiple geographies around the world, which ideally should have helped in bringing right technologies for the mountain cities. So far there have not been any such examples in the mountain states for path breaking solutions either from developed or developing nations. There are examples in European alpine countries and Andean Countries in South America which could be used as base for developing local solutions in the area of public transport, waste management etc.

Science & Technology, especially from the domain of environmentalists, has had a sway over most policy matters of the mountain states. So far the emphasis has been on conservation and very little has been done on adaptation by the science & technology community. In recent times the work done in the area of valuing ecosystem services etc. has been one of the few constructive works of scientific community which would help in

augmenting resources of the mountain states. The real challenge for the scientific community would be to balance the conservation and adaptation for the development of the mountain states. In the area of urban development a lot of new technologies are needed to find geography specific solutions and the scientists would be needed to step up to the plate.

Private sector has been shackled by the lack of public sector initiative mostly. The local private sector has its limitations in terms of resources and capacity. Private sector could play a big role provided the issue of scale can be addressed by the central and state governments to make private sector participation worthwhile. In recent times 3 JNNURM supported SWM projects in Uttarakhand were successfully contracted out to private sector but lack of adequate capacity in public sector and delays on environmental clearances have resulted in setbacks. Success of these projects would have worked as catalyst and also as platform for encouraging the private sector to take smaller projects in the state. In case of public transport also if one were to look for a new alternative like PRTS solution to address one city project the cost would be huge but if we are able to study and commission solution for 10 similar cities it would bring the cost down by bringing economies of scale. This has already been successfully tried in case of JNNURM urban bus standardization. Cost of Metro Rail implementation in India would also soon provide similar benefits as more cities opt for it and encourage manufacturers to localize their content.

Civil Society has been active at various levels and it has resulted in change of policy making and implementation at all levels of government. However urbanization has once again not been the primary agenda for the civil society in most cities. Even the vocal sections of the civil society have been limited to an urban area or a particular sector only and thereby not having right impact. Indian Mountain Initiative has been in existence since 2011 and has tried to tackle such limitations of civil society action. The mountain cities agenda is one more such step which began with first mountain cities discussion in 2012 Gangtok SMDS-2. Some of the recommendations from this discussion were:

- Better definition of road hierarchy, focusing on transport issues, forming region-based tourism circuits, by curtailing rural-urban and urban-urban migration, and through egalitarian distribution of resources.
- The focus of urban intervention should also be on such soft aspects as urban governance and capacity building. In the area of urban governance there is a need for revising bye laws, developing e-governance, creating municipal act to form a 3-tier urban mechanism, and developing public-private partnership mechanisms.
- Approaches such as city branding also allows for a strategic vision to be implemented.
- As funding is seen as a fundamental bottleneck there is a need to find multiple sources of funding based on assets, central resources, subsidies, etc., especially to sustain the development of smaller urban centres.

In order to study the issues greater details IMI convened the second mountain cities event on January 20, 2014 at Mussoorie. This study has been part of this initiative and author has played active part in conceptualizing, organizing the event. Event was structured to bring out specific suggestions to influence the National and State Urban Development Programs

for a visible change in the provision of Urban Amenities in the mountain states with an objective to create discourse on Sustainable Habitats in the mountain states.

Through this event, important connection was made with the National Mission for Sustaining the Himalayan Eco-system by engaging the division on climate change in department of science & technology where this important mission has been anchored. This engagement also helped the mountain states to bring the urban development as key agenda for the mission.

Price Waterhouse Cooper also provided the knowledge support to the event by bringing out a study on the urban scenario in the mountain states.

The participants also were asked to divide into three thematic groups to discuss specific aspects of Planning, City Services & Governance with respect to urban development in mountain states. Each group was asked to bring out key suggestions for short, medium & long term by different entities of the state.

Innovative approach to spatial planning was introduced in this event by engaging non-profit entity ArchI to study Mussoorie and create a 3D model with scenario development for future course of development of the town.

In the next section detailed report on the proceedings & outcomes of this event has been presented.

Mountain Cities 2014, Mussoorie

This conference was scheduled to be held on January 19 & 20 at Mussoorie but due to sudden weather changes and heavy snowfall at Mussoorie, the organizers and participants were reminded of the severities faced by mountain cities and how elements of nature, human interaction can turn the most appropriate tourism opportunity of snowfall into nightmare for the city dwellers and tourists.

Under the circumstances, innovative parts of the event, a Mussoorie walk by participants and interaction with the urban local body representatives had to be cancelled. Despite all the odds the indomitable spirit of the participants prevailed over the adverse conditions and everyone made it to the event venue, LBS National Academy of Administration Mussoorie by late night of January 19th.

Innaugral Session :

Ms Vandana Chavan, Member of Parliament and former Mayor of Pune, delivered a highly emotive and thought-provoking Inaugural address on January 19th itself in which she captured the subject of urbanization in the context of mountain cities, the efforts of central government and the way forward.



On the morning of January 20th in the inaugural session Participants were welcomed by Manmohan Singh Mall, Chairman of Mussoorie Municipality. He gave a brief introduction Mussoorie Urban Local body and history of Mussoorie. He underlined the problems of parking, drinking water and sewerage. He also underlined Mussoorie specific problem of forest conservation act which is impeding implementation of housing and necessary

infrastructure projects. He thanked IMI for choosing Mussoorie as venue for this event. He hoped that the conference and future discussion will help in finding solutions for mountain cities.



The Inaugural presentation by Dr Akhilesh Gupta, Advisor, Department of Science & Technology, Climate Change Programme, exposed the participants to the rolling out of the National Mission on Sustaining Himalayan Ecosystem (NM SHE), one of the eight National Missions of the Climate Change architecture. Dr Akhilesh Gupta shared that this Mission has to

involve all eleven mountain States and Sustaining Urban Habitat was one major part of this Mission and he looked forward to engaging with many stakeholders who had assembled in this Workshop. Ms Patricia Mukhim, a renowned environmental activist from Shillong raised many a doubts regarding the way the official roll out of these Mission take place and how far removed are common man even from the jargon that gets deployed in official communications! She urged for use of simple and lay man language and better understanding of mountain habitat related problems and issues.



Mr Kush Varma, DG, National Institute for Administrative Research (NIAR) welcoming the participants shared his own experience and looked forward to mainstreaming the learnings of this National Workshop and its follow-up by the IMI. Inaugural Plenary generated a charged exchange with participants welcoming this initiative and underscoring how the problems and

issues of small and medium mountain cities get ignored both by the state governments and marginalised due to non-implementation of the 24th Amendment to the Constitution, specifically aimed at empowerment of the urban local bodies.



Mr. Nidish Nair from PWC presented a study on comparison and benchmarking of Mountain cities with the objectives to make a comparative assessment of hill cities, to draw the attention of policy makers for a separate SLB for hill cities & to draw the attention of policy makers to major issues in hill cities and to initiate discussion on hill city specific strategies. This study underlined how cities have unique challenges;

hence require different service benchmarks. Cities of Gangtok, Shillong, Nainital, Aizwal, Mussoorie & Shimla were selected under the criteria of Size, significance (capital cities/ economic importance/tourist centers, etc.) and regional balance (North, eastern etc.). The indicators measured were Urban planning mechanisms in

place, Environment friendliness, Disaster Mgmt. preparedness, Quality of basic services, Energy management initiatives, Financial sustainability & e-governance initiatives. The Study concluded that:

- Special service level benchmarks for Hill cities, covering environment, disaster mgmt, land use planning need to be developed
- There are Positives in these cities with respect to sensitivity towards environment, disaster management
- Improvements are needed in Basic Service quality, Service level reforms
- Certain Sectors needing urgent attention – Urban planning, public transport, solid waste management

Case Study - Mussoorie's Alternative Futures



The research, info graphics, mapping and 3 D Model in the Case Study developed by Arch.I. and led by Mr Anne Fenstra generated huge interest among the participants and the post Inaugural plenary session. This study proposed an innovative and alternative future vision for the 33,600 population Hill Town through 3 themes; 'Clean Air', 'Smart Water' and 'Organic City'. The research based methodology used design and graphics as communication tools and arch i team proposed to set up a 'Solution Studio' for the Mountain Cities. It created lively discussions and a very appropriate back-drop for the three planned break-out sessions, on Governance & Finance, City Planning and Architecture and Public Utilities and Services. The break-out sessions allowed participants to exchange views and experiences of various towns, experts, officials, public representatives, town planners and concerned citizens. Arguably, such a cross section of people, drawn from governments, Central Ministries and mountain States, institutions,

utilities and town-planners had taken for the first time, in a small mountain city like Mussoorie. Not only the issues related to the Flagship programme of urban development, namely the Jawaharlal Nehru National Urban Revival Mission (JNNURM) and another National Mission, Sustaining Himalayan Ecosystem, were shared for the first time, in context of small mountain cities, but a realization was driven home that the mountain cities receive the same treatment as do the mountain issues on the national canvas of policies.

Future of Mountain Cities in India

This session was co chaired by Mr. Manmohan Mall, Chairman Mussoorie & Ms. Patricia Mukhim, Editor from Meghalaya. This session saw presentations from MoUD representative, participants from HP, Ladakh, Uttarakhand, Sikkim & representative from European Business & Technology Centre.

Ms. Anjaly Pancholy, Associate Town & Country Planner from MoUD Definition of Mountain Cities in India There is a need for slope criteria besides the altitude criteria. Studies of Mountain Cities in India However no comprehensive literature exist for identifying the problems, issues and planning requirements of mountain cities. Ms. PAcholy also Suggested Planning Norms for Mountain Cities :

- Since it is an ecologically fragile area, only carrying capacity based development should be proposed, with not only planning parameters but also aesthetic and cultural parameters taken into consideration.
- Delineation of area for development should be made considering land suitability analysis including physical factors such as soil, geology, rock types, geomorphology, topography, slope, etc. Remote sensing & GIS technology should be used for generating maps at appropriate scale. Microzonation of delineated area should be carried out before planning for development.
- Proper policy, institutional and legislative framework has to be created for preparation of Comprehensive Development Plan and its implementation keeping in view the natural hazard proneness of the area
- While formulating Comprehensive Development Plan priority should be given for Environmental Management and Disaster Management. The following restrictions and conditions may be proposed for future activities.
- No construction should be ordinarily undertaken in areas having slope above 30% or areas which fall in landslide hazard zones or areas falling on the spring lines and first order streams identified by the State Government on the basis of available scientific data.
- Construction may be permitted in areas with slope between 10% to 30% or spring recharge areas or old landslide zones with such restrictions as the competent authority may evolve.
- Prepare detailed contour plan of the area of 1:5000 or larger showing contours at interval of 0.2 to 0.5 metre;

- Regulations for disaster mitigation -development control, building regulations/bye-laws for natural hazard prone areas should be followed in the proposed development.

Mr. Tikender Pawar, Deputy Chairman of Shimla Municipal Corporation voiced the concerns of the mountain cities in a very appropriate Shakespearean dilemma “To be or not to be”. Mountain Cities have primary survival goal of “To be” at the moment against the odds of nature and policy climate of the nation. He also differentiated between the course and nature of discourse with the habitants of mountain cities and the outside stakeholders. It is important capture the imagination and aspiration of the city stakeholders while visualizing and shaping future of the mountain cities while the outside stakeholders need to have a responsible attitude in terms of sharing the enforced disabilities of mountain cities. He also emphasized the point of not copying other cities as the situations are completely different. He gave example of Pune which has to pay on 2 Rs./KL for bulk water whereas Shimla pays 60 Rs./KL for bulk water. Solutions for drinking water supply have to take care of this basic difference in conditions.

Mr. P S Jangpangi, Director Urban Development, Government of Uttarakhand presented the Uttarakhand urban development scenario. He presented how current programs under various flagship schemes are being implemented in the state. He also pointed out how the schemes in urban development arena eg. National Urban Health Mission or National Urban Livelihood Mission are currently being adapted from Rural Development program. Mr. Jangpangi also made a very relevant point about glaring miss with regards to involvement of Urban Development department in District Plan exercise. He was hopeful that this would soon be corrected.

Mr. Moses from DRDA, Ladkha made a presentation introducing Leh city. He informed the audience that Leh will also be venue of the 4th Sustainable Mountain Development Summit. He touched upon the basic problems of city which are similar to others like drinking water & sanitation. Leh city has developed vision 2025 document which states that “By 2025 Leh will emerge as the country’s best model for hill area development in a challenging environment with its sustainability embedded in the ecological protection, cultural heritage & human development”

Mr. Shakti Singh presented on behalf of Sikkim contingent. It was interesting to note that Sikkim is only state in the country which has increased its forest cover in last year. He informed that Solid waste management is being implemented in community model for door to door collection. He also underlined the issue of problem to get environmental clearance for land fill in the state. Sikkim is trying to innovate around the problem by encouraging zero waste dump approach and ensuring that waste is completely processed or recycled. Mr. Singh also informed that Sikkim doesn’t have any property tax and there is political hindrance for

imposing such taxes which results in loss of a revenue source for local body. The water supply is at flat rate of 60 rs. /month. Sewerage is 60% connected. Lack of parking lots and hence they are going for ropeway etc. This approach also has run into problems due to high cost of DPR preparation at the moment.

Mr. Monish Verma from European Business Technology Centre introduced his organization and its relevance to mountain states. The approach of EBTC is more focused on technology platforms and projects. He drew attention of audience to European conditions which are very similar to mountain states and how we can learn from them. He also informed the audience that EBTC is actively looking for engagement in the area of waste management technology where Swedish technology partners are keen to discuss possibilities.

Thematic Breakout Sessions:

For thematic session a matrix was worked out by knowledge partner PWC to ensure a goal oriented discussion. It was designed to focus on what best practice the group would like to share or implement in the three time frames by various stakeholders. These are also outcomes and recommendation of this summit.

	< 1 Year	1- 3 Years	➤ 3 years
I (Individual)			
Civil Society			
City Authority			
State Government			
Central Government			



City Services Group : This group focused on Solid waste management and waste water management. The other city services could not be taken up for discussion due to paucity of time. This group was facilitated by Mr. Sushil Ramola.

	< 1 Year	2- 3 Years	➤ 3 years
I (Individual)	• Reduce , “Refuse” • Recycle & Segregate at Home • Educate Family & Neighbours		
Civil Society	• Green Protocol • Pressure Group • Awareness in School etc. • Create A Model • IMI Theme Group		
City Authority	• Levy Fines/Reward for violation/following	• Water Harvesting	• Recycle every possible waste

	• Implement SWM Rule 2000 (Modify for Mountains) • Create Data	• Decentralize Waste Management	
State Government	• Levy Tax on non-environmental friendly packaging • Involve Army/Eco Task Force	• One Agency for Water • Goal of water positive state • Ban Non-recyclables (or find solutions) • Drainage System	• Awareness
Central Government	• Make Mountain Specific SWM Guidelines • Mandatory use of Polythene on the roads	• Impose Industry Responsibility	



Planning Group: This group was facilitated by Prof. Mahavir, Head of Department of Environmental Planning, Head of Department Regional Planning, SPA New Delhi & Mr. Tikender Pawar, Deputy Mayor Shimla. The group mainly focused on actions from the state & central government as the planning in the current circumstances is being dealt at these levels of governance.

- State Action :
 - o State commission on Urbanization
 - o Regional Planning Guidelines
 - o Managing the peri-urban areas, transitioning urban habitats
 - o Planning Process Capacity Building
 - o Integrated Planning Process involving elected representatives, civil society & experts etc.
 - o Manage and plan urbanization for creating employment.
- Central Government Action :
 - o URDPFI guidelines revision in terms of Hilly Areas
 - o Legal Framework
 - o Incentives
- Local Body / Civil Society :
 - o Planning to address lifestyle / culture issues
 - o Micro zoning to facilitate out migration
 - o Plan for Micro Solutions
 - o Balance Planning for City residents and tourism

Governance & Finance Group: There was a discussion regarding the best practices involving government functionaries, involvement of community & improvement of finances of urban local bodies. The main recommendations from the group were:



- Best practices by the government departments could be brought into mainstream by providing legal backing
- Best practice of community participation in garbage handling at Govindghat was shared.
- Cities could create their own finances instead of depending on state or central government finances. A suggestion was made in terms of issue of municipal bonds by the ULBs
- A system of accountability & transparency needs to be brought in to ensure that taxes and charges levied for specific purpose are spent on that purpose by the collecting authority.
- Land based revenue system for the urban local body also could be developed, similar to land revenue system in rural settings. This could be another revenue source for local body

The valedictory plenary, guided by Ms Bharti Ramola and Sushil Ramola, in which the insights gained in the three break-out sessions were discussed after presentations, showed that the participants had been exposed in a fair measure to the main issues and agendas that require to be attended to, on a high priority, at various levels in multiple forums, from grass -roots right into the national policies levels.

A few suggestions came from the participants, which are worth sharing :

- All IMI events to be plastic free events in future. Ms. Jodie Underhill volunteered to collect all the plastic waste from the summit.
- Documentation of best practices was requested by all the participants
- 'Solution Studio' for the Mountain Cities so research/mapping/3 D modeling for future events and cities will be available. IMI would thus become the 'Solution Generator Platform'
- Summary report to be shared with central & state governments

Heavy snowing, near intractable transportation, over-stretched carrying capacity of a small Hill Station like Mussoorie, damaged and disrupted public utility like electricity and water and a near absence of any planning or future plan provided a made-to-order backdrop for this inaugural workshop on a highly neglected public policy, urban development in mountain regions, as distinct from the burgeoning cities in the plains region –the latter, a high priority both for the mountain states and the Urban Development Ministry. Participants and the local organizers, among others, especially thanked the Convenor Mr PD Rai, the Academy and the Doon University Volunteers, who braved all possible odds offered by the Nature.



Recommendations

This study and discourse on mountain cities through IMI has brought the issue of urbanization in mountain states into focus. The conference in Mussoorie made a breakthrough with the new beginning in perspective planning with the help of 3-D modeling as well. Based on the inputs from the conference and material referred to in this study, here is the brief of recommendations for various categories of issues:

Planning: This is key area has been addressed only by a few states so far. Most of the small and developing towns in our country today have no master plans. The JNURM program brought in the city development plan documents which had galvanized the process across the country for a rudimentary but welcome framework for planning. The latest draft URDPFI guidelines 2014 also as yet do not recognize the specificity of mountain regions. The need for recognizing this is very important as the entire policy paradigm is dependent on it. For example currently Uttarakhand follows the same UP acts on urban planning and still has same by-laws for entire state whereas the geography of the state has slopes of varying degrees which can't be dealt with same specifications. For example the road planning in the master plans in mountain cities needs to taken into issues of land availability, the setbacks of buildings then need to be revised, alternate public transport options need to be factored in. It is important that following actions be taken at various levels :

Centre :

- Immediate recognition for the need of specific requirement of mountain states and supporting development/modification of national guidelines accordingly.
- Supporting States in the various levels of planning as the mountain states and cities lack resources to undertake this major overhaul.

State :

- States like Uttarakhand should immediately redraw the policy landscape by revisiting the UP acts and revising/replacing them refreshed acts/policies.
- Develop state perspective plans and regional plans
- Provide resources to subsidiaries & ULBs for decentralized Planning.
- Ensure that planning process looks at carrying capacity & disaster management as the fundamental components. Carrying capacity tool should be used not stymie the development but also assist in

development process by finding sustainable solutions to increase carrying capacity.

- As the land availability is limited in urban growth centres and these are interspersed with nature, it would be better to look at cluster approach for developing the local level plans. This would lead to a more sustainable approach for sharing resources and increasing carrying capacity for the cluster while individually these urban centres would saturate at lower levels. This brings the urban transport as a tool for connecting the nodes of the cluster as the centerpiece of the strategy and improve its viability as well.
- Better utilization of Land for public/semi public purposes needs to be given priority in planning and implementation so as to ensure that land scarcity doesn't lead to exclusion of poor from the process.
- Every city in mountains has inherent potential for tourism and it should be made part of urban planning process

Local :

- Local Bodies and PRI entities need to find their collective voice for developing the clusters as mentioned above.
- Improving the resources of these entities is in their hands and through participatory approach it can be achieved as well.

City Services:

- The specific Service level benchmarks should be developed for mountain cities for all city services.
- The roll out of many city services would have to be planned as hub and spoke models in a cluster to make the best use of shared resources and provide better scale to private/public implementation of these projects.
- Public Transport, Roads, Parking, Water, Sewage & Waste Water, Solid Waste Management need to be made part of essential services for all urban centers.
- Public transport planning should look at a mix of mobility solutions which would connect with road and off road networks in the city. There have been encouraging examples in many cities like Medellin, Hongkong etc. for these interconnected mixed models.
- Waste & Waste water management are key areas for these cities where both of these problems could be turned into solutions. The Mussoorie model prepared by ArchI needs to be explored further to develop more integrated projects.

- City Services planning should also take into account the major economic driver of tourism. Every city in mountains has inherent potential for tourism and it should be made part of urban planning process

Governance & Finance:

- Decentralization and implementation of 74th amendment has been recommended so often that now it is becoming a cliché in its own right. Even if the process is slow but an institutional approach to this goal is important.
- The development of certain institutions to support the local bodies under the reformed regime is very important. The city services related agencies could be developed on regional or cluster basis and linked to local bodies in functional/service delivery structure.
- Development of PPP mechanism to support the capacity gap for these institutions is needed urgently
- Developing new central schemes or converging national missions for mountain areas with the urban planning regime is also important to bring new funding sources. The latest tools like Green Bonus also should be used partly to fund the urban areas so as to make the initial high costs of sustainable development technologies affordable.

Private Sector Engagement:

- Hitherto private sector has not developed in the area of city services or other urban development activities in the mountain cities. It is not possible to implement programs/ projects without some degree of private sector involvement in the implementation process.
- As suggested above the planning process should enable the mountain cities to collectively create economies of scale to make private sector participation viable and sustainable in these activities.
- Better urban planning & implementation regime would also create enabling environment for private sector investments in the other areas of economy of these mountain cities and thereby improving financial resources for the cities.

Appendix 1

Background Note of Mountain Cities 2014

National Workshop on Mountain Cities 2014

Mussoorie – 19th & 20th January 2014

Background Note

Urbanization in Mountain States has historically developed as Hill Stations or pilgrimage locations. Most of these hill stations have a legacy of colonial planning and still are dependent on infrastructure created during those days. Second wave of urban growth was driven by migration of villagers to nearby towns in search of education and employment which led to growth of few towns as education centres as well. Majority of the mountain states in Indian were carved out of the bigger states as the development of these areas was a subject of neglect under the bigger entities. Formation of new states also led to growth of urbanization in the capital cities & district head quarters of these states.

Despite the growth in urbanization, there are only 20 one lakh plus population cities in these states and most of which are in the plains/terai part of the states. By classification of urbanization most of these urban settlements would qualify as towns only.

As this urbanization has been a result of growth of small towns which have grown into nearby rural habitations, it has been plagued by :

- Lack of Master Planning
- Unplanned development of housing
- No plan for Urban Transport
- No plans for basic necessities like drinking water, sewerage, drainage & solid waste management
- Population growth out pacing development of physical infrastructure
- Disaster prone development near hazardous areas
- Lack of resources and capacity in urban local bodies & delays due to centralized planning/implementation

As we, the citizens of these mountain states face the consequences of these problems and compare ourselves with the developments in neighbouring metropolitan cities or mountain cities around the world; it is natural to have aspirations for better liveable mountain cities/towns. It is imperative for the governments of these cities and states also to improve state of urban amenities in order to ensure a better experience for the tourists who provide one of the biggest sources of income to these states. These urban agglomerations are also important link in the value chain of inclusive development and

act as growth drivers for surrounding rural economies. In the context of mountain development rural and urban need to be treated as complementary to each other for either to be effective. History has also taught us that these urban habitats have always been prone to natural calamities and in the absence of long term planning for such events there have been historic disasters.

The national urban planning landscape also is dominated by the topography of plains which has led to super imposing ill fitted solutions on these cities. When these small states seek solutions on their own, the market has never perceived them as sizeable opportunity to design unique and economical solutions. There are pockets of improvements but impact of these is either limited to a small area or soon outstripped by the demand due to lack future proofing at the planning stage.

Indian Mountain Initiative (IMI), which began with the first Sustainable Mountain Development Summit (SMDS-1) in Nainital in 2011, has been trying to change the paradigm of planning & development for mountain states both at the national and state level. In 2012 Gangtok SMDS-2 the issues regarding Urban Scenario in Mountain States were discussed. The keynote speaker Dr. K.C. Sivaramakrishnan, Chairman Centre for Policy Research underlined issues that are unique to mountain cities, a by-product of such features as topography, slope, altitude, restricted space, etc. There is little recognition of the unique challenges faced by mountain cities in the policymaking circles. This is best reflected in City Development Plans and how similar they are irrespective of the urban location/site in question. The guidelines of the Ministry of Urban Development as listed in Jawaharlal Nehru National Urban Renewable Mission which have been framed with cities in the plains in mind, do not distinguish between mountain cities and cities in the plains. In other words, there are no guidelines or standards for planning and development of mountain cities. Paucity of space and opportunities has resulted in pockets of urban concentration in mountain regions. In the case of Sikkim, population, investment, and traffic, to name a few variables, are concentrated in Gangtok and the East District. Such imbalance could be corrected through better definition of road hierarchy, by focusing on transport issues, forming region-based tourism circuits, by curtailing rural-urban and urban-urban migration, and through egalitarian distribution of resources. The focus of urban intervention should also be on such soft aspects as urban governance and capacity building. In the area of urban governance there is a need for revising bye laws, developing e-governance, creating municipal act to form a 3-tier urban mechanism, and developing public-private partnership mechanisms. Approaches such as city branding also allows for a strategic vision to be implemented. As funding is seen as a fundamental bottleneck there is a need to find multiple sources of funding based on

assets, central resources, subsidies, etc., especially to sustain the development of smaller urban centres.

IMI is taking this discourse further with the Mountain Cities-2014 in Mussoorie. **Centre for Public Policy, Doon University** is the anchor institution to host this IMI. This event aims to bring out specific suggestions to influence the National and State Urban Development Programs for a visible change in the provision of Urban Amenities in the mountain states with an objective to create discourse on Sustainable Habitats in the mountain states. IMI is also working to bring all the stakeholders and various agencies to converge on this agenda through this event. Planned structure and agenda of Mountain Cities-2014 is as below :

Structure :

In this one day event participants shall work towards outlining integrated models for mountain cities with a focus on following major components of urban development planning framework:

- Planning :
 - City Master Plans
 - City Aesthetics, Public Space Planning & Management
 - Building Bye-laws with mountain specificities & disaster management focus
- Water & Sanitation Issues
 - Drinking Water
 - Drainage, Sewerage & Waste Water management
 - Solid Waste Management
- Urban Transport
- Financing of these physical & social infrastructure projects

Participants are being invited from:

- Urban Development directorates of Mountain States
- Select group of Mayors/Chairmen, Municipal Commissioners
 - Representing State Capital Cities
- Core IMI participants
- Representative of MoUD Government of India
- Representatives of multilateral organizations:
 - World Bank
 - ADB
 - UN Habitat

- o GIZ
- o ICIMOD
- o GIZ
- o SDC
- Subject Experts :
 - o Water & Sanitation Expert
 - o Urban Transport Expert
 - o Sustainable Architecture Expert
 - o Disaster Management Expert
 - o City Master Plan & Building Bye-Laws Plan

Location : Mussoorie – LBSNAA

Dates : 19th & 20th Jan, 2014.

Format and length : A walk through the city, a discussion on Mussoorie will be followed by Dinner on Sunday, Jan 19, followed by the workshop on January 20.

ArchI, Delhi shall present sustainable mountain city models with Mussoorie as subject city which will entail :

- Conducting a research and analysis of the most significant issues for the city of Mussoorie. Analyzing the city, looking into current issues/ problem faced by the city.
- Preparing the research in New Delhi, Mussoorie, Dehradun.
- Preparing illustrations, text, filtering research/data collection. Giving holistic view to the city.
- Developing future scenario for Mussoorie, giving insight into the future of the city.

Note on prime movers & supporters of the agenda

The Indian Mountain Initiative

Indian Mountain Initiative (IMI) is a collective initiative for recognizing the value of mountain regions and enabling people to realize the potential by integrating knowledge and experiences of multiple stakeholders. It started with the first Sustainable Mountain Development Summit (SMDS-1) in Nainital by Central Himalayan Environment Association (CHEA) wherein civil society, private sector, scientist, administrators & political representatives gathered to ponder over the development issues of mountain states and also to create a collective voice of its people. This initiative has caught the imagination of the people of the mountain states which has resulted in continued momentum leading into next summits in Sikkim (SMDS-2 Gangtok, 2012) & Nagaland (SMDS-3 Kohima, 2013). Next summit has already been planned in Jammu & Kashmir in 2014. IMI has helped also co creation of a legislator's forum & youth forum of mountain states. At the national planning stage IMI has been instrumental in creation of Mountain Division of Ministry of Environment & Forest. IMI inputs have also been key to two of the most important working groups created for 12th Plan of Planning Commission on mountain issues. IMI has acted as a movement so far and has worked without a permanent secretariat. In SMDS-3 it has been resolved that an institutional setup would also be put in place to conduct year around activities on Mountain Development issues. CHEA, ECOSS Sikkim & SDFN Nagaland are founding members of IMI.

Indian Mountain States areas cover 11 states and 1 hill district of West Bengal at the moment. These states cover 18.15% of india's land mass and population is 6.35% of national total. The urban- rural distribution is at 21% -79% for these states whereas national distribution is as 31%-69%. These sates have had only 5% share of the national GDP in FY2012.

State	Population	Growt h Rate	Area Sq.km	Densi ty	Sex Rati o	Literac y	Urban	Rural
India	1,210,193,422	17.64	3287240	382	940	74.04	377,105,760	833,087,662
Assam	31205576	17.07	78438	398	958	72.19	4398542	26807034
Jammu and Kashmir	12541302	23.64	222236	56	889	67.16	3433242	9108060
Uttarakhan d	10086292	18.81	53483	189	963	78.82	3049338	7036954

Himachal Pradesh	6864602	12.94	55673	123	972	82.8	688552	6176050
Tripura	3673917	14.84	10486	350	960	87.22	961453	2712464
Meghalaya	2966889	27.95	22429	132	989	74.43	595450	2371439
Manipur	2570390	12.05	22327	115	992	79.21	834154	1736236
Nagaland	1978502	-0.58	16579	119	931	79.55	570966	1407536
Arunachal Pradesh	1383727	26.03	83743	17	938	65.38	317369	1066358
Mizoram	1097206	23.48	21081	52	976	91.33	571771	525435
Sikkim	610577	12.89	7096	86	890	81.42	153578	456999
Hill District of West Bengal	1846823	14.77	3149	586	970	79.56	727963	1118860
Total	76825803		596720				16302378	60523425

Centre for Public Policy, Doon University:

Centre for Public Policy is an autonomous Centre anchored in School of Social Sciences (SoSS) of Doon University. The Centre has been setup to promote and nurture researches and serious efforts in the domain of public policy, with special reference to the mountain States like Uttarakhand. In the context of climate change and associated vulnerability especially to the mountain ecosystems necessitates the formation of an institute that can act as facilitator for policy formulations and evaluations for the state. With this view in focus it wishes to establish an on-going dialogue with all on-going researches and research projects which may be in progress in Uttarakhand. It is headed by NTPC chair Professor Dr. R S Tolia, former Chief Information Commissioner & Chief Secretary of Uttarakhand. Dr. Tolia was the first convenor and prime mover of the Indian Mountain Initiative.

National Centre for Urban Management (NCUM), NIAR Mussoorie

The National Centre for Urban Management (NCUM) has been established at Lal Bahadur Shastri National Academy of Administration, Mussoorie under the aegis of Ministry of Urban Development, Government of India. NCUM's mandate is to prepare urban managers in government, enhance local self-governments as vibrant institutions, promote inclusive, transparent and good urban governance, and provide capacity and capability enhancement to stakeholders involved in urban development, management and quality improvement in teaching, training, and research in urban sector to make cities more liveable. It now functions under NIAR which is an autonomous research institute under LBSNAA, Mussoorie. NCUM is to act as a catalyst institution to promote professionalism in urban management and development administration; to share knowledge, information and experience in decentralization, good urban governance practices, municipal management and act

as knowledge hub; to provide opportunities to career civil servants to develop and upgrade their knowledge and experience; to organize Training of Trainers (ToT) and specialized training courses; to undertake and/or commission studies in urban development systems research in urban management and development issues like housing and environment etc.; to undertake impact assessment of training and to network amongst training institutions within and outside the country.

Supporters of Mountain Cities 2014

- **DEPARTMENT OF SCIENCE & TECHNOLOGY (CLIMATE CHANGE PROGRAMME DIVISION)**
- **ICIMOD , Kathmandu, Nepal**
- **GIZ RED Uttarakhand & GIZ CCA-NER**
- **ECOSS Sikkim (Founding Member, Indian Mountain Initiative)**
- **CHEA Uttarakhand (Founding Member, Indian Mountain Initiative)**
- **SDFN Nagaland (Founding Member, Indian Mountain Initiative)**

Issues :

Water & Sanitation:

Despite being called water towers of India, none of the mountain state cities meet the modern service level benchmarks for the delivery of water services to citizens, neither for quality nor for quantity. Water supplies that were sufficient till a few decades back have now been outstripped by demand and old infrastructure has makes the entire process cost inefficient. While water has been a subject of exploitation for energy but has not been managed as source for drinking water at the same time. Majority of ridge towns face shortage of supply and at the same time even river side urban settlements have not reached 24x7 water supply benchmarks.

Waste Water treatment and reuse is another neglected subject especially in the case of ridge towns which spend considerable resources on pump lifting water. There is a need for integrated water supply which includes waste water management as well.

Fast growing cities and new consumption patterns have led to growing mounds of solid waste right at the edges of these cities/towns. Managing this growing problem is complicated by :

- Small size of waste collection in the individual cities fails to attract private sector partners.
- Lack of suitable and available land for procession and disposal of waste
- Lack of coordination among urban local bodies to develop cluster based solid waste processing and disposal for smaller towns
- Lack of private sector players in waste to energy solutions and also lack of waste to energy technologies appropriate for environmentally fragile mountain cities.

Sustainable Architecture, City Master Plan & Building Bye-Laws Plan

Master planning concept have lagged behind the development of mountain cities which have rapidly added the out growth and rural habitats into their fold. This lack of planning has resulted in many ills like, lack of road connectivity to residential areas, lack of public spaces, choking of natural drainage and water sources. The speed of development has also led to growth of concrete jungles in these cities and also extinction of traditional and sustainable architecture of these areas.

Disaster Management

Many of the mountain cities have had close encounter with natural disasters and have been rebuilt a few times over already. Recent earthquakes in Sikkim and Flood disaster have been timely reminders for the mountain states to focus on disaster management for both rural and urban context. Building codes and city master plans need to

incorporate and enforce the disaster management related changes. New technologies also need to be explored for all

Urban Transport

Urban transport is yet to develop into a citizen service for the mountain cities. Walking is seen as most natural process of commute in these cities apart from privately owned transports. Lack of roads and also the limitations of road width hamper implementation of bus based solution. Lack of appropriate bus/minibus design for these conditions has also been glaring miss under the JNNURM and National Urban Transport Policy. There is an urgent need to initiate discussions on technologies for multi modal urban transport solutions for the mountain cities.

Energy

How do we use energy and can we plan for more renewables right from here?

Appendix 2

Program Schedule

Program : 19/1/2014

On Arrival - 4PM	Check-in, Registration & Tea At Silverwood Executive Guest House adjoining LBS main entry Gate of LBSNAA
4-5.15 pm	Mussoorie Walk Through Introduction to the Walk by Prof. Anne Feenstra Walk through Mussoorie led by Anne's Team. • SWM Group Led by Mr. Vipin Kumar - o Gandhi Chowk to SWM Dumping Zone - o Pick up and drop to Town Hall - o By vehicle from Town Hall to LBSNAA • Other Group Led by Anmol Jain - o Gandhi Chowk – Town Hall walk - o By vehicle from Town Hall to LBSNAA Groups arrive at Town Hall via Separate Routes.
4.30-5.00 pm	Media Interaction at Town Hall
5.15-6.30 pm	Welcome of Participants by Shri Manmohan Mall Discussion on Future Scenarios for Mussoorie by Anne & Archi
6.30 pm	Return by Vehicles to Silverwood
7:30 pm	Dinner at LBS Academy

Program : 20/1/2014

8 - 9AM	Breakfast & Registration At Gyanshila, LBSNAA
9-10.30 AM	Introductory Plenary At Gyanshila Auditorium, LBSNAA Chair : Mr. Kush Verma, DG NIAR Welcome Address : Dr. R S Tolia Speakers : • Ms. Vandana Chavan, MP • Dr. Akhilesh Gupta & Dr. Nisha Mehendirataa, DST • Mountain Cities - A Benchmark Study: Mr. Nidish Nair, PwC

10.30-11.15 pm	Case Study – Mussoorie’s Alternative Futures By Mr. Anne Feenstra & ArchI Team
11.15 - 12.00 pm	Mussoorie's Model Discussion followed by Tea Break By Mr. Anne Feenstra & ArchI Team At Gyanshila Lounge
12 - 1.30 pm	Future of Mountain Cities in India Co- Chair :Mr. Manmohan Mall, Mussoorie Co-Chair :Ms. Patricia Mukhim, Meghalaya * MoUD, GoI : Anjaly Pancholy * Presentation from HP, J&K, Sikkim, Uttarakhand & Meghalaya * Learning from Other Countries: Europe Mr. Monish Verma, EBTC
1.30 - 2.15 pm	Lunch
2.15 - 3.30 pm	Thematic Discussion: The Future of Mountain Cities Governance & Finance At Gyanshila Auditorium, LBSNAA Co Chair : Mr. Sushil Ramola Co Chair : Mr. Umakant Pawar Planning At Seminar Room III, Gyanshila LBSNAA Co Chair : Dr. Mahaveer, Head of Department,SPA Co Chair : Mr. Tikender Pawar, Deputy Mayor Shimla City Services At Seminar Room IV, Gyanshila LBSNAA Co Chair : Ms. Bharti Gupta Ramola, PWC Co Chair : Ms. Higio Aruni, Chief Councillor Itanagar Short Presentations: • SWM (Mussoorie): Mr. Vipin Kumar • SWM (Dharmshala): Ms. Jodie Underhill, Waste Warriors • Waste Water : Mr. Sanjay Agrawal, Clover Organics

3.30 - 4.00 pm	Break for Tea
4.00 - 5.00 pm	Report Back to the Plenary At Gyanshila Auditorium, LBSNAA Co Chairs : Governance & Finance Co Chairs : Planning Co Chairs : City Services
5.00 - 5.30 pm	Action Agenda for Mountain Cities for going forward Summary & Closing Mr. Sushil Ramola & Ms. Bharti Gupta Ramola At Gyanshila Auditorium, LBSNAA Vote of Thanks Mr. Sushil Ramola

Appendix 3

Speech of Ms. Vandana Chavan



Speech of Ms. Vandana Chavan

The world is undergoing urbanisation at an extremely fast pace.

It was in 2007 (July 11), for the first time in the history of the world that more than half of the world's population (ie. 3.3 billion) out of the 6.6 billion total population, according to the UN report, started staying in urban areas, the majority of them in developing countries.

This number would double to 6.4 billion by 2050 when some 9.2 billion people are expected to inhabit the earth, the report said.

Today there are 1,80,000 more people living in urban areas than there were yesterday. There will be another 1,80,000 there when you wake up tomorrow and another 1,80,000 the day after that. This urban dynamo will continue for decades.

Globally therefore urbanisation is one of the greatest challenges facing humanity in the 21st century thus, bringing 'Urban Issues' centre stage and tagging it as an extremely important issue for the governments and all concerned to address.

URBANISATION IN INDIA

Though the urbanisation in India (which is 31.16%) is much lesser compared to many other countries (China 45%, Indonesia 44%, Mexico 78%, Brazil 87%) – but is certainly poised to grow. Natural growth of cities, the 'rural flight' exhibit skewed patterns of urbanisation in Indian cities.

Some telling statistics of India's urbanisation pattern

- India's urban population will increase from 377 million in 2011 to 600 million by the year 2031.
- According to the 2011 Census 53 'million +' cities accounted for 43% of India's urban population
- According to the 2011 Census no of towns in India increased from 5161 in 2001 to 7935 in 2011

Some interesting figures would show that the National Capital Territory of Delhi is the most urbanised at 93%, followed by Union Territory of Chandigarh 89.8%, and Pondicherry at 66.6%. Amongst the States it is Tamil Nadu at 43.9%, Maharashtra 42.4% and Gujrat 37.4%; in absolute numbers however it is Maharashtra which leads with 41 million people living in the urban areas, followed by UP with 35 million and Tamil Nadu with 27 million. It is interesting to observe that some of the Hilly States are among the least urbanised – Himachal Pradesh at 9.8%, (Bihar 10.5%), Assam 12.7%, (Orissa 14.9%)

Urbanisation had been considered as a problem in India till recently and the governments at all levels tried to discourage migration. But in recent years the perception has changed.

With cities contributing more than 65 per cent of the GDP in the recent years, the government has begun to look at the urban areas as engines of growth. It has been acknowledged by the High Powered Expert Committee, headed by Dr. Isher Judge Ahluwalia, that 'India's economic growth momentum cannot be sustained if urbanisation is not actively facilitated'

Since growth is inevitable, governments need to develop timely policies that turn potential crisis into opportunities.

CHALLENGES FACED DUE TO URBANISATION

The Twelfth Five Year Plan Report identified the challenges that cities face due to rapid urbanisation

- Shortage of urban housing – 18.78 million
- Insufficient water – the 2011 census revealed that only 70.6% urban population is covered by individual water connection (that too for a duration of only 1 to 6 hours) which is far below the figures in other countries – China 91%, S. Africa 86%, Brazil 80%.
- Quality of water
- Sanitation issues – specially the issue of Open defecation – According to a World Bank report ‘Over 600 million people in India or 53 per cent of Indian households defecate in the open, absence of toilet or latrine leading to health issues and malnutrition.
The 2011 census reveals that 13 % of the urban population defecate in the open; Out of the total number of toilets - 37% toilets are connected to open drains and 18% not connected at all.
- Illegal settlements - Increase in the number of poor in the cities (migrated for sustenance/outcome of natural disaster). 34.4% between 1993-2004
- Traffic and Transportation in every big city is a problem – in a study on Urban Transport by the Ministry of Urban Development, in 2010, based on 87 cities, it is estimated that in about 20 years’ time, if no concrete steps are taken, speed of major corridors in many cities would fall from 26-17km/hr to 8-6 km/hr.
- The Air Quality has deteriorated sharply – the per capita emission levels in India’s 7 largest cities have been estimated to be atleast 3 times than the WHO standards.
- Besides this there are problems like untreated sewage being dumped into rivers thus polluting the water bodies, problem of solid waste management, environmental and health issues and the list can go unendingly.

MOUNTAIN STATES – CHALLENGES

The problems and challenges for the mountain cities, however, are more serious and diverse and have to be looked in a completely different perspective.

Though size-wise and population-wise the Mountain Cities may be smaller than many others, the peculiar locations at which they are seated, attract special attention, and therefore the development parameters for the ‘plain areas’ will not be suitable here.

The Himalayan Mountains and the North Eastern Regions in a way regulate a major part of the country’s economy as they are the sources of our life supporting rivers.

Considering the fragile nature of the ecology, the difficulty in implementing conventional development initiatives, the vulnerability and the effects of Climate Change – there is a need to reshape national development and other policies and frameworks to recognise and address the particular needs of mountain populations.

- During my little research on the Mountain Cities, it was heartening to see that special attention has been provided to the region and a concerted approach for the region has been consistently taken through the Five Year Plans for the Hill Area Development Program and the Western Ghats Development Program.

It is obvious that it is not enough otherwise we would not be here to deliberate on this important topic.

The Fifth Five Year Plan provided for a *Special Central Assistance* to the designated hill area in order to supplement the efforts of the State Governments to concerted supplement the efforts of the State governments in the development of these ecological fragile areas.

The Sixth Five Year Plan though the emphasis shifted to ecodevelopment, the general tenor of HADP remained substantially the same as that of normal State Plan following the same sectoral approach.

The Seventh Five Year Plan laid particular emphasis on the development of ecology and environment, namely *eco-restoration, eco-preservation and eco-development*. The aim was to evolve plans and programmes which would *stimulate socio-economic growth, development of infrastructure and promotion of ecology* of the areas covered by HADP.

During the Eighth Plan, the approach was substantially the same as that in the Seventh Plan with special focus on *involvement of the people and meeting their basic needs* through improved management of their land and water resources. The measures outlined towards this end include

- (i) an *energy policy* which would reduce pressure on forests and provide alternate sources of energy,
- (ii) *afforestation* of denuded forest land with species which can provide both fuel and fodder,
- (iii) provision of *adequate and safe drinking water* by development of gravitational sources of water,
- (iv) emphasis on *improvement of health facilities* including infrastructural facilities in primary health institutions,
- (v) development of *skilled manpower*,
- (vi) evolving a proper *land use pattern* keeping the socio-economic and ecological parameters in view,
- (vii) development of *horticulture and plantation crops*,
- (viii) improvement of *livestock*,
- (ix) development of *industries such as electronics* which do not pollute the atmosphere and lead to high value addition,
- (x) development of *network of transport and communication facilities* with emphasis on feeder paths and roads;
- (xi) evolution of *appropriate technology and scientific inputs* which would suit local conditions and harness local resources.

In the Ninth Plan, the main objectives of the Programme were *ecopreservation and eco-restoration*.

All development schemes were to be planned within this framework with emphasis on *preservation of bio-diversity and rejuvenation of the hill ecology*. Traditional

practices were to be dovetailed with appropriate technology to serve the needs of the people of these areas.

The Tenth Plan, the multi-sectoral approach continued but with increasing emphasis on *watershed development* and ecological restoration/preservation for the hill areas of Assam and West Bengal.

- I was happy to read that a 'Task Group on Problems of Hilly Habitations' has been constituted for areas covered by the Hill Areas Development Programme (HADP) to study the objectives with which HADP and WGDP were initiated and examine to which extent those objectives have been fulfilled, further to also modify the objectives in the light of current circumstances.

I learn that this Task Group is to examine planning and implementation mechanism and suggest framework for participatory planning as envisaged in the V. Ramachandran Committee Report of the 'Expert Group on Grassroots Level Planning', Study the structure of the local governing bodies in planning, decision making and execution of works, further study the mechanisms of convergence/synergy of policies, programs and funds, viability of flagship programs for the region and recommend revision of guidelines to secure full and better coverage and finally to recommend outlays.

- I also came across a Report "Climate Change and India: a 4x4 Assessment - (A Sectoral and Regional Analysis for 2030s)" published by the Ministry of Environment and forests, which provides an assessment of impact of Climate Change in 2030s on 4 key sectors viz. Agriculture, Water, Natural Ecosystems and Bio-diversity and Health for 4 Climate Sensitive Regions viz. the Himalayan Region, the North Eastern Region, the Western Ghats and the Coastal Area.

In order to have a tangible effect of these studies, programmes and outlays, in achieving the major objective of ecological balance of hill areas, there is a need to integrate all the programmes and schemes both horizontally and vertically and fill in the missing gaps.

CLIMATE CHANGE

We have to recognise that, no country in the world is as vulnerable to Climate Change, on so many dimensions, as we in India.

- A coastline of 7000 km is susceptible to sea level rise,
- Rivers emanating from the Himalayan Glaciers are the life support to billions for their life and livelihood,
- almost 70 million hectares of forests are exposed to Climate change on multiple fronts (also to the mining as they are reservoirs of valuable minerals).

While 'strategizing' development for the Mountain region therefore, it is vital, that the science based study should be put as the key filter.

It is an extremely challenging and daunting task!

It would be in the fitness of things that this forum deliberates to pen down such pointers in the deliberations that follow in the day - to my mind to spell out a few

- there is need to do a Mapping of Mountain Regions – identify disaster prone and eco sensitive areas, biological and socio-economic livelihood zones and habitable zones
- need to prepare Climate Change Action Plans-whereby sustainable development, adaptation and disaster management issues are addressed
- there is a need to Strengthen Processes of Planning and Management, at State and Local level

POVERTY AND VULNERABILITY

We are aware of the fact that climate change, environmental and socio- economic factors have greatest impact on the marginalised and poor, as they have the least adaptive capacity. One of the most important factors which will have to be addressed while strategizing development of Mountain Cities is therefore, Poverty and Vulnerability

Cities are considered engines of economic growth – in the mountain cities however, considering the special geographical constraints and considerations, I strongly feel that an approach of ‘integrated planning’ needs to be adopted to include rural area in the vicinity as a part and parcel of the mountain cities - as the economies of both are and need to be, strongly supported by each other.

Mountain communities have a high degree of resilience and a rich tradition of practices to avert risks.

Increasing uncertainties,
inadequate and insecure access to resources, technology and finance,
a rapidly degrading natural resources, and
poor integration into value chains and markets

however, severely compromise their capacities to effectively deal with change and take advantage of emerging opportunities to pull themselves to improve their economic conditions.

Addressing poverty is an integral part of sustainable development, and therefore it should be the foremost task of all concerned, to reduce vulnerability and increase socio economic resilience.

I feel these are another set of issues that need to be deliberated by this forum. To my mind, we need to find and suggest, sustainable livelihood options, to be able to enhance the economic conditions and in turn strengthen the resilience of the Mountain people:

On a general note, we need to support or help them, to harness the rich natural and socio-cultural diversity, to be able to reap full benefit of their unique environment

- Promote eco-tourism
- Support in promoting niche products and services
- Explore sustainable livelihood options for men and women
- Build strong rural –urban linkages to benefit all, agriculture products, handicrafts
- Innovate income generation strategies
- Finding non-polluting businesses for the new generation –
animation industry for the IT savvy,
handicrafts for those with deft fingers
wellness industry for the health conscious
- City branding

Tourism is a key sector for economic development in this region. With the growing number of tourist arrivals, negative environmental impacts have already been observed, especially in terms of waste (biodegradable and non-biodegradable) that is polluting the sacred environment.

Haphazard and uncontrolled tourism development is damaging the ecosystems, and eroding cultural and spiritual values. This would cause irreversible damage to local livelihoods in the long-term.

Efforts need to be taken up to promote “Responsible Tourism”. Not only Tour operators should be cast with a duty but Mountain Cities should aim to become ‘temples for teachings on Cleanliness, Hygiene and Good Citizenship’.

A special effort by a massive campaign and sometimes strict penal actions would probably help to achieve desired results to keep the Mountain areas pristine and serene.

Agriculture is one of the main occupations of the people in the Mountain area.

Recognising that EXOTIC FRUITS AND VEGETABLES ARE AN ATTRACTION AT HILL STATIONS, efforts need to be taken to further develop the same:

It is encouraging to learn that Local innovation and experiments to cultivate new crops, growing several crops at the same time, and improved methods are making farmers better equipped to face a future with an uncertain climate.

To encourage and build capacities of such farmers we need to take steps to :

- organise Community to Community knowledge or experience exchange
- push the Government to take lead to initiate an interface between community and agricultural experts, to solve problems and guide the farmer community
- Also an interface with Policy makers to understand what kind of critical support community requires from the Government at the National, State and Local level.

On all these counts, whether Climate Change, Livelihood issues or vulnerability and adaptations issues - it is very important to bridge the Information and Knowledge Gap.

It is extremely important that, in the light of the regions vulnerability, the Policy-makers, necessarily take ‘informed decisions’ – by which I mean they are fully aware of the fragility of the area and its environmental and socio-economic consequences.

CHALLENGES FACED BY THE LOCAL GOVERNMENTS

No doubt it is important that the Central and State governments look into the issues of the region and also provide special attention, policies and outlays for the development of the Mountain region, which is an important, ecological sensitive zone, for the country as a whole – it is equally important to address civic issues efficiently and proactively through the local governments.

Uttarakhand disaster showcased clearly how unplanned and haphazard development, resulted in the wash away of buildings, sweeping away thousands of innocent lives.

Local governments have an extremely important role to play in managing the cities and the other smaller settlements. Just as in other cities, what local governments lack today, is the capacity to manage the rampant growth

- 1) Capacity Building – the pace of addressing issues of towns and cities has not been able to cope up with the speed of urbanisation. One sees therefore that at the local government level we are only fire fighting rather than spending time on long term vision plans and their effective implementation and monitoring.

The administration, elected representatives need to get inputs regarding latest studies on urbanisation trends, latest technological solutions for providing basic civic amenities, good practices and successful urban development models in similar situations etc. City to City Partnerships – within hilly region and other big cities

- 2) Planning – India's urbanisation effort is being implemented through haphazard and disjointed projects and activities, with inadequate or no planning for the urban area as a whole.

The Master Plan or the Development Plans pertain mostly to land use and although mandated by legal provisions, do not adequately address the financial or operational strategy for holistic development of the urban area.

- 3) Infrastructure – Water Treatment Plants and distribution, Sewerage Treatment Plants, Roads, Solid Waste Management, Urban Transport all form important components of a city.
- 4) Financing for Urban Local Bodies – apart from special funds from Central and State Governments – tourists – object is always to address paucity of funds – PPP etc

Tourism Tax, Environment Tax

- 5) Good Governance

Local governments are the first interface between people and government

- Improved service delivery – Citizens charter
- Decentralisation
- Better information management and transparency
- People's participation – Citizens Committees/ Area sabha to institutionalise participatory development process
- Improved interaction with – people. NGOs, CBOs
- e-governance
- forging and strengthening regional partnerships for sustainable mountain development.

I am sure the initiative taken by the Indian Mountain Initiative since the past two years to address issues on urbanisation in the Mountain States will bear fruit.

As they say “Great things are done when men and mountains meet.”

Appendix 4

Presentation of Dr. Akhilesh Mishra

National Mission for Sustaining The Himalayan Ecosystem: Objectives, Deliverables and Governance

Akhilesh Gupta & Nisha Mendiratta

**Climate Change Programme,
Department of Science & Technology
Government of India**

Email: akhilesh.g@nic.in, nisha67@nic.in

National Action Plan on Climate Change

Eight National Missions

- **National Solar Mission**
- **National Mission for Enhanced Energy Efficiency**
- **National Mission on Sustainable Habitat**
- **National Water Mission**
- **National Mission for Sustaining the Himalayan Ecosystem**
- **National Mission for a Green India**
- **National Mission for Sustainable Agriculture**
- **National Mission on Strategic Knowledge for Climate Change**

The National Mission for Sustaining the Himalayan Ecosystem (NMSHE)

- **GOAL:** To understand the complex processes affecting the Himalayan Eco- system and **evolve suitable management and policy measures** for sustaining and safeguarding the Himalayan eco-system.

Indian Himalayan States



Administrative Regions

- Jammu & Kashmir
- Himachal Pradesh
- Uttaranchal
- Sikkim
- W.Bengal Hills
- Meghalaya
- Assam Hills
- Tripura
- Mizoram
- Manipur
- Nagaland
- Arunachal Pradesh

08

03

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02

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05

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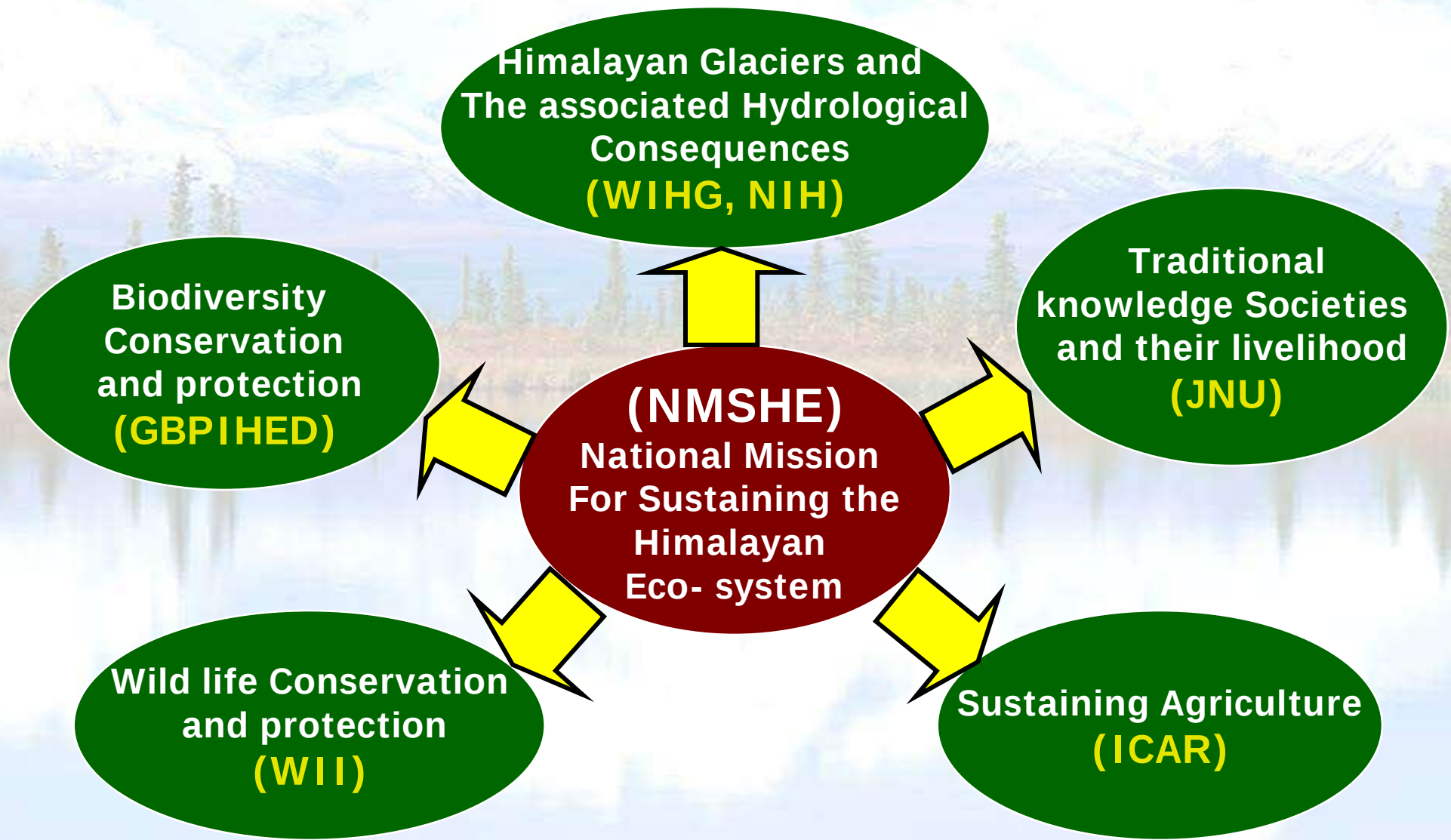
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03

Primary Mission Objectives

- Building Human and Institutional **capacities**
- **Networking** and Strengthening knowledge institutions and to develop a **coherent database** for Himalayan Ecosystem (geological, hydrological, meteorological, biological and socio cultural issues)
- Detecting and Decoupling natural & anthropogenic **causes**
- Prediction of **future trends** on potential **impact of CC**
- Assessment of **socio-economic** and ecological consequences
- Traditional knowledge systems for **Community Participation**
- Developing **regional cooperation**
- Creating **awareness amongst** stakeholders in the region and their participation

Thematic Task Forces and Issues Being Addressed under the Mission



NMSHE Deliverables



Institutional Network Partnerships proposed

- Academic institutions and universities
- Scientific institutions:
Under various ministries
- Technical bodies and agencies: Both State and Central Governments
- Defense and para- military organizations
- Training institutions in mountaineering
- Community based organizations
- Knowledge institutions in the private sector
- Non Governmental Organizations
- Public outreach and awareness organizations
- Governmental and non Governmental Organizations in the Himalayan States

Proposed Actions to Address Mission's Objectives and Goals

- Continuous Monitoring of Ecosystem / **Data Generation**
- Establishment of **State-of-the-Art institution on Himalayan Glaciology** for Research
- Prediction of Socio-Economic and **Climate Change Scenarios** and Vulnerability Assessment
- Identification of desirable **Adaptation and Development Policies** for IHR
- Strengthening of **Regional Cooperation**
- Implementation of **G-SHE guidelines** for priority action

Possible Roles of Stakeholders in NMSHE

- **MOEF** : - G-SHE related coordination and implementation in collaboration with State Governments
 - Policy related actions
- **MOES** : - Observational Network,
 - Forecasting / Warning System for Extreme Weather
 - Climate Projections
- **Himalayan State Governments:**
 - G-SHE related actions
 - Developing CC **Vulnerability & Resilience database**
 - Coordination with State level R&D institutions for undertaking **CC related research**
 - Synergizing NMSHE related actions with **State Action Plan**
 - Creating **awareness** amongst users at the State level

Climate Change: State Level Response

- In August 2009, the Prime Minister urged all the states to develop their State Action Plan on Climate Change consistent with the objectives of the NAPCC
- To set the stage for stimulating action on climate change at the state level
- To effectively ensure that national objectives are aligned with regional development priorities and the local environmental context

Objectives of SAPCCs

Lay out sector-specific and cross-sectoral, time bound priority actions for the state



Outlay consequent budgetary requirements



Outline necessary institutional and policy infrastructure including planning processes

NMSHE linkages with SAPCCs in the Himalayan States

NMSHE	J&K	UK	HP	Skm	Asm	Meg	Man	Nag	Miz	ArP	WB
Secondary Objectives											
Network knowledge institutions in Himalayan Ecosystems	●	●	●	◐	●	●	●	●	NA	NA	●
Develop bio-geo data base for Himalayan Ecosystems	●	●	●	●	●	●	●	●	●	●	●
Detect & decouple natural & anthropogenic induced signals	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐
Assessment of the socio-economic and ecological consequences of global environmental change	●	●	●	◐	●	◐	◐	●	●	●	●

NMSHE linkages with SAPCCs in the Himalayan States

NMSHE	J&K	UK	HP	Skm	Asm	Meg	Man	Nag	Miz	ArP	WB
Secondary Objectives											
Studying of traditional knowledge systems for community participation in adaptation, mitigation and coping mechanisms	●	●	●	●	●	NA	●	●	●	●	●
Evaluation of policy alternatives for regional development plans for key sectors	●	●	●	●	●	◐	●	●	◐	●	◐
Creation of awareness amongst stakeholders	●	●	●	●	●	●	◐	●	●	●	●
Development of regional cooperation with neighbouring countries	●	●	●	NA	NA	●	◐	●	NA	NA	●

NMSHE: Progress So Far

- Mapping of all R&D Institutions in the IHR completed
- A Network of nearly 50 institutions in the region is set up- funding of projects being initiated
- 6 Thematic Task Forces anchored at lead institutions in the region being set up
- State Level CC Cell/Centre being set up/strengthened
- A National Centre for Himalayan Glaciology is being set up in Mussoorie – EFC submitted
- An Indo-Swiss Capacity Building Programme in glaciology and related areas was launched last year. 2 Phases completed
- The EFC on NMSHE approved- the Cabinet Note submitted
- Action on G-SHE component initiated jointly with MoEF



Issues Concerning Governance for Sustaining Himalayan Ecosystem (G-SHE)

Governance for Sustaining Himalayan Ecosystem (G-SHE)

■ **Sustainable Urbanization:**

- Solid waste management
- Town planning norms
- Pilgrimage in sensitive areas
- Eco-tourism

■ **Water Security:** Rejuvenation of Springs

■ Building environmental **Awareness**

■ **Conservation** through community involvement

■ Infrastructure Development: **Green roads**

G-SHE Actions: Solid Waste Management

- Complete **ban on use of plastic bags** in all hill towns and villages
- **Discouraging** use of **bottled water**, which adds to toxic plastic litter in hill towns and along trekking routes.
- **Composting** of bio-degradable household waste and **recycling** and re-use of other types of waste

G-SHE Action: Town Planning and Adoption and Enforcement of Architectural Norms

- Amendment of **Municipal bye-laws** for construction
- Enforcement of **National Building Code**-setting up of State-level Urban Arts Council
- Compulsory use of **solar water heaters, rain water harvesting** and appropriate **sanitation facilities**
- Prohibition of **Construction activity** in **source-catchment areas of cities**, including along mountain lakes and other water bodies.

G-SHE Actions: Promotion of Sustainable Pilgrimage

- Developing a comprehensive **inventory of key pilgrimage sites** in each State that would include analyses of the ecological capacity of each site, based on its location and fragility.
- Develop a **plan to harmonise the inflow of pilgrims** with the capacity of the local environment to cater to the needs of pilgrims
- The construction of roads should be prohibited beyond **at least 10 kilometres from protected pilgrim sites**, thereby creating a much-needed ecological and spiritual buffer zone around these sites.

G-SHE Actions: Promotion of Sustainable Pilgrimage:

- Each designated **pilgrimage site** should have a declared **buffer zone** where development activity will be carefully regulated.
- At all entry points to designated buffer zones, **pilgrims will be advised to take back all waste**, in particular, non-degradable items.

G-SHE Actions: Commercial and Adventure Tourism

- **Homestead tourism** would be promoted in this area and **commercial hotel** tourism of the 3 to 5 star-variety would be **avoided**.
- Each state to set up a **Homestead Tourism Audit and Certification agency**, to promote standardized and quality practices in designated tourism zones.
- Each state to consider the **imposition of an entry tax** for vehicles entering important hill towns.
- **Parking fees** for private vehicles in hill markets and hill towns to be **raised substantially** to discourage heavy traffic

G-SHE Actions: Water security

- Initiate a state-wide programme for **rejuvenation of Himalayan springs** and protection of high-altitude lakes
- Provide legislative **protection for mountain lakes, natural springs** and key water sources and **prohibit construction activities along these water-bodies.**
- **Inventorise mountain springs** (active and dormant) and also do detailed geological mapping to identify the spring recharge zone.

G-SHE Actions: Building environmental awareness

- Utilize **local festivals and fairs** for spreading **environmental awareness** and to link the protection of environment to local cultures and festivals
- Central and State governments to jointly organise an **annual festival of the Himalayas** to celebrate local cultures, which demonstrate ways of sustainable living for resilient societies in harmony with the pristine nature of the Himalayas.

G-SHE Actions: Green Road Construction

- **Environmental Impact Assessment** to be made mandatory for the construction of all **state & national roads and expressways** of more than 5 km length
- Road construction will provide for the **treatment of hill slope instabilities** resulting from road-cutting, cross drainage works and culverts, using bio-engineering and other appropriate technologies
- Plans for road construction must provide for **disposal of debris** from construction sites at suitable and identified locations

G-SHE Actions: **Implementation Mechanism**

- DST and MOEF to work together with Himalayan State Governments for implementation of G-SHE components
- GBPIHED would be coordinating G-SHE actions from MoEF
- NMSHE has earmarked some funds for G-SHE implementation
- A Coordination mechanism between DST and MOEF is being evolved

Growing Population in the Indian Cities

(Census 2011)

- **8 Cities** with population **5 m and above** (13 by 2021)
- **53 cities** with population **1 m and above** (76 by 2021)
- **459 Cities/Towns** with population **more than 1 lakh** (~600 by 2021)

Most Populous Cities in the Himalayan States

City ranking in terms of population	Major Cities in Himalayan States	Population as per 2011 Census
30	<u>Srinagar</u>	1,192,792
46	<u>Guwahati</u>	963,429
74	<u>Dehradun</u>	578,420
88	<u>Jammu</u>	503,690
147	<u>Aizawl</u>	291,822
160	<u>Imphal</u>	264,986

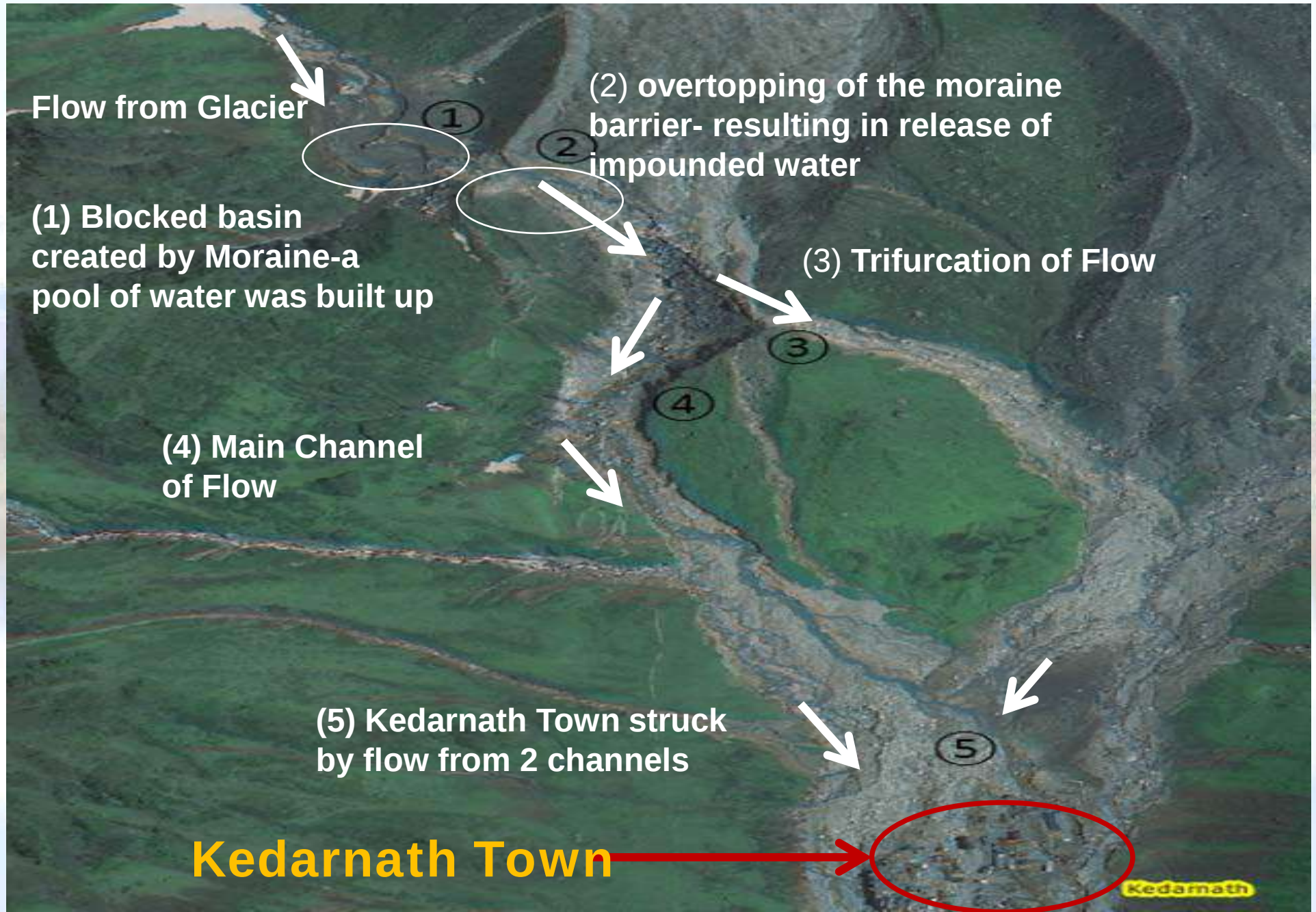


Uttarakhand Disaster, June 2013

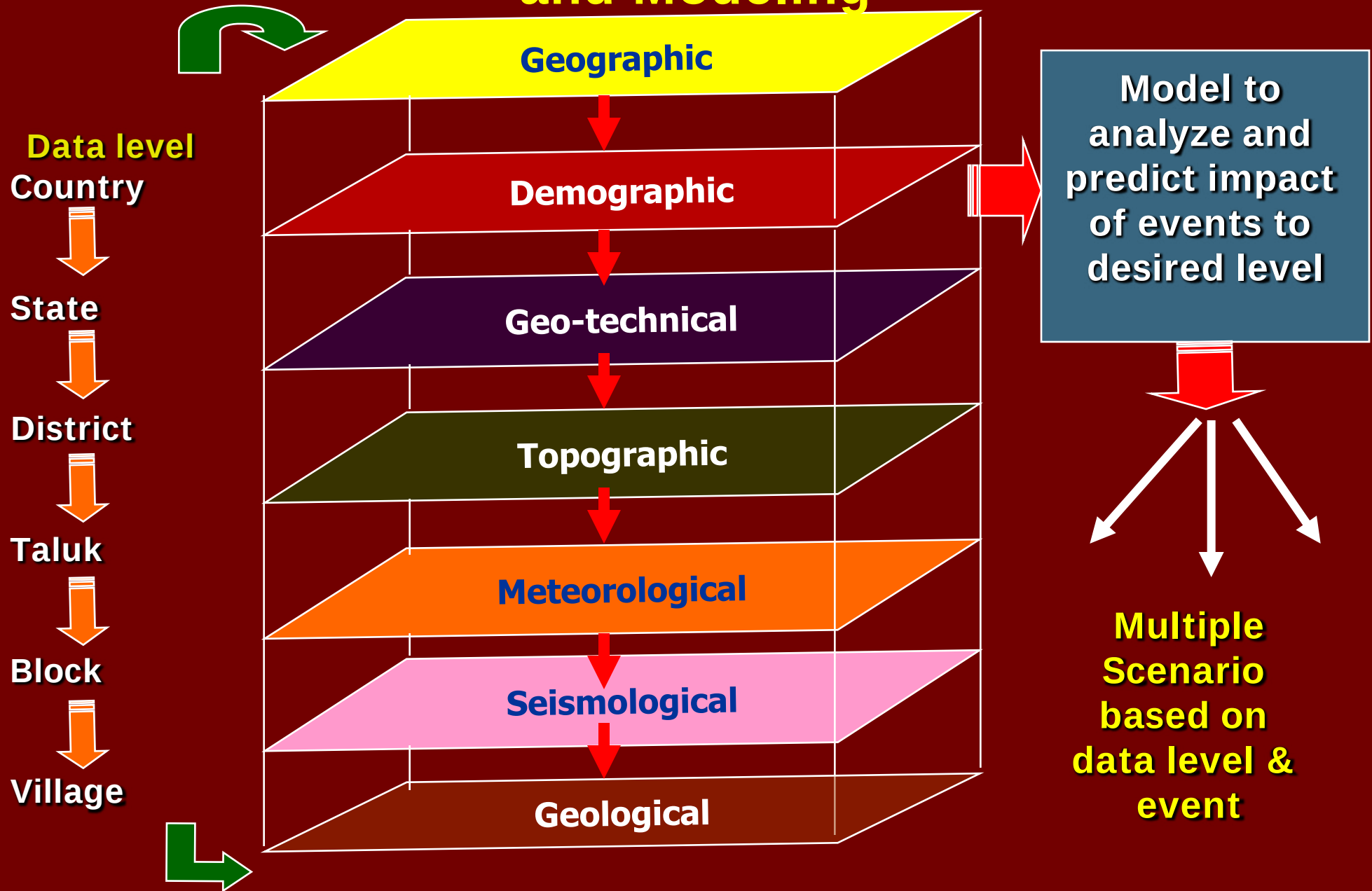
Possible Causes of Uttarakhand (Kedarnath) Deluge June 2013

- An unconfirmed cloudburst event,
- Glacier and moraine outbursts,
- Steep slopes associated with the terrain,
- Sudden gushing of water and debris into the valley regions,
- Flooding of rivers on account of incessant rain,
- Exceeding of carrying capacity of rivers,
- Major landslides,
- Panic reactions of people

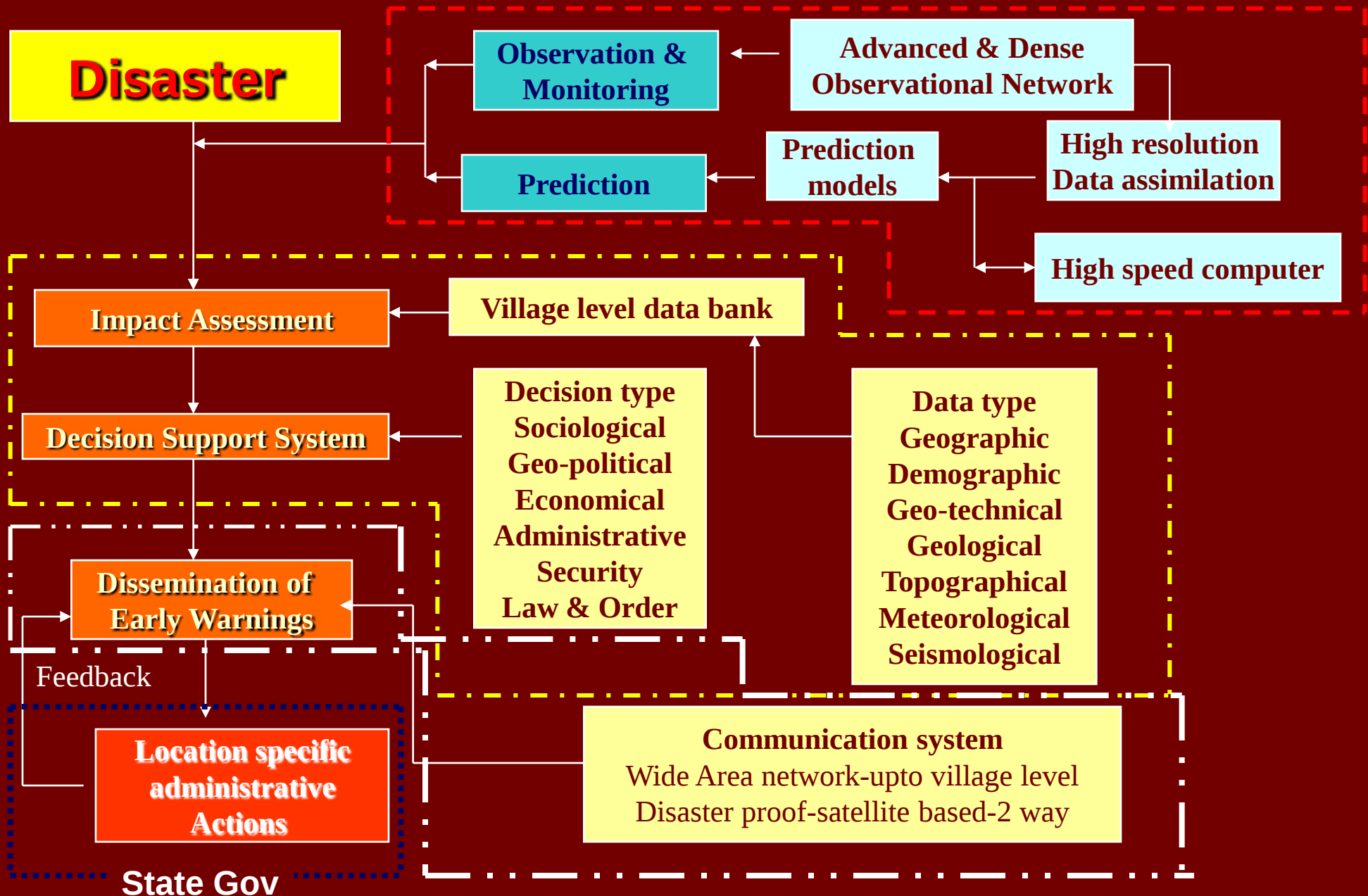
High Resolution Satellite Imagery of Uttarakhand Disaster



Multi-layered Data Base Management and Modeling



Integrated Disaster Management Concept



Disaster Management System Required for IHR

- **Observations:** Close Network of Doppler Weather Radars, Dense Network of Automatic Weather Stations and High Resolution Satellite Imageries
- **Forecast:** Running of High Resolution Weather Forecast Models on the Super Computing System
- **Application:**
 - Linking forecast with Disaster Management and Decision Support System
 - Deployment of Integrated Disaster management System
- **Dissemination:** Real Time dissemination to Public and Disaster managers

A scenic view of a mountain range with a rainbow in the sky. The mountains are covered in green vegetation and are partially shrouded in mist. The sky is blue with a few white clouds. A rainbow is visible in the upper right portion of the sky. The text "Thank You !" is overlaid in the center of the image.

Thank You !

Appendix 5

Presentation of PWC by Mr. Nidish Nair

Benchmarking Hill Cities

20th January, 2013



Content

Introduction

Objective, approach and limitations

Hill cities comparison / benchmarks

*Demographics, Urban Planning
mechanism, Environment friendly
initiatives, Disaster management readiness,
Quality of basic services and service level*

*JNNURM program and hill cities,
Governance and IT reforms*

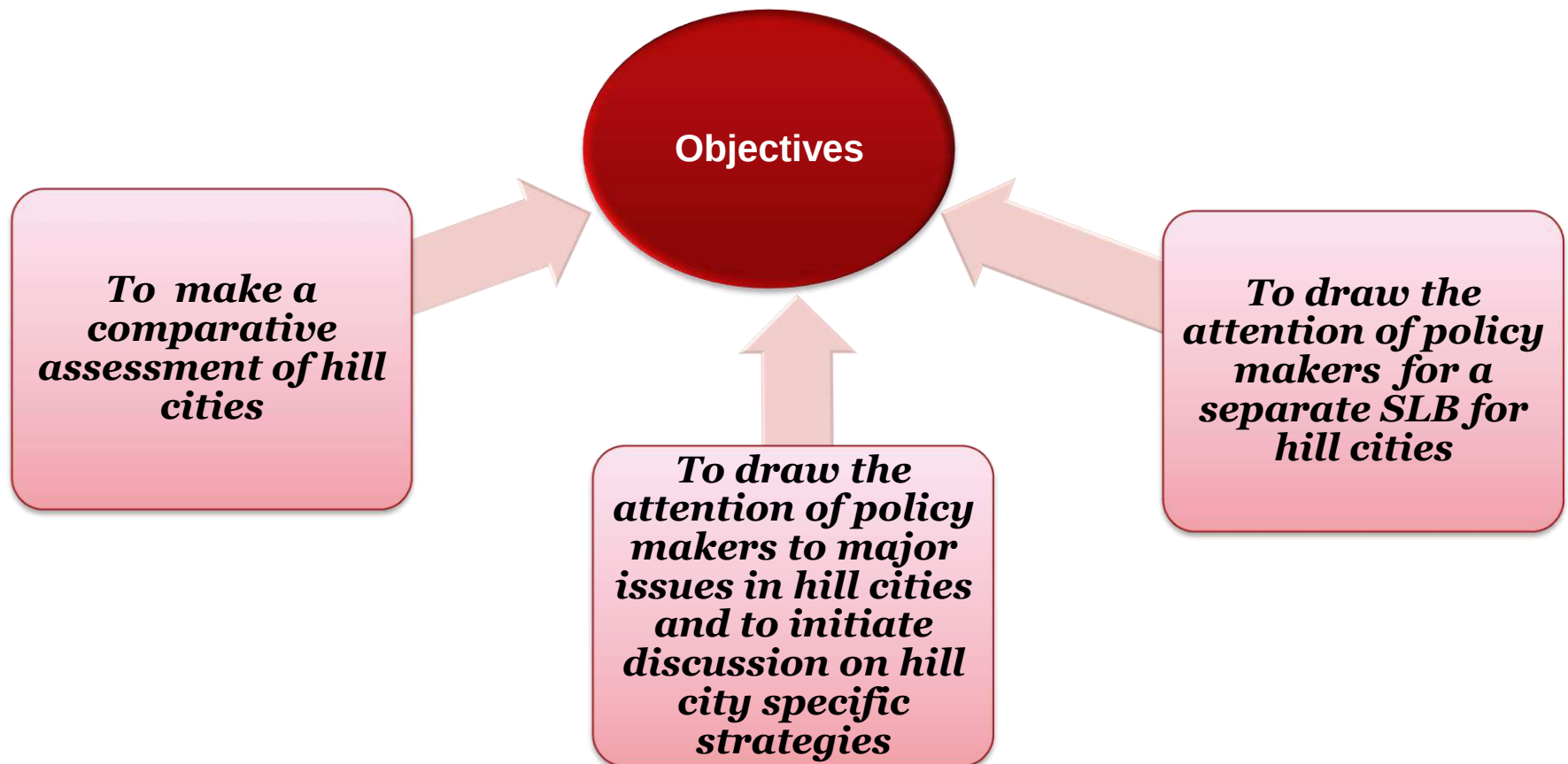
Heat Map for Hill cities

Discussion points

Introduction

Objectives of benchmarking of hill cities

Hill cities have unique challenges; hence require different service benchmarks



Approach and methodology of the study

Criteria for the selection of cities

- Size, significance (capital cities/ economic importance/tourist centres, etc.) and regional balance (North, eastern etc.)

Cities selected

- Gangtok,
- Shillong,
- Nainital,
- Aizwal,
- Mussoorie
- Shimla

Indicators

- Urban planning mechanisms in place
- Environment friendliness
- Disaster Mgmt. preparedness,
- Quality of basic services,
- Energy management initiatives,
- Financial sustainability
- e-governance initiatives

Output
A
comparative
analysis of
hill city
parameters

Limitations: Majority data is self reporting by cities; Secondary data sources include JnNURM website, Census data, SLB of MoUD, project reports; Limited time frame for the study; Data gaps for several indicators

Hill cities comparison

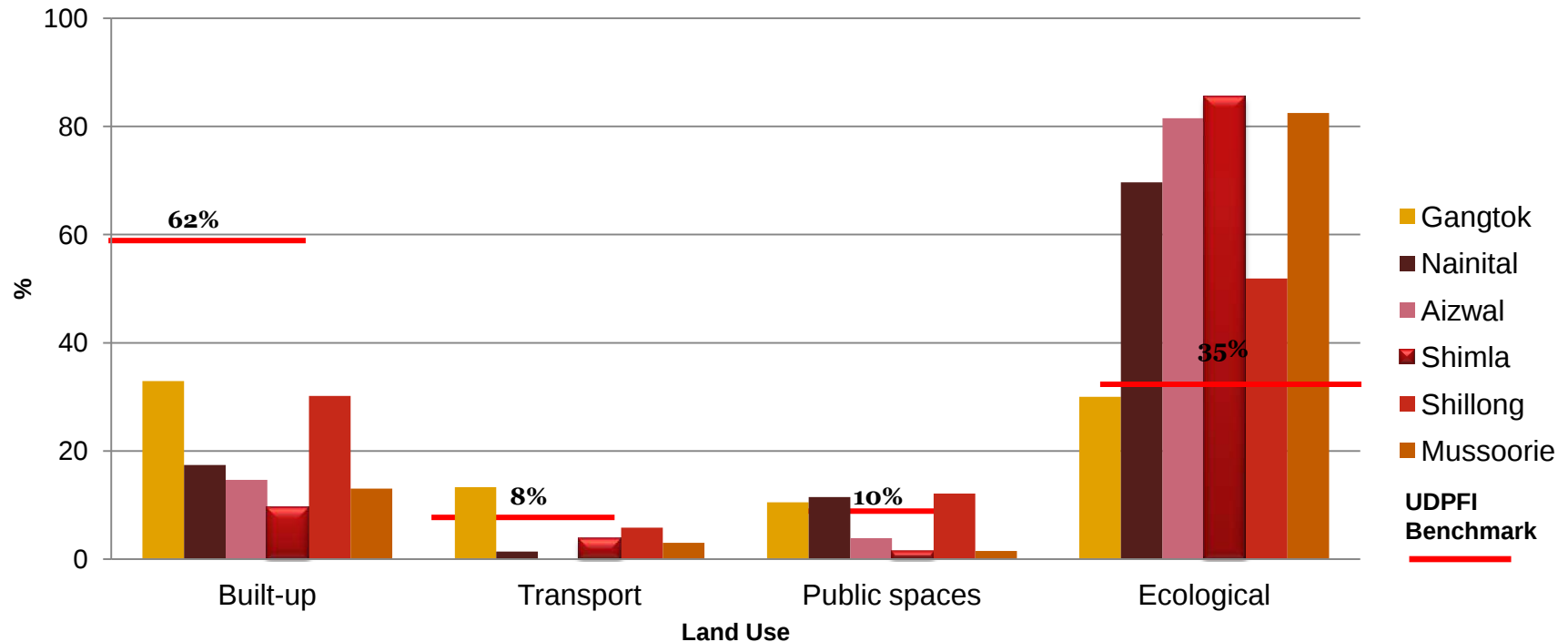
Demographic profile

Parameters	Cities					
	Gangtok	Nainital	Aizwal	Shimla	Shillong	Mussoorie
Area (Sqkm)	19.28	11.73	129.91	35.54	10.36	67.00
Population in million (2011)	0.10	0.047	0.291	0.171	0.143	0.033
Growth Rate (Decadal) (%)	242	27	28	17	08	NA
Population Density (P/Sqkm)	5202	4068	2246	4834	13804	449.52
Gender Ratio (Female/1000 Male)	889	894	1029	915	1006	NA
Literacy Rate (%)	82.17	84	98.8	94.55	91.5	NA
Slum Population (%)	23.51	21	26.48	6.1	10	NA

Urban Planning readiness – what plans are in place?

Parameters	Cities					
	Gangtok	Nainital	Aizwal	Shimla	Shillong	Mussoorie
Transportation Plan (TP)	Yes	Yes	No	Yes	No	Yes
City Sanitation Plan (CSP)	No	No	No	Yes	No	Yes
Climate Resilient Plan (CRP)	Yes	No	Yes	Yes	Yes	NA
Solar City Plan (SCP)	No	No	Yes	Yes	Yes	No
Laws & regulations governing natural reserves and green space	Yes	Yes	Yes	Yes	Yes	Yes

Urban Planning Tools – Applicability of landuse benchmarks?



City Initiatives

Nainital: Building Bye Laws Supporting Natural Resource Conservation through development of 'Sewerage and drainage lines up to discharge point and water supply lines'

Mussoorie: New Constructions of residential houses/ hotels needs supreme court permission in Mussourie, monitory.

Environmental Sensitivity Readiness

Parameters	Benchmark	Cities					
		Gangtok	Nainital	Aizwal	Shimla	Shillong	Mussoorie
Pollution Control Mechanism							
Air	Air Pollution Monitoring Mechanism	Yes	No	Yes	Yes	Yes	Yes
Water	Water Pollution Monitoring Mechanism	Yes	Yes	Yes	Yes	Yes	Yes
Noise	Noise Pollution Monitoring Mechanism	Yes		Yes	Yes	Yes	Yes
Other (bio medical & hazardous waste, MSW etc.)			Yes	No	Yes	Yes	

Environment Sensitivity Readiness

Parameters	Benchmark	Cities					
		Gangtok	Nainital	Aizwal	Shimla	Shillong	Mussoorie
Environment Preservation/Sustainability							
Ban on Plastics	Required to have Ban on Plastics	Yes	Yes	No	Yes	Yes	Yes
Control on Vehicular Movement	Policies or Regulation for control on Vehicle Movement	No	Yes	Yes	Yes	Yes	Yes
Promotion of Non-Motorised Transport	To promote Non-Motorized Transport	No	Yes	Yes	Yes		Yes
Environment related reforms	Environment related reform should be 100% achieved	Yes*	Yes	Yes	Yes	Yes	

*They are not 100% achieved because the building plan approval process is not in place with compliance with available building by laws.

January 20, 2014

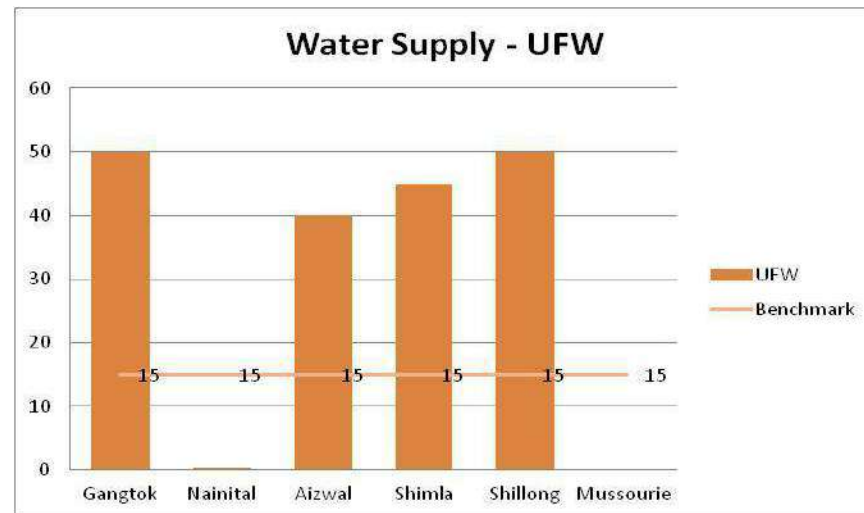
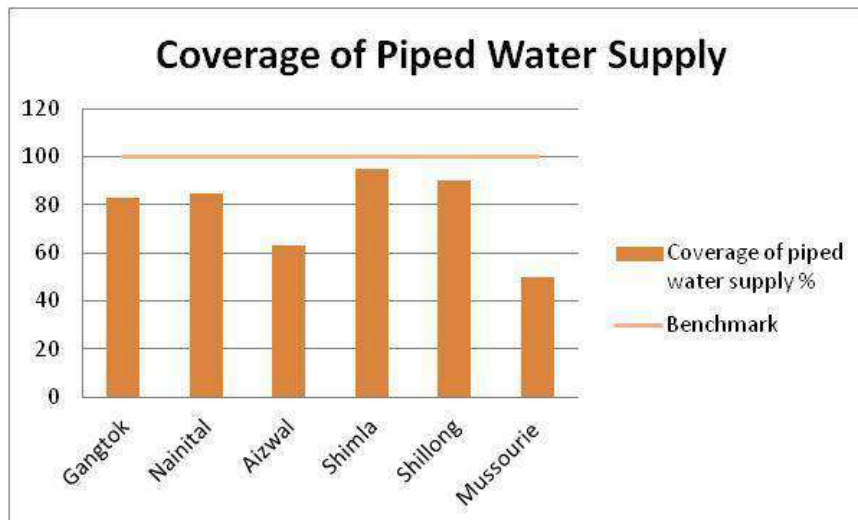
Disaster mgmt. preparedness

Parameters	Benchmar k	Cities					
		Gangtok	Nainital	Aizwal	Shiml a	Shillon g	Mussoo rie
City Level Disaster Management Plan(CDMP)	<i>City Level Disaster Management Plan</i>	No	Yes	No	Yes	Yes	Yes
Disaster Preparedness Mechanism	<i>Advisable</i>	Yes	Yes	Yes	Yes	Yes	Yes
City Level Institutional Mechanism	<i>Advisable</i>	No	Yes	Yes	Yes	Yes	Yes
Community Awareness Program	<i>Advisable</i>	Yes	Yes	Yes	Yes	Yes	Yes

Quality of Basic Services – Water and Sewerage

Parameters	Benchmark	Cities					
		Gangtok	Nainital	Aizwal	Shimla	Shillong	Mussoorie
Water supply							
Quality of Water sources	Good	Good	Good	Good	Good	NA	Good
Recovery of O&M Cost through user Charge Collection	Yes	Yes	NA	Yes (15%)	Yes	Yes (90%)	Yes (80%)
Sewerage							
Existence of Sewerage System	Yes	Yes	Yes	No	Yes	No	No

Service Benchmark - Water



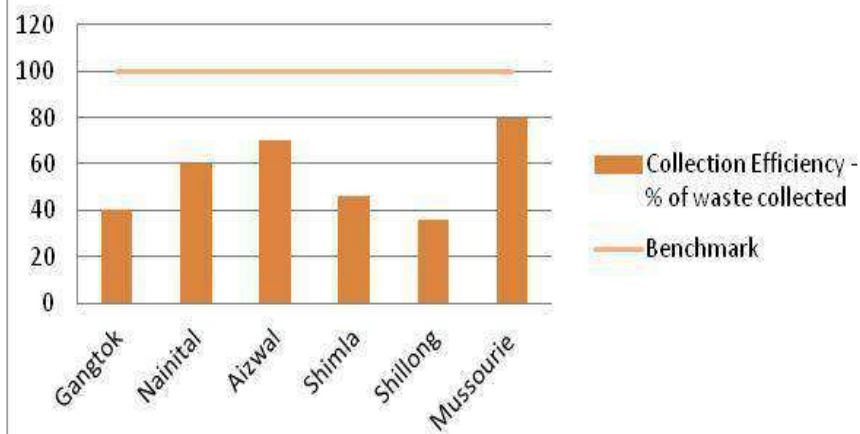
Quality of Basic Services – Drainage and SWM

Parameters	Benchmar k	Cities					
		Gangto k	Nainital	Aizwal	Shiml a	Shillong	Mussoo rie
Drainage							
Projects Planned under various schemes	Yes	Yes	No	Yes	Yes	Yes	Yes
SWM							
Waste Treatment mechanism in place	Yes	No	No	No	Yes	No	Yes
NGO/CBO Participation in Waste Management	Yes	Yes	Yes	Yes	Yes	Yes	Yes

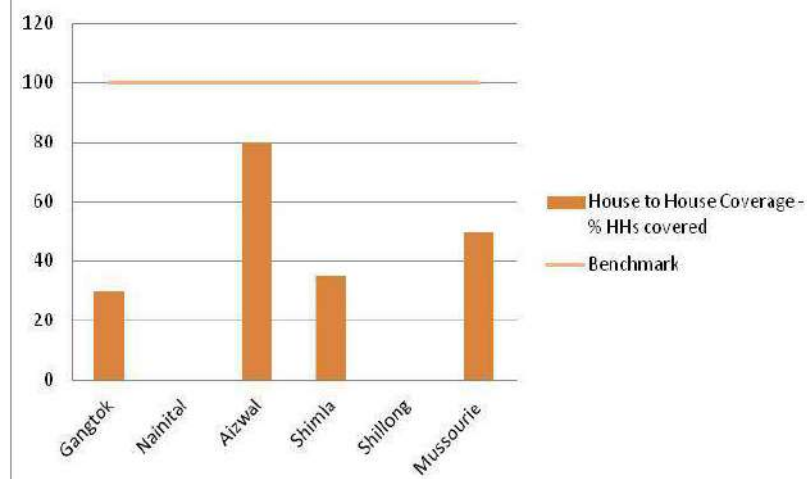
January 20, 2014

Service Benchmark - SWM

SWM - Collection Efficiency - % of Waste Collected



SWM - House to House Coverage - % House Covered



Quality of Basic Services – Public transport

Parameters	Benchmar k	Cities					
		Gangto k	Nainita l	Aizwal	Shimla	Shillon g	Mussoori e
Urban Transport							
Availability of Public Transport	Advisable to have Public Transport	No	No	Yes	Yes	Yes	No
Intermediate Public Transport (Organized/Un-organized)	Organised	Un-Organised	Organised		Un-Organised	Un-Organised	Unorganised
Level of Congestion (High/Medium/Low)	High/Medium/Low	High	High	High	High	High	High
Policies for Traffic Congestion	Yes			Yes	Yes	No	Yes
Designated Parking Spaces	Yes	No	No	Yes	Yes	No	Yes

January 20, 2014

Ongoing initiatives - Municipal reforms and infrastructure projects

What initiatives are underway - Municipal Reforms

Municipal Reforms	E-Governance set-up	Shift to Accrual based Double Entry Accounting	Property Tax(85% Coverage & 90% Collection Efficiency)	100% cost recovery (Water Supply & SWM)	Internal Earmarking of Funds for Services to Urban Poor	Provision of Basic Services to Urban Poor	
Gangtok							Meeting targets
Nainital							Slow progress
Aizwal							Not satisfactory
Shimla							Meeting targets
Shillong							Meeting targets

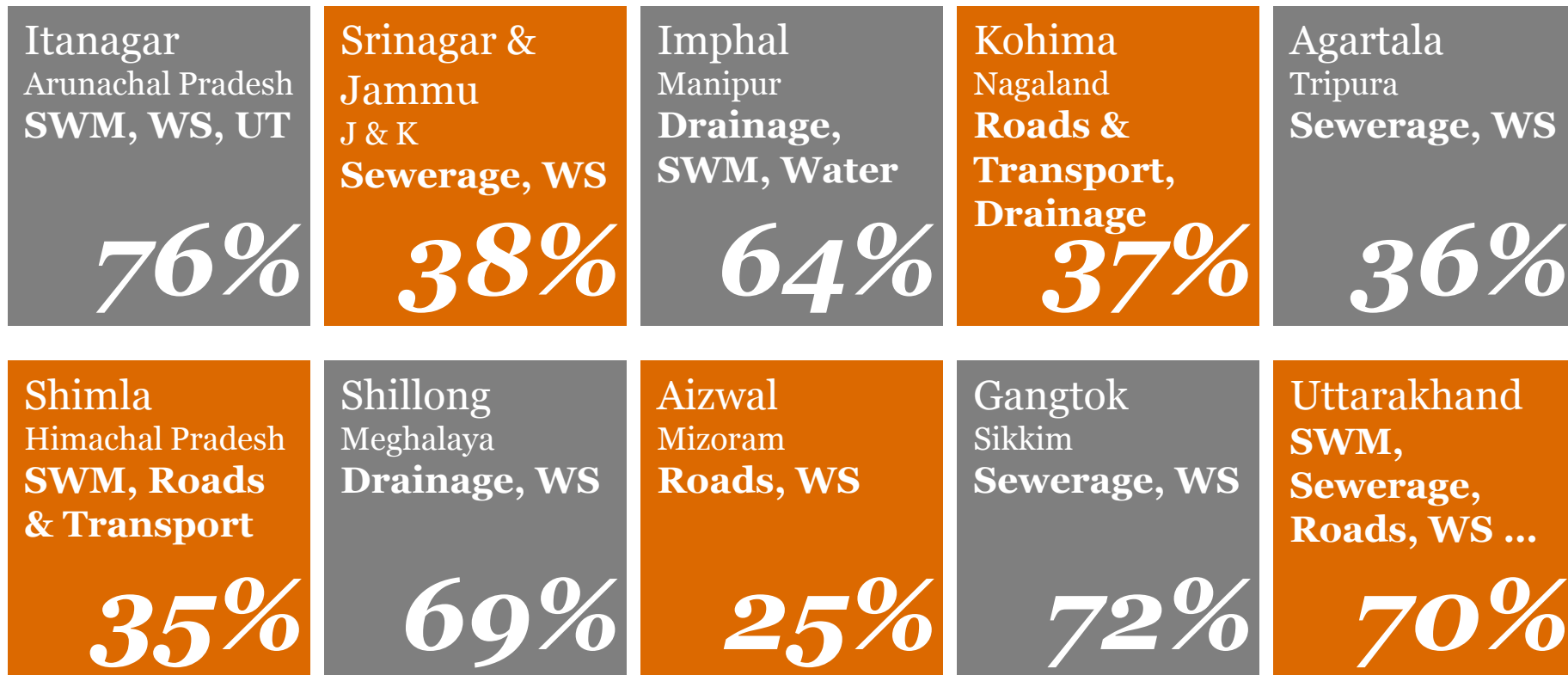
Capacity Building

JnNURM provides funding support to States, based on the State Comprehensive CB Plans and all the ULBs are covered under the CB plan

Plans submitted by
4 States, so far
Rs 127 Cr

What initiatives are underway – Basic infrastructure development under JNNURM

- 85% of the scheme funds has been allocated for the implementation of projects
- Over 40 projects worth Rs. 2000 Cr sanctioned for Hill States, > 50% progress



January 20, 2014

Conclusion

Conclusion - Heat Map of Cities

Cities	Urban Planning	Environment Sensitivity	Disaster mgmt plans	Water Supply	SWM	Urban Transport	Municipal Reforms
Gangtok							
Nainital							
Aizwal							
Shimla							
Shillong							
Mussoorie							

- *Special service level benchmarks for Hill cities, covering environment, disaster mgmt, land use planning....*
- *Positives – sensitivity towards environment, disaster management*
- *Improvements needed – Basic Service quality, Service level reforms*
- *Sectors needing urgent attention – Urban planning, public transport, solid waste management*

Thank you

Points for consideration

Special service level benchmarks for hill cities, incorporating

- Disaster mgmt., environmental factors, revised water norms.....
- Land use planning norms

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1

Service Level Benchmark
for Hill Cities

2

Conclusion text goes here

3

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Discussion points (based on data generated from cities)

- ***Applicability of SLB to hill cities***
- ***Areas doing good:***
 - Mechanisms to prevent disaster management and environment protection are the areas showing good performance
 - In all the cities various urban planning mechanisms are in place
 - There is scope of land use planning in all the cities
- ***Areas that require improvements:***
 - Environment friendly urban transport system, SWM AND SEWAGE are the major sectors need attention
 - In all the cities, the level of unaccounted water is very high
 - Except Shimla & Mussoorie, other cities does not have any waste treatment mechanisms . This will leads to environmental degradation
 - None of the cities have achieved 100% collection efficiency in SWM
 - Efforts have to be taken to improve house to house collection
 - Reform implementation is very slow : especially in NE states

Final analysis

City	Achievements	Attention required
Shimla	• Various urban planning mechanisms are in place, • Efforts have been taken by the city to reduce traffic congestion through controlled vehicular movement at designated stretch. • City DMP is in place • 100% achievement in implementing environmental related reforms • Pollution control mechanisms are in place	Despite being controlled vehicular movement, the city has high level of congestion and there is lack of unorganised intermediate public transport
Mussoorie	• Pollution control mechanisms are in place • 80% Recovery of O&M Cost through user Charge Collection • SWM collection efficiency is good;75% and door to door coaction is 50%, which needs attention.	• Though disaster management related mechanisms are in place, there is no CRP and SCP in place; also climate resilient plan is not in place • Should focus on the implementation of environment related reforms • Absence of sewage treatment mechanisms is another area needs to be looked into. • Issues in urban transport such as availability of public transport, intermediate public transport system,and level of traffic congestion has to be addressed in a systematic way. • Coverage of piped water supply, & metering are far below the benchmark

Final conclusion

City	Positive aspects	Negative aspects
Shillong	•High population density with low growth rate , higher gender ratio, & highly literate •The city has scope for expansions in land use •Pollution control mechanisms and Disaster management mechanisms are in place •Piped water coverage is very good;90% & metering is 100%	•TP & CSP are not in place •Greater emphasis is required in Urban Transport sector as the availability of public transport & intermediate public transport are not in place and level of traffic congestion is high •SWM collection efficiency is not up to the mark: 36% •Only three e governance modules are developed •Waste treatment mechanism and sewage treatment are the areas needs attention.
Nainital	•Scope for expansion in land use patterns •Pollution control mechanisms are not up to the mark •Have taken very good initiatives environmental protection •Coverage f piped water is good:85% & SWM collection efficiency is satisfactory:60% •Services availability through governance is good: 8 out of 9 modules are developed	•CSP, CRP and SCP are not in place •No waste treatment mechanism in place •Greater emphasis is required in Urban Transport sector as there is non availability of public transport, level of traffic congestion is high and no designated parking spaces in the city

Final conclusion

City	Positive aspects	Negative aspects
Aizwal	• Impressive gender ration • Scope for expansion in land use of various categories • Pollution control mechanism and environment preservation mechanisms are in place except that the city has not banned the use of plastics • Disaster management mechanisms are good except that the city has not prepared DMP • Urban transport system is satisfactory, however the level of congestion • SWM collection efficiency is good:70% and door to door collection is 80.	• Sewage treatment and SWM treatment mechanism are not in place • Piped water supply coverage is only 63% • Service delivery through e –governance is NIL • Planning mechanisms are above average as TC and CSP are not in place
Gangtok	• Pollution control mechanism are in place • Environment preservation mechanism are average • Piped water coverage is good:80%	• CSP and SCP are not in place • Gangtok has reached upper limit of residential land use, crossed the upper limit for transport & communication and about to reach commercial land use. • CDMP is not in place. Similarly, city level institutional mechanism for disaster management are also not in place • Waste treatment mechanism are also not in place • Urban transport mechanisms need attention • SWM sector also needs attention: collection efficiency and door to door collection is below 40%

Appendix 6

Presentation of ArchI

by Mr. Anne Fenster

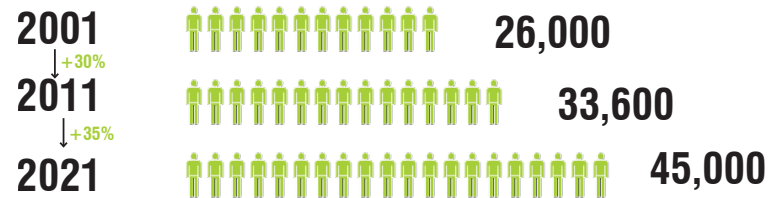


MOUNTAIN CITIES CASE STUDY

MUSSOORIE

DATA COLLECTION AND ANALYSIS

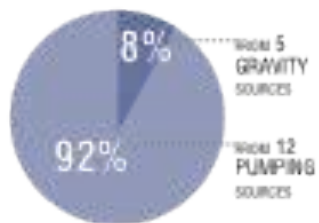
RISE IN POPULATION OVER THE YEARS



FLUCTUATING POPULATION INFLUENCES MANAGEMENT

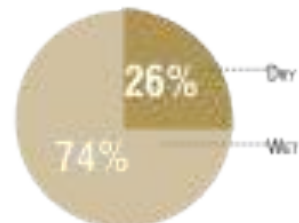


VOLUME OF WATER SUPPLY

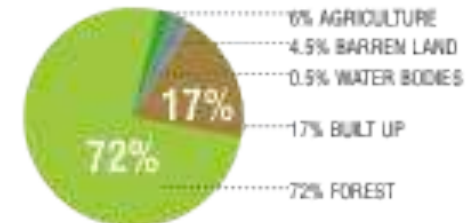


Water is pumped to 100-500m

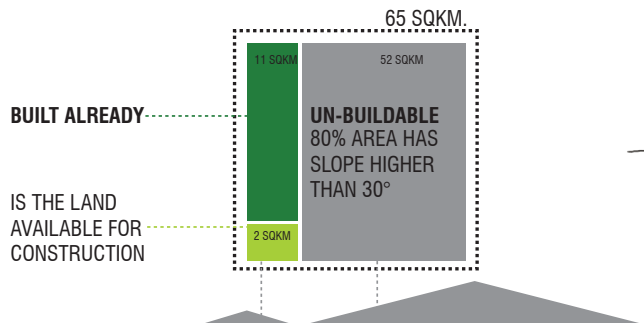
WASTE GENERATED



LAND USE

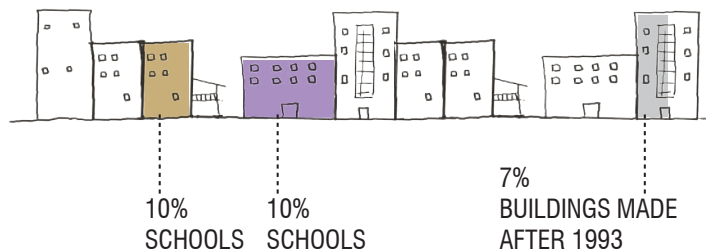


SLOPES AND BUILT UP AREA



600 SCHOOLS & HOTELS

3344 BUILDINGS IN MUSSOORIE



BUILDINGS IN MUSSOORIE

EARTHQUAKE ZONE

4

19% BUILDINGS FALL UNDER HIGH PROBABILITY RISK OF EARTHQUAKE DAMAGE

WASTE

LEAN SEASON
DECEMBER-JANUARY



WATER



POPULATION



PEAK SEASON
APRIL, MAY, JUNE, JULY



CASE STUDIES

HOME TO A NEWLY-BORN RIVER NAMED THE GAD GANGA

- Soil and water conservation efforts
- reduced the rate of rainwater runs off on the slopes
- increases infiltration
- Increases soil moisture
- Helps springs recharge

ENGINEERING MEASURES

- Trenches(15-30cm deep and 1-20m long) dug along the contours
- Mud-and –stone walls (1m high and 10m long)
- 150 pits dug for plantation and infiltration

SLOPE	HEIGHT	TRENCHES PER HECTARE	VOLUME OF TRENCH	STORAGE OF WATER PER HECTARE	SECTION OF THE PIT		
%	m	no.	Cum.	cum.	m	m	m
< 20	20	83	1.7	142	2.5	1.5	0.6
20 - 30	18	111	0.9	100	2	1	0.6
30 - 40	14	143	0.6	86	2	0.6	0.6
40 - 50	11	152	0.5	76	1.5	0.6	0.6
50 - 60	8	208	0.35	73	1	0.6	0.6
> 60	Recommended for stable slopes						

JAL TALAIS (WATER PITS)



PLANTATION AROUND TALAIS



WATER TRENCHES





WATER STORED IN DAMS



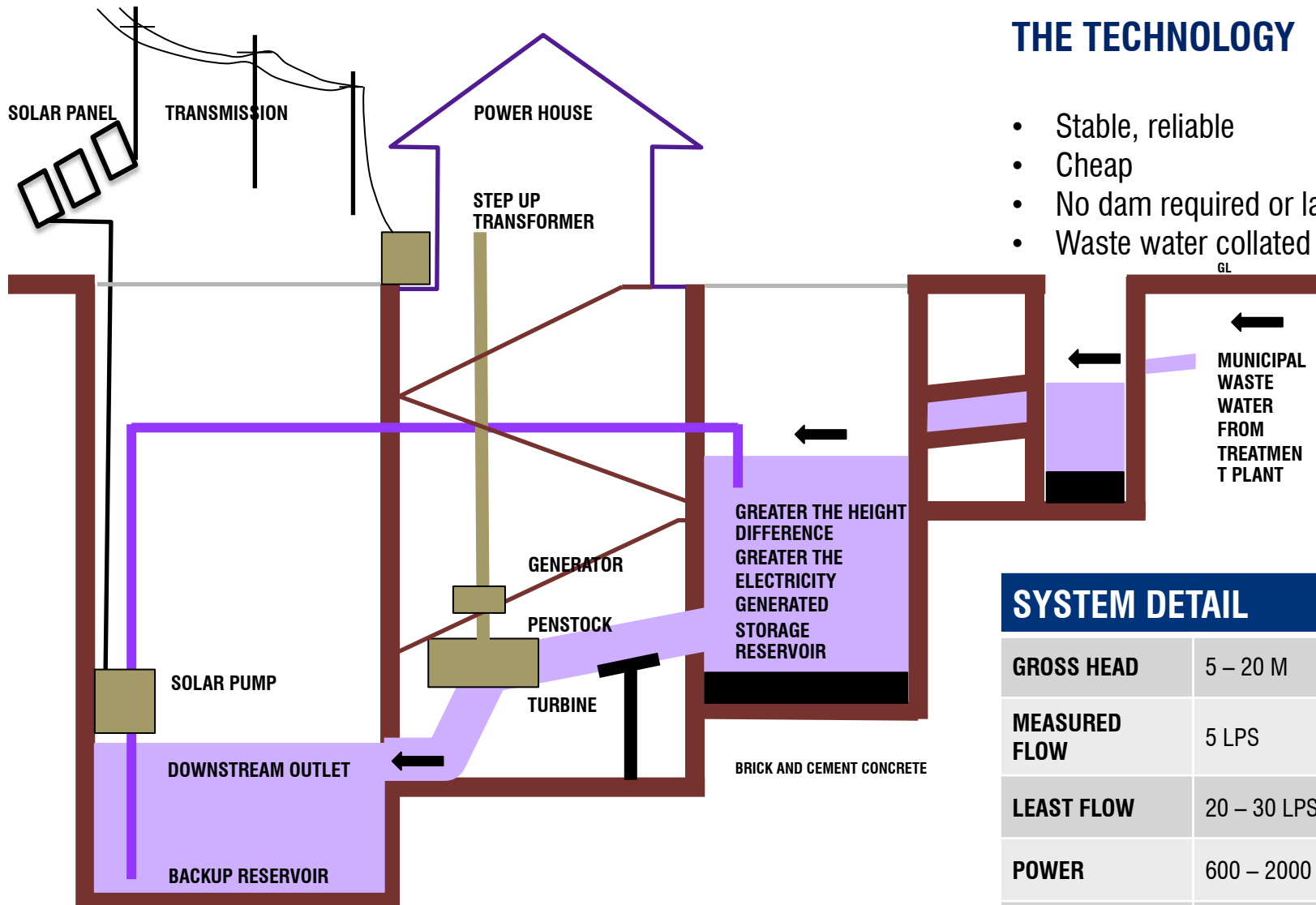
REJUVINATED STREAM

INDUCED

- Reduced Peakflow
- Increased Time of concentration
- Increased Infiltration
- Increased Base Flow
- Reduced Soil Erosion

ACHIEVED

- Higher Plant Survival Rate
- Increased Fodder Availability
- Drinking Water Security
- Increased Life of Downstream Storage Structures



THE TECHNOLOGY

- Stable, reliable
- Cheap
- No dam required or land flooded
- Waste water collated

SYSTEM DETAIL

GROSS HEAD	5 – 20 M
MEASURED FLOW	5 LPS
LEAST FLOW	20 – 30 LPS
POWER	600 – 2000 W
GENERATOR	TURGO , INDUCTION GENERATOR
TYPE OF TURBINE	PROPELLER KAPLAN

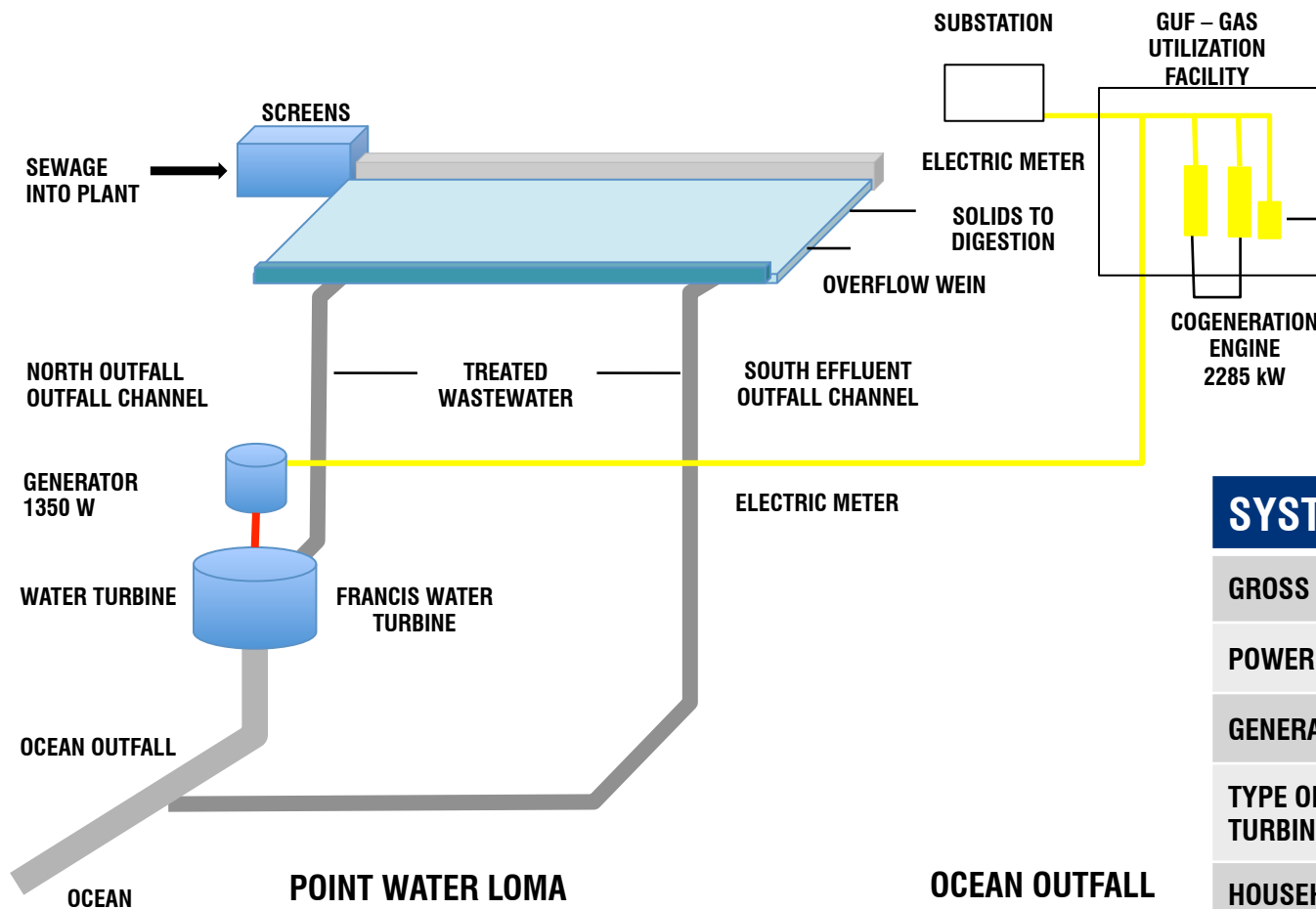
TYPICAL HYBRID MICRO – HYDRO POWER PLANT USING MUNICIPAL WASTE WATER AFTER WATER TREATMENT

SR.N O	EXPENDITURE	COST			NOT REQUIRED
		HIGH	MEDIUM	LOW	
1.	PRELIMINARY EXPENDITURE		✓		
2.	LAND AND REHABILITATION			✓	
3.	CIVIL WORKS	✓			
4.	BUILDINGS	✓			
5.	ROADS AND COMMUNICATION				✓
6.	CONSTRUCTION SUPERVISION AND ESTABLISHMENT		✓		
7.	MAINTANENCE DURING CONSTRUCTION			✓	
8.	PLANT AND EQUIPMENT	✓			
9.	ECOLOGY AND ENVIRONMENT		✓		✓
10.	MISCELLANEOUS WORKS				

**HIGH - > Rs 10000
< 5000**

Rs. 10000 > MEDIUM > Rs.5000

COST ESTIMATION	
COST OF CIVIL STRUCTURE (PENSTOCK)	Rs 5000
POWER HOUSE	Rs 35000
TOTAL	40000
INSTALLED CAPACITY	2 x 5hp = 7.46 kW
COST PER WATT	Rs 5.3
OPERATION COST	1% OF COST
MAINTANANCE COST	0.5 % OF CIVIL WORK
	2 % OF HYDRO MECHANICAL, ELECTRICAL COST
ANNUAL DEPRECIATION CHARGES	2 % OF TOTAL COST
INTEREST RATE	10 % FROM BANK
SELLING PRICE	Rs. 300 PER UNIT
LOW	



ENGINEERING MEASURES

- Daily effluent flow
- Screened through filters
- Tertiary treated waste water
- Clean Water reaches ocean

SYSTEM DETAIL

GROSS HEAD	28M
POWER	1.35 MW
GENERATOR	1350 KW
TYPE OF TURBINE	PROPELLER KAPLAN
HOUSEHOLDS SERVED	13,000
COST OF PROJECT	739 MILLION INR
COST PER kWh	Rs 50
SALE RATE	Rs 2
OUTFALL	4.5 MILE LONG INTO OCEAN



ESCALATOR



TRANSPORT LAYOUT



MEDELLIN CITY

EXTENSION 380.64 Km²

POPULATION CENSUS (2005) 2,223,078

ALTITUDE 1479 m.s.l.

ANNUAL TEMPERATURE 18 - 24 C

TRANSPORT LAYOUT



Metro

Línea A

- Niquia - Itagüí
Norte a Sur
- Itagüí - Niquia
Sur a Norte

Línea B

- San Antonio - San Javier
Oriente a Occidente
- San Javier - San Antonio
Occidente a Oriente

Metrocable

Línea C

- San Javier - La Aurora
Occidente a Noroccidente
- La Aurora - San Javier
Noroccidente a Occidente

Línea K

- Acevedo - Santo Domingo
Occidente a Oriente
- Santo Domingo - Acevedo
Oriente a Occidente

Línea L

- Santo Domingo - Arví
Occidente a Oriente
- Arví - Santo Domingo
Oriente a Occidente



Convenciones

- Estación con transferencia al Metrocable
- Estación con Punto de Atención al Cliente
- Estación con Bibliometro
- Estación de Transferencia

- Estación con Sistema Integrado de Transporte
- Estación con Parqueaderos para bicicletas
- Estación con Sistema de acceso para PMR - Personas con Movilidad Reducida



INITIATIVE

- Public transport initiative
- Reduces crime, poverty
- Connecting poorest neighbors
- Travel on steep slopes
- 3,20,000 SQM green space

ESCALATORS



SYSTEM DETAIL – ESCALATOR

NEIGHBOURHOOD	COMUNA TRECE
NETWORK LENGTH	385 M
HIGHEST ELEVATION	28 STOREY HIGH
PROJECT COST (1.8KM)	412 MILLION INR
TRAVEL TIME (BEFORE)	30 MIN WALK
TRAVEL TIME (AFTER)	7 MINS
CAPACITY	12000

CABLE CAR



SYSTEM DETAIL – CABLE CAR

CHARACTER	ELEVATED
ELECTRIFICATION	ELECTRIC MOTOR CABLE POWERING BULL WHEEL
OPERATING SPEED	16 KM/H
HIGHEST ELEVATION	399 M (1,309 FT)
PROJECT COST (1.8KM)	1600 MILLION INR
METROCABLE 1 (2003)	2 KM , 7 MINS
LINE K	
METROCABLE 1 (2007)	2.7 KM , 11 MINS
LINE J	
METROCABLE 1 (2009)	4 KM , 15 MINS
LINE L	
ROUTES	3
TICKET FARE	Rs 30
REDUCED CO2	18,932

INITIATIVE

- Reduce heavy waste transport to 60%
- **1999** - Mobile Vacuum System, 2400 dwellings (non – recyclable, organic waste)
- **2005** – 1st phase, underground waste transport system (non – recyclable, organic waste, paper)
 - waste room (not included in underground system, E waste)

STREET SECTION AT STOCKHOLM



SEPERATION

GREEN CHUTE	Organic recyclables (all food waste, garden & compostable waste)
ORANGE CHUTE	Dry, recyclables (paper, card, glass, cans, plastic bottles)
BLACK CHUTE	Residual waste

ENGINEERING MEASURES

STAGE ONE

- Deposits waste into Inlet
- Stored temporarily
- Inlets emptied, regular intervals
- Automatic emptying

STAGE TWO

- Sensored system to empty
- Fans build vacuum in pipe
- First, transport air enters the pipe system
- Second storage valves beneath the inlets are opened
- Waste bags fall sucked away

STAGE THREE

- Collection station
- Separated through a cyclone separator
- Separated from transport air
- Compressed
- Transport air released clean

STAGE FOUR

- Collection separated
- For disposal or re-processing

COMPACTOR



CONTROL ROOM



SERIES OF FAN



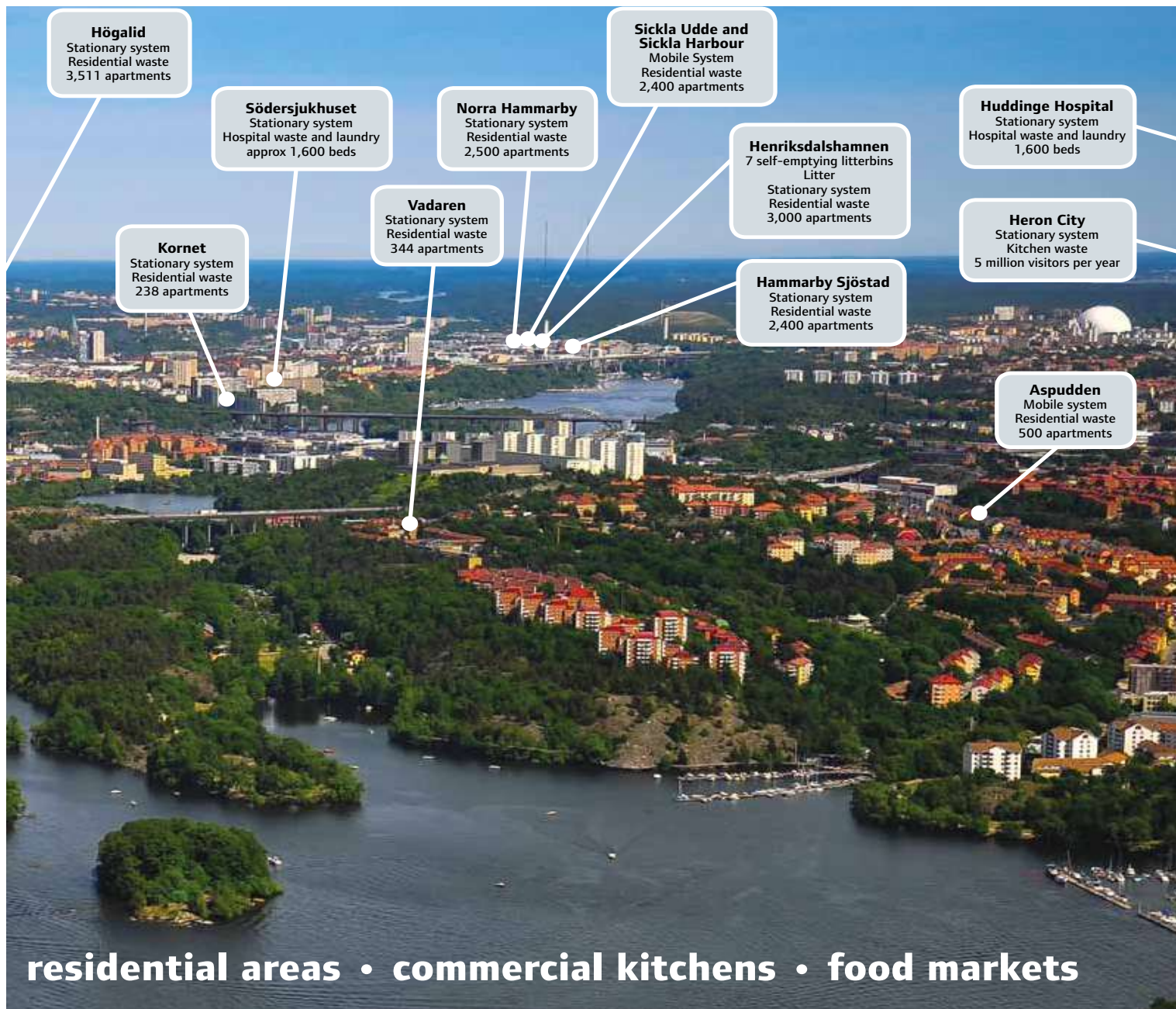
CONTAINER FOR FOOD WASTE



FOR RESIDENTS AND THE LOCAL

- Accessibility and convenience
- Local environment is improved
- Traffic movements are reduced
- Vehicle related CO2 emissions reduced General greenhouse gas emissions lower





FOR THE LOCAL AUTHORITY

- No contingency planning required
- Minimal health & safety
- manual handling
Recycling rates improved
- No Contamination
- Food waste recycling rates improved

FOR THE DEVELOPER

- Additional space is made available
- Improves cityscape
- No on-going costs

WIDER ENVIRONMENTAL / SOCIAL CONTEXT

- Recycling increases
 - Reduction in methane emissions
 - Incentive schemes can be easily
 - Future developments (heating scheme and energy production)
 - Accessibility and convenience
 - Traffic movements are reduced
 - Vehicle related CO2 emissions
-
- Higher investment costs for suction systems
 - Lower operating costs
 - Lower costs per year dwelling for stationary suction systems

PRELIMINARY CALCULATION (53 SERVICE PLACES 3 FRACTIONS 2095 APARTMENTS)	INVESTMENT COLLECTION SYSTEM	OPERATING COSTS, COLLECTION SYSTEM	TOTAL OPERATING AND CAPITAL COST (6% COST OF CAPITAL)
MANUAL WASTE HANDLING	250 MILLION	25 MILLION	41 MILLION
PNEUMATIC SYSTEM	400 MILLION	7.5 MILLION	36 MILLION
% DIFF	+ 40 %	- 70 %	- 12 %



DOCKING POINTS



WASTE DATA	
NO. OF DWELLINGS	2095
WASTE AMOUNT	TON/YEAR
COMBUSTIBLE WASTE	471
PAPER WASTE	175
ORGANIC WASTE	218
DRIVING DISTANCES	KM
DRIVING UP DISTANCE	4
TO TREATMENT PLANT	8
RETURN DISTANCE	4

INITIATIVE

- Informal recycling economy
- Dry waste separated for recycling
- Organic waste, heaviest waste
- Treated close to source, avoids transportation
- Through composting pits and biogas
- Residents bring waste to collection points (78%)
- House-to-house collection system (22 %)
- Workers earn income
- Receive fee for collecting, sorting and managing compost (biogas plant)
- Resulting biogas is methane 85 %

STREE Mukti Sangathan (SMS) - NGO

Parisar bhaginis,” or “neighborhood sisters,” teaching them the principles of zero waste

BHAGINIS



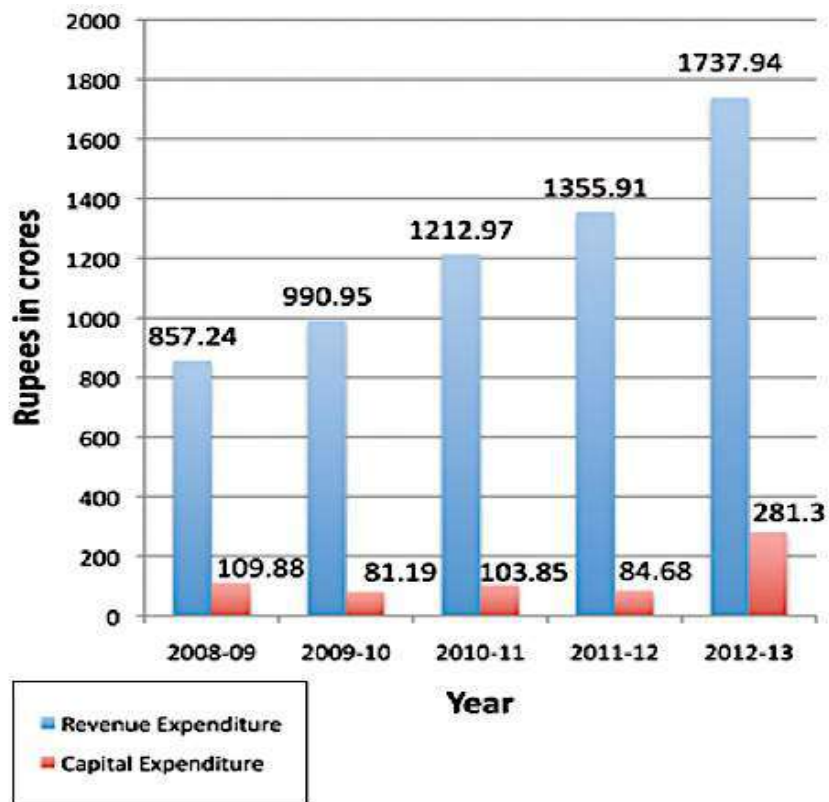
SYSTEM				
	SITES	WORKERS	WET WASTE (KG)	DRY WASTE (KG)
COMPOSTING	27	57	1714	418
CLEANING	26	42		318
DRY WASTE COLLECTION	70	282		14212
HOSPITALS	19	35		1670
BIOGAS PLANTS	8	13	7055	39
TOTAL	150	429	8769	16657

BIO GAS



WASTE SEPERATION





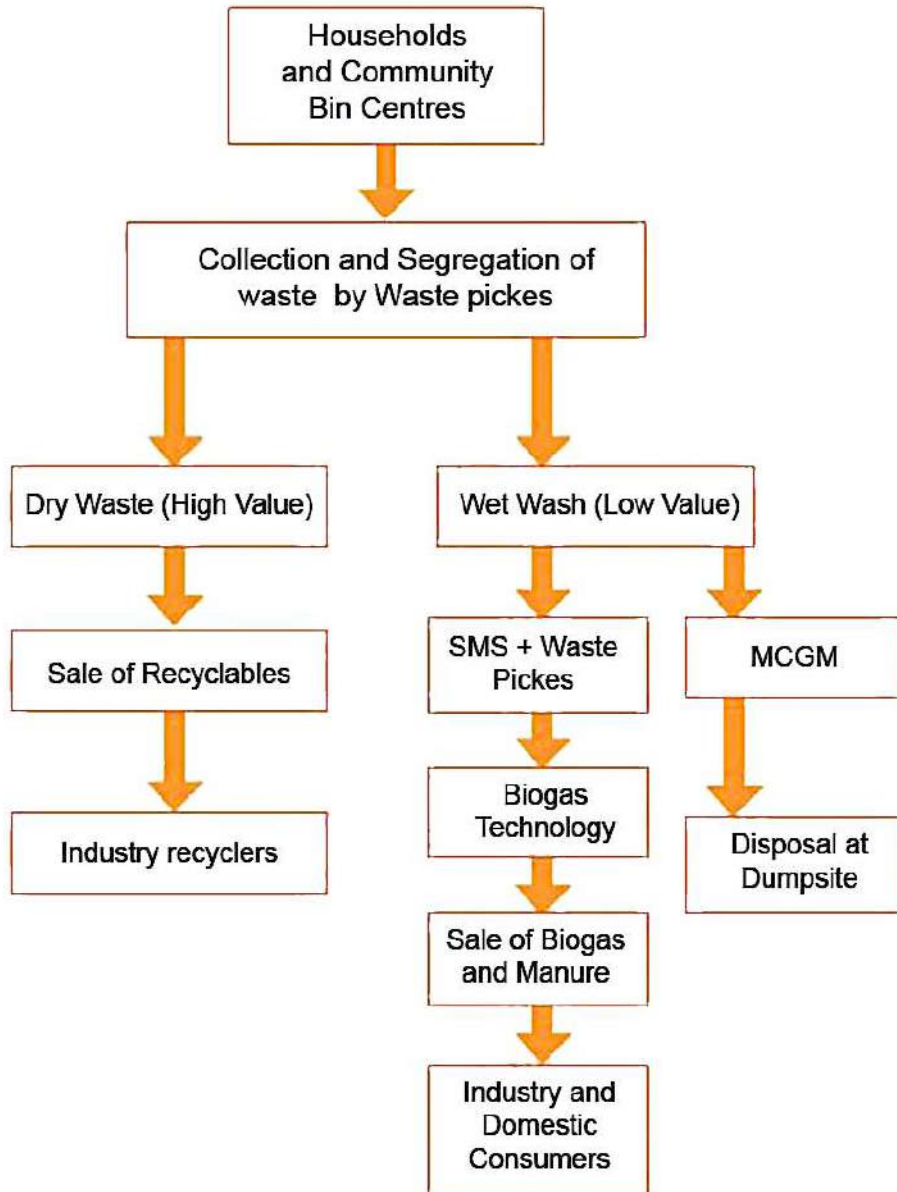
COST ESTIMATION

ANNUAL CONTRACTS RECEIVED	RS 100,000 – RS 2,00,000
COST FOR TRANSPORT PER TON	RS 600
COST FOR DISPOSAL	RS 500
AMOUNT SAVED	RS 3,69,360
QUANTITY GENERATED	55,000 LPG 10,000 kg ORGANIC COMPOST

CAPACITY COMPARISON OF DIFFERENT BIOGAS PLANTS

CAPACITY	INSTALLATION COST (US \$)	OPERATING COST/YEAR (US \$)	DAILY WATER (RECYCLED)	DAILY WORKERS	DAILY BIOGAS (AS COMPARED TO LPG CYLYNDER, WHICH RUNS UPTO 45 – 60 DAYS)	DAILY FERTILIZERS (TONS/DAY)	SPACE REQUIRED (m2)
500 kg	22,000	2,000	1 kl (500 l)	1 1 SUPERVISOR	0.75 - 1	0.004 – 0.05	50
1 ton	30,000	3,000	1.5 kl (1 kl)	2 1 SUPERVISOR	1.5 - 2	0.08 – 0.1	80
2 tons	44,000	5,000	3 kl (2 kl)	3 1 SUPERVISOR	3 - 4	0.16 – 0.2	150
5 tons	1,00,000	8,000	6 kl (5 kl)	4 1 SUPERVISOR	8 - 10	0.4 – 0.5	300

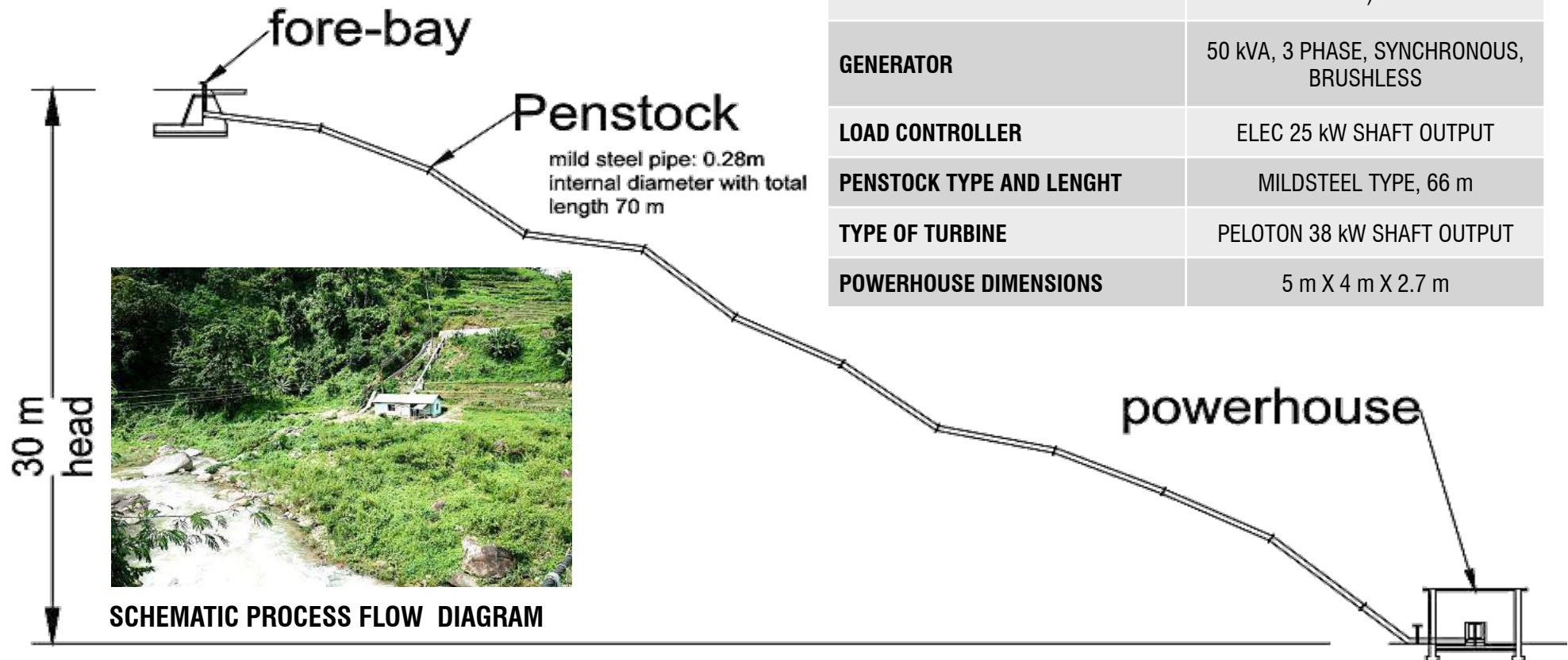
PARISAR VIKAS WASTE MANAGEMENT PROCESS

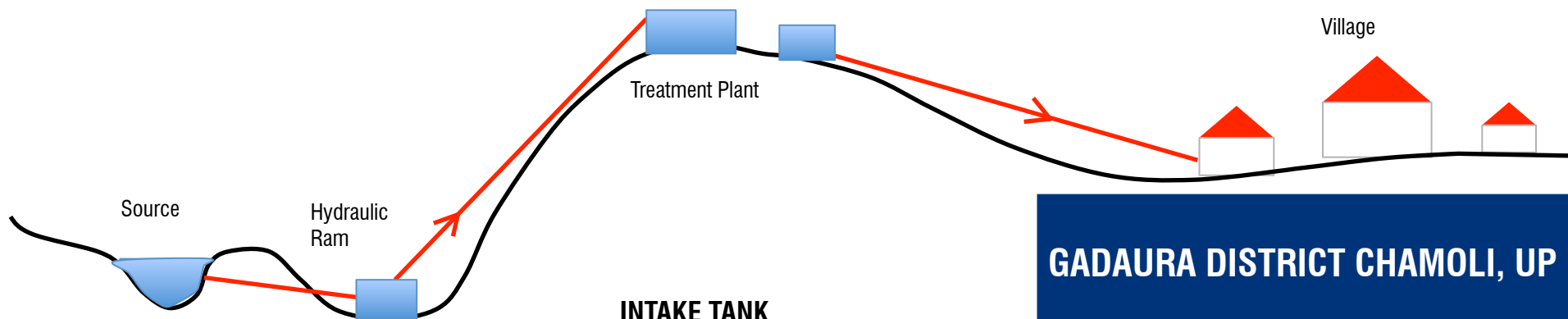


TECHNICAL DETAILS

MICRO HYDRO PROJECT	1300 MSL ELEVATION
GROSS HEAD	3 - 30 m
MEASURED FLOW AND DATE	0.204 m ³ /s (may 2010)
LEAST FLOW	0,20134 m ³ /s
DESIGN FLOOD LEVEL	0.6 m ABOVE NORMAL WATER LEVEL

WATER LEVEL	0.8 m
DESIGN DISCHARGE	0.154 m ³ /s
RIVER SOURCE	LAMAYA KHOLA (PERENNIAL) RIVER)
ROTATIONAL VELOCITY	120 TO 300 RPM
POWER	25000 W / 25 kW
HOUSEHOLDS SERVED	259
LENGTH OF HEADRACE CANAL	1071 m (STONE MASONRY WITH CEMENT MORTAR)
GENERATOR	50 kVA, 3 PHASE, SYNCHRONOUS, BRUSHLESS
LOAD CONTROLLER	ELEC 25 kW SHAFT OUTPUT
PENSTOCK TYPE AND LENGHT	MILDSTEEL TYPE, 66 m
TYPE OF TURBINE	PELTON 38 kW SHAFT OUTPUT
POWERHOUSE DIMENSIONS	5 m X 4 m X 2.7 m





UNA DISTRICT, BLOCK AMB , HIMACHAL PRADESH

WATER SOURCE	KARLUHI
WATER LIFT	26 m
INTAKE TANK	8000 LITRES
DELIVERY TANK	2.88 HEACTARES
AREA COVERED	2.88 HECTARE
COST	1.96 LAKHS
YIELD	40 TO 100 KGS

INTAKE TANK



HYDRAM SYSTEM

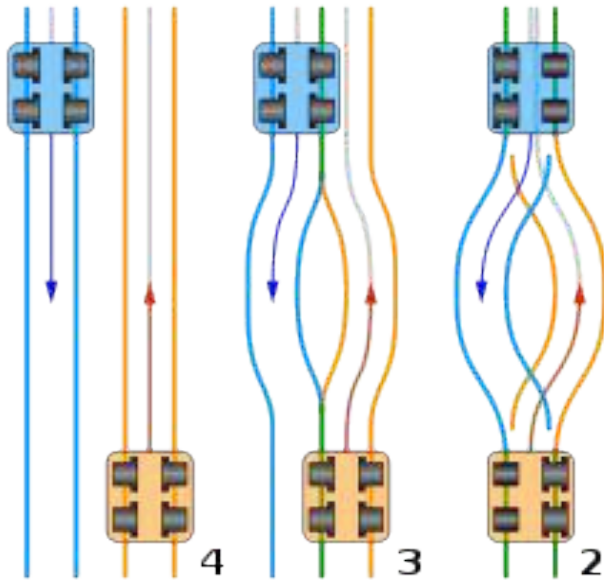


DELIVERY TANK



GADAURA DISTRICT CHAMOLI, UP

ENERGY UTILIZATION EFFICIENCY	35 %
WATER LIFT	30 TIMES WATER HEAD
ENERGY UTILIZATION EFFICIENCY	98 %
WATER LIFT	4 – 10 TIMES WATER HEAD
LOW MAINTENANCE COSTS	ADVANTAGES
LOW TECHNICAL EXPERTISE	
COST COMPARISON	
GRAVITY SYSTEM	20 % MORE
ELECTRIC SYSTEM	35 % MORE
DIESEL SYSTEM	45 % MORE



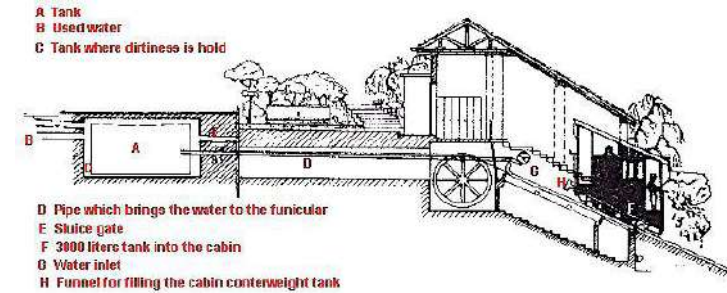
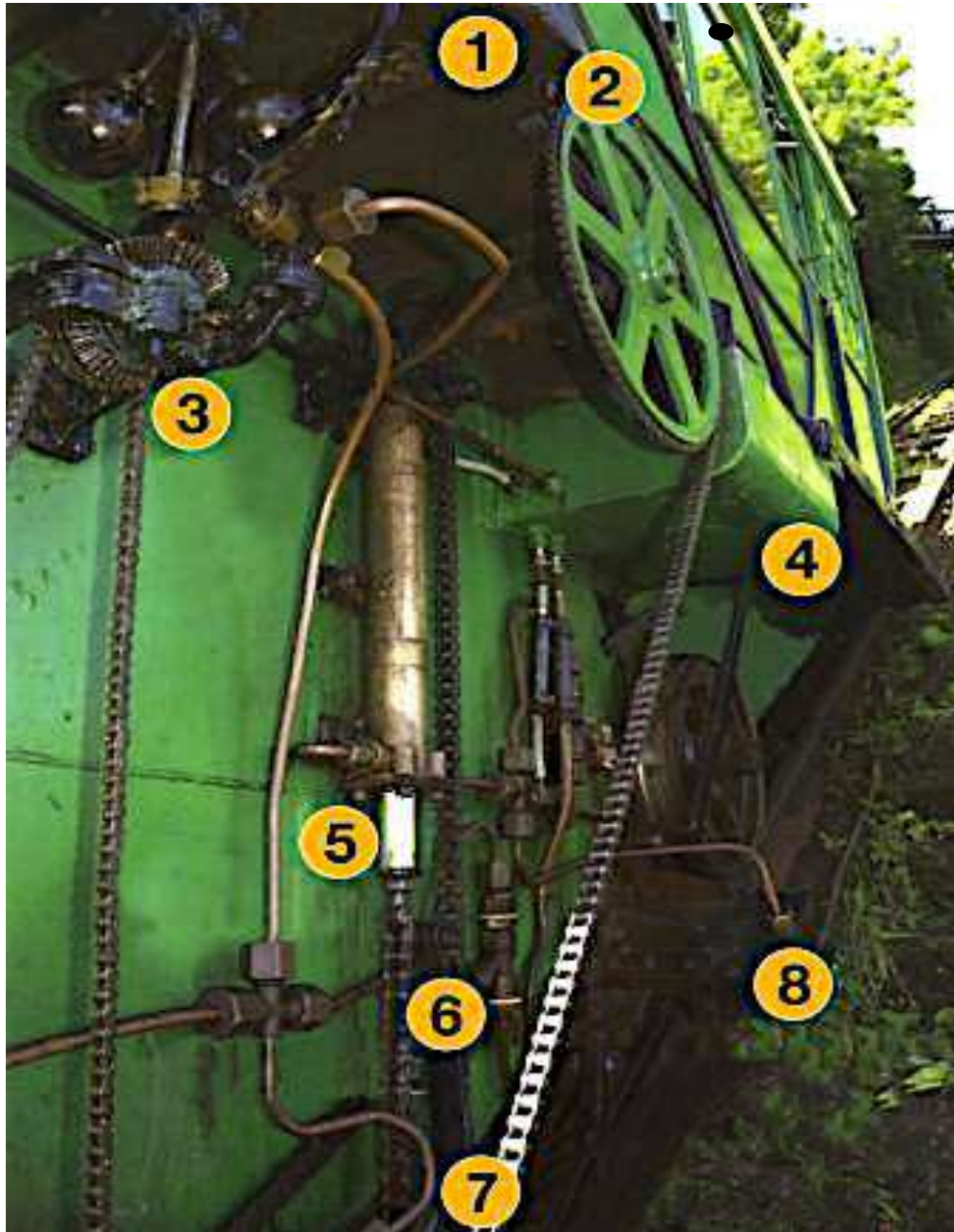
“ A funicular or inclined plane or cliff railway, is a cable railway in which a cable attached to a pair of tram-like vehicles on rails moves them up and down a steep slope; the ascending and descending vehicles counterbalance each other “



START	1992
LENGTH	53 m
GAUGE	1.6 m
DIFFERENCE OF LEVEL	30 m
SLOPE GRADIENT	67.5 %
SPEED	0.7 m/s
CABLES	2 + 1
NUMBER OF CARS	2
WATER TANK	1600 L
CAPACITY	17 PER CAR

ENGINEERING MEASURES

- Run off water stored in reservoir
- Water pipes operated by hydraulic jack
- Upper car should be heavier than bottom car
- Water added to the tank of upper car till car begins to move, 1600 litre
- Automatic filling and movement based on computers
- Based on pull of the cable on the winding drum
- Water released when car arrives at bottom
- Water from bottom reservoir put to top reservoir by hydraulic pump
- Water reused



The Lifts need absolutely no power to operate , water is its motive power. This is not damaged or polluted in any way, just used as ballast and dropped on the beach at Lynmouth about 100 metres away from the river, from which it was taken. The lifts themselves do not create any emissions, their carbon footprint today has not significantly changed since the lift opened, it is probably one of the most environmentally friendly tourist attractions in the country and has been for well over a hundred and twenty years.



1. WATER DISCHARGE PEDAL
2. FOOT BRAKE PEDAL
3. GOVERNOR CONTROLLING FOOT BRAKE
4. BRAKE ACCUMULATOR TANK
5. ACCUMULATOR
6. FOOT BRAKE PUMP
7. FOOT BRAKE
8. MAIN BRAKE ASSEMBLY

SCIENTIFIC CLOSURE PLAN

- Relocation and reformation of existing waste to a 1:3 slope
- Laying construction and demolition waste and compaction
- Laying vegetation layer
- Laying 300mm top soil
- Laying geo composite layer
- Laying 1.5mm geo membrane layer
- Laying 200 gsm and 400 sm geotextile
- Laying 300 mm drainage layer
- Installing landfill gas recovery system – methane
- Methane – power generation of 2mw
- Installing leachate collection system – further sent to sewage treatment plant
- Channelling storm water
- Construction of landscape and roads for recreation



START	1992
POPULATION	12 MILLION
MUNICIPAL SOLID WASTE (MSW)	6500 TONN PER DAY
CONSTRUCTION AND DEMOLITION (C&D) WASTE	2400 TONS PER DAY AT GORAI
WASTE DUMP	2.34 MILLION TONS
DUMP HEIGHT	26 m

MUMBAI SPREAD OVER AN AREA OF 437.71 SQ KM, PROXIMITY TO SEA COAST WITH HIGH HUMIDITY LEVELS, AND TIDAL INUNDATION. CREEK WATERS POLLUTED DUE TO INFLOW OF LEACHATE HARMING THE MANGROVES IN THE VICINITY

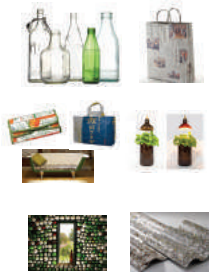


SYSTEMS

WASTE SYSTEM

2

DRY WASTE REUTILIZATION



RE-USE

KEEP THE EXISTING FORM OF THE PRODUCT WITH MINIMAL INTERVENTION INTO ITS STRUCTURE/

RE-PURPOSING

CHANGE THE FORM AND USE OF THE OBJECT UTILIZING ITS STRUCTURAL AND PHYSICAL PROPERTIES

RE-CONSTRUCTION

RETHINK THE USE OF THE PRODUCT AND CHANGE ITS FORM IN A MAJOR WAY

CLEANING

TO MAKE FIT FOR REUSE /RECYCLE

SECOND SEGREGATION

UP CYCLE CENTRE

DIRECT USE WITHOUT PROCESSING
-REUSABLE OBJECTS/CLOTHES
-REUSABLE MATERIALS

RECYCLE CENTER

COLLECTIVE SEGREGATION

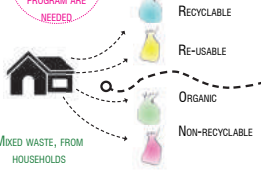
EDUCATION AND AWARENESS PROGRAM ARE NEEDED

UNIT LEVEL SEGREGATION

SMALL SCALE INDUSTRIES
AGRICULTURAL WASTE, SILAGE
RESTAURANTS

BULK WASTE, FROM INDUSTRIES, RESTAURANTS

MIXED WASTE, FROM HOUSEHOLDS



TO COLLECTION SITES

TO BE TREATED SELECTIVELY AND APPROPRIATELY

METHANIZATION

HEATED DIGESTER

DIGESTATE

POST DIGESTER

BIO GAS

DIGESTATE

COMPOSTING

VENTILATED DECANTATION FARM

HYGIENIC CLOSED STORAGE TANK

CLOSED AND VENTILATED STORAGE HALL

VALORIZATION

COMBINED HEAT AND POWER

HEAT NETWORK

ELECTRICITY

ELECTRICAL NETWORK

AGRICULTURAL AND INDUSTRIAL BUILDINGS

HOMES AND PUBLIC BUILDINGS

BIO METHANE

PURIFICATION

COMPRESSED NATURAL GAS VEHICLE

GAS NETWORK

SLUDGE, SEWAGE

MANURE, SLAUGHTERHOUSE WASTE, EFFLUENTS FROM AGRO-FOOD INDUSTRIES

RESTAURANT WASTE

AGRICULTURAL WASTE, SILAGE

SECOND SEGREGATION

RECYCLABLE

RE-USABLE

ORGANIC

NON-RECYCLABLE

RECYCLE CENTER

UP CYCLE CENTRE

COLLECTIVE SEGREGATION

UNIT LEVEL SEGREGATION

DRY WASTE REUTILIZATION

WASTE SYSTEM

2

WET WASTE REUTILIZATION

WATER

WIND

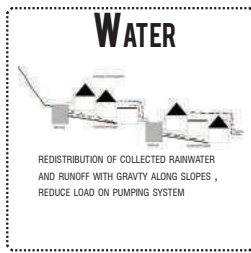
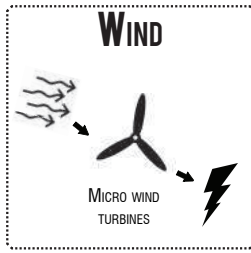
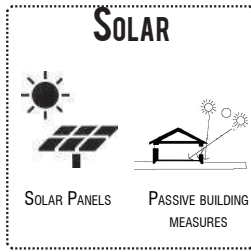
SOLAR

ENERGY SYSTEMS

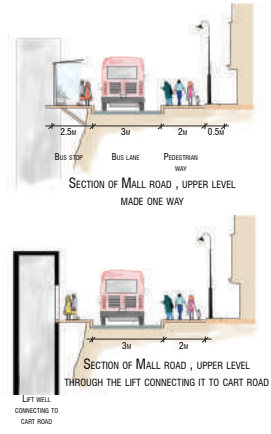
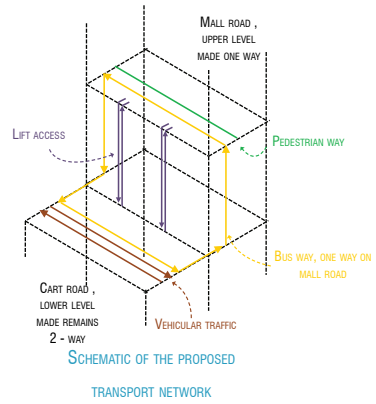
TRANSPORT SYSTEM

WATER SYSTEM

ENERGY SYSTEMS



TRANSPORT SYSTEM



THE PROPOSAL IS TO MAKE THE MALL ROAD AS PEDESTRIAN FRIENDLY AS POSSIBLE, BY REDEFINING THE STREET PROFILE. THIS WILL INCLUDE EXTENDING THE PEDESTRIAN PATHWAY AND RESTRICTING THE ROAD TO BE ONLY A ONE WAY BUS LANE WITH STOPS AT REGULAR INTERVALS.

THE MALL ROAD CONNECTS TO CART ROAD, AT A LOWER LEVEL TO FORM A LOOP. THE CART ROAD REMAINS 2- WAY AND LIFTS AT REGULAR INTERVALS FACILITATE VERTICAL MOVEMENT OF PEOPLE.

AT NIGHT FOR CERTAIN HOURS THE BUS LANE GETS CONVERTED TO A SERVICE LANE.

DISTRIBUTION OF CONSUMPTION:

- DRINKING
- COOKING
- BATHING
- HAND AND FACE WASH
- CLOTH WASH
- UTENSIL WASHING
- TOILET FLUSH
- FLOOR WASH
- GARDENING/ IRRIGATION
- CAR WASH

SUPPLY

155 lpcd + 20 lpcd
MUNICIPAL GRID TANKER

PER CAPITA CONSUMPTION OF WATER = 175 lpcd

NEW REQUIREMENT OF MUNICIPAL WATER = 175- 30 lpcd = 145 lpcd

18% LESS USAGE OF FRESH WATER

RAIN WATER HARVESTING

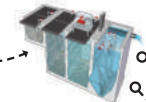
AREA OF HOUSE = 50 m²
COLLECTION FROM ROOF TOP = 0.95(EFFICIENCY)X AREA = 0.95 X 50 = 47.5 m²

ANNUAL RAINFALL = 1200 MM
WATER COLLECTED ANNUALLY = 55000 L
PER DAY = 150 L

PER CAPITA (FAMILY OF 4) = 30 lpcd



SEWAGE GENERATED = 75% OF WATER CONSUMED



RECHARGE

INTO PITS INTO THE RIVER

TREATED WATER = 40 % OF SEWAGE

BIO FILTRATION / POLISHING POND

GENERATE ELECTRICITY

OUTFLOW INTO TURBINES



IRRIGATION

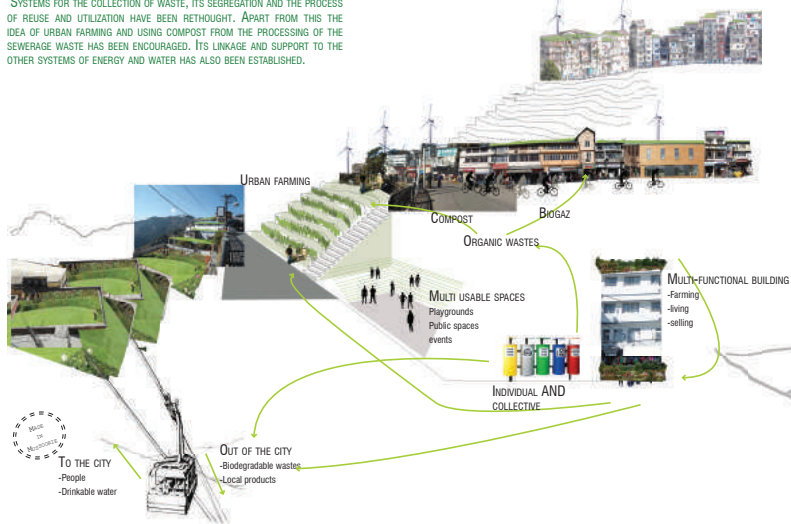
PUBLIC USE

VISIONS

ORGANIC CITY

SYSTEMS FOR THE COLLECTION OF WASTE, ITS SEGREGATION AND THE PROCESS OF REUSE AND UTILIZATION HAVE BEEN RETHOUGHT. APART FROM THIS THE IDEA OF URBAN FARMING AND USING COMPOST FROM THE PROCESSING OF THE SEWAGE WASTE HAS BEEN ENCOURAGED. ITS LINKAGE AND SUPPORT TO THE OTHER SYSTEMS OF ENERGY AND WATER HAS ALSO BEEN ESTABLISHED.

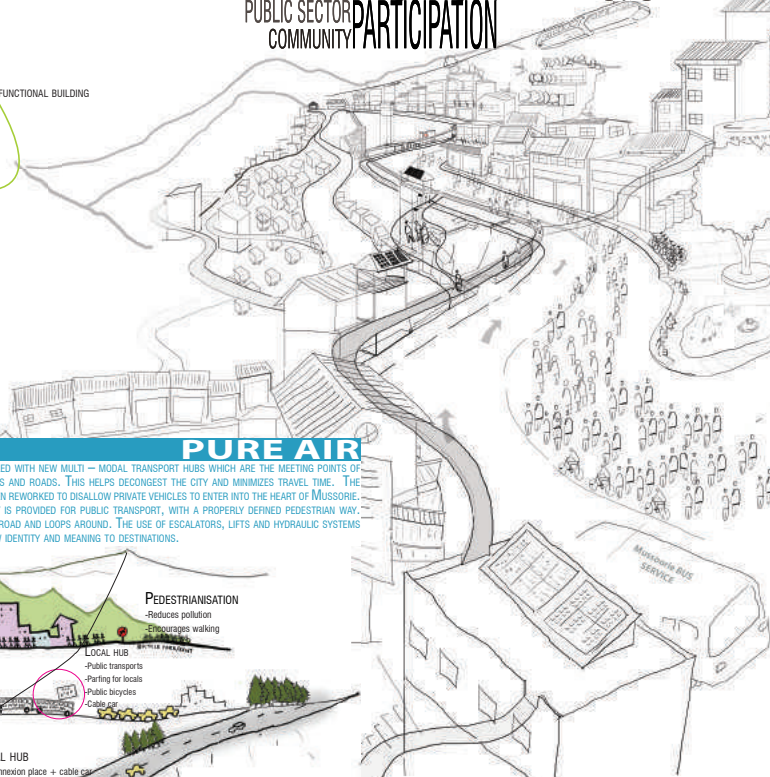
KITCHEN GARDEN ROOF GARDENS
ORGANIC PACKING LOCAL PRODUCTION BIOGAS
EDIBLE GARDEN ORGANIC FUEL SEPARATION OF WASTES
SOLAR PASSIVE ENERGY COMPOST PERMACULTURE



GOVERNANCE SMART TECHNOLOGIES

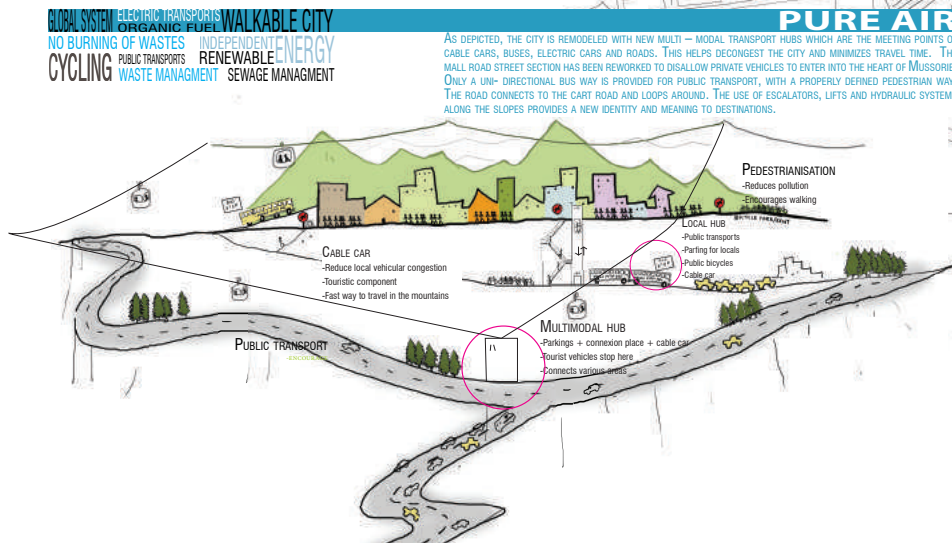
POLICY REVISION

PUBLIC SECTOR COMMUNITY PARTICIPATION



PURE AIR

AS DEPICTED, THE CITY IS REMODELED WITH NEW MULTI-MODAL TRANSPORT HUBS WHICH ARE THE MEETING POINTS OF CABLE CARS, BUSES, ELECTRIC CARS AND ROADS. THIS HELPS DECONGEST THE CITY AND MINIMIZES TRAVEL TIME. THE MAIN ROAD STREET SECTION HAS BEEN REWORKED TO DISALLOW PRIVATE VEHICLES TO ENTER INTO THE HEART OF MUSSORIE. ONLY A ONE-DIRECTIONAL BUS WAY IS PROVIDED FOR PUBLIC TRANSPORT, WITH A PROPERLY DEFINED PEDESTRIAN WAY. THE ROAD CONNECTS TO THE CART ROAD AND LOOPS AROUND. THE USE OF ESCALATORS, LIFTS AND HYDRAULIC SYSTEMS ALONG THE SLOPES PROVIDES A NEW IDENTITY AND MEANING TO DESTINATIONS.



VERTICAL MOVEMENT CAPILLARY SYSTEM
RAINWATER PURIFICATION DRINKABLE
CLEAN RE-USE
SEWAGE TREATMENT PLANTS
CLIMATE CONTROL PONDS
PERMANENT GRAVITY SYSTEM

SMART WATER

THE PERSISTENT WATER SCARCITY LEADS TO THE DEVELOPMENT OF SYSTEMS TO HARNESS WATER FROM RAIN AT A HOUSING LEVEL AND TO TREATING SEWAGE WATER CENTRALLY TO THE EXTENT THAT IT CAN BE USED FOR PUBLIC USES, LIKE FLUSHING AND WATERING PLANTS. FOCUS IS ALSO LAID ON REPLENISHING THE VERY SOURCES OF WATER BY UTILIZING THE NATURAL SLOPES AND COUNTOURS TO COLLECT SURFACE RUNOFF FROM RAINWATER AT VARIOUS CATCHMENT POINTS TO RECHARGE THE SPRINGS.



3 SCENARIOS FOR A FUTURE VISION

PURE AIR -

IN THIS SCENARIO FOR THE CITY, THE PRISTINE AIR QUALITY OF THIS MOUNTAIN CITY IS HOPED TO BE PRESERVED BY TACKLING THE PROBLEMS OF AIR POLLUTION WHICH PERSIST IN THE VARIOUS PHASES OF THE CITY. POLLUTION BY VEHICLES IS A MAJOR CONTRIBUTOR IN THIS RESPECT FOLLOWED BY BURNING OF COAL AND WASTE RELATED STEVOR. HENCE, THE URBAN TRANSPORT HAS BEEN REDEFINED RADICALLY AND RETROFITTED FOR A PEDESTRIAN FRIENDLY SYSTEM RATHER THAN ONE WHICH FAVORS VEHICULAR MOVEMENT.

SMART WATER -

EXPLORING THE THEME OF EFFICIENT AND SMART WATER SYSTEMS, DEMANDS A MORE CRITICAL LOOK AT THE VARIOUS SOURCES OF WATER AND WAYS OF TREATMENT AND REUSE OF WATER FOR MEETING THE DEMANDS OF VARIOUS PROCESSES. MOUNTAINS OFTEN HAVE AN ABUNDANCE OF FRESHWATER, WHICH IS NOT THE CASE FOR MUSSORIE.

ORGANIC CITY-

PROCESSES FORM A VITAL COMPONENT OF ANY SYSTEM. HENCE THIS SCENARIO FOCUSES ON THE VARIOUS INPUT AND OUTPUT PROCESS OF THE MOUNTAIN CITY. FROM THE VERY BIRTH OF THE ELEMENT TO ITS FINAL FORM, THE CRADLE TO CRADLE THEORY HAS BEEN APPLIED TO CERTAIN PROCESSES OF THE CITY.

Appendix 7

Presentation by Ms. Anjali Pancholy, MOUD, GOI

Development of Mountain Cities

Perspectives for Urban Development in India

Anjali Pancholy

Associate Town & Country Planner

Town & Country Planning Organization

Ministry of Urban Development, Govt of India

20.01.2014



Definition of Mountain Cities in India

- No clear cut classification
- Known as Hill Stations in popular perception
- Planning Commission defined hill area as those with elevation of 600 m and above, later in 1985, any area with slope of 30% and above was classified as hilly.
- Hill Area Development Programme uses the 981 definition.
- Therefore Cities in these states can broadly be called mountain cities.
- There is a need for slope criteria besides the altitude criteria.

Studies of Mountain Cities in India

- There are a number studies/ theses reports etc. on individual mountain cities/ towns
- ITPI – two conferences dealing with hill areas – 1994 (Coimbatore) and 2003 (Shimla)
- UDPFI Guidelines make some statements about planning in Hill Areas
- However no comprehensive literature exist for identifying the problems, issues and planning requirements of mountain cities



Classification of Mountain Cities in India

Functional Classification

- Pilgrimage Cities – Haridwar, Rishikesh, Badrinath, Kedarnath
- Tourist Resorts – Manali, Mahabaleshwar
- Administrative Capitals – Shimla, Shillong, Kohima
- Market and Trading Centre, Industrial Centres – Solan, Mandi, Almora
- Plantation Cities – Ooty, Darjeeling
- Educational and Health Centres – Nainital, Shimla, Darjeeling
- Military Cantonments

Classification on the basis of site and physiography

- Cities along spurs and ridges – Shimla, Almora
- Cities in valleys – Dehradun, Kathmandu

Classification based on history

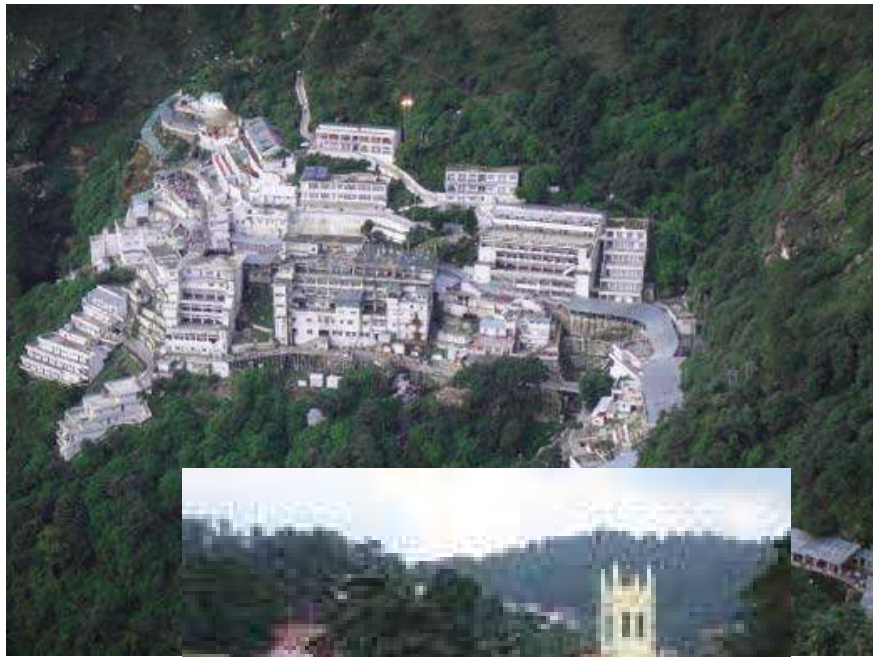
- Pre-British Traditional Towns and Capitals of Kingdoms – Chamba
- Cities founded by the British – Hill Stations like Shimla, Dalhousie
- Post Independence Cities – New Tehri



Historical Aspects of Mountain Cities in India

- Mountain Cities originally associated with **religion and mysticism**
- Colonisation and their so-called discovery by the British led to establish of **hospitals and educational institutions** first, followed by **administrative institutions** – Shimla is an ideal example.
- Some mountain cities started off as collection and trading centres for agricultural, horticultural or **plantation** produce of the surrounding areas
- **Tourism** has been an important driver of the development of mountain cities
- In recent times, the formation/ grant of statehood to the North-East States has provided fillip to the growth of the North-East Mountain Cities as **State Capitals**
- Large projects and associated displacement, such as Tehri Dam, have also led to formation of new cities





Constraints in Development of Mountain Cities

- Basically, mountain cities have been slow to develop due to
 - **Site constraints** and lack of buildable land
 - **Accessibility constraints** and difficulty of transporting people and goods
- Mountains are also more vulnerable to **natural disasters**. The Himalayas are highly prone to earthquakes, landslides and flash floods.
- Most mountainous regions also repositories of biodiversity and ecologically fragile
- Rampant city development could have disastrous consequences if unplanned and unchecked.
- But in recent decades, rapid and unbridled urbanisation has made settlements even more vulnerable to natural & man-made disasters. According to a statistic, the Himalayas have the **highest density of population** as compared to any other mountain region in the world.
- Ref: Uttarakhand cloudburst 2013 and Ladakh disaster 2010; devastating earthquakes have occurred with surprising regularity in the Himalayas
- It is the **poor** who are left most vulnerable. Almost 70% of the 210 million people who live in the greater Himalayan region live in poverty.



Problems of Urban Development in Mountain Cities

- Other problems plague the development of mountain cities, such as:
- High population growth and urban sprawl – in-migration from surrounding areas
- Traffic and transportation problems
- Scarcity of water and difficulty of providing water supply, iron contamination of water
- Solid waste management problems – dumping on hillsides
- Waste water disposal
- The **high degree of informality** is apparent in everything – from basic services to tourism infrastructure
- Other not-so-apparent problems: loss of green cover and bio-diversity, concretization of slopes and natural drainage, occupation of marginal land
- Despite its reputation as the “water tower of Asia”, most of the Himalayas’ high-altitude cities already struggle with **water shortages** in the dry season. **Climate change and shifting rain patterns** have compounded new population pressures. This not only affects drinking supply, but also has impacts in areas such as hydropower.



Demographics

City/Town	2001			2011			Decadal Growth Rate		
	State	Civic Status	Population	State Urban Population	Share of State Population (%)	Population (provisional)		State Urban Population	Share of State Population (%)
Srinagar	Jammu & Kashmir	UA	971357	2516638	39%	1192792	3433242	35%	23%
Shimla	Himachal Pradesh	UA	144578	595581	24%	169758	688552	25%	17%
Dehradun	Uttarakhand	UA	527859	2179074	24%	578420	3049338	19%	10%
Gangtok	Sikkim	NTA	29162	59870	49%	98658	153578	64%	238%
Guwahati	Assam	UA	814575	3439240	24%	968549	4398542	22%	19%
Shillong	Meghalaya	UA	267881	454111	59%	354325	595450	60%	32%
Itanagar	Arunachal Pradesh	CT	34970	227881	15%	59490	317369	19%	70%
Aizawl	Mizoram	NT	229714	441006	52%	291822	571771	51%	27%
Agartala	Tripura	MCI	189327	545750	35%	399688	961453	42%	111%
Kohima	Nagaland	TC	78584	342787	23%	n.a.	570966	n.a.	n.a.
Imphal	Manipur	UA	245967	575968	43%	414288	834154	50%	68%

Source: Census of India 2001 and 2011 (provisional)



Government of India Initiatives -

- Hill Area Development Programme
- North East Development Programme
- Western Ghats Development Programme

There is also the United Nations'
International Partnership for Sustainable
Development in Mountain Regions



Two Important Factors

to remember while planning for Himalayan Cities

- the vulnerability of the region and
- the important role the mountain range plays in regulating global climate



Special Development Needs of Mountain Cities

UDPFI Guidelines 1996, though far from comprehensive, recognize the special requirements of planning in hill cities, through:

- Lower developed area density parameters
- Different pattern of landuse, with larger provisions for residential and ecological landuses and smaller for industrial and transportation landuses
- Provision of land for commercial activities in tourist centres, board and lodging requirements and informal sector (informal eating places and shops selling local specialities) on the basis of tourist inflow figures

UDPFI Guidelines are currently under revision.



Suggested Planning Norms for Mountain Cities

Since it is an ecologically fragile area, only **carrying capacity** based development should be proposed, with not only planning parameters but also **aesthetic** and **cultural parameters** taken into consideration. For example, care should be taken to regulate buildings styles so that they conform to traditional facades that match the temple building and merge with surrounding landscape.

Delineation of area for development should be made considering **land suitability analysis** including physical factors such as soil, geology, rock types, geomorphology, topography, slope, etc. Remote sensing & GIS technology should be used for generating maps at appropriate scale. **Micro zonation** of delineated area should be carried out before planning for development.

Proper **policy, institutional and legislative framework** has to be created for preparation of Comprehensive Development Plan and its implementation keeping in view the natural hazard proneness of the area



- **Economic activity and tourist arrivals** should be regulated as per comprehensive development plan prepared for this purpose with various stake holders. Separate arrangements must be made for low-cost informal sector.
- **Land Use Zoning:** The main purpose of the land use zoning is to provide regulations for development of a particular area to serve the desired purpose efficiently and to preserve its character. It also provides guidelines for the kind of buildings to be constructed. Zoning regulations are legal tools for guiding the use of land and protection of public health, welfare and safety. Such regulations also include provisions for the use of premises/property and limitations upon shape, size and type of buildings that are constructed or occupy the land. Further, these provide both horizontal as well as vertical use of land. These regulations also improve the quality of life.



- While formulating **Comprehensive Development Plan** priority should be given for **Environmental Management and Disaster Management**. The following restrictions and conditions may be proposed for future activities.
 - No construction should be ordinarily undertaken in areas having slope above 30% or areas which fall in landslide hazard zones or areas falling on the spring lines and first order streams identified by the State Government on the basis of available scientific data.
 - Construction may be permitted in areas with slope between 10% to 30% or spring recharge areas or old landslide zones with such restrictions as the competent authority may evolve.
 - Prepare detailed contour plan of the area of 1:5000 or larger showing contours at interval of 0.2 to 0.5 metre;
- Regulations for **disaster mitigation** - development control, building regulations/bye-laws for natural hazard prone areas should be followed in the proposed development.



Famous Mountain International Cities

Davos & Bogota

These two exemplify two diverse types of development – one located in a developed country with a high per capita income and the other in a developing country with a relatively low GDP and per capita income.

The former is a world class ski resort and convention centre, the latter a national capital and a sprawling city facing pressures of all kinds.

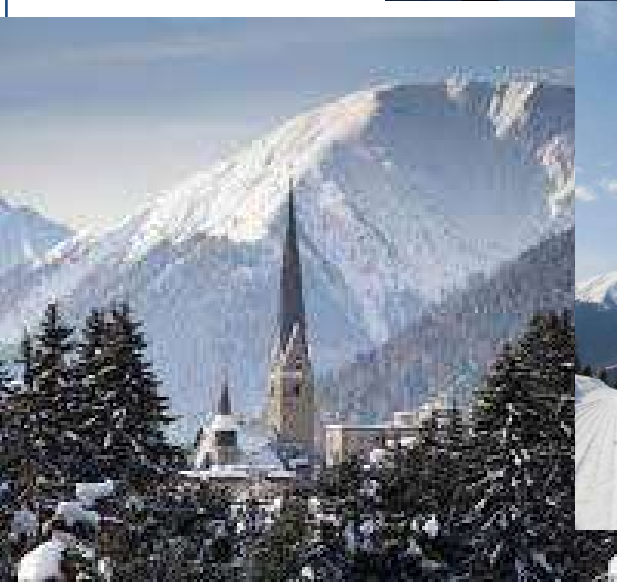
Alpine mountain cities

North American mountain cities

South American mountain cities

Japanese mountain cities





Thank you

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TCPO website: www.tcpomud.gov.in



Appendix 8

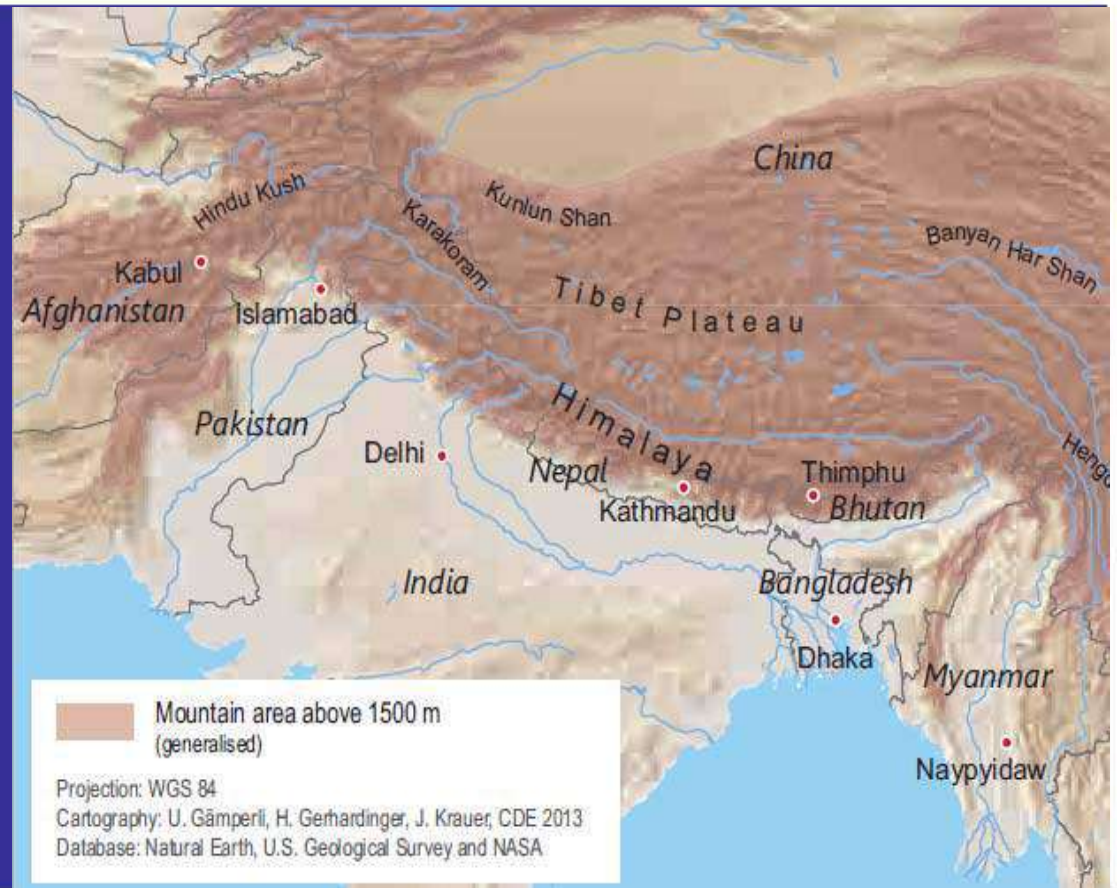
Presentation of EBTC

by Mr. Monish Verma



European Business and Technology Centre

EU's Mountain Agenda Urban Cleantech Collaboration



Innovative bottom-up project development for Mountain Cities

Monish Verma, Environment Sector Specialist , EBTC, New Delhi, India
January 20, 2014, *LBSNAA, Mussorie*

www.ebtc.eu

EBTC's Urban Cleantech Collaboration



1. About EBTC

2. Mountains - Europe's Ecological Backbone



EBTC is dedicated to promoting EU clean technologies in India



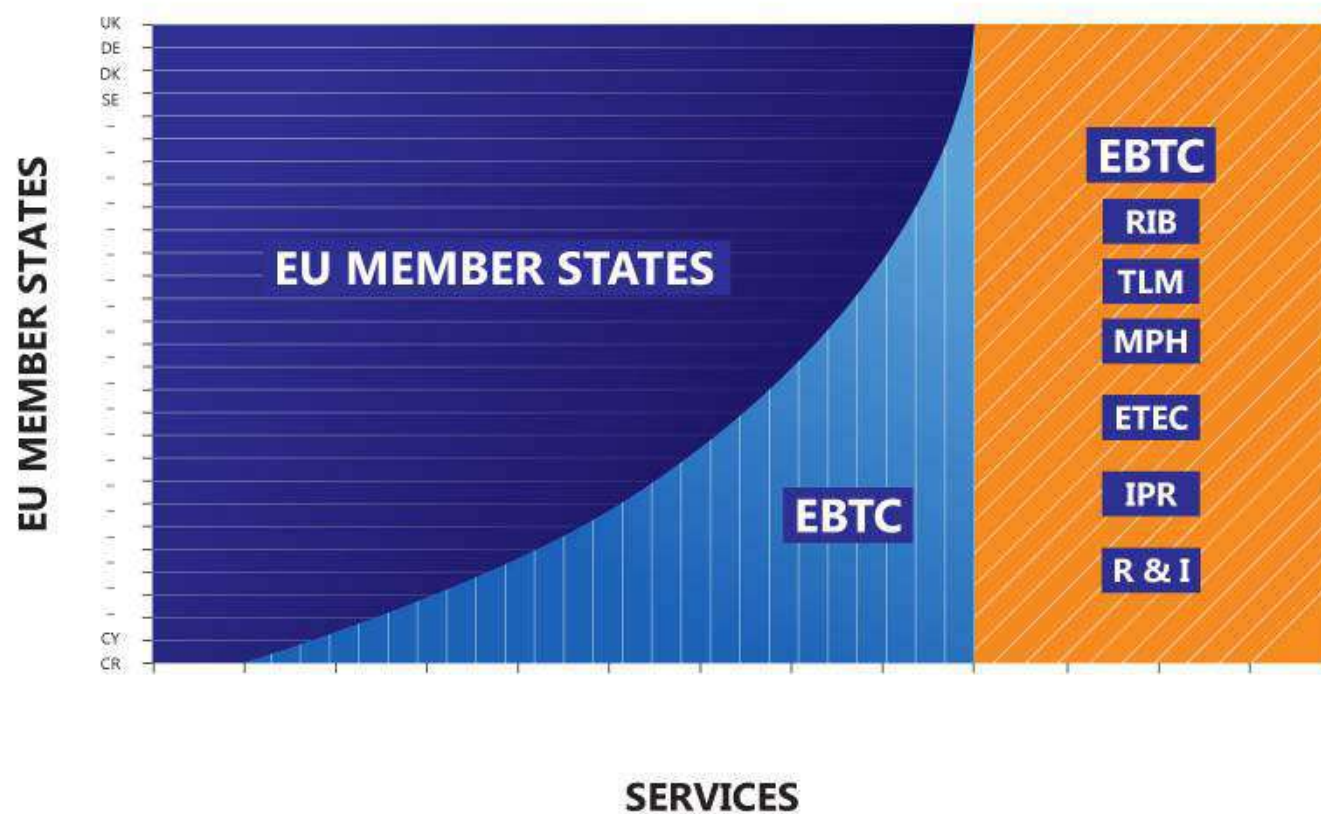
- EBTC works complementarily with existing EU efforts in India.
- EBTC provides tailored services ranging from market exploration to establishment in the Indian market. It provides, notably:
 - comprehensive market insight,
 - help in market access issues,
 - inroads for entrants,
 - identifying projects and partners
 - advice on market entry strategy
 - business and technology incubation.
- EBTC is the nodal point in India of the **Enterprise Europe Network (EEN)**

EBTC in short

- 4 sectors: **Biotech, Energy, Environment and Transport**
- 4 offices: **New Delhi, Mumbai, Bengaluru and Kolkata**
- 20 staff including 4 sector experts & IPR expert
- 30 partners, based in Europe and India
- 22 cooperation agreements between companies facilitated
- 300+ delegates from 24 EU states, including via 12 Flagship missions and 9 Focus missions
- 100+ project briefs on EBTC website



EBTC Services – Value add



➔ Creating value, addressing gap, being complimentary to existing efforts

The approach to value creation: from B2B ideas to market access

*Connecting SMEs
from EU and India
on a web platform*

**Enterprise
Europe
Network**

*Exploring
commercial
potential of
research ideas*

**Research
Innovation
Business**

*Adapting and
localizing mature
technologies to Indian
context*

**Technology
Localization
Model**

*Ensuring technological
validation through
demo*

**Making
Pilots
Happen**

EBTC is EEN's
node in India

FP7
Horizon 2020

A unique model
being developed
with EBTC
partner

IWDP
India Water
Development
Programme



Developing a set of platforms and channels for companies, clusters, investors, research institutions and technology developers

Urban Cleantech Collaboration in EBTC's WP6 2014



Objective:

As cities grow there is an increasing need for clean technologies to enable their transition to more sustainable (cleaner and greener) future. Else, the economic dynamism that cities bring will be vitiated.

Description:

To leverage the Greening Cities activity (WP5), EBTC intends to collaborate with international bodies and selected Indian cities to explore ways for using EU clean technologies in energy, environment and mobility sectors. Some activities include:

- To develop a sustainable development strategies which focuses on mitigation and adaptation strategies for climate change as well as energy provision and efficiency for developing Indian megacities on one hand and the furiously growing Tier II/III towns/cities in India.
- To use EU expertise and technologies to select and implement pilot projects

Outcome:

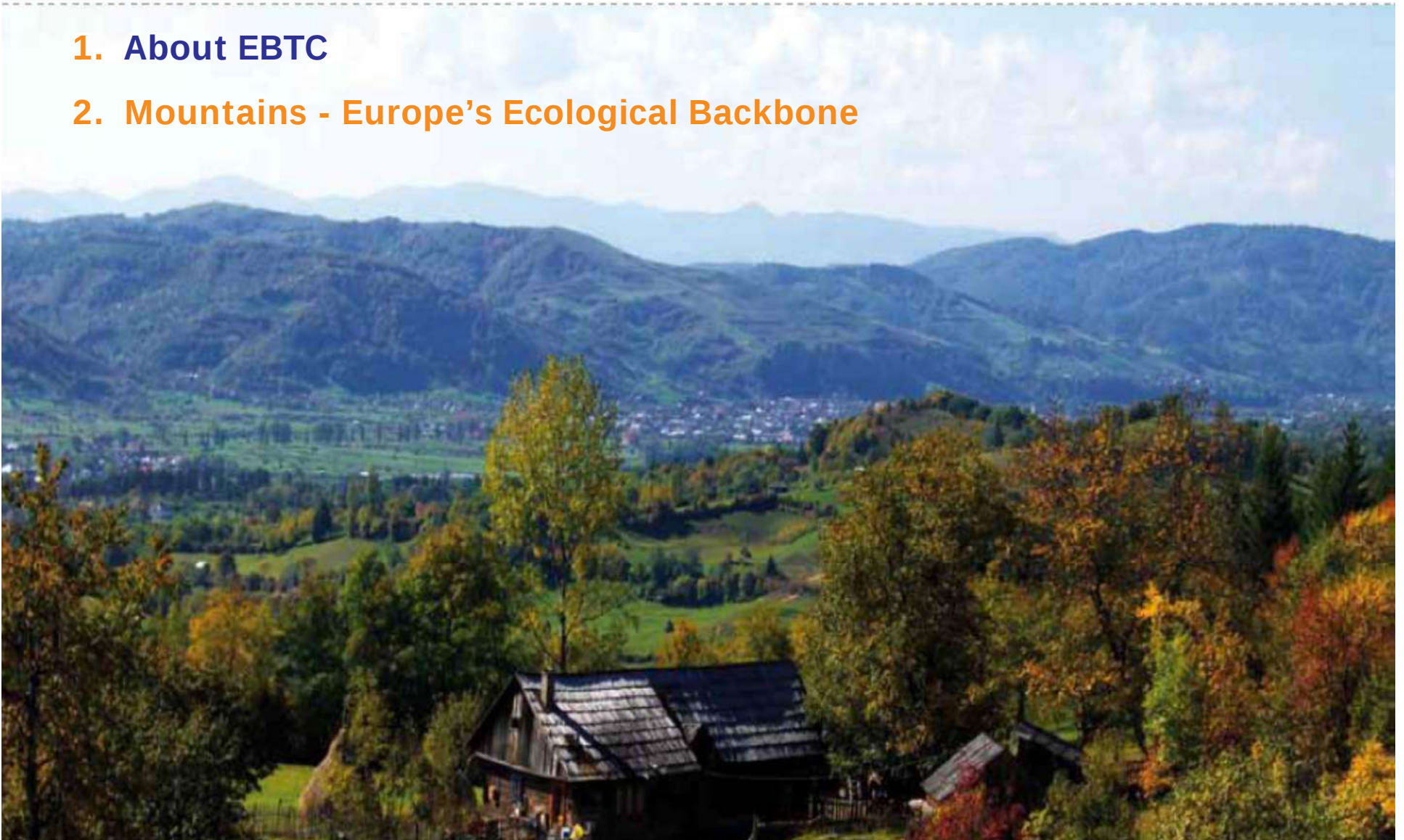
Build EU-India city partnerships, participate in urban projects/initiatives in select cities

EBTC' Urban Cleantech Collaboration



1. About EBTC

2. Mountains - Europe's Ecological Backbone



Europe's ecological backbone: recognising the true value of our mountains



© M. Price

Mountains (36 % of Europe's area) are often recognised as areas with permanent natural handicap – steep slopes, less fertile soils, extreme climate, remote location

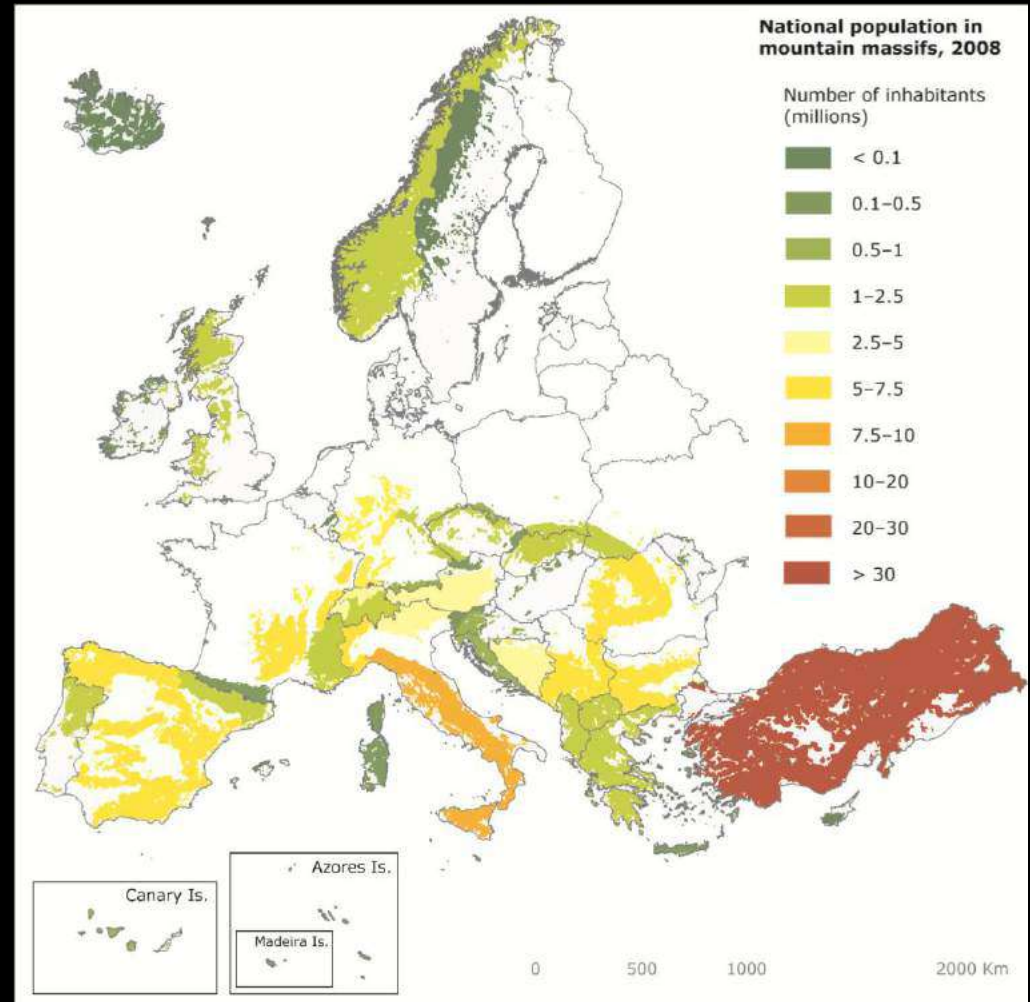


© M. Price



Mountains – population unevenly distributed, increasing but also depopulating in certain areas

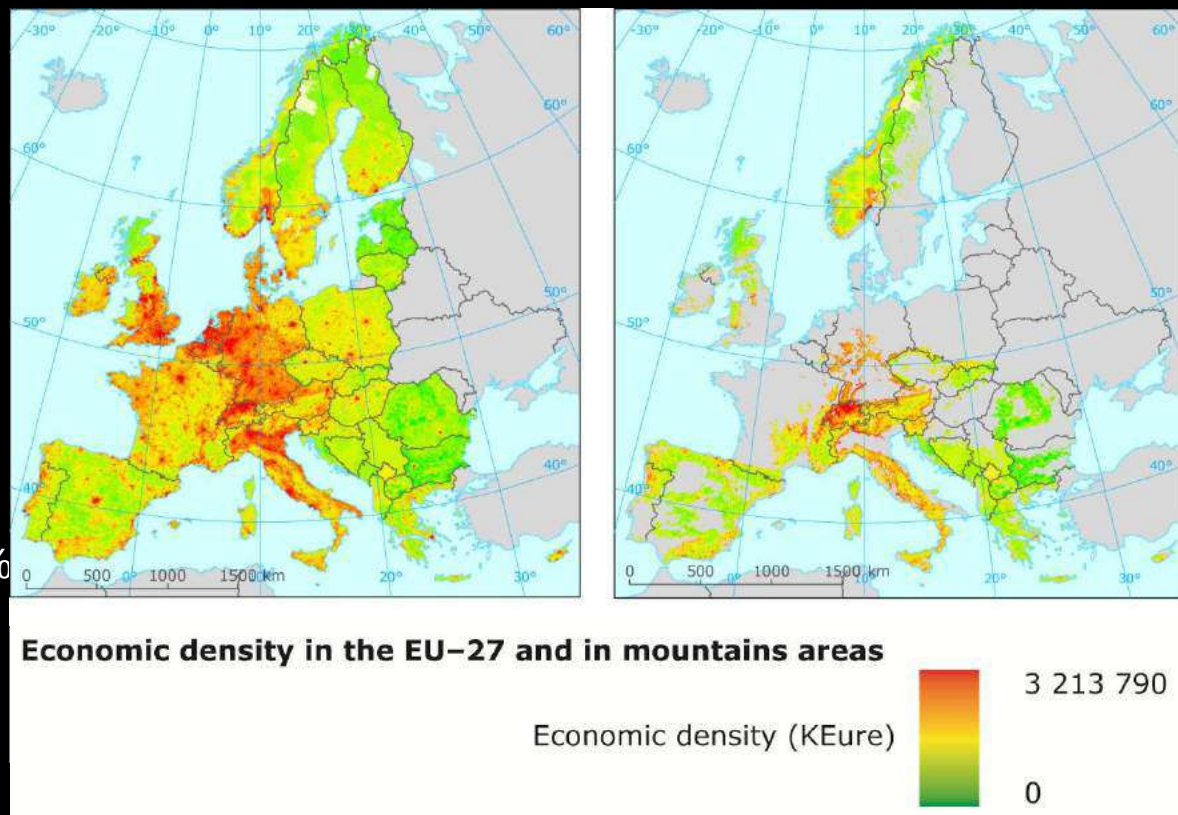
But 118 million people live in mountains (including Turkey) and 10 countries have at least half of their population living in mountains



Mountain economy –
forestry, agriculture,
manufacturing and
services

Land cover

forest 41 %,
pasture and mosaic farmland 16 %
natural grasslands 15 %
unvegetated open space 14 %



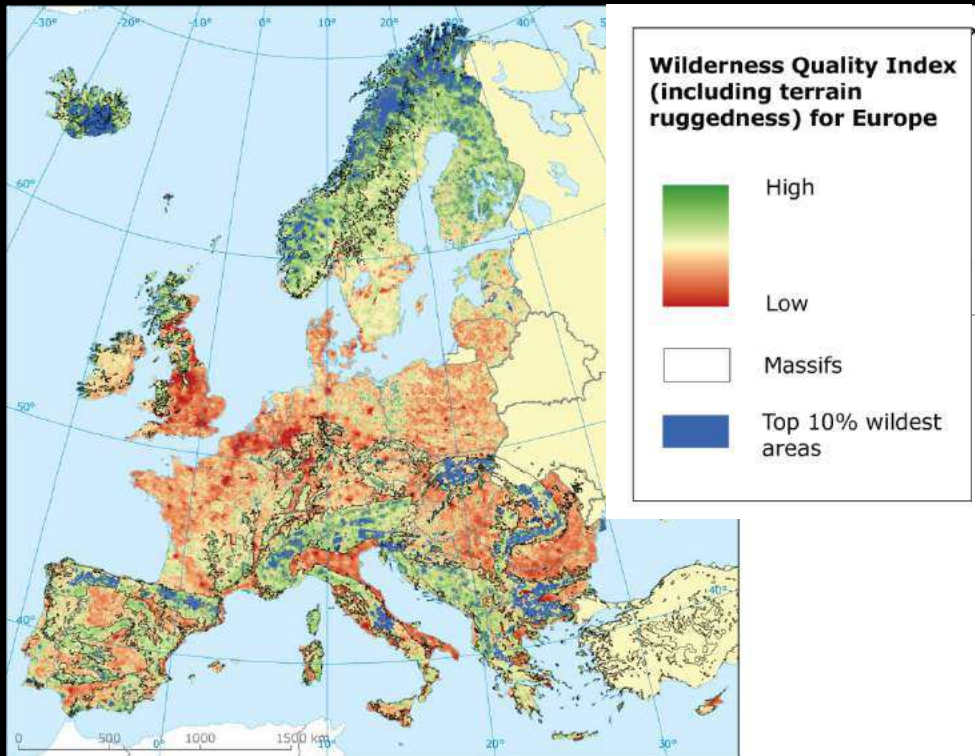
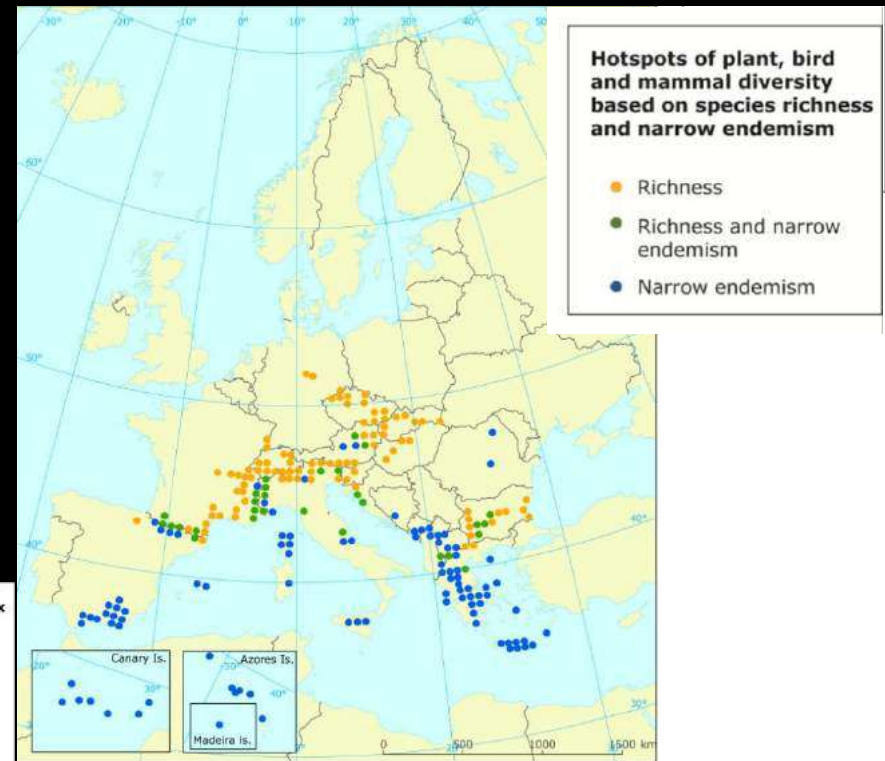
© B. Olah



Mountains are rich in biodiversity

16 % of Habitats Directive species live exclusively and other 11 % mainly in mountains

18 % of habitat types are linked to mountains, other 39 % occur in mountain areas

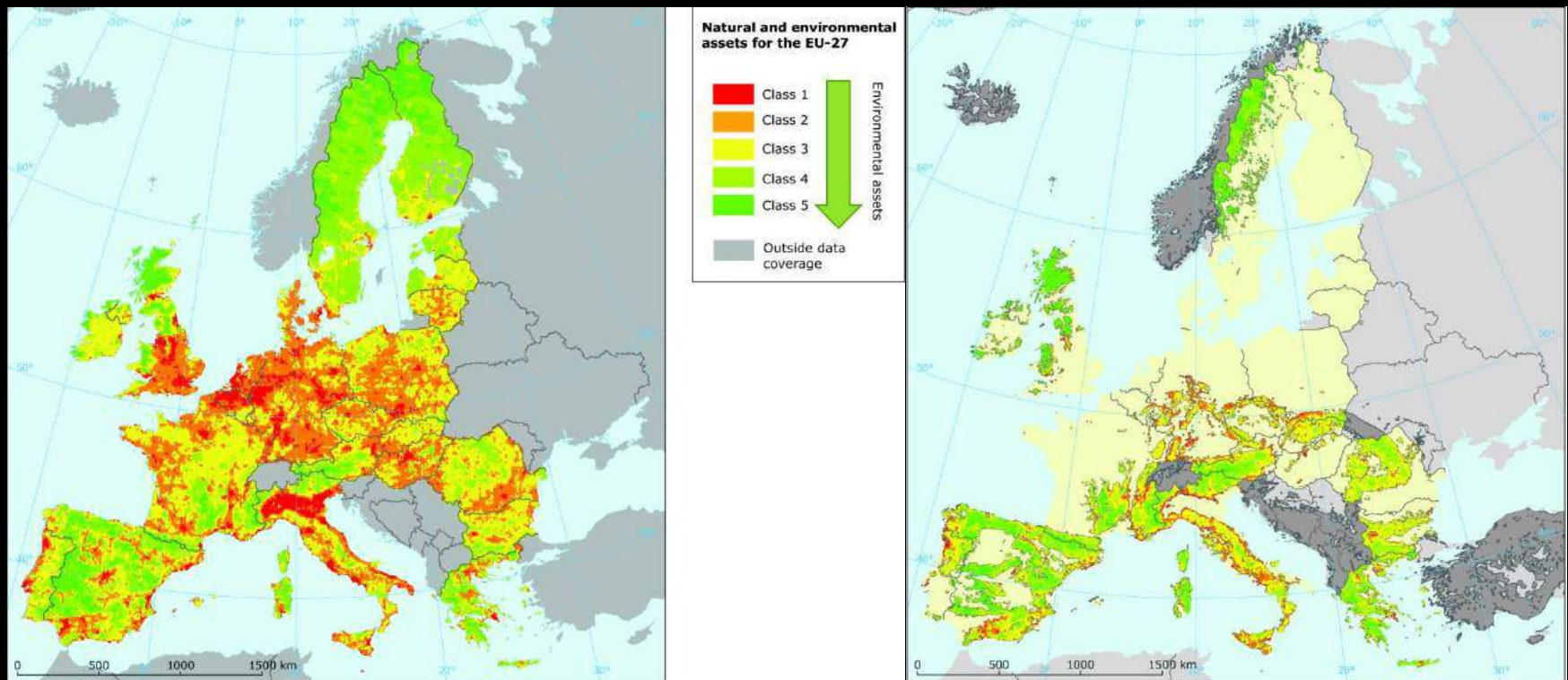


© P. Sackl



Mountains have, on average, better environmental quality than non-mountain areas

Based on economic density and accessibility, HNV farmland, proximity to natural areas, air quality and degree of soil sealing



Mountains provide essential ecosystem services

Ecosystems	Agro ecosystems	Forests	Grasslands	Heath and scrubs	Wetlands	Lakes and rivers
Provisioning						
Crops/timber	↓	↑			↓	
Livestock	↓	=	=	=	↓	
Wild Foods	=	↓	↓		=	
Wood fuel		=		=		
Capture fisheries					=	=
Aquaculture					↓	↓
Genetic	=	↓	↓	=	=	
Fresh water		↓			↑	↑
Regulating						
Pollination	↑	↓	=			
Climate regulation		↑		=	=	=
Pest regulation	↑		=			
Erosion regulation		=	=	=		
Water regulation		=		↑	↑	=
Water purification					=	=
Hazard regulation					=	=
Cultural						
Recreation	↑	=	↓	↑	↑	=
Aesthetic	↑	=	=	=	↑	=
Status for period 1990–present ■ Degraded ■ Mixed ■ Enhanced ■ Unknown □ Not applicable						

Trend between periods

↑ Positive change between the periods 1950–1990 and 1990 to present

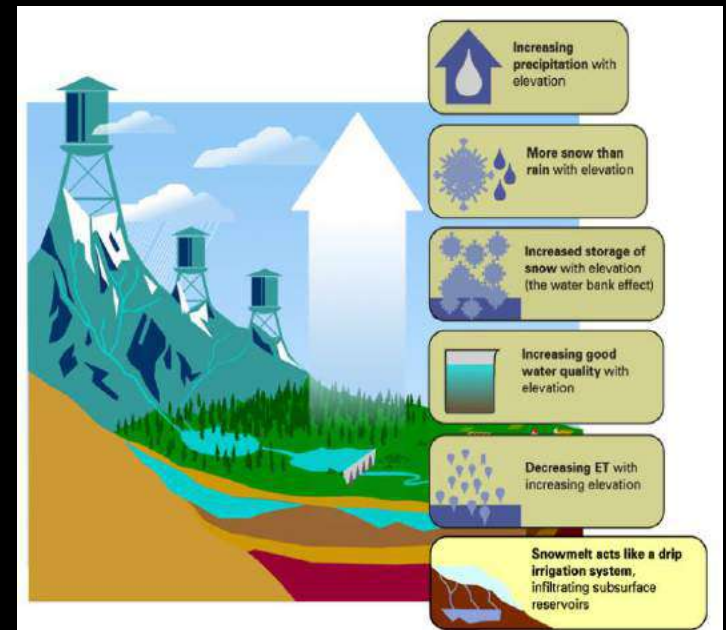
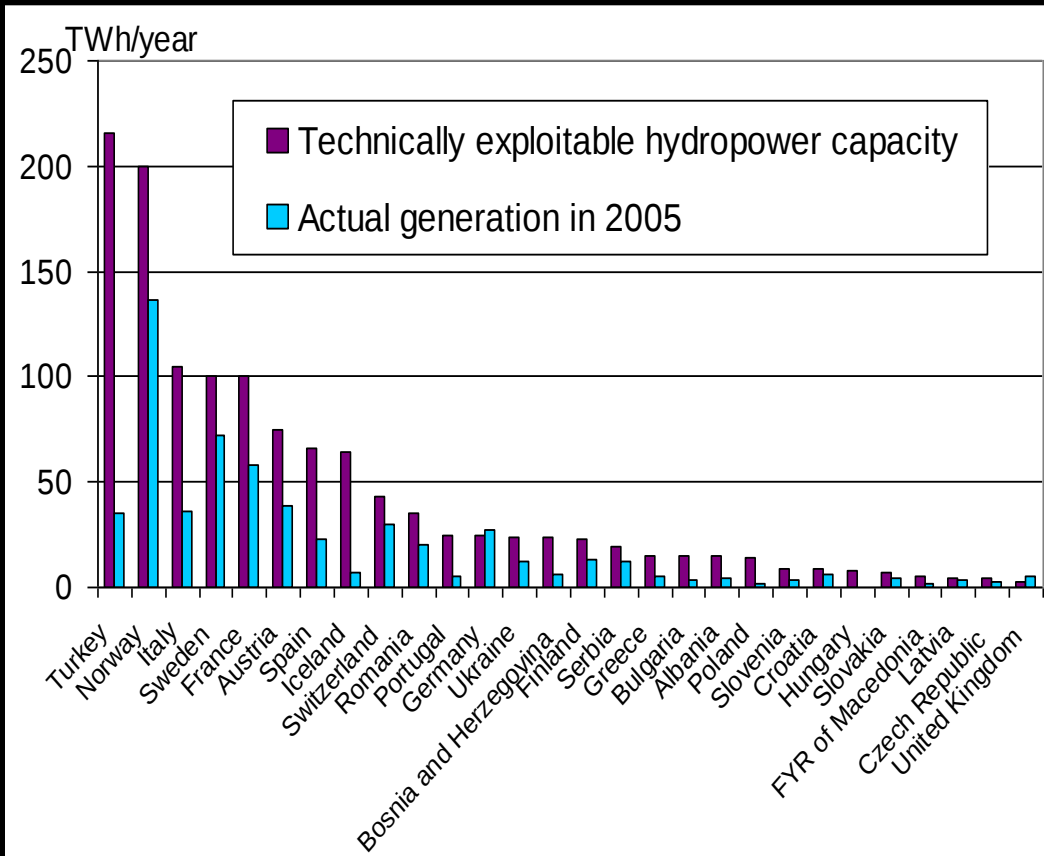
↓ Negative change between the periods 1950–1990 and 1990 to present

= No change between the two periods

degrading - the loss of biodiversity often reduces productivity of ecosystems



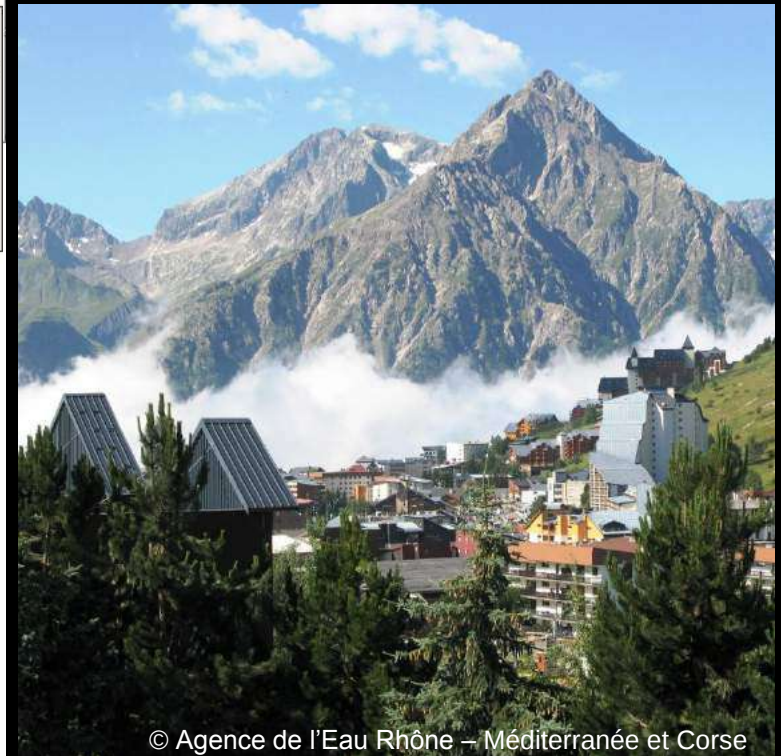
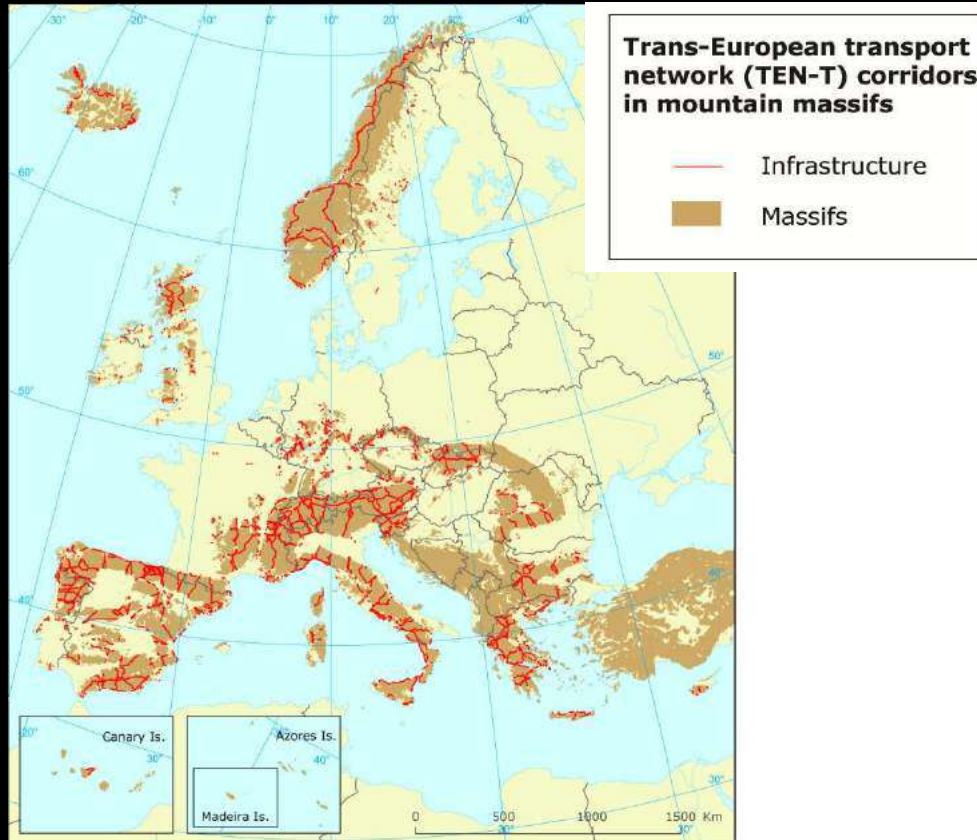
Mountains are a significant resource of water and renewable energy for whole Europe



Threads

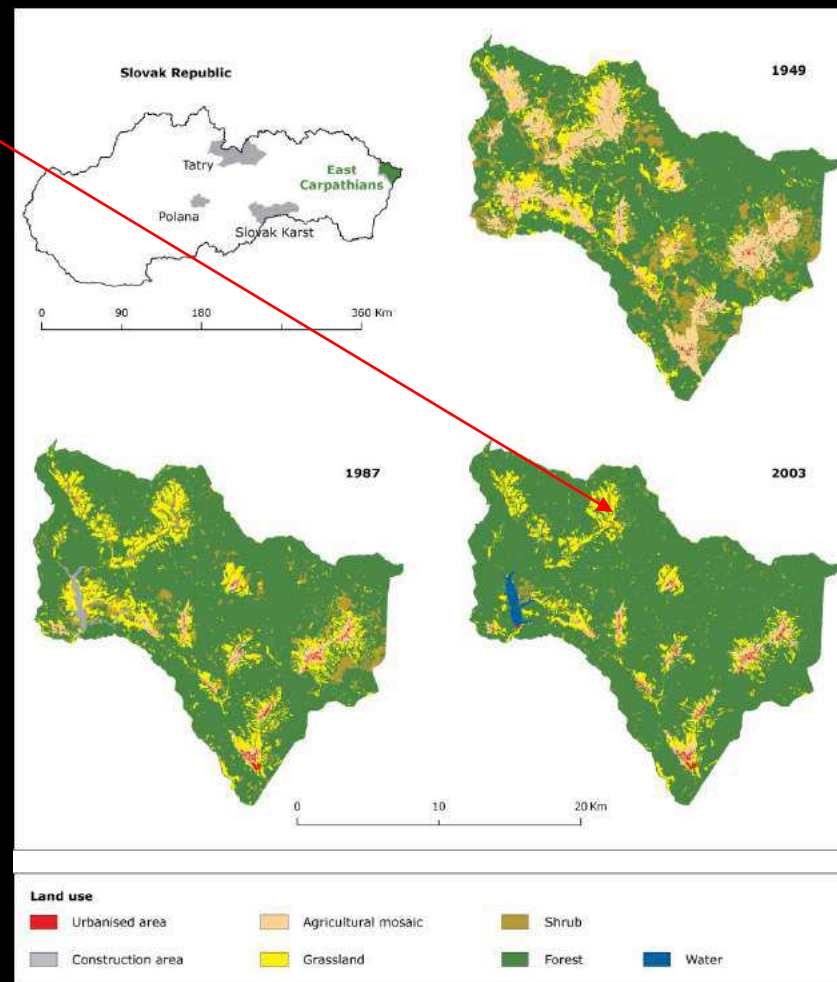
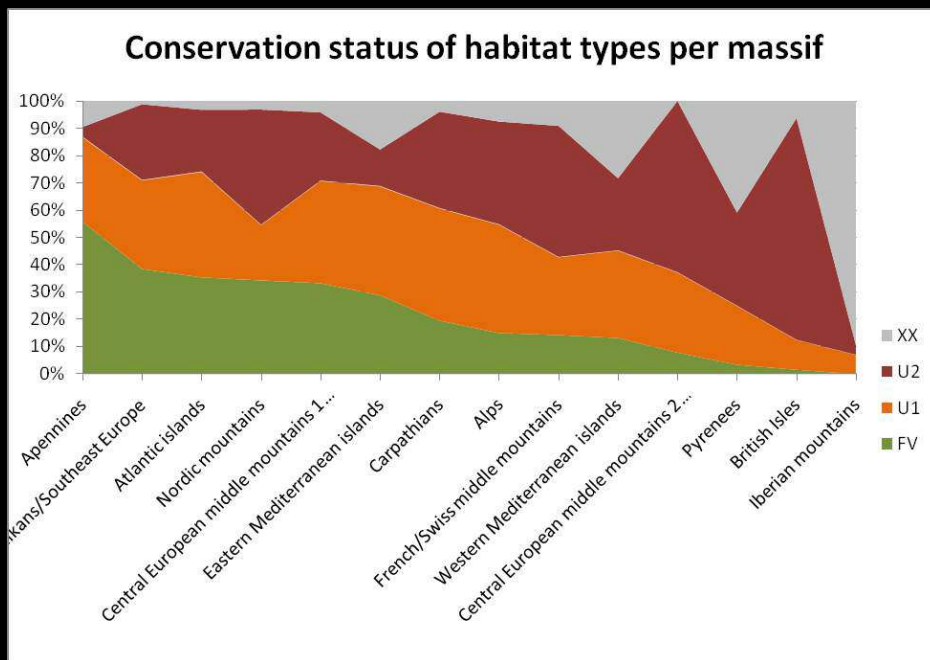
intensifying utilisation (agriculture, forestry, urbanisation, transport - habitat loss, fragmentation)

Up to 10 % of mountain areas is affected by TEN-T corridors and approx. half of mountain populations live within 5 km from those corridors



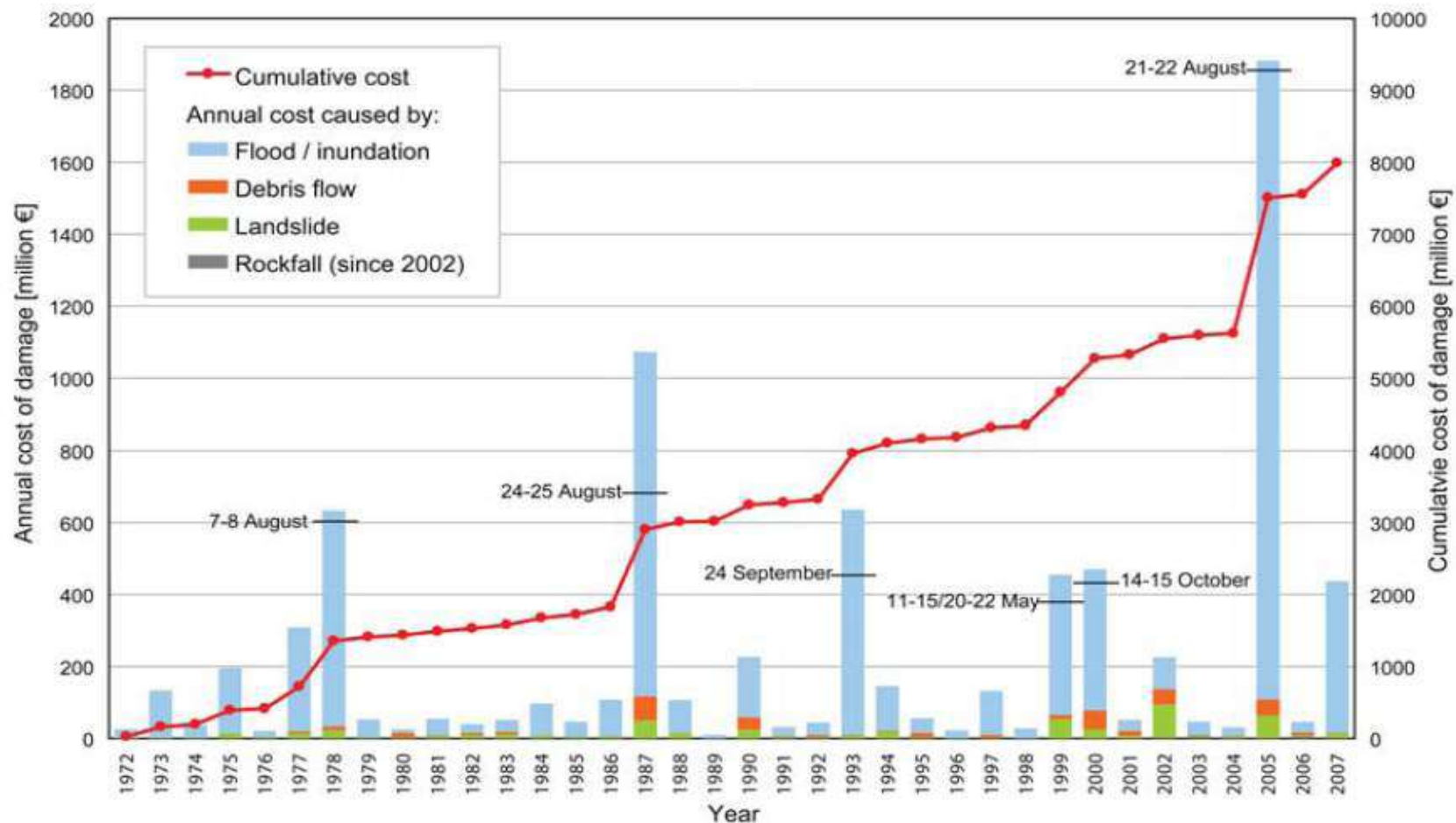
Threads

land abandonment (loss of species and ecosystems requiring management)



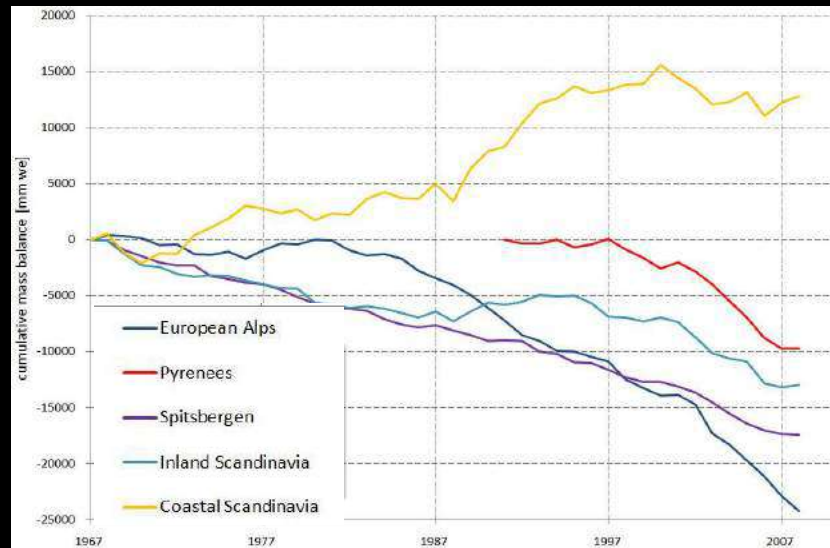
Threads - climate change (extreme events, higher risk of rock falls and soil erosion, upward shift of biota and risk of extinction)

Growing damages and restoration costs

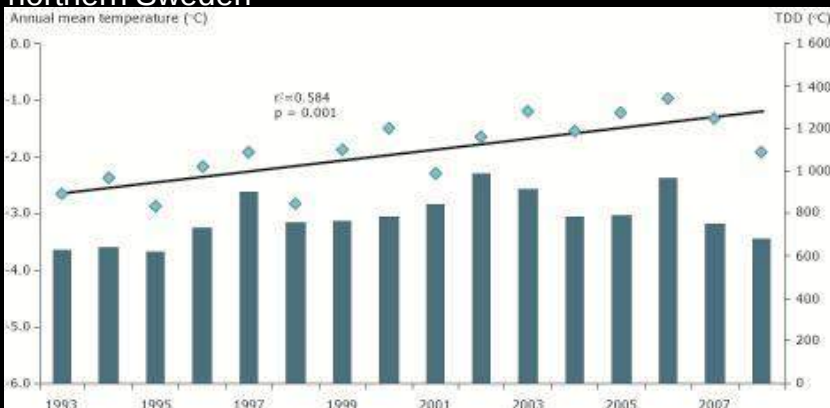


Threads - climate change (faster change than adaptation capacity, temperature increase, less snow, melting glaciers and permafrost)

Glacier mass balance of European regions, 1967–2008



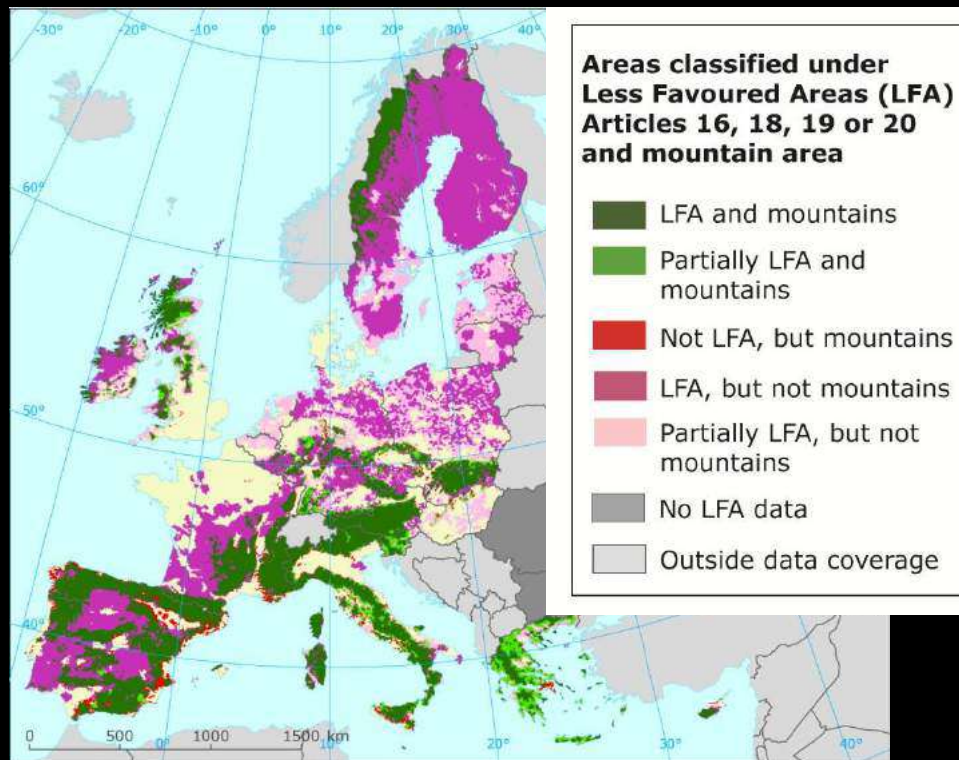
Temperature sum $> 0^{\circ}\text{C}$, from May to Sept. at Latnjajaure, northern Sweden



Mountains are addressed in various policies but mainly as a part of other sectors - agriculture (RDP, LFA), forestry, nature conservation (nationally designated areas, NATURA 2000) or wider regions - territorial cohesion policies (ERDF, ESF),

92 % of EU mountain area (excl. BG and RO) is classified as LFA

49 % of Natura 2000 area (EU-27) is in mountains



33 % of EU mountain areas is HNV farmland

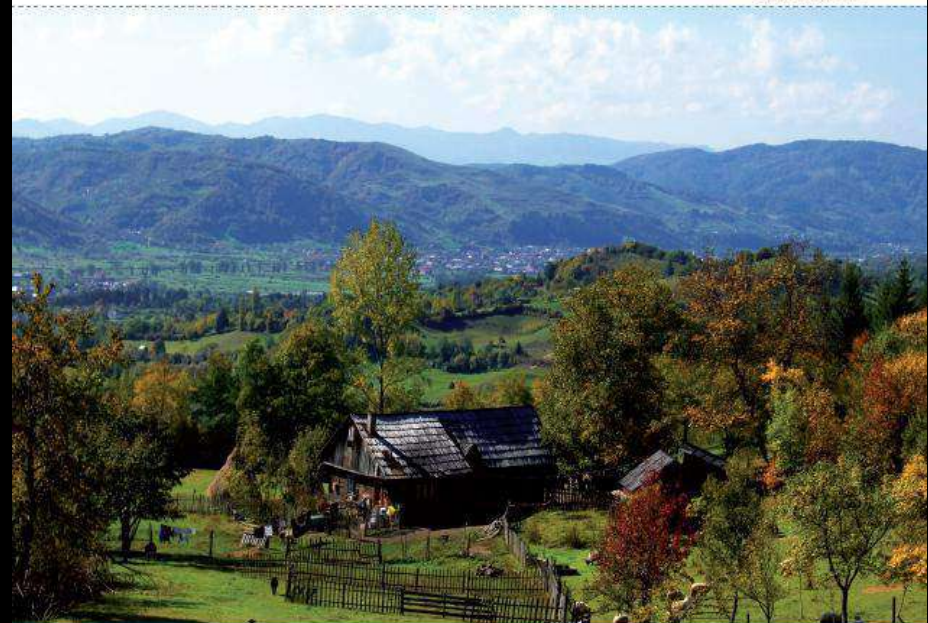


Mountain people are more vulnerable as they might lose their very subsistence and living environment

Non mountain people might be threatened indirectly – decrease in provided ecosystem services (water availability, but also floods, mountain recreation)

Europe's ecological backbone: recognising the true value of our mountains

ISSN 1725-9177



Thank You!



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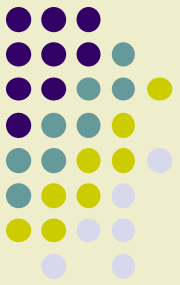
New Delhi | Mumbai | Bengaluru | Kolkata | Brussels

EBTC is a programme co-funded by the  European Union and coordinated by  EUROCHAMBRES, the Association of European Chambers of Commerce and Industry

Appendix 9

Presentation of Uttarkahnd Urban Development

by Ms. P S Jangpangi, Director Urban
Development, GoUK

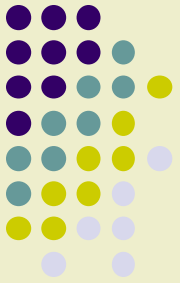


Mountain Cities of Uttarakhand



Urban Development Department Uttarakhand

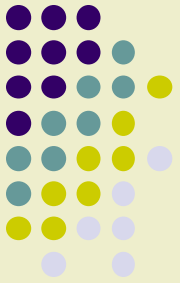
PROFILE OF THE STATE



● Year of creation	9 th Nov 2000 as 27 th State.
● Total districts	13
● Districts in Hill Area	11
● Districts in Plain Area	02
● Divisions	2
● Total Area	53483 sq km.
● Forest area	34651 sq km.
● Total Population	100.86 lacs.
● Urban Population	30.49 lacs (30.20 %)

State consists largely of difficult hilly terrain, snow bound mountains, rivers and valleys.

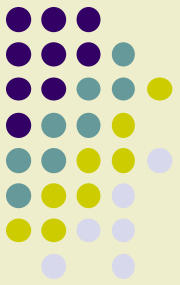
PROFILE OF LOCAL BODIES



- Largely small to medium towns, with some having major transitional/migratory population
- Geographically difficult and hilly terrain.
- 72 ULBs in the State. 69 with elected bodies.

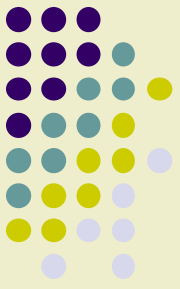
Nagar Nigam	06
Nagar Palika Parishad	28
Nagar Panchayats	38
- ***41 ULBs located in hill areas and 31 in plain areas***

CONSTRAINTS.



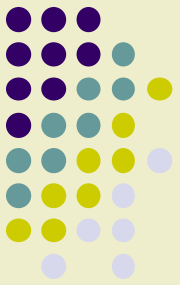
- Small to medium towns, with major transitional/ migratory population and limited revenue generating possibilities and capacity to pay.
- Geographically difficult terrain, raises project and O&M costs.
- Service provision obligation for huge floating population **putting extra burden on ULBs** -- 16 ULBs pilgrim destinations, others important tourist destinations.
- Towns sparsely populated, low levels of economic activity and low tax paying capacity of citizens leading to high dependence on State Government
- Land scarcity with most of the ULBs due to environmental imperatives.
- Elected Bodies reluctant to enhance / impose taxes & fees and averse to reforms
- ULBs Lack capacities

VISION



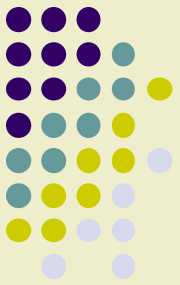
- Improved quality of urban life through integrated sustainable development of urban areas.
- Slum free, poverty free, fully sanitized cities.
- Equitable cities with access and affordability of services for all.
- Sustainable provision of quality services through adequate infrastructure
- Creation of empowered and self-sustaining urban governance structures
- Creation of Satellite towns

STRATEGY



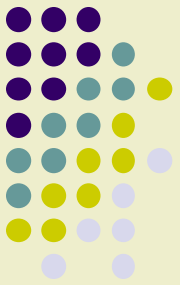
- Fund urban infrastructure through convergence of available funding avenues – JnNURM, NULM, RAY, ADB, NGRBA, State and City funds, user charges, multilateral funding, PPPs etc.
- Pursue reforms, including 74th Amendment, at State and City level, incentivize key outcomes – sanitized cities, universal basic services, revenue generating infrastructure
- Targeted poverty alleviation: slum up-gradation and rehab, self-employment and training, employment generation
- Widening of revenue base
- Implementation of Reform agenda
- Incorporation of ULBs under district plan
- Predictable norms based inter-governmental fiscal transfers – SFC and infrastructure funding; Rs. 263 Crore during 2013-14

PRESENT INFRASTRUCTURE SCENARIO



- Water supply Avg Water Supply-70-100 lpcd
Avg Supply Hours- 4 hrs/day.
- Sewer 6 Towns Covered with Sewerage system.
(Mussoorie,Nainital,Bhimtal,Dehradun,Haridwar,Rishikesh)
- SWM SWM initiated only in 3 Mission towns(Dehradun,Haridwar,Nainital),
Non availability of flat land resulting in non-disposal of Waste
- Parking Multi level parking only at 3 places
with low capacity(Mussoorie,Nainital, Almora)
- Roads and drains Urban roads conditions poor due to
excessive rains and land slides.

MOUNTAIN CITIES OF UTTARAKHAND



Total number of Mountain cities	=	41
Total Population of State	=	10086000
Total Urban Population of State	=	3049000
<i>Percentage of Urban population</i>	=	30.20
<i>Total population of Mountain cities</i>	=	478020
<i>Percentage of population in Mountain cities in Urban population</i>	=	15.68
<i>Percentage of Mountain cities population in State</i>	=	4.73

Garhwal Mandal = 27 ULBS
Nagar palika parishad = 9
Nagar Panchayat = 18

Kumaon Mandal = 14 ULBS
Nagar palika parishad = 7
Nagar Panchayat = 7

Service level Benchmarks in mountain cities

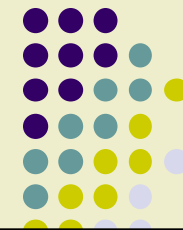
Water Supply - 9 INDICATORS



S.N	Name of District	Name of ULB	Coverage of water supply Connections	Per capita supply of water	Extent of metering of water connections	Extent of non revenue water	Continuity of water supply	Quality of water supplied	Efficiency in redressal of customer complaints	Cost recovery in water supply services	Efficiency in collection of water supply-related charges
INDICATORS Water Supply			100%	135lpcd	100%	20%	24hrs	100%	80%	100%	90%
			Current	Current	Current	Current	Current	Current	Current	Current	Current
			2012-13	2012-13	2012-13	2012-13	2012-13	2012-13	2012-13	2012-13	2012-13
1	नैनीताल	न0पा0परि0 नैनीताल	62	107	20	47	18	100	90	85	95
2		न0पा0परि0 भवाली	62.4	34	4.4	85	5	100	80	100	99
3	पिथौरागढ़	न0पा0परि0 पिथौरागढ़	80	102	34	46	16	100	100	50.6	60
4	चम्पावत	न0पा0परि0 टनकपुर	52	88	3.8	40	8	100	91	100	90
5	बागेश्वर	न0पा0परि0 बागेश्वर	65	95	0	10	5	95	90	50	90
6	अल्मोडा	न0पा0परि0 अल्मोडा	94	222	0	43	8	100	74	44	0
7	देहरादून	न0पा0परि0 मसूरी	90	80	80	20	4	100	90	100	80
8	चमोली	न0पा0परि0 गोपेश्वर	50	85	30	30	6	100	70	80	45
9		न0पा0परि0 जोशीमठ	21	48	0	71	8	78	42	73	4.4
10	पौड़ी	न0पा0परि0 पौड़ी	80	80	0	0	2	100	60	95	34
11		न0पा0परि0 श्रीनगर	96	135	20	18	6	100	95	93	90
12		न0पा0परि0 दुगड्डा	11	97	0	0	16	100	80	85	90
13	टिहरी	न0पा0परि0 नरेन्द्रनगर	65	150	65	45	6	85	88	0	0
14		न0पा0परि0 टिहरी	40	40	10	50	3	100	70	30	60
15	उत्तरकाशी	न0पा0परि0 उत्तरकाशी	41	82	70	15	8	100	100	73	100
16	रूद्रप्रयाग	न0पा0परि0 रूद्रप्रयाग	28	75	0	50	6	80	2.8	67	75

Service level Benchmarks in mountain cities

Sewerage and Sanitation -9 INDICATORS

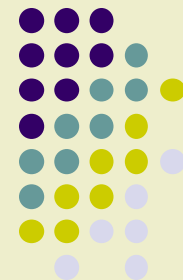


Sl. No.	Name of District	Name of ULB	Coverage of toilets	Coverage of sewage network services	Collection efficiency of the sewage network	Adequacy of sewage treatment capacity	Quality of sewage treatment	Extent of reuse and recycling of treated sewage	Efficiency in redressal of customer complaints	Extent of cost recovery in sewage management	Efficiency in collection of sewage charges
INDICATOR (Sewerage and Sanitation)			100%	100%	100%	100%	100%	20%	80%	100%	90%
			Current	Current	Current	Current	Current	Current	Current	Current	Current
			2012-13	2012-13	2012-13	2012-13	2012-13	2012-13	2012-13	2012-13	2012-13
1	नैनीताल	न0पा0परि0 नैनीताल	95	65	9	8	12	2	95	75	95
2		न0पा0परि0 भवाली	100	0	0	0	0	0	0	0	0
3	पिथौरागढ़	न0पा0परि0 पिथौरागढ़	100	40	60	0	0	0	75	0	0
4	चम्पावत	न0पा0परि0 टनकपुर	79	2.3	0	0	0	0	0	0	0
5	बागेश्वर	न0पा0परि0 बागेश्वर	100	0	0	0	0	0	0	0	0
6	अल्मोडा	न0पा0परि0 अल्मोडा	99	8	33	32	0	0	10	35	10
7	देहरादून	न0पा0परि0 मसूरी	60	60	80	0	0	0	60	60	70
8	चमोली	न0पा0परि0 गोपेश्वर	100	20	50	0	0	0	50	20	85
9		न0पा0परि0 जोशीमठ	73	20	0	0	0	0	76	60	53
10	पौड़ी	न0पा0परि0 पौड़ी	90	0	0	0	0	0	0	0	0
11		न0पा0परि0 श्रीनगर	85	20	0	100	100	15	80	70	82
12		न0पा0परि0 दुगड्डा	90	0	0	0	0	0	0	0	0
13	टिहरी	न0पा0परि0 नरेन्द्रनगर	10	0	0	0	0	0	0	0	0
14		न0पा0परि0 टिहरी	97	83	85	20	100	100	74	20	50
15	उत्तरकाशी	न0पा0परि0 उत्तरकाशी	91	35	40	42	0	0	70	0	0
16	रूद्रप्रयाग	न0पा0परि0 रूद्रप्रयाग	99	0	10	0	0	0	0	0	0

Service level Benchmarks in mountain cities(16 Nagar Palika Parishad)

Storm Water Drainage - 2 INDICATORS

	Name of District	Name of ULB	Coverage of storm water drainage network	Incidence of water logging/ flooding
BENCH MARK INDICATORS (Storm Water Drainage)			100%	
			Current	Current
			2012-13	2012-13
1	नैनीताल	न0पा0परि0 नैनीताल	5	1
2		न0पा0परि0 भवाली	50	0
3	पिथौरागढ़	न0पा0परि0 पिथौरागढ़	100	0
4	चम्पावत	न0पा0परि0 टनकपुर	100	2
5	बागेश्वर	न0पा0परि0 बागेश्वर	30	0
6	अल्मोडा	न0पा0परि0 अल्मोडा	10	0
7	देहरादून	न0पा0परि0 मसूरी	0	0
8	चमोली	न0पा0परि0 गोपेश्वर	15	0
9		न0पा0परि0 जोशीमठ	15	0
10	पौड़ी	न0पा0परि0 पौड़ी	35	0
11		न0पा0परि0 श्रीनगर	35	0
12		न0पा0परि0 दुगड्डा	10	0
13	टिहरी	न0पा0परि0 नरेन्द्रनगर	10	0
14		न0पा0परि0 टिहरी	100	0
15	उत्तरकाशी	न0पा0परि0 उत्तरकाशी	60	0
16	रूद्रप्रयाग	न0पा0परि0 रूद्रप्रयाग	20	0



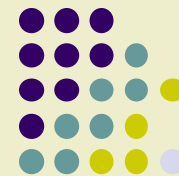
Service level Benchmarks in mountain cities (16 Nagar Palika Parishad)

Solid Waste Management - 8 INDICATORS



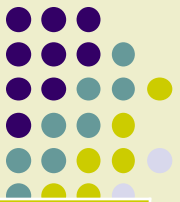
Service - Solid Waste Management			INDICATORS							
Sl. No.	Name of District	Name of ULB	Household level coverage of solid waste management services	Efficiency of collection of municipal solid waste	Extent of segregation of municipal solid waste	Extent of municipal solid waste recovered	Extent of scientific disposal of municipal solid waste	Efficiency in redressal of customer complaints	Extent of cost recovery in SWM services	Efficiency in collection of SWM charges
BENCH MARK INDICATORS (Solid Waste Management)			100%	100%	100%	80%	100%	80%	100%	90%
			Current	Current	Current	Current	Current	Current	Current	Current
			2012-13	2012-13	2012-13	2012-13	2012-13	2012-13	2012-13	2012-13
1	नैनीताल	न०पा०परि० नैनीताल	51	88	0	4	0	100	27	82
2		न०पा०परि० भवाली	100	100	100	100	100	0	100	90
3	पिथौरागढ़	न०पा०परि० पिथौरागढ़	94	96	0	0	0	0	0	0
4	चम्पावत	न०पा०परि० टनकपुर	100	100	0	0	0	70	0	0
5	बागेश्वर	न०पा०परि० बागेश्वर	0	80	0	0	0	0	0	0
6	अल्मोडा	न०पा०परि० अल्मोडा	0	90	5	0	50	100	0	0
7	देहरादून	न०पा०परि० मसूरी	70	75	50	0	0	100	0	0
8	चमोली	न०पा०परि० गोपेश्वर	5	83	0	0	0	0	0	0
9		न०पा०परि० जोशीमठ	16	76	23	2.8	75	75	0	0
10	पौड़ी	न०पा०परि० पौड़ी	60	90	0	0	0	90	0	0
11		न०पा०परि० श्रीनगर	25	90	10	0	0	98	0	0
12		न०पा०परि० कोटद्वार	30	75	0	0	0	100	0	0
13		न०पा०परि० दुगड्डा	0	0	0	0	0	0	0	0
14	टिहरी	न०पा०परि० नरेन्द्रनगर	60	60	0	0	0	0	0	0
15		न०पा०परि० टिहरी	11.3	96	10	0	0	80	10	100
16	उत्तरकाशी	न०पा०परि० उत्तरकाशी	54	82	50	0	24	80	0	0
17	रूद्रप्रयाग	न०पा०परि० रूद्रप्रयाग	12	92	10	0	0	69	0	0

Projects for 41 Mountain Cities



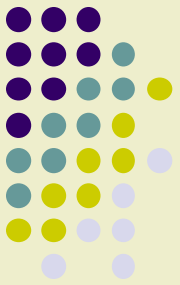
			Ongoing Projects		Proposed Projects	
S.No	Component	Funding Source	No of Projects	Total Cost (In Lacs)	No of Projects	Total Cost (In Lacs)
1	Water Supply	JnNURM	1	547.00	8 H6	19829.84
		ADB H5	1	4251.00	3	-
		NGRBA H5	-	-	1	-
2	Sewerage	JnNURM	2	81.33	5 H7	13038.04
		ADB	-	-	4	-
		NGRBA		-	5	-
3	Solid Waste	JnNURM	2	1064.00	5 H8	-
		SPA	13 H9	838.51	-	-
		NGRBA	-	-	12 H5	-

Projects for 41 Mountain Cities



			Ongoing Projects		Proposed Projects	
S.No	Component	Funding Source	No of Projects	Total Cost (In Lacs)	No of Projects	Total Cost (In Lacs)
4	Road with Drains	JnNURM	7 H10	2938.53	5 H11	7849.41
5	Soil Erosion	JnNURM	-	-	2	2700.20
6	Heritage	JnNURM	1	1085.00	-	-
7	Poverty Alleviation	RAY	3 H12	3856.00		
		NULM			2	

Poverty Alleviation program in mountain cities



Slum free mountain ULBs H1	=	8
Slums in Mountain ULB's	=	149
Slum Population	=	42462
No. of slum Households	=	6736
BPL Population	=	13664
No. of BPL Households	=	2819

Slum profile of Mountain ULB's [H2](#)

(As per Slum survey report June 2011 UUSDIP)

Proposed Schemes Under Poverty Alleviation:

1) NULM

Mountain ULBs under NULM:-

Garhwal Region

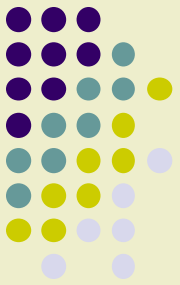
- Uttarakashi
- Chamoli
- New Tehri
- Rudraprayag
- Pauri

Kumaon Region

- Pithoragarh
- Champawat
- Almora
- Bageshwar
- Naintal

Proposed Activities under NULM [H3](#)

- Social Mobilization & Institution Development**
- Employment through Skills Training & Placement**
- Self Employment Program**
- Capacity Building & Training**
- Support to Urban Street Vendors**
- Scheme of Shelters for Urban Homeless**





2) RAY

•Rajiv Awas Yojana envisages a '*Slum-Free India*' with inclusive and equitable cities with every citizen having access to basic social and civic services. The Scheme focusing on:

- Bringing the slums within the formal system and providing same amenities as the rest of the city/town
- Redressing the failures of the formal system that lies behind the creation of slums
- Tackling the shortages of urban land and housing

Projects Sanctioned recently :

S.No	Mountain ULB	No. of Dwelling Units	Sanctioned Project Cost (Rs. in Lakhs)
1.	Agstyamuni	204	1984.57
2.	Rudraprayag	95	744.73
3.	Joshimath	150	1128.56
Total-		449	3857.86

- Projects for Barkot and Chinyalisaud are under preparation.

Capacity Building Scheme for Urban Local Bodies(CBULB)

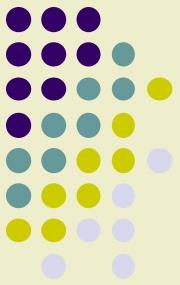


- GoI has sanctioned Capacity Building Project for ULBs amounting for Rs 43.92 Cr
- The project will strengthen the role of urban local bodies in context of national priorities and urban reform.
- RPMC H4** will be established in following **09** Mountain ULBs under the project-

- | | | |
|----------------|-------------|---------------|
| 1) Almora | 4) Pauri | 7) Uttarkashi |
| 2) Mussoorie | 5) Srinagar | 8) Gopeshwar |
| 3) Pithoragarh | 6) Tehri | 9) Bageshwar |

•Activities proposed under CBULB

- Preparation of **Integrated city Plan** for the city & its Peri-urban area including CB Plan
- Preparation of **Business cum Financial Plan** for Projects, Setting of Systems for asset management & value creation & putting in place fiscal tools for revenue enhancement
- Preparation of Training Modules (15 nos)
- Residential Training Programme (15 nos)
- Non Residential Training Programme (12 nos)
- Exposure Visit (10 nos)
- Research Study/Documentation of best practices (5 nos)



Thank You

Appendix 10

Presentation of Leh

by Mr. Moses Kunzang, Project Director,
DRDA

An aerial photograph of a mountainous region in Ladakh. In the upper center, a white monastery with a red-roofed section sits atop a steep, rocky mountain peak. Below the peak, a town is built into the valley, with buildings of various colors (yellow, white, red) and some taller structures. The surrounding mountains are rugged and brown, with patches of snow visible on the right side. A blue rectangular box with white text is overlaid in the center of the image.

Presentation from Team Ladakh

Special features of Leh, J&K



- Spread across 45110 sq Kms (Ex Aksai Chin)
- Lowest population density and lowest precipitation
- Sharing border with two countries

Distt Profile

- Population: 1,48,437 souls
- Buddhist: 77.30%
- Muslim: 13.78%
- Rest: Hindu, Christians & Others
- ST: 82.04%



Distt Profile-2



- 9 Blocks
- 3 Tehsils
- 93 Panchayat Halkas
- 112 inhabited villages



Distt Profile



- Democratic decentralization in the form of LAHDC.
- One Chairman/CEC
- 4 Executive Councillors ECs
- 30 Councillors
- 26 Elected & 4 Nominated

Critical Developmental Issues



- Connectivity & Communication
- Less working season
- Extreme weather conditions
- High cost of living
- High construction & maintenance cost



Leh Town:

- Population 28, 639 souls
- Highly fluctuating
- In summers: Tourists, Labour class for civil & Army
- Presence of Army in Large numbers.

Existing Scenario

- Problem Areas:
- Drinking Water: Tanker, Only Public posts. Drilling
- Drainage & Sewerage; Leaking on Septic Tank
- Traffic:
- Toilets
- Unregulated Constructions.
- Poor road network
- Public Transport

Unregulated Construction





Drinking Water Problem



Open drain running over waters supply pipes.

Garbbage Problem





Future Prospects: JNNURM

- Augmentation & Re-Organization
- of Supply Scheme: Rs 70.48
- Sewerage System in : Rs 59.39
- Solid Waste Management: Rs 10.94
- Improvement of Roads in: Rs 76.53
- Total Rs 217.35 Crores

- 
- Theme of the Workshop:
 - Governance & Revenue
 - City Planning & Building By Laws
 - City Services

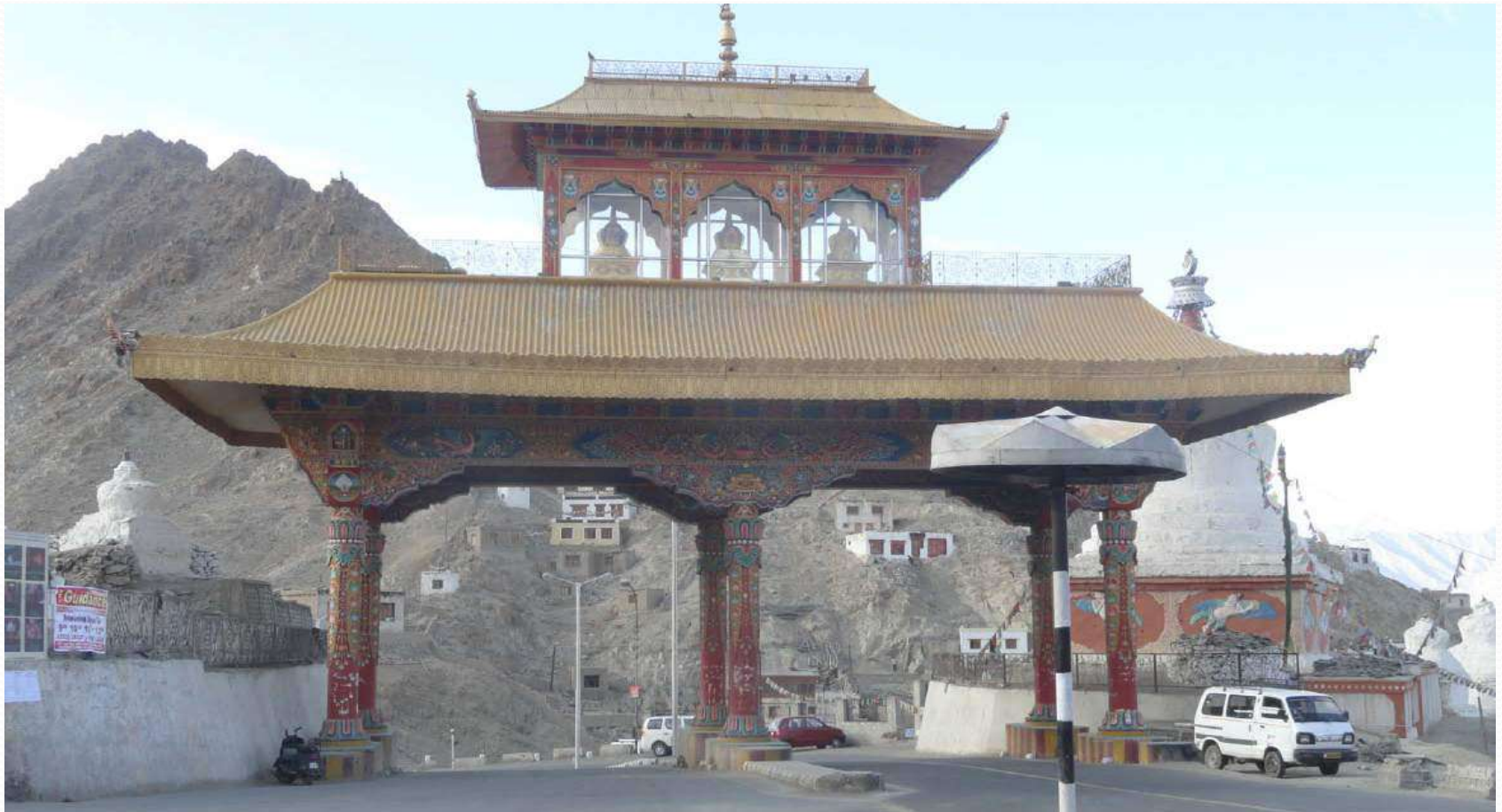
Perspectives for Future

- Vision Document: Ladakh 2025
- Leh city as microcosm of Ladakh Region.
- Tourism Facilities
- Heritage Town:
 - Organization Help
 - Individual efforts like Tsingtsaks
 - Polythene Ban
 - Festivals
 - Construction Regulation
 - Local vegetable vendors

Heritage Town



Leh Gate



Natural Disaster

- Climate Change
- Leh Floods of 2010
- Leh District Disaster Management Plan.
- State Disaster Plan with TISS
- Community based Disaster Management Plan

- 
- Theme of the Workshop:
 - Governance & Revenue
 - City Planning & Building By Laws
 - City Services

Governance

- Failure as far as Leh is concerned:
 - No ULB in Place
 - Two Councillors represent the Town
 - 4 Lambardars/Gobas
-
- We are aware of peoples participation
 - Local Ownership
 - Reathing space for tourists and locals

City Planning & Bye Laws

- Draft Leh Master Plan
- Building Regulations not in place
- Building Permission not implemented.
- Leh Town a transition between Rural & Urban



City Services

- Waste Management
- Water
- Energy
- Transportation

- 
- Source of Energy:
 - Solar
 - Hydal
 - Wind Geothermal
 - Fossil Fuel
 - Animal

Energy Supplied through

- Diesel Generators In almost every village
- Alchi Hydel Project: 45 mw
- Stakna Hydel: 4 mw
- Martselang Hydel: 3 MW
- Dha Hydel: 6 Mw
- Hanu Hydel: 9 MW
- Puga Geothermal
- Ultra mega Solar Power Project: 5000 MW



Vision 2025

By 2025, Leh will emerge as the country's best model of hill area development in a challenging environment, with its sustainability embedded in ecological protection, cultural heritage and human development. "

-Vision 2025

-Vision document available at www.leh.nic.in



Julley!

Appendix 11

Base Paper on SWM

by Mr. Vipin Kumar, Mussoorie

Solid Waste Management Present and Future Perspective

1.Introduction:

“Municipal Solid Waste” (MSW) is a term usually applied to a heterogeneous collection of wastes produced in urban and rural areas the nature of which varies from region to region.” Waste generation is closely related, directly or indirectly, to a number of issues such as urban lifestyles, resource consumption patterns, jobs and income levels, and other socio-economic and cultural issues. All these issues have to be brought together on a common platform in order to ensure a long-term solution to urban waste.

The Municipalities face an uphill challenge to properly manage their waste with efforts to reduce the final volumes and to generate sufficient funds for waste management. The ULBs will have to divert waste for material and resource recovery, so that a substantial reduction in final volumes of waste could be achieved. The recovered material and resources could be utilized to generate revenue to fund waste management.

At present the towns in Uttarakhand State due to rapid urbanization and changing lifestyles, are generating about 752 tons per day of solid waste. Further, due to intermittent driving forces such as religious or leisure based tourism several tons of solid waste is added to the existing waste generation quantum in the tourist destinations, Char Dhams and en-route townships to these holy destinations. The process of collection, transportation and disposal of Municipal Solid waste(MSW) follows the traditional method of transferring waste to garbage dumps creating disorder in the inhabited areas with disorder in the dump sites.

1.1.Nature of Solid Waste

The high organic content of the hill towns MSW having moisture content between 60 -70% decomposes rapidly during the summer season producing foul odor of Hydrogen Sulphide, Cadaverine and Putrescence. These unattended dumps become a monotonous smitten of filth during the monsoons blocking the emission of gases but creating ideal conditions for breeding of disease causing vectors a potential threat to human health and safety. The indiscriminate disposal of waste alongside rivers, streams, hill slopes, road-sides and vacant lots, invite stray animals and has an adverse impact on the bio-diversity.

1.2.Impact of Solid waste in the Terrai Region

The problem of water logging after a sporadic torrential shower in the plains is due to clogging of drains which is an outcome of sweeping of waste in drains and water outlets. Although the Urban local bodies (ULBs) in Uttarakhand State spend a sizeable portion of the municipal budget on cleanliness of the towns yet they are unable to provide effective services in the Solid Waste Management (SWM) Sector. Most of the ULBs do not even have reliable MSW generation estimates which are normally based on the capacity of bins or the waste carrying trolleys.

1.3.Peri-urban areas and problem of Solid Waste

The hinterlands of the urban areas which once formed the lungs of the towns have been transformed into inhabitable zones. At the same time shrinking land in urban agglomerates and unsystematic disposal of waste on the outskirts of the towns ,on approach roads and on hill slopes is creating a cauldron of conflicts between the urban and the rural population.

This problem needs immediate attention as it is a cause of a major organizational, financial and environmental challenge for the State.

2. Statutory provisions

As per the Constitution of India, Solid Waste Management is a state subject and is the primary responsibility of the State Government to ensure that appropriate solid waste management practices are introduced in all towns of the state. **The National Waste Management Policy is governed through the Municipal Solid Waste (Management & Handling) Rules 2000 and the Plastic Waste (Management and Handling Rules 2011).** Both set of rules are the guiding principles for evolving a sustainable Solid Waste Management system which not only provides cleanliness to the towns but also minimizes adverse impact on the environment. The State Government promulgated Government orders in the year 2007 for urban and Jila Panchayat areas **vide No.558/A.Sha.V.-06-248 (Sa)/03 dated April 4th, 2007 and G.O. No. 113.** The objectives of the State Directives was to ensure a decentralized waste management system in the hill towns to minimize the land requirement through encouraging back yard composting of the bio-degradable waste. The non-biodegradable waste was to follow the chain of recycling. In continuation of the Plastic waste management and handling rules 2011 the State Government issued the **Plastic usage and Disposal of other Non-biodegradable Waste Act 2013.**

2.1.,Detailed objectives of the G.O. No.558/A/sha.V.-06-248 Approach for Recovery of Resources for Recycling

2.1.1.Waste Generator's Responsibility:

Municipal solid waste can be broadly divided into three major categories as per source of generation i.e. domestic, commercial and institutional waste. Domestic waste is the largest part (81%) of municipal waste. Housing condition, Institution and Commercial set ups, Markets, Hotels and restaurants contribute to waste generation in an un-segregated manner. This waste is disposed off through open dumping without treatment. **The waste generators have the responsibility to segregate their waste at source for material and resource recovery.**

2.1.2.. Material Diversion Strategy

The constituency wise desiccation of waste is the basis for evolving a **“Material Diversion Strategy”** as a step for resource recovery and energy conservation. It improves the quality of the bio-degradable composting material and minimizes the “pressure” on environment.

2.1.3.The Efficiency multiplier Approach (E.M.A.) for material diversion from the waste stream is based on participatory approach of the community and all stake holders of the town as it promotes a decentralized waste management system. It promotes source separation based on developing **“vicinity composting”, “backyard composting” by bulk generators of waste by Aerobic methodology.** This also helps in optimizing transportation costs and increased efficiency in the waste collection system and less requirement of big patches of land which are not available with the ULBs. **The Non –biodegradable waste, post component segregation and compaction can be sent for end use disposal through recycling. This diversion strategy was implemented as a pilot project**

named **MISSION BUTTERFLY** at **NAINITAL** IN THE YEAR **2008-09-AND 10**. It was subsequently switched over to PPP mode under the JnNurm project.



The Efficiency Multiplier Approach for resource recovery

3. The Waste to Resource Action Programme for Non –Biodegradable waste (WRAP)

3.1.The concept of WRAP = Waste To Resource Action Programme

The Non-biodegradable waste in the Municipal Solid Waste stream is a resource and it can only be recovered through a value chain. **It implies treating the low value garbage as secondary raw material through value addition with end use linkage through recycling.** The backup mechanism for use of such material needs to be understood in the context of a hierarchy of carbon recovery with a support price. Waste collection and component segregation is the first step followed with a strategy to minimize transportation cost through compaction of voluminous material like plastic and paper. The recycling of such material saves on use of energy, checks carbon emissions and saves natural resources.

The short cut methods of disposing garbage through burning leads to release of carbon in gaseous form with precipitation of heavy metals in the bottom ash. The leaching of such metals in the ground water and their washing off after a torrent, may lead to their transfer to the human body through bio-magnification or direct consumption. Thus burning technologies which includes incineration under controlled conditions is not a solution to manage and dispose off municipal solid waste in the hill towns.

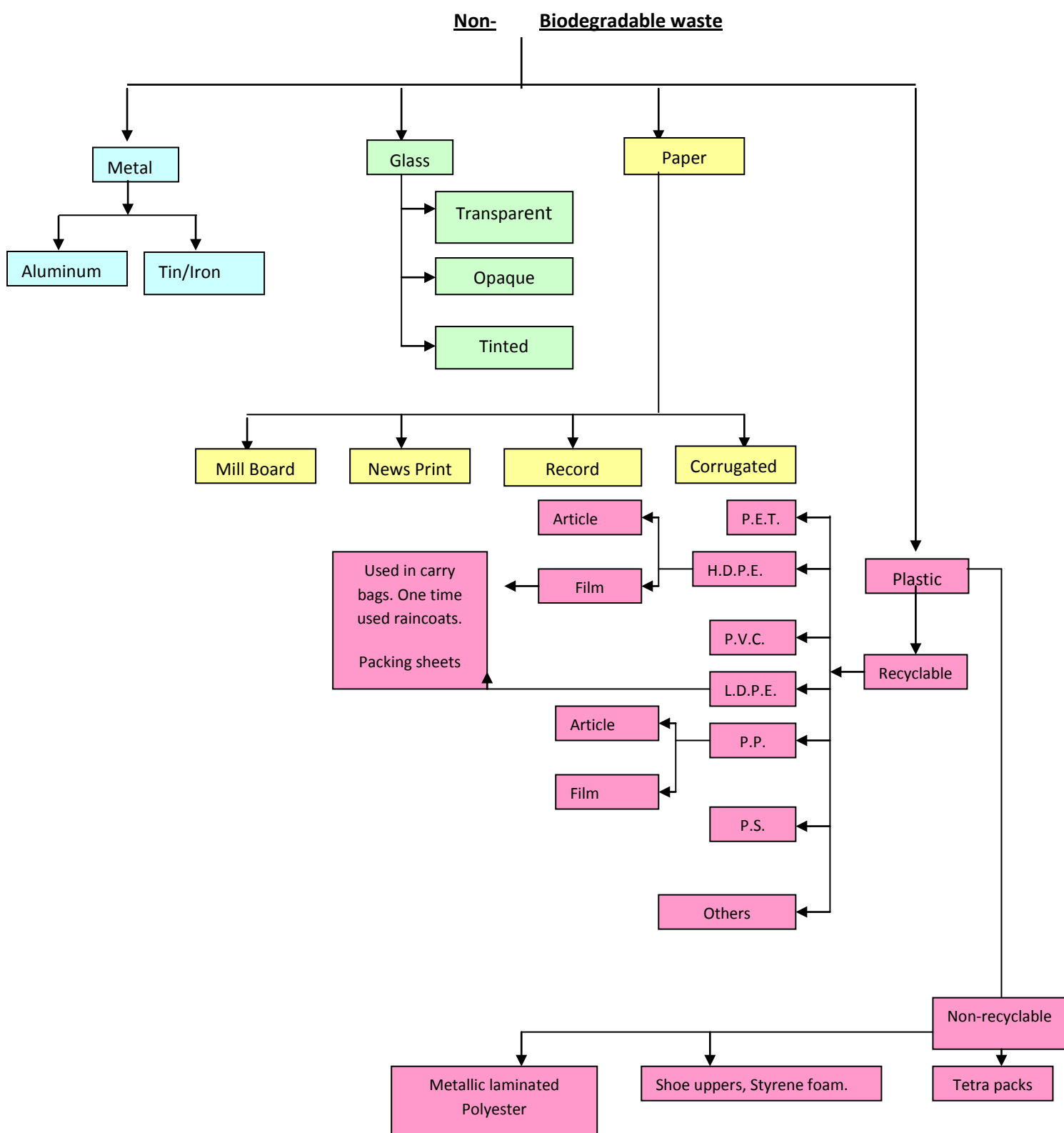
3.2.Value Chain in Plastic ,Paper, Cans and Tins

The spinoff of tourist activity leads to generation of huge quantum of waste which is either burnt or dumped in rivers. The main hindrance to handle such waste is its large volume and high transportation cost. At the initiative of the author four compactors were installed in Char Dhams in the year 2009 which helped in recovery of more than 200 tons of plastic and paper waste. This compacted waste was sent for recycling to Kathgodam and since then the compactors are functional. The success of the pilotised programme in the Char Dhams led to installation of eleven more compactors at different destinations in the State. Since, there is value addition to waste a lot of non –biodegradable waste is being diverted from the waste stream for recycling. 8 more compactors are being installed in the year 2013-14. The status of functional compactors as of date is as follows:

S.No.	Destination	District
1.	Dehra Dun (Private sector)	Dehra Dun
2.	Mussoorie	Dehra Dun
3.	Janki Chatti (Yamunotri)	Uttarkashi
4.	Gangotri	Uttarkashi
5.	Soneprayag	Rudraprayag
6.	Badrinath	Chamoli
7.	Gobindghat	Chamoli
8.	Joshimath	Chamoli
9.	Chamoli	Chamoli
10	Karanprayag	Chamoli
11.	Gochar	Chamoli
12.	Bageshwar	Bageshwar
13.	Pithoragarh	Pithoragarh
14.	Almora	Almora
15.	Champawat	Champawat

TO RECYCLING PLANT AT KATHGODAM

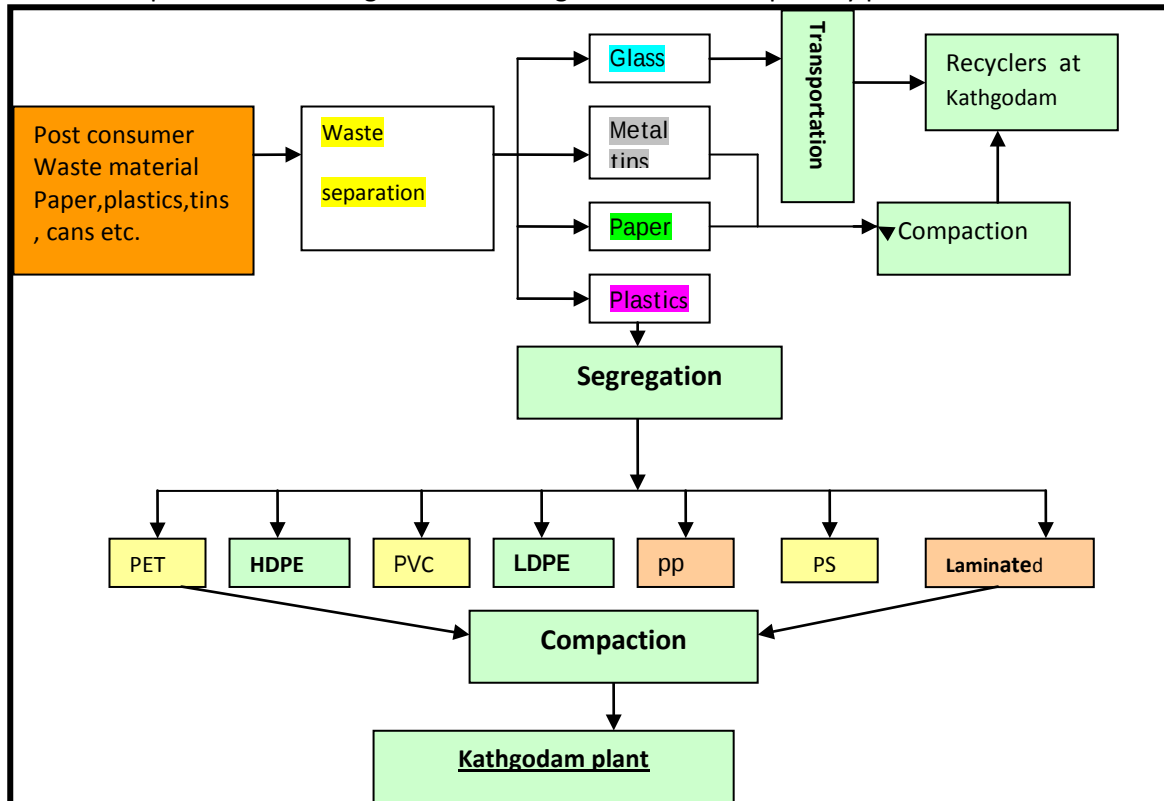
3.3.PRINCIPLE OF VALUE CHAIN IN POST CONSUMER NON-BIODEGRADABLE WASTE (VIPIN KUMAR)



3.4.Methodology and Technology

The compactor provides an integrated solution for collection, compaction and end use disposal of the non-biodegradable waste to the Urban Local Body and its surrounding area. The non-

biodegradable waste which is left littered due to low value addition is disposed through the chain of recycling. The methodology is simple and replicable anywhere in the country more effectively in the hill regions of the country. Precisely, it is a process to minimize the exorbitant transportation costs accruing during the disposal of voluminous waste. The schematic below provides an overview of the role of compactor for handling the non-biodegradable waste especially plastics :-



The compactor minimizes the volume of the non-biodegradable waste in the ratio 6:1 for all types of plastics, metal cans, paper, and also the multi-layered laminated packings. Once segregated and compacted, the waste becomes a resource and is sold for a price which helps in creating jobs and cleaning the environment.



A vertical hydraulic Compactor



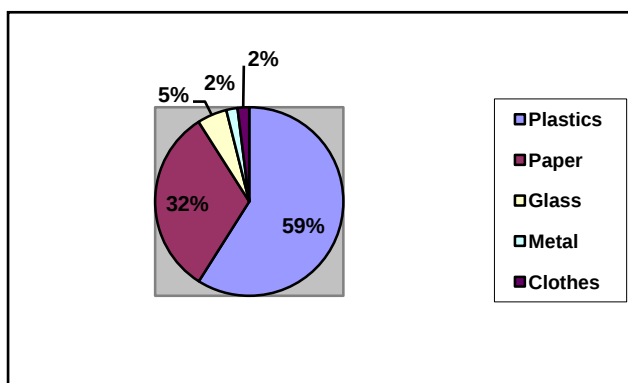
Compacted waste as bales

3.5. Characterization and desiccation of NBW

The non-biodegradable waste was segregated into different components and weighed separately for three days for 100 households, 25 shops, 10 restaurants and 20 lodges at Gangotri Dham.

3.5.1.Over all % age composition and scenario of Non-biodegradable waste (100 Kg. of NBW)

<u>Plastics</u>	<u>Paper</u>	<u>Glass</u>	<u>Metal</u>	<u>Clothes</u>
58.98%	32.00%	05.09%	1.93%	2%



3.5.2.Weight based waste analysis of NBW components in H.H., Hotel, Road side waste in 25.18 % of (NBW) on a sample size of 500 Kgs at Gangotri

<u>Plastics</u>	<u>Paper</u>	<u>Glass</u>	<u>Metal</u>	<u>Clothes</u>
295 Kgs.	160 Kgs.	25.45 Kgs.	9.65 Kgs.	10 Kgs.

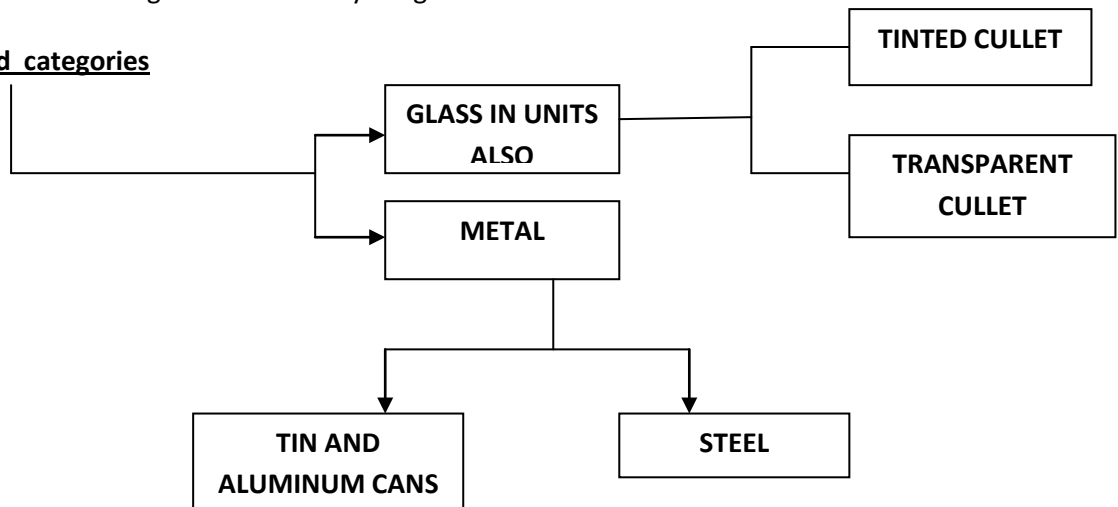
3.5.3.Detailed analysis of plastics and other NBW

S.No.	Material	Weight	% age
1.	PET # 1 Polyethylene-tere-pthalate	35.4 Kgs.	12.00%
2.	HM # 2 High Density Polyethylene Film (Carry bags,	82.2 Kgs.	27.87%
3.	HDPE#2 Article (mugs, bottles, lids, etc)	19.82 Kgs.	06.72%
4.	PVC # 3 Polyvinyl Chloride in bottles of shampoo, oil	11.32 Kgs.	03.84%
5.	LDPE # 4 Low density Polyethylene film	24.10 Kgs.	08.17%
6.	P.P. # 5 Poly propylene film	25.51 Kgs.	08.65%
7.	P.P. # 5 article glasses ,bowls , biscuit containers trays	31.18 Kgs.	10.57%
8.	P.S. # 6 Polystyrene (Thermo Cole) crockery +	11.38 Kgs.	03.86%
9.	Multilayered laminated (Gutka,namkeen and chips	53.86 Kgs.	18.26 %
	Total plastics	294.77 Kgs.	58.98%
10	Paper (Mill Board, packing paper, cardboard boxes)	160.00 Kgs.	32.00%
11.	Glass	25.45 Kgs.	05.09%
12.	Metal including aluminum foil	9.65 Kgs.	01.93%
13.	Left over clothes	10.00 Kgs.	02.00%

3.6.The working of centralized Micro-enterprise at ULB level in SWM (WRAP)(I)

Categories of Non-biodegradable waste by weight and volume

Weight based categories

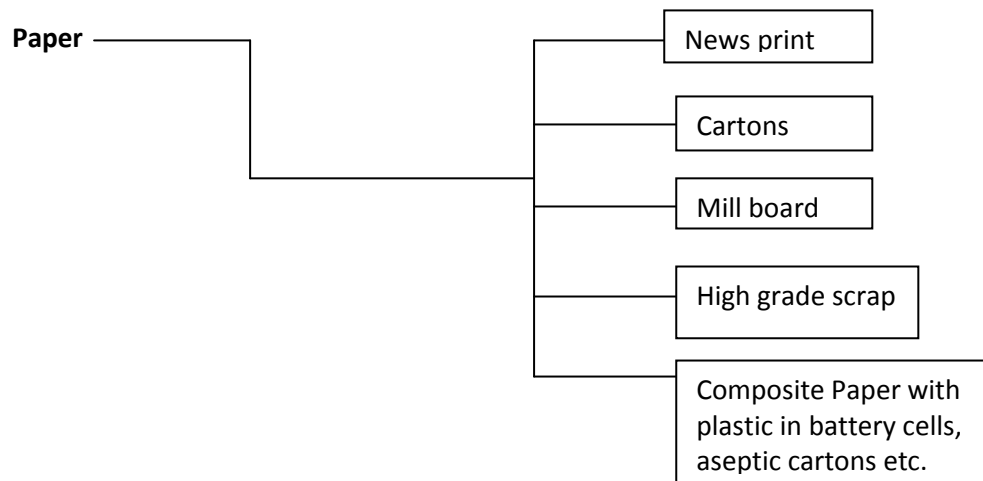


- *Glass bottles used in liquor packing are diverted for reuse and recycling on unit price by itinerant waste buyers.
- *Glass bottles used in packing milk /syrup etc. are sold as glass cullet by weight.
- *Recycling glass saves huge quantum of energy as compared to fresh glass manufacturing.
- *Glass is recycled at Rishikesh, Roorkee and Rudrapur.

- *Metal as tin and steel is always sold by weight to the itinerant waste buyers
- *Tin canisters are sold at unit price.
- *Metal traditionally has a high recycling potential.
- *It is recycled at Roorkee and Rudrapur

3.7.The working of centralized Micro-enterprise at ULB level in SWM (WRAP)(II)

Volume based categories in solid waste



*Cartons and Newsprint are diverted from the waste stream by Itinerant waste buyers.

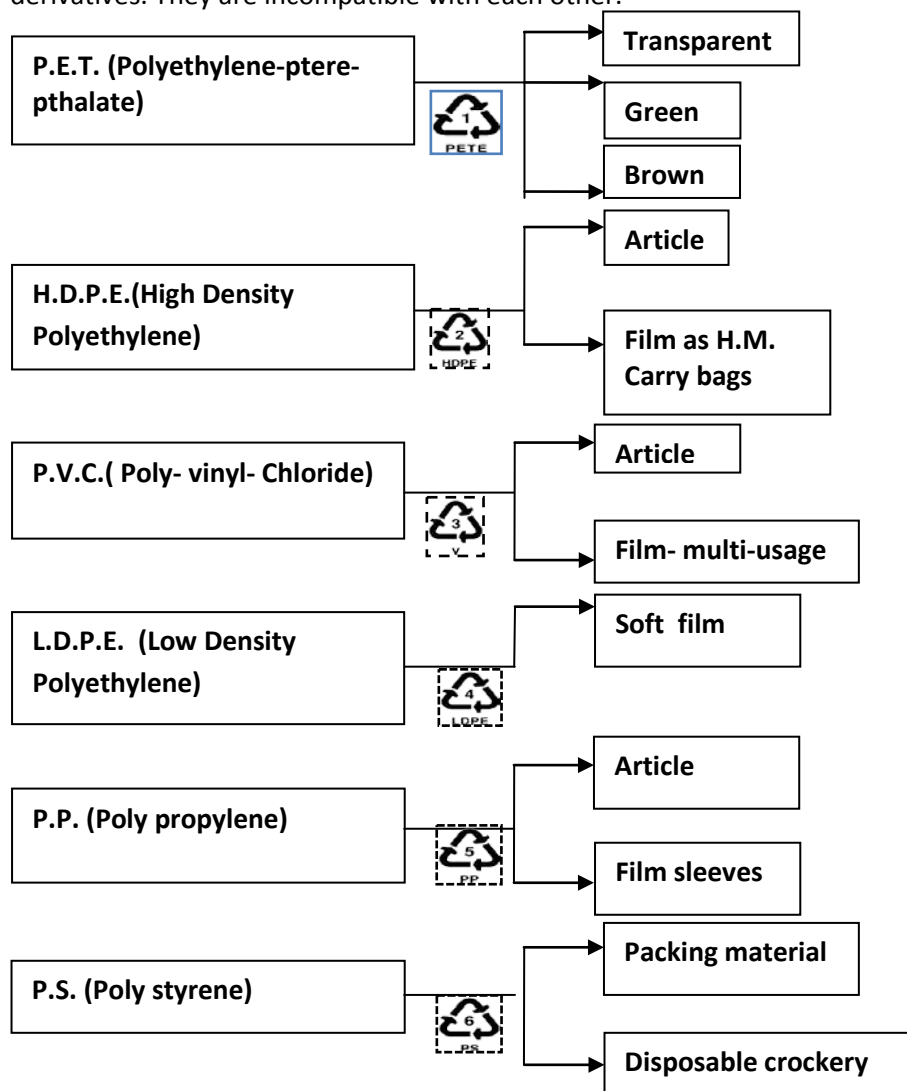
*Mill board (card board),scrap white paper (Record) and composite paper with plastic packing (as in battery cells) is collected from the Municipal solid waste stream.

*This voluminous waste is segregated into different components and is then compacted for value addition . This also helps in minimizing transportation cost from the remote regions of the state.

*Paper recyclers are based in LalKuan and Kashipur in Uttarakhand . It is also recycled at Muzaffarnagar in U.P. and Yamuna nagar in Haryana.

3.8.The working of centralized Micro-enterprise at ULB level in SWM (WRAP) Volume based category Plastics (III)

Plastics are Polymers which are a complicated group of carbon and hydrogen bonded products and are non-biodegradable under normal conditions. They are segregated as per their properties and derivatives. They are incompatible with each other.



The other category  comprises of ABS =Aceto-nitrile-butaedine styrene, PA= Polyamide (Nylon) PCB= Poly carbonates etc. All the above seven categories of plastics are called as Thermo- plastics as they can be moulded in any shape on a fixed temperature. Besides, different grades of the above mentioned plastics as composite material with paper and metal in medicine wrappers and other packings are recovered from the waste stream which are segregated by tearing and are recycled.

3.9.Component segregation is the key to management of Plastic waste (IV)

<u>Name of Plastics</u>	<u>Grades</u>	<u>Value Addition</u>
P.E.T.	Transparent, Green and Brown	All three grades are to be segregated before being sent for recycling.
H.D.P.E.	Articles Film	Mugs, Buckets, Bottle lids, containers, Hangers etc. H.M. Carry bags.
P.V.C.	Articles Film	Pipes, cable-insulators, shoe soles, .syringes, I.V.sets, Vials etc. Bags, cellophane, gift paper ,cellu-tape etc.
L.D.P.E.	Film	Milk and salt packets ,tarpaulin, seat covers. (Is compatible with HDPE)
P.P.	Article Film	Cups, glasses, chairs, bowls etc. Packing Sleeves of ready made garments ,C.D. covers etc.
P.S.	Article	Packing material and disposable crockery. (Light weight and blown up by carbon-di-oxide.)
A.B.S.	Article	Helmets, dash boards and other strong bond applications.
P.A.	Article Fibre	Composite with metals in cars, gear boxes etc. Thread, socks and inner wear applications.
P.C.B.	Film	Used as liner in PP and H.M. bags used for packing flour and pulses.
Composite plastics with paper and metal or bubble foil packaging like medicine wrappers.		Segregated manually by tearing. Paper follows its own life cycles while Plastics their own. Metallic laminates of polyester are non-recyclable but can be used with 50% H.M. for moulded building material.

3.10.Value Addition through Waste Collection and Segregation centre Dehra Dun

A pioneering initiative was taken in the year 2003 when a recycler from Delhi was allotted Government land by the then Chief Secretary Dr.R.S.Tolia for setting up a recycling plant. The Doon Valley Act and its prohibitory provisions restricted the setting up of the plant and the entrepreneur started a plastic waste collection and segregation centre. At present the entrepreneur has established a plastic recycling plant in the Industrial estate at Selakui. A plastic processing plant was also established by the Government at Srinagar Garhwal with a private contractor to run it was unfortunately washed away in the unprecedented floods of June 2013. This project was helpful to initiate the concept of value addition to the low value based which is neither diverted by itinerany waste buyers nor by the waste pickers.

4.What needs to be done further ?

The State Government needs to define the Governing principles for evolving a sustainable waste management programme which addresses all issues pertaining to different constituents of the Municipal Solid Waste.

The **Governing Principle** should ***“Provide, facilitate and operate infrastructure and services to all, to achieve excellence in integrated solid waste management in a proactive, participatory, socially responsible and cost effective manner to protect health and eco-systems. To work in collaboration with all stakeholders, build area specific appropriate capacities and competencies and forge partnerships.”***

	Goal I	Goal II	Goal III
Perspective →	Reduce Risk to Public Health and Ecosystems.	Compliance of the regulatory framework related to SWM	Strengthening the ULBs and the SWM Committee constituted in partnership with the community at the ULB level.
Objective (1)	Minimize human exposure to solid wastes.	Achieve compliance with MSWM Rules - 2000 and G.O. No. No.558/A.Sha.V.-06-248 (Sa)/03 dated April 4 th . 2007 & G.O. No.113 of Panchayati raj.	Build internal capacity of Executive Officers, Sanitary inspectors and subsequently of the swachaks for compliance of the rules and adapt decentralized waste management system.
Objective (2)	Minimize Impact of plastic waste on environment in terms of air, water, soil, flora and fauna.	Achieve compliance with Plastic Waste Management and Handling rules 2011.	Build internal capacity for formulating bye laws as per clause 4 (b) of the rules. Evolve a value chain for plastic waste through rag-picker partnership with the formal system.
Objective (3)	Minimize risk to human health.	Achieve compliance with Bio-Medical waste management and handling rules 1998 as amended in 2003.	Build Internal capacity of the ULBs to report the matter to the UEPPCB for monitoring the disposal of Bio-medical waste as per the guidelines.
Objective (4)	Minimize the Impact	Evolve a set of specific	Build Internal capacity of the

	of C&D waste on the environment	guidelines for C&D Generators.	ULBs to ensure safe disposal of such waste for reuse and recycling against a Waste fees.
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It is in this background that a clear, concise and consistent policy is necessary to establish waste management systems which are relevant and area specific as per the requirements of the towns.

4.1. Proposed main objectives of the Policy:

To evolve innovative solutions for community mobilization in the plain and mountain regions that respond to the diversity and complexity of area specific Solid Waste Management problem affecting the ecosystem. It will consequently lead to:

1. Evolution of strategic planning to handle and manage solid waste in the Urban Local Bodies through participation of the Community and all stakeholders.
2. Creating of institutional structure like SWM Executive committee at the State level, SWM cell (Advisory Committee) at the Directorate level, Project Management Unit at the District level and SWM implementation steering committee at the ULB level.
3. Structuring of economic efficiency by incidence of a user charge for primary collection through segregation of waste at source by the community to minimize the diminishing ecological values.
4. Placing of strategic interfaces for value addition to the waste through a resource based approach.
5. Selecting of appropriate SWM treatment technologies based on quantification and characterization of solid waste of towns and region specific situations.
6. Capitalizing of vehicles and equipments which are compatible and area specific to avoid contact and multiple handling of waste as far as possible.
7. **Training of the Chairman, Elected members, Executive Officers, Medical Officer Health and Sanitary Inspectors and members of the steering committee (working group) at the ULB level by structured tools evolved through a participatory process to manage and operate the SWM activities.**
8. **Formalizing of the participation of itinerant waste buyers and rag pickers for resource recovery of high and low value based non-biodegradable solid waste especially film plastics.**
9. Developing of Information, Education & Communication (IEC) materials like brochures, flipcharts, media communication for bringing about a behavioral change for handling and management of solid waste at the community level.
10. Generating of employment in the Solid Waste Management sector.

11. Developing of skills and mechanisms in waste collection of the “waste collection crew” which are humane and dignified.
12. Integrating of all types of “waste” which includes “construction and demolition debris”, “biomedical waste” and waste generators like the Jila Panchayat governed areas, PWD, Housing, Forest, Tourism, Regulatory zones, ULBs and Pollution control board.
13. Drafting of a citizens charter which clearly defines the “mission” and “vision” statement as envisioned by the Government.
14. Evolving a regulatory framework for managing the waste streams through identification of gaps in the existing waste handling and management system.
15. Enhancing the capacity of the ULBs for not burning any type of garbage especially plastics.

4.2. Measuring outcomes through Key performance Indicators :

The **Key Performance Indicator (KPI)** is a quantitative measuring tool to assess the delivering system at the desired level. The focus of the indicator should be in terms of the overall cleanliness of the town in qualitative terms along with a data base of the quantum of waste recycled.

Key performance Indicators for the ULBs

Perspective	Performance Area	Unit of scale.	Performance Indicator	Output scale
	Working group at the ULB level	No. of members	Drafting of a citizen charter and an agreement with the Mohalla Swachta Samitis	Number of Swachta Samitis with their own accounting system
	Implement New organizational Structure for Door to Door collection	Quintals	Placement of karamcharis in Mohalla Swachta Samitis for door to door collection creating a cluster of 160-200 households in the hills and 200-260 H.H. in the plains.	Swachta Samitis to promote source separation of garbage and end use disposal through composting and recycling. Quantity in Kgs/Quintals to be specified. Contribution fees as user charge of the stakeholders in swachta samitis and

				details of bank account and transaction by the community an essential requisite.
Institutional	Promotion of Business and performance culture through sales of recyclable non-biodegradable post consumer waste and compost	Quintals	Value chain in non-biodegradable recyclable waste.	Revenue generation by the sales of recyclables and compost.
Communication with Internal and External stakeholders	Development and implementation of a Citizens Charter for Solid Waste Management	%	Participation of all stakeholders which includes schools, Hotels, Lodges, Ashrams and Community based organizations	Success of Charter
Human Resource Development	Development and Implementation of workforce skills	%	Understanding life cycle of the post consumer waste and its disposal. through composting and recycling of the non-biodegradable waste.	Promotion of composting and recycling of waste thereby enhancing waste handling capacity.
	Budget spent on developing workforce skills	%	Essential expenses for crystallization of new technique for waste collection and disposal.	% age of the total annual budget.
	Development of a waste minimization partnership plan	Numbers	A holistic plan for minimizing waste and land requirement for disposal.	Visualizing areas where waste can be handled in backyards of waste generators. Hotels, institutions, Govt colonies etc.
	Waste minimization communication plan	%	Implementation of waste minimization plan for composting in the backyards of the bulk generators.	Involving waste generators for implementing waste minimization plan.
	Development and Implementation of	Numbers	A curriculum based programme for managing	Training the children the skill of source

Waste Education, Awareness and Training	a schools' waste Awareness and Education Plan		waste in the school campus. It includes Government and Public schools.	separation and management of such waste within the campus.
	Development and implementation of a waste awareness and education plan for hoteliers, Ashrams, Lodges etc.	Numbers	An action based programme which promotes source separation and scientific end use disposal.	Training the Hoteliers, Lodge and ashram owners the importance of source separation and end use disposal through composting and recycling.
	Development and implementation plan of waste awareness and education plan for Shops, trading centres , street vendors etc.	Numbers	An action based programme for containerizing garbage for collection in the evenings/ night time.	Training the trading and business community in containerizing waste for collection and disposal during evenings and night time.
	Development and implementation plan of waste awareness and Education for public events and special projects	%	A strategy needs to be put into place for collection of waste during public events like fairs, kumbh, Char dham yatra, Religious ceremonies and sermons , programmes conducted by community based organizations ,mass gatherings ,Secretariat Collectorate etc.	Training of event managers and special provision for waste collection and disposal against a user charge.
	Policy and management Plans	Numbers	Improvement of service delivery to all households.	Total number of households.
		Numbers	Implementation of service delivery to all trading centers.	Total number of shops.
		Numbers	Implementation of service delivery to all hoteliers, lodges, barat ghars , wedding points ashrams etc.	Total number of bulk generators.
		Numbers	Implementation of service delivery in slums and shanty slum areas around river	Total number of slum dwellers.

Waste Collection			catchments.	
	Optimization of collection operations	Kgs.	Waste collected per day per employee.	Total quantity of waste collected per employee per month.
	Fleet management	%	Use of containerized vehicles like binned rickshaws, handcarts, sid on bin lifter, refuse collector cum compactor etc.	Compatible fleet for hills and plains for waste collection in which waste is containerized.
Waste processing and Disposal	Management System	%	Development and implementation of waste processing and disposal Policy.	Implementation of policy through aerobic composting and recycling.
	Disposal facilities	%	Compliance with regulatory requirements as per MSWM rules – 2000 and G.O. No. No.558/A.Sha.V.-06-248(Sa)/03 dated April 16th. 2007 and No.113 in the peri-urban areas.	Degree of compliance
	Transfer stations and Material Recovery facilities	Numbers	Implement development of transfer stations in accordance with policy plan.	Number of facilities provided
	Compost facilities on decentralized and centralized basis.	No. and quantum of waste processed in Kgs/tons	Development and Implementation of a plan to address organic wastes	Implementation of plan.
	Policy and implementation plan for handling Construction and demolition waste	Tons.	Special plan for using such waste for soling of pavements and roads.	Implementation of plan.
	Policy and	%	Finalization of Area cleaning	Implementation of

Area Cleaning	management plan		services policy	policy
		%	Implementation of Area Cleaning services Policy	Total extent of public areas served
		%	Overall cleanliness of the city	Compliance with standards set using a photographic cleanliness index for comparison on progress made on monthly basis.
Plastic waste management	Policy and management plan.	Quintals	Component segregation as per the property of polymers. Plastic waste management rules 2011. (Schedule of the rules)	End use disposal at Srinagar/ Dehra dun/ Kathgodam.
Cluster based approach for towns for developing sanitary land fills	Policy and management plan	Quintals	Compliant landfills in compliance of Schedule III of SWM rules 2000.	Left over residue like cloth waste, disposal nappies and other minor non-recyclables.
Linkage with peri-urban areas	Handling the Non-biodegradable waste	Quintals	In compliance of the G.O. No.113 of the Panchayat Raj	Quantum of Non-biodegradable waste handled.

4.3. Institutional frame work:

The term “Institutional framework” refers to a set of formal organizational structures, rules and informal norms for service provision. Such a framework is the precondition for the successful implementation of solid waste management intervention tools.

4.3.1.Executive Committee at the State Level:

Official	Designation	Activity	Expected outcome
Chief Secretary	Chairman	Coordination and issuing directives	Flexibility and adaptability in the ISWM programme.
Secretary Urban Development	Nodal Officer	Interaction with departments for evolving a holistic policy	Integrated solution to the waste problem.
Secretary, Panchayati Raj	Member	Adopting the State policy on ISWM for Jila Panchayt administered areas.	Ensuring implementation of ISWM programme in peri-urban areas under their jurisdiction.
Secretary, Tourism	Member	Adopting ISWM programme.	Participating and supporting ISWM in achieving the policy goal of

			“clean India campaign” of Govt. of India. Awareness generation activities among the tourist population.
Secretary Forest and Environment	Member	Adopting the ISWM programme.	Implementing the forest conservation act 1986 for clean forests and helping in identifying waste land patches for developing compost sites and compliant sanitary landfills. To monitor the actions required or Environmental Clearances if any required by SEIAA/SEAC. The UEPPCB to effectively implement the BMW management.
Secretary Housing	Member	Adopting the ISWM programme.	Incorporating structural change during planning housing colonies with a mandatory inbuilt provision of land for Solid waste management. They need to also formulate policy for disposal of C&D waste in the process of construction and demolition through scientific end use disposal.
Secretary PWD	Member	Adopting the ISWM programme	Evolving a Policy for re-use of demolition waste in pavement and road construction. Banning the indiscriminate dumping of accumulated waste on the hill slopes during cleaning of PWD road drains.
Director, Town Planning	Member		To identify the lands for setting up Solid Waste Management activities like Transfer Stations, Processing plants, landfill sites and declare no development zone/ Buffer Zone.
Member Secretary, State Pollution Control Board	Member		To evolve a working model to assist speedy action in land identification/ authentication on the suitability of land for SWM activities, issuing SWM Authorization, Consent for Establishment etc.

4.3.2. Advisory Committee at the Directorate Level:

Official	Designation	Activity	Expected outcome
Director	Chairman	Coordination and issuing directives	Implementing the policies at the ULB level.
Member Secretary	Deputy	Delivering the	Ensuring the implementation of

	director UD	directives to the ULBs.	the ISWM master Plan.
Member	UEPPCB	Compliance BMW rules	Ensuring the safe disposal of the contaminating BMW.
Member	Deputy Director UTDB	Awareness in tourism related activities	Ensuring the compliance of the “Clean India campaign” and initiative of the Govt. of India.
Member	Expert SWM	Regular inputs to the ISWM cell.	Monitoring the implementation and filling the gaps for dumpsite free ULB.
Member	Panchayati Raj	SWM in Village and Jila Panchayat areas	Implementing the SWM rules in the peri-urban areas.

4.3.3. District level Committee

Official	Designation	Activity	Expected outcome
District Magistrate	Chairman	Coordination and issuing directives	Monitoring the implementation of ISWM programme at the District level.
Sub Divisional Magistrate	Nodal Officer	Interaction with departments for area specific strategy.	Restructuring the ISWM policy if required at the Tehsil level.
Chief Development officer (CDO) and Panchayati Raj Adhikari	Member	Adopting the State policy on ISWM for Jila Panchayat administered areas.	Ensuring implementation of ISWM programme in peri-urban areas under their jurisdiction.
Executive officers of the ULBs	Members	Mandatory duty of the ULBs.	Ensuring participation of the community and different stake holders within their area of jurisdiction.
District Tourism Development Officer (DTDO)	Member	Adopting ISWM programme.	Participating and supporting ISWM in achieving the policy goal of “clean India campaign” of Govt. of India. Ensuring the implementation of the ISWM programme in the GMVN and KMVN guest houses.
Divisional forest Officer	Member	Adopting the ISWM programme.	Ensuring clean forests and helping in identifying waste-land patches for developing compost sites and compliant sanitary landfills.
Secretaries of Vinimit Kshetra (Restricted areas) and Development Authorities	Member	Adopting the ISWM programme.	Implementing structural changes during planning housing colonies with a mandatory inbuilt provision of land for Solid waste management. Disposal of C&D waste be implemented in accordance of the policy adopted by the Ministry of

			housing.
Executive Engineer PWD	Member	Adopting the ISWM programme	Ensuring re-use of demolition waste in pavement and road construction. Identifying patches of land under their jurisdiction for storing such waste.

4.3.4 Implementing of SWM at the ULB level through a Working Groups:

Headed by Chairman, ULB

Executive Officer-Secretary

Elected Ward Members

Environmental Engineer

Prominent NGO working in SWM

Senior Citizen (Retired)

Stake holders – CBOs, Religious Heads, Schools, Traders, Institutions, Hoteliers, Ashrams,
Journalist (One Member each)

The working group at the ULB level shall help in mass education and help in prevention of littering of waste in public places.

4.3.5. Mohalla Swachta Samiti:

President – Nominated (Honorary)

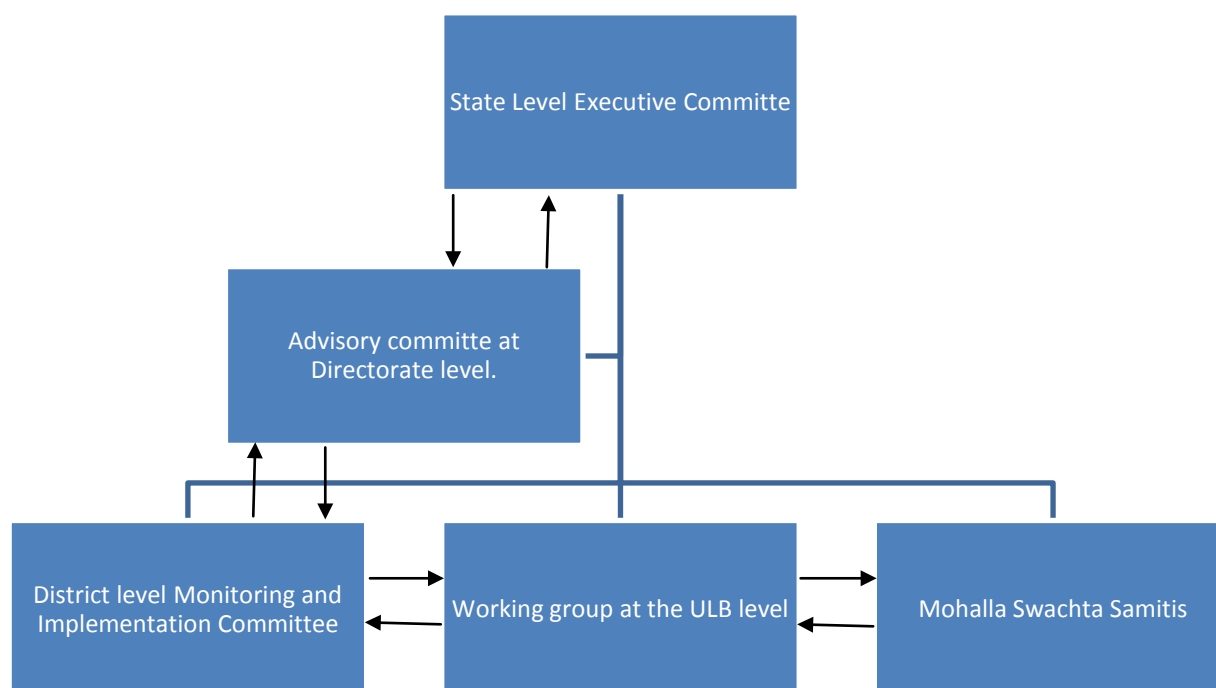
Secretary- Nominated (Honorary)

Treasurer- Nominated (Honorary)

2- Executive Members- Nominated (Honorary)

The Swachta Samiti shall maintain a day to day record of waste collection from step door. They shall frequently interact at the ULB level with the working group for improving service delivery and in over all cleanliness of their areas.

4.4. Organizational Chart for Institutionalizing Solid Waste Management:



4.5. Violation and Penalties:

Any person/ institution/ government body who litters wastes in privy, drains, public roads, gullies, road sides, hill slopes, ravines, water bodies, streams, springs, **rivulets**, rivers, canals or any such place which is approachable and in use shall evoke penalties under Municipalities & State Acts.

The municipalities shall maintain a record of number of Challans & revenue realized through prosecution of offenders under the Acts.

5. The Role of Multilateral Donor Agencies

Multilaterals and International Donor Agencies can play significant role in the SWM sector for mountain cities as the financing and technology would be key issues beyond the capacity of urban local bodies. So far the efforts and impact of their intervention has not been very encouraging.

World Bank funded JNNURM has helped only a few cities in mountain states but only a few cities have benefitted under this program.

ADB also has been active in many of the mountain states and has funded the Urban Development programs which have targeted the smaller towns. In Uttarakhand also ADB is engaged in such a

program but it now has retreated from funding SWM project due to non-availability of experts for the hill town.

Appendix 12

Case study on Waste Water treatment by Clover Organics

THE LAWRENCE SCHOOL, SANAWAR

CASE STUDY PAPER ON WATER RECYCLING

The Lawrence School, Sanawar is one of the most prestigious schools of India and being founded in the year 1847, is also one of the oldest. It was earlier called the Royal Military School where children of the British soldiers were sent to study. The School has always had excellent infrastructure backed by dedicated Management and Staff to provide all round education to students for many years. Sir Rudyard Kipling stated in his book 'Kim' quote "send him to Sanawar and make a man of him" unquote.

The school is situated on top of a hill near Sanawara village in Himachal Pradesh and is close to Kasauli and Solan. Being formerly an army school, the school received most of its water from MES reservoir near the Kasauli Club by means of a gravity main line of GI pipe of 3" diameter. On an average, the school received 1,28,000 liters per day (128 KLD) if supplies are normal. This supply was however erratic especially during the summer months.

1. Water Requirement of the School: The immediate water requirement of the School on an average basis was as under:

SI #	USE OF WATER	CALCULATION (Average Basis)	REQUIREMENT (Litres)
1	Bathing	30 liters x 1,600 units	48,000
2	Washing/Cloths / Utensils CIC	35 liters x 1600 units	56,000
3	Cooking	10 liters x 1600 units	16,000
4	Flushing	10 liters x: 1600 units	16,000
5	Drinking	5 liters x 1600 units	8,000
6	Gardening		35,000
7	Swimming Pool Daily topping		3,000
	TOTAL		1,82,000

This is an ideal situation in consumption of water as per Central Public Health and Environmental Engineering Norms, where by each child is given a bath daily. Break up of 1600 units staying on the school campus during term time is students -711 staff including supports staff 200 nos X4 (dependents) units = 800 units, total say 1600 units.

1. **Future requirement:** The school has many playing fields, which it always wanted to green, but could not do so owing to lack of water.
2. **Water supply situation:** The School received water from various sources. These were as follows:

SL #	SOURCE	AVERAGE QUANTITY (Liters)	BRIEF DESCRIPTION
1	MES (Kasauli)	60,000	Being formerly an army school, the school received most of its water from MES reservoir near the Kasauli Club by means of a gravity main line of GI of 3" diameter. The supply is very erratic.
2	Spring Source	6,000	Erratic supply as spring dries up during summer months.
3	Bore Wells	50,000*	There are 3 bore wells dug. They give a supply ranging from a high of 20,000 liters per day to a low of 2,000 liters per day. One bore well has already stopped working.
4	Tankers	5,000	Water is carried from Pinjore to the School in water tankers at great cost.
5	Recycling of STP	8,000	Partial recycling was being done of sewage water.
6	Rain water harvesting	3,000	Erratic supply and only partial roofs covered.
	TOTAL	1,32,000	

* Bore wells: There are three Bore-wells drilled in the School Campus. These three Bore-wells have been drilled to a depth of about 450 feet to 500 feet each. Initially the discharge from these Bore-wells, like the one below SSC was about 10,000 liters per hour but during the dry spell from March to June, it went down to 2000 to 3000 liters per hour.

3. **Total requirement of the School:** The School urgently needed at least 50,000 liters per day in order to meet its requirements. The School approached many batches for help and many meetings took place, however nothing substantial materialized.
4. **Batch of 1983:** The batch of 1983 created a milestone of sorts by collecting > Rs 20 lakhs from various students. The batch made Mr. Sanjay Aggarwal (their own batch mate) to head the project and create water for the School. This was because Mr. Aggarwal owns and heads, Clover Organic Pvt. Ltd, a Company offering ecological and innovative solutions in the area of wastewater treatment amongst other segments and could provide sustainable solution for the School. Many ideas were discussed by him and rejected. These included the following:

SL #	SOURCES	REMARKS
01	Digging more tube wells	No contractor was willing to offer assured supplies and hence this ideas was dropped.

02	Rain water harvesting	This meant tapping all the major roofs the buildings of the School and creating a contour mapping to collect water in different locations. Estimated cost of the same was given to be > Rs 2 crores and hence this was dropped.
03	More tankers	This was not a sustainable solution. Water had to be carried large distances and with the constant increase in fuel rates, it did not offer a lasting solution and hence it was dropped.

Exploring each idea above and then subsequently rejecting the same took a lot of time. He decided to look at recycling of wastewater as an option and found it to be a plausible solution to the School's problems. After a lot of survey, data was collected and consolidated on the School wastewater situation. (Kindly see Annexure 1).

5. **Implementing the project:** Funding for the project was received from the Batch of 1983. They nominated Clover Organic Pvt. Ltd., to head the project.

6. **Details of project implemented:**

- Creation of a new STP near Butchery:** A new STP was created of 10 KLD capacity. This was to take care of sewage being generated in the Girl's Department (GD) of about 6.5 KLD.
- Refurbishing existing plants:** The existing plants located in PD (Prep Department) & BD (Boy's Department) were repaired and made more efficient.
- Connectivity:** Pipe connectivity was carried out for bringing sewage to the new plant and then taking the same for recycling after treatment.
- Bio-augmentation:** In order to make the water fit for recycling, Clover Organic used NatureVel – WW for the same. It is a microbial product used for making the plants more efficient. This was used in all the plants by the School.

7. **Outcome of the project:** The following benefits accrued to the School as a result of this intervention:

- The School has started receiving > 38 KLD of recycled water, which is being used for gardening and flushing. This has freed fresh water of equal quantity and now the School is surplus in water requirements.
- Due to the use of NatureVel – WW, there is negligible Coliform in the treated wastewater and the treated waste water more than meets the norms as laid down by CPCB. There is also no foul odour and very little sludge is being created.

8. **Some pictures of the project with explanations:**



The existing plant at PD (Prep Department) was refurbished under the directions of Clover Organic Pvt. Ltd. The plant now offers water quality within CPCB norms including the Coliform count.



The new plant near the Butchery that was made A pipe line was laid to connect the wastewater with the help of the Batch of 1983. generated at GD (Girl's department) to the new plant installed near Butchery.

Appendix 13
Paper on status of city planning in
Uttarakhand
by Town & Country Planning
Department, GoUK

Problems of city Planning in Mountain regions of Uttarakhand

Uttarakhand is a newly carved hill state which came in to existence on 9th November 2000. Just like other hilly states of India, Uttarakhand state also has peculiar phenomenon of urbanization. As per 2001 census out of total state population of 84, 89,349 , 25.67% of the population lived in 86 census towns. During 2011 out of the total population of 1,01,16,752 persons 30.55% lived in 115 census towns.

The following table shows the class-wise classification of Towns in Uttarakhand.

Table
Class-wise classification of Towns in Uttarakhand

Class	No. of towns 2001	Urban Population 2001	No. of towns 2011	Urban Population 2011
I	4	1025204	7	1908600
II	3	260448	5	267634
III	14	446670	13	372148
IV	13	205255	22	30093
V	27	199899	28	214978
VI	15	41598	11	28316
TOTAL	76	2179074	86	3091169

Sources: Census of India -2011

During 2001-11 decade the state has registered urban growth rate of 41.86%. This shows that majority of the town of Uttarakhand are small and medium towns.

Preparation of Master Plans in Uttarakhand:

Legal provisions

After creation of new state of Uttarakhand all the legal provisions as applicable in the erstwhile state of Uttar Pradesh were adopted by the state of Uttarakhand. A brief description of the legal provisions is as follows:

1- The U.P. Regulation of Building Operation Act -1958

Under provisions of this Act only regulatory functions are performed. Important salient features of this Act are as follows:

Section 2(f) Appointment of Prescribed Authority.

Section 3 Declaration of Regulated Area.

Section 4 Creation of Controlling Authority for discharge of functions assigned under the Act.

Section 5-A Master plan of Regulated Area.

2- The Uttar Pradesh Urban Planning and Development Act, 1973.

Under provisions of this Act there is provision for creation of Development Authority which carries out regulatory as well as development functions. Important salient features of this Act are as follows:

Chapter –II The Development Authority and its objects

Section 3 Declaration of development areas.

- Section 4 The Development Authority.
- Chapter –III** Master plan and Zonal Development plan.
- Section 8 Civil survey of the Master Plan for the development area.
- Section 9 Zonal Development plans.

3- **The Uttar Pradesh Special Area Development Authorities Act, 1986.**

This act was enacted to provide for establishment of Special Area Development Authority for planned development of certain area of Uttar Pradesh and the matters ancillary there to. Important salient features of this Act are as follows:

- Chapter II** Establishment of Special Area Development Authorities.
- Section 3** Declaration of Special Development Areas.
- Chapter III** Master Plan for Special Development Areas.
- Section 8** Preparation of Master Plan.
- Section 9** Sector plans.

However after the creation of the new state of Uttarakhand, efforts were made to prepare a consolidated Urban and Regional Planning and Development Act viz. The Uttarakhand Urban and Country Planning and Development (Amendment) Act, 2013 Uttarakhand Act no. 25 of 2013. It was notified vide Gazette Notification no. 168/xxxvi (3)/2013/26(1)2013 dated Deharadun April 05, 2013.

Until now 23 Regulated Areas have been notified under R.B.O Act 1958 of which 13 are in Garhwal Division and 10 in Kumaun Division. There are 3 Development Authorities created under Urban Planning and Development Act 1973 and 3 Special Area Development Authorities created under the Special Area Development Authorities Act 1986. Detail of the above stated agencies is given in Annexure-I .

The Town and Country Planning Department, Uttarakhand

At the time of erstwhile state of Uttar Pradesh, there were only two Town and Country Planning Division at commissionary level viz. Garhwal Sambhagiya Niyojan Khand, Dehradun and Kumaun Sambhagiya Niyojan Khand, Haldwani which were carrying the work of preparation of Master Plan for the respective areas. However, after the Partition and creation of new state of Uttarakhand only few posts were made available from the Head quarter, Town and Country Planning Deptt., U.P. The post of Chief Town and Country Planner is yet to be created in the newly carved state. Till now the reorganization and strengthening of the Deptt. has not been done.

Since there is inadequate technical staff in Development Authorities/ Regulated Areas for carrying out the work of planning, enforcement and implementation of Master Plans, the preparation of the Master Plans / Regional plan is being carried out by the Town and Country Planning Deptt. The present status of the Master Plan / Regional Plan is depicted in Annexure-II.

Issue related to the Master Plan for the Hill Towns:

Preparation of the Master Plan for the hill towns is a challenging exercise. It requires practical experience and adequate knowledge of the hill topography. In Uttarakhand about 2/3rd of the area falls in the hilly topography. Therefore there is limited contiguous land available for development.

- 1- Irrespective of the fact that Uttarakhand possesses varied landforms from plains to the higher gradient hills, the method and norms for the preparation of the Master Plans is generalized which renders ineffective the planning proposals for hills. Therefore different norms should be laid for hill and plains separately with reference to:
 - 1- Land uses and land use area percentage distribution.
 - 2- Minimum area norms, population and gross/ net density.
 - 3- Zoning Regulations.
- 2- Unifunctional towns like pilgrim town, tourist town, industrial town needs specific land use categories, land use area percentage distribution and zoning regulations with respect to character of the town.
- 3- Keeping in view the sensitive environmental and ecological balance of the hilly areas, the control over floating population needs to be exercised through carrying capacity calculations.
- 4- Limited availability of developable land in the state demands rational approach to land use planning incorporating mixed land use provision both vertically and horizontally.
- 5- The higher or comparatively less compatible activities allowed in zoning regulations should be made conditional with respect to approach road and minimum plot area. Such activity should bear impact fee for upgrading existing infrastructure facilities in the area.
- 6- The Master Plan should contain a transportation plan, an infrastructure plan and a disaster mitigation plan

Issue related to the Bylaws:

- 1 Separate building bylaws should be specified for Hills and Plains keeping in views the landform and its vulnerability to nature calamities.
- 2 Definitions of Hills with respect to mean sea level needs to be rectified. It should be defined with respect to the slope gradient as well.
- 3 Definition of Ashram / Dharmshala to be included in pilgrim towns.
- 4 Definition of temporary and permanent structures.
- 5 Norms to determine the river banks in hills and plains should be evolved so that construction activities could be allowed at appropriate distance from the banks.
- 6 To maintain the building lines on major roads, the front setback should be laid down with respect to the road width in front of the plot instead of the plot size.
- 7 Approach road width needs to be specified for all activities.
- 8 Road hierarchy (including pedestrian path), junction geometry should be specified.
- 9 Basement norms to be elaborated with respect to definition, its usage, height, number, and mechanized/ semi mechanized parking.
- 10 Stilt norms to be elaborated with respect to definition, its usage and height.
- 11 Parking norms to be established with respect to different kinds of the parking viz terrace/mechanized/semi mechanized/ non mechanized/ road level terrace parking in hills/ basement /stilt/open parking.
- 12 Areas to be excluded and included in F.A.R computation to be listed.
- 13 Building bylaws pertaining to eco resorts to be included.
- 14 Method to promote amalgamation of land vide F.A.R and other bylaws parameters should be stated.
- 15 Method to extract spaces for public/semi-public uses through compensatory FAR's.

Suggestions for improvement of hill town planning and implementation:

- Hill towns have limited land and sometimes, limited potable water resources. So based upon the availability of above, carrying capacity should be calculated and accordingly floating population should be regulated in these towns. Calculation of carrying capacity shall be the basis of Master Plan.
- Mixed land use character of the towns has made traditional type of Master Plan landuses redundant. Therefore, approach in Master Plan should be to promote vertical and horizontal mixed use.
- Developable land is available only along the major spines which causes ribbon development and congestion. Therefore, a model should be devised which addresses the above issue.
- Identification of landslide zone is necessary and suitable measures should be proposed to safeguard life and property of these areas.
- Available developable land is primarily owned by private owners. So it is not practical to propose public/semi-public land uses. Therefore mechanism to assemble land for such uses should be devised in Master Plan.
- Land use reserved for public/semi-public uses shall be developed on priority basis which otherwise remains on paper only.
- Inadequate public parking provisions in Master Plan.
- Green buildings should be promoted in Master Plan.
- Buffer along river banks, forests should be spelt out in Master Plan.
- Proportion of negative slopes is often more in hilly areas. Therefore, the prescribed setbacks fail to fall in place. Minimum setbacks according to height of building shall be defined and rest shall be taken care of through ground coverage norms.
- The character of the town shall be preserved to maintain its identity. Otherwise all hill towns shall get converted to concrete jungle without any urbanscape and distinct character.
- The biggest challenge in hilly towns is that the available developable land is almost developed. So the issue is how to organize and regulate the organic development through Master Plan.
- Strategies to promote economic drivers shall be incorporated in Master Plan to control ex-migration of youth.
- Though Master Plan provisions are adequate but generally the proposals remain on paper only as implementation part of the plan does not spell out clearly as to which agency shall carry out those proposals of Master Plan; so fixing up of responsibilities should also be a part of Master Plan proposal.

Annexure-1
Existing Regulated Areas in Uttarakhand

Garhwal Division

- 1- Roorkee
- 2- Uttarkashi
- 3- Chamoli-Gopeshwar
- 4- Badhrinath
- 5- Gochar
- 6- New Tehri
- 7- Rudraprayag
- 8- Kedarnath
- 9- Pauri
- 10- Shrinagar
- 11- Auli
- 12- Chopta
- 13- Naveen Chakrata

Kumaun Division

- 1- Pithoragarh
- 2- Bageshwar
- 3- Ram-nagar
- 4-Haldwani-Kathgodam
- 5-Kashipur
- 6-Bazpur
- 7-Rudrapur
- 8-Kausani-lewshal
- 9-Champawat
- 10- Kichha

Development Authorities

- 1- Mussoorie-Deharadun Development Authority.
- 2- Haridwar Development Authority.
- 3- Tehri Jheel Parikshetra Development Authority.

Special Area Development Authorities

- 1- Doon-valley Special Area Development Authority
- 2- Nainital Lake Area Special Area Development Authority
- 3- Gangotri Special Area Development Authority

Annexure-2

Master Plans Status in Uttarakhand

Regulated areas Garhwal Division

1- Roorkee Master Plan	- under preparation
2- Uttarkashi Master Plan	- to be prepared
3- Chamoli-Gopeshwar Master Plan	- 2016
4- Badrinath Master Plan	- 2031
5- Gochar Master Plan	- 2021
6- New Tehri Master Plan	- to be revised
7- Rudraprayag Master Plan	- to be prepared
8- Kedarnath Master Plan	- under revision
9- Pauri Master Plan	- under revision
10- Srinagar Master Plan	-2011(to be revised)
11- Auli Master Plan	- under preparation
12- Chopta Master Plan	- to be prepared
13- Naveen Chakrata Master Plan	- to be prepared

Development Authority/ Special Development Authority

1- Dehradun Master Plan	-2025
2- Haridwar Master Plan	-2025
3- Tehri Jheel Parikshetra Master Plan	-to be prepared

Special Area Development Authority

1- Doonghati special area Master Plan	- 2001under revision
2- Gangotri special area Master Plan	- to be prepared

Regulated areas Kumaun Division

1- Pithoragarh Master Plan	- under preparation
2- Bageshwar Master Plan	-2031
3- Ram-Nagar Master Plan	-2001(to be revised)
4-Haldwani-Kathgodam Master Plan	- to be prepared
5-Kashipur Master Plan	-2011(to be revised)
6-Bazpur Master Plan	- 2011to be revised)
7-Rudrapur Master Plan	-2031
8-Kausani-lewshal Master Plan	-2011(to be revised)
9-Champawat Master Plan	- to be prepared
10- Kichcha Master Plan	- 1991under revision

Special Area Development Authority

1- Nainital Master Plan	- 2011(to be revised)
2- Bhimtal Master Plan	- 2011(to be revised)

Appendix 14

Paper on Mussoorie Water Supply by Uttarakhand Jal Sansthan

MUSSOORIE WATER SUPPLY SCHEME

PRESENT STATUS AT A GLANCE

Water Supply Scheme for Mussoorie Town was constructed in the year 1908. In this scheme seven springs were tapped and water of these springs was collected in a sump situated at Murrey and then pumped to the reservoir constructed at Winsten hill, the total water production from this scheme is 2.40 MLD. Afterwards following reorganizations/augmentations works were executed to improve the water supply.

- A. In the year 1913 three springs were tapped and after collection in a sump at Mechennon, the water is pumped to another reservoir constructed at library. Thus 0.14 MLD water productions were enhanced.
- B. In year 1923 a boosting station at Landour was established.
- C. In year 1925 another augmentation work was carried out, in this Bhilaru spring was tapped and pumped to Gunhill reservoirs. This pumping station is producing 0.45 MLD of water.
- D. In year 1971 first reorganization of scheme was carried out in which along with previous production another sources named Jinsy spring and Koltu Gadhera were also tapped which is producing 1.85 MLD and 0.65 MLD water respectively.
- E. In the year 2003, a scheme from Dhobighat spring (Total production 0.40 MLD) was constructed to augment the water supply of Barloganj and Kingcrabe areas.
- F. In the meantime 6 gravity sources were also tapped and water from these sources is carried to different reservoirs.

At present the total water production from pumping schemes is 5.89 MLD and from gravity schemes is 0.61 MLD, thus total 6.5 MLD **(Details as per Annexure-1)**. In the first scheme 5 reservoir of total capacity

6.98 MLD were constructed to meet the demand and supply gap in Tourist season. These are reserve reservoirs which are used only in tourist season. In year 2006 two more such reservoirs of total capacity 8 MLD were constructed for reserve storage.

At present there are 29 reservoirs with total capacity 29 MLD out of which 24.98 MLD is the reserve capacity and rest 4.02 MLD storage capacity is used for daily water supply. Present Permanent Population of Mussoorie Town is 42078 with 8000 Floating Population, the floating population increases to 50845 in peak season (Figure taken from Tourist Department). Present water demand of off season is 7.76 MLD and for Tourist season is 14.40 MLD while production is just 6.50 MLD. Thus deficit in water production is 1.26 MLD for off season and 7.9 MLD for Tourist season. The gap between demand and production shall go on increasing in coming year.

Thus there is a great need to make a suitable scheme to solve the water crises in Mussoorie Town.

Proposals – Uttarakhand Peyjal Nigam has to construct the new scheme. Peyjal Nigam is preparing a proposal to lift the water from Yamuna river. The funding source shall be either JNNURM or ADB. At present reorganization of old Sewerage scheme is under execution. But if the new sewerage line does not get proper liquid effluent, it cannot work properly and there will be a silting problem. Thus viewing the water crises and sewerage scheme reorganization there has become a great need to expedite the reorganization of water supply scheme.

MUSSOORIE SEWERAGE SCHEME

PRESENT STATUS AT A GLANCE

Sewerage Scheme for Mussoorie Town was constructed in the year 1931-32 for a small population. Afterwards some improvements were made in original scheme. At present approximately 55% population is benefitted from this sewerage scheme. The area covered from the scheme are, 1. Landour Buchad Khana, 2. Saraya Kuldi, 3. Archedia, 4. Shergadhi, 5. Barlawganj, 6. Bhiladu, 7. Company Garden, 8. Happy Valley. But still Landour Cantt Area, Tehri Bus Stand, Balahinsar, Chandra Bhawan, Maisonic Lodge to Kinkreg Bus Stand, In Mall Road Haikmans to Under Hotel Roseline, Library Bus Stand to Hotel Sunrise, Radha Bhawan Estate Circular Road, Spring Road are uncovered. The collected sewer is transported to 8 nos. Sceptic tanks. The salient features of present sewerage scheme is as per Annexure-2.

Scheme under execution – Reorganizations of Sewerage Scheme is being executed by Uttarakhand Peyjal Nigam. In this scheme Peyjal Nigam has proposed to treat the sewerage before disposal, thus replacing the old septic tanks. After execution of this scheme it is expected that the whole Mussoorie Town shall be covered by sewer system.

WATER SUPPLY SCHEME**SALIENT FEATURES**

1.	Year of Construction	1908	
2.	Main Reorganizations	1971-72, 1992 (Jinsi Pumping Scheme) and 2003-04 (Dhobighat Pumping Scheme)	
3.	Beneficiaries	Whole Mussoorie Town and Nearby 4 Villages	
		Off Season	Tourist Season
4.	Permanent Population- 2001	29319	29319
5.	Present Permanent Population	42078	42078
6.	Floating Population	8000	50845
7.	Total Population	50078	92923
8.	Water Production (MLD)		
	a. By Pumping	6.50	6.50
	b. By Gravity	0.61	0.61
	c. Total Water Production	7.11	7.11
9.	Demand of Water (MLD) @ 135 LPCD + 15% Wastage	7.77	14.42
10.	Deficit (MLD)	0.66	7.31
10.	Total no. of Storage Reservoirs	29	
11.	Total Storage Capacity (MLD)	4.44	
12.	For Tourist Season No. of Reserve Storage Reservoirs	6	
13.	Extra Reserve Storage Capacity (MLD)	24.6	
14.	Total No. of Pumping Stations	8	
16.	Length of Rising & Distribution Mains	About 96 Km	

SEWERAGE SCHEME**SALIENT FEATURES**

1.	Year of Construction	1931-32
2.	Total Coverage	App. 55%
3.	Covered Zone	1. Landour Buchad Khana, 2. Saraya Kuldi, 3. Archedia, 4. Shergadhi, 5. Barlawganj, 6. Bhiladu, 7. Company Garden, 8. Happy Valley (Total 8)
4.	Uncovered Areas,	Landour Cantt Area, Tehri Bus Stand, Balahinsar, Chandra Bhawan, Maisonic Loudge to Kinkreg Bus Stand, In Mall Road Haikmans to Under Hotel Roseline, Library Bus Stand to Hotel Sunrise, Radha Bhawan Estate Circular Road, Spring Road
5.	Length of Sewer Line	App. 21.00 Km
6.	No. of Inspections Chambers	1100
7.	No. of Sewer Connections	995
8.	No. of Sewer Seat	4552
9.	Sewerage Treatment Plant	08 no.
10.	Sewerage Treatment System	Septic Tank

Appendix 15

List of Participants for Mountain Cities 2014

Sl	Name	Designation	Organization	City	State	Mobile	Email
1	Smt.Higio Aruni	Chief Councillor	Itanagar Municipal Council (IMC)	Itanagar	Arunachal	9436633096	
2	Shri. Tagom Doming	Councillor and Member of ESC	Pasighat Municipal Council (PMC)	Itanagar	Arunachal	9862196129	
3	Shri. Tayar Tache	Deputy Director	Deptt. of UD & Housing.	Itanagar	Arunachal	9436041362	deputydirectorudhita@gmail.com
4	Shri Likha Suraj	Town Planner	Deptt. of Town Planning & ULB's.	Itanagar	Arunachal	9436050132	likhasuraj@gmail.com
5	Ms Anjali Pancholy	Associate Town & Country Planner	T&C Planning, Mo UD	Delhi	Delhi	9810682809	anjali.pancholy@gmail.com
6	Mr. Sushil Ramola	CEO	B-Able	Delhi	Delhi	9810162526	sushil.ramola@b-able.in
7	Dr. Nisha Mehendiratta	Director / Scientist-F	Climate Change Program, Department of Science & Technology	Delhi	Delhi		nisha67@nic.in
8	Mr. Monish Verma	Environment Sector Specialist	European Business & Technology Centre	Delhi	Delhi	9818209314	verma@ebtc.eu
9	Dr. Akhilesh Gupta	Head / Scientist - G	Department of Science & Technology	Delhi	Delhi	9810422249	gakhilesh2002@yahoo.co.in
10	Mr. Kiran Rajashekariah	Head, Regional Program	WWF-India	Delhi	Delhi	9711188465	kiranraj@wwfindia.net
11	Mrs. Bharati Gupta Ramola	Market and Industry Leader at PwC	PwC	Delhi	Delhi	9810000734	bharti.gupta.ramola@in.pwc.com
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13	Ms.Melina	Member	archl	Delhi	Delhi	9910484676	
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Appendix 16

Resource List :Mountain Cities Agenda

- Public Transport
 - Road
 - Buses
 - We need the right sized urban transport buses for mountain cities. Currently the Urban buses being run in India are more suited to bigger roads in Plains Routes, Bus Shelters etc.
 - Current Status and Implementation of Bus Shelter projects is totally oblivious to the nitty gritty of Urban Transport requirements.
 - Smaller Vehicles
 - Park Shuttle Example in Capelle aan den IJssel town in Netherlands shows a vehicle that could be appropriate for small towns in mountains (<http://connectedcities.eu/showcases/parkshuttle.html>)
 - Alternatives to Road
 - PRTS
 - <http://www.2getthere.eu/>
 - Rope/Cable Based
 - Funicular in Montmartre Paris
 - Medellin's Metrocable
 - Lifts / Escalators
 - Shimla has lifts between upper mall and Lower mall
 - Medellin has put outdoor escalators as slum rejuvenation tool (<http://www.theguardian.com/world/gallery/2013/jul/31/outdoor-escalator-medellin-colombia-pictures>)
 - Hongkong has implemented Outdoor Escalators as http://en.wikipedia.org/wiki/Central-Mid-Levels_escalator_and_walkway_system
- Drinking Water Supply
 - A few ADB Projects are underway in North East, Uttarakhand etc.
 - Municipal Corporation Shimla had floated a PPP Project Bid
- Solid Waste Management
 - JNNURM Examples
 - Guwahati Project
 - Dehradun Project
 - Nainital Project
 - Haridwar Project

City Models From Around the World :

- Medellin, Columbia
- Bogota , Colombia
- Caracass, Venezuela
- Davos, Switzerland

Useful Websites

- <http://connectedcities.eu/>
- <http://www.newurbanism.org/newurbanism.html>
- <http://www.udfcd.org/downloads/>
- <http://www.newurbanism.org/newurbanism/principles.html>

- <http://www.southasiancityessummit.com/>
- <http://www.unvac.org/>
- <http://www.cdia.asia/>
- <http://www.niua.org/>
- <http://www.sustainable-buildings.org/>
- <http://www.teriin.org/index.php>
- <http://dsds.teriin.org/>
- <http://www.acccrn.org/>
- <http://www.sde.nus.edu.sg/csac/projects.html>
- <http://planningcommission.nic.in/hackathon/index.php?sector=Urban Development>
- <http://citiesalliance.org/>
- <http://www.sutp.org/>
- <http://www.citypopulation.de/India-Uttaranchal.html>
- <http://www.indiasanitationportal.org/>
- <http://www.sputnicproject.eu/sputnic-products.php>
- <http://www.ebtc.eu/>
- <http://www.cities21.org/>
- <http://www.2getthere.eu/>
- <http://bclip.takshashila.org.in/>
- <http://catalyst.nationalinterest.in/tag/data-visualisation/>

Document Links

- http://planningcommission.nic.in/aboutus/committee/wrkgrp12/hud/wg_%20urban%20Transport.pdf
- [http://planningcommission.nic.in/aboutus/committee/wrkgrp12/hud/wg_Urban Governance Final Report.pdf](http://planningcommission.nic.in/aboutus/committee/wrkgrp12/hud/wg_Urban_Governance_Final_Report.pdf)
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- http://planningcommission.nic.in/aboutus/committee/wrkgrp12/wg_land0508.pdf
- <http://www.tcpomud.gov.in/Divisions/uris/towns.html>
- <http://icrier.org/Urbanisation/research.html>

Ideas

- [http://www.ted.com/talks/enrique_penalosa_why_buses_represent_democracy_in action.html](http://www.ted.com/talks/enrique_penalosa_why_buses_represent_democracy_in_action.html)
- http://www.ted.com/talks/michael_green_why_we_should_build_wooden_skyscrapers.html
- http://www.ted.com/talks/jaime_lerner_sings_of_the_city.html?quote=252
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- http://www.ted.com/talks/janette_sadik_khan_new_york_s_streets_not_so_mean_any_more.html
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- http://www.ted.com/talks/kent_larson_brilliant_designs_to_fit_more_people_in_every_city.html
- http://www.ted.com/talks/iwan_baan Ingenious homes in unexpected places.html
- <http://thisbigcity.net/eight-projects-finding-imaginative-ways-to-use-infrastructure-in-cities/>