



Environment

Water Community



## Solution Exchange for the Water Community Consolidated Reply

*Query: Handbook on Innovations in Watsan – Experiences.*

Compiled by Pankaj Kumar S., Resource Person and Ramya Gopalan, Research Associate  
28 February 2007

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From Chicu Lokgariwar, Gomukh Environmental Trust, Pune  
Posted 31 January 2007

I work for the Gomukh Trust, an NGO working primarily in watershed management, decentralized water supply and sanitation, and negotiated integrated River Basin Management. We also attempt to influence policy by researching, developing, and creating awareness about sustainable mechanisms for water supply. As part of the last, we are now working on a European Economic Union project to document and develop action plans for innovative watsan systems in Indian cities.

For the above documentation, we are compiling a handbook on “best practices” in urban water supply and sanitation. These “best practices” are expected to be of the following types:

- **Technologies** - including comprehensive systems of water supply and sanitation and processes like water distribution, purification, and metering.
- **Institutional innovations** - for equitable and participatory management and monitoring of watsan systems.
- **Economic innovations** – e.g. through cost sharing, metering, revenue models, etc.

The “best practices” will be selected for inclusion in the handbook on the basis of following criteria:

1. Economic, environmental and social sustainability.
2. Reliability, ease of operation and maintenance
3. Affordability of the installation and running costs
4. Potential for scaling up and replicability

Members are requested to include case studies of where the “best practices” faced major opposition and how these were overcome. Case studies of not-so-successful innovations but possessing a major learning value may also be contributed, as sometimes failures teach more than successes.

Needless to say, all contributors will be acknowledged in the compendium.

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Responses were received with thanks from

1. [Anjal Prakash](#), WaterAid India, New Delhi

2. [Eric Lemetais](#), L2i Consultants, Paris ([Response 1](#); [Response 2](#))
3. [John Oldfield](#), Water Advocates, Washington, D.C.
4. [Nafisa Barot](#), Utthan, Ahmedabad
5. [Biplab K. Paul](#), Lokvikas, Ahmedabad
6. [Prabhjot Sodhi](#), UNDP GEF SGP, New Delhi

*Further contributions are welcome!*

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## Summary of Responses

The member is compiling a handbook on innovations in water and sanitation (watsan) that meet the criteria of sustainability, reliability, affordability, and replicability. Members responded by highlighting a range of personal and organizational experiences and technologies. The handbook will include three types of “best practices” - technologies, institutional innovations and economic innovations. The practices mentioned by members, are listed below:

### Technologies

Respondents drew attention to several technologies that they felt could be included in the Handbook. One was the “Moringa Oleifera” tree, which has a tremendous potential to serve multiple purposes – for example its leaves and pods contain many vitamins, and its seeds purify water. A similar innovation mentioned was an indigenous system in [Nigeria](#) that improves water quality by combining coagulant [Moringa](#) (seed) powder with slow sand filtration. Respondents also cited another integrated system from [Tamil Nadu](#) which uses local plants, sand and solar power to purify water. Other technologies mentioned by members included using solar energy for ecotoilets, sodis and solar pasteurization to disinfect PET tanks and/or bottles.

### Economic Innovations

Members also discussed several innovations showcasing the economic use of water resources. These included:

- Enviro Loo- [South Africa](#)'s waterless sanitation solution to the sanitation crises
- [Tarun Bharat Sangh](#)'s innovative monsoon water harvesting structures for replenishing groundwater tables in [Rajasthan](#)
- Social Centre for Rural Initiative and Advancement's ([SCRIA](#)) on rainwater catchment structures
- International Development Enterprise ([IDE](#))'s low-cost water lifting and drip irrigation technologies developed for small farmers
- Economically and ecologically sustainable irrigation technology- designed for saline affected areas in northern [Gujarat](#) developed by [Lokvikas](#) and their SHG members

Discussing innovations on sanitation, respondents threw light on [Sulabh International](#)'s toilet technology, currently used by over 10 million Indians each day and felt that this has the potential to be scaled up in other parts of the world.

### Institutional Innovations

Responding to the request for institutional models, members listed a couple of innovations. They suggested several collaborative models such as management of community toilets and bathing complexes by women's groups in [Tiruchirappalli, Tamil Nadu](#) and the work of Ruchika Social Service Organisation (RSSO) and WaterAid India ([WAI](#)) to educate slum children on sanitation in the slums of Cuttack, [Orissa](#).

Other collaborative institutional innovations mentioned were the partnership between [Pune](#) Municipal Corporation, Society for Promotion of Area Resource Centre (SPARC) and Shelter Associates (SA) for urban sanitation through people's participation. They also mentioned a watsan network in [Gujarat](#) that

undertakes rainwater harvesting and recharges ground water aquifers in urban areas through several housing societies.

In addition to the above, members highlighted initiatives undertaken by [Utthan](#) in Ahmedabad including:

- Community based technologies on a substantial scale such as lining pond bottoms for rainwater harvesting in saline areas of Bhal region in **Gujarat**
- Establishing filtered bore wells in fluoride affected village, Balisana for shallow aquifer artificial recharging
- Reducing evaporation losses through multiple pond systems for drinking water in Adhelai of Bhavnagar
- Setting up hand pumps and applying lime to roof water harvesting tanks
- Facilitating communities to build over 3,000 sub-surface check dams near the coastal area to prevent sea water from underground through a barrier of liner and fresh water table

### **Funding Opportunities**

Members mentioned the [Small Grants Program](#) (SGP), funded by the Global Environment Facility (GEF), which supports activities demonstrating innovative community-based approaches and utilizes lessons learnt from other development projects to reduce threats to local and global environment. They also recommended using "[Development Marketplace](#)" and "[Tech Museum Awards](#)" to promote water and sanitation innovations.

The discussion gave a flavour of some of the numerous innovations being taken up in both rural and urban water supply and sanitation. However, considering that many more innovations on urban sanitation are being tried in various nooks and corners of India, the query may need to be revisited at a later time.

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## **Comparative Experiences**

### **Tamil Nadu**

**Locally Managed, Cost Effective Purification Technique** (*from Eric Lemetals, L2i Consultants, Paris; [response 1](#); [response 2](#)*)

CDDP created a water filter system using powdered seeds of local plant materials to treat water bringing it to WHO acceptable standards for potable water. Result – 100% purified bottled drinking water at a production cost of \$1 per 225 liters per day per unit lower than the market price \$75. The key feature is that local self help group of 15 women maintain the unit themselves and get water for family consumption and for profitable sale to the community. Read [more](#).

*From [Anjal Prakash](#), WaterAid India, New Delhi*

**Community Toilets & Bathing Complexes Managed By Women's Groups, Tiruchirapalli**  
Gramalaya along with city authorities and communities successfully managed public toilets and bathing complexes which was handed over to women's groups by the municipal corporation. These women's groups now work as a federation taking up various activities apart from management of the toilets and bathing complexes. Six years after this initiative recommendations for improving its sustainability and scalability to other cities in similar situation is being considered.

### **Maharashtra**

**Urban sanitation with People's Participation, Pune**

This case of Pune Municipal Corporation attempted to capture efforts of the municipality in partnership with NGOs namely Society for Promotion of Area Resource Centre (SPARC) and Shelter Associates (SA) to

address the problem of urban sanitation. The Municipal Corporation provided an overview of the intervention, its approach, technology and its implications on lives of the poor in accessing sanitation.

## **Orissa**

### **Urban Sanitation for the poor, Cuttack**

RSSO partnered by WAI undertook the integrated project of water sanitation in the slums of Cuttack in Orissa. RSSO's long experience in educating and working with slum children, enabled them to integrate water and sanitation activities for schools, highlighting the need to reach out to the communities through school and basti committees. This case also showed the acute need of slum dwellers for water-sanitation services and how school sanitation is one step ahead. See [details](#).

## **Rajasthan**

### **Reviving Water Harvesting Traditions** (from [John Oldfield](#), *Water Advocates, Washington, D.C.*)

Tarun Bharat Sangh promoted the economic advantages of water harvesting structures by building small earthen check-dams called Johads in Alwar District. For every Rs. 100 invested the economic production in villages rose by Rs. 400 using only 3% of the total rainwater. In spite of initial bureaucratic resistance five rivers now flow perennially, due to the 20 percent additional groundwater recharge and 3000 water harvesting structures are set up in 650 villages. See [details](#).

## **Gujarat**

### **Sustainable Irrigation Model for Saline-Affected Regions** (from [Biplab K. Paul](#), *Lokvikas, Ahmedabad*)

The Lokvikas team along with their Self Help Group members developed an economically and ecologically sustainable irrigation technology for salinity-affected areas of North Gujarat. It is a people friendly, cost effective technology with a breakeven period of 1 year. The technology is getting popular in the region. Now the team is trying to identify Geohydrology experts to assist in the development of various cost reducing models and make it operational by women. See [details](#).

## **International**

*From Eric Lemetals, L2i Consultants, Paris ([Response 1](#); [Response 2](#))*

## **Nigeria**

### **Joachim Ibeziako Ezeji's Mor-sand Filter**

Over 10 million people found vulnerable to public health concerns due to industrial pollution, population density, and poorly managed on-site sanitation systems. Other issues include fragility of the environment, coupled with the flawed process of awarding water contracts. To address this, the filter was adopted as an integrated water quality improvement system that intervenes at the household level thus effectively gets rid of health threatening purities in the drinking water. Read [more](#).

## **South Africa**

### **Enviro Loo**

This is a waterless dehydration/evaporation toilet system providing a safe, non-polluting, cost-effective solution to the sanitation crisis and offers a standard of convenience and respectability. This model was tried, tested and evaluated in the field since February 1993 extended over five years and involved scientific, health and environmental impact studies, as well as community feedback. Over 25 000 units have been installed throughout South Africa and neighbouring countries. Read [more](#).

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## Related Resources

### Recommended Documentation

From Eric Lemetais, L2i Consultants, Paris ([Response 1](#); [Response 2](#))

#### **The miracle tree with tremendous natural multipurpose activities - Moringa Oleifera**

<http://www.solutionexchange-un.net.in/environment/cr/res31010701.pdf> (Size: 1,033 KB)

*Discusses the tree's uses of all its parts especially for their pharmacological, nutritional and purifying water properties and for its further use as a natural fertilizer and livestock feed*

#### **Joachim Ibeziako Ezeji's Mor-sand Filter**

2006 Environment Award Laureate, The Tech Museum Awards

<http://www.techawards.org/laureates/stories/index.php?id=136>

*Details this integrated water quality improvement system, indigenous to Nigeria that combines the coagulant Moringa (seed) powder with slow sand filtration*

#### **Water Filter from Tamil Nadu**

Centre for Development of Disadvantaged People, 2006 Economic Development Award Laureate

<http://www.techawards.org/laureates/stories/index.php?id=132>

*Explains the technology that fulfills the need through a local grass-root based, self-managed, simple, cost effective, and environmentally friendly purification technique.*

#### **Project Proposal – "Miracle Moringa Seeds to Clean and Purify water"**

Eric Lemetais

<http://www.solutionexchange-un.net.in/environment/cr/res31010702.doc> (Size: 64 KB)

*Proposes to provide safe drinking water, sanitation and better health to rural households of the Niger river using moringa seeds to clean water river turbidity*

#### **A Waterless Sanitation Solution Developed in South Africa**

<http://www.solutionexchange-un.net.in/environment/cr/res31010703.doc> (Size: 1652 KB)

*Explains the Enviro Loo which functions as a waterless dehydration/evaporation toilet system that provides a safe, non-polluting, cost-effective solution to the sanitation crisis.*

### Recommended Organizations

#### **WaterAid India (WAI), New Delhi** (from [Anjal Prakash](#))

India Country office, 25, Navjivan Vihar, Malviya Nagar, New Delhi-110017; Tel.: +91-11-26692206

Click [here](#) to view link

*Organization is recommended for the research and action undertaken on the issue of urban water supply and sanitation; documenting some of its best practices as well as that of others*

From Eric Lemetais, L2i Consultants, Paris ([Response 1](#); [Response 2](#))

#### **The Tech Museum of Innovation, USA**

201 South Market Street San Jose, CA 95113; Tel.: (408) 795-6338; [techawards@thetech.org](mailto:techawards@thetech.org)

<http://www.techawards.org>

*An international awards program that honors innovators from around the world who are applying technology to benefit humanity*

#### **Development Market Place**

<http://www.developmentmarketplace.org>

*A competitive grant program (global and country) of the World Bank that funds creative, small-scale development projects that deliver results and have the potential to be expanded or replicated*

From [John Oldfield](#), *Water Advocates, Washington, D.C.*

### **Tarun Bharat Sangh, Rajasthan**

Tarun Ashram, Bhikampura, Kishoree, Via Thangazi, District Alwar, Rajasthan – 301022; Tel.: +91-1465-225043 or Tarun Bharat Sangh, 34/46 Kiran Path, Mansarover, Jaipur, Rajasthan – 302020; Tel.: +91-141-2391092; [rajendrasingh@tarunbharatsangh.org](mailto:rajendrasingh@tarunbharatsangh.org)/ [watermantbs@yahoo.com](mailto:watermantbs@yahoo.com)  
<http://www.tarunbharatsangh.org/programs/water/water.htm>

*Recommended particularly for their innovative monsoon water harvesting structures primarily to replenish groundwater tables, thus benefiting both the environment and humans.*

### **The Social Centre for Rural Initiative & Advancement [SCRIA], Haryana**

Khori 123101, District Rewari, Haryana; Tel.: +91-9416065234; [scriakhori@yahoo.co.in](mailto:scriakhori@yahoo.co.in) / [mail@scria.org](mailto:mail@scria.org);  
[http://www.scria.org/Sampada\\_Prakritik.htm](http://www.scria.org/Sampada_Prakritik.htm)

*For reviving of traditional water harvesting - storage structures and community management practices for drinking & other purposes since 1983*

### **International Development Enterprise India (IDEI), New Delhi**

C 5/43, Safdurjang Development Area (1st & 2nd Floor), New Delhi 110016; Tel.: +91-11-26969812, 26969813, 26964632; Fax: +91-11-26965313; [mailbox@ide-india.org](mailto:mailbox@ide-india.org)  
<http://www.ide-india.org/ide/product-technologies.shtml>

*Discusses water lifting and water saving technologies particularly the low cost water lifting technology, also called the treadle pump, developed and promoted by IDEI*

### **Sulabh International, New Delhi**

Sulabh Gram, Mahavir Enclave, Palam Dabri Marg, New Delhi 110 045; +91-11-25032617, 25031518, 25031519; Fax: +91-11-25034014, 25036122; [sulabh1@nde.vsnl.net.in](mailto:sulabh1@nde.vsnl.net.in), [sulabh2@nde.vsnl.net.in](mailto:sulabh2@nde.vsnl.net.in), [sulabhacademy@vsnl.net](mailto:sulabhacademy@vsnl.net); <http://sulabhinternational.org/pg02.htm>

*Recommended for their innovative, low cost and ecologically sound toilet technologies currently in use across India*

### **Lokvikas, Ahmedabad (from [Biplab K. Paul](#))**

Saket House, 1, Panchsheel Society, Usmanpura, Ahmedabad 380013; Tel.: +91-79-7551931, 7552873; [teamleader@lokvikas.org](mailto:teamleader@lokvikas.org); <http://www.lokvikas.org>

*Recommended for their intervention in saline affected areas in North Gujarat by the development of an ecologically and economically sustainable irrigation technology along with SHG members*

### **SGP Secretariat UNDP GEF Small Grants Programme, New Delhi (from [Prabhjot Sodhi](#))**

CEE Delhi, D-35, 1st Floor, South Extension Part-II, New Delhi 110 049; Tel.: +91-1126262878, 26262881; Fax: +91-11-26262880; [sgpdelhi@ceeindia.org](mailto:sgpdelhi@ceeindia.org), [ceedelhi@ceeindia.org](mailto:ceedelhi@ceeindia.org)  
<http://www.sgpindia.org/>

*Seeks to support initiatives, which demonstrate community-based innovative, gender sensitive, participatory approaches that lead to reduce threats to the local and global environment*

### **Utthan, Ahmedabad (from [Nafisa Barot](#))**

36, Chitrakut Twins, Nehru Park, Vastrapur, Ahmedabad 380 015; Tel.: +91-79-26751023, 26732926, [utthan@icenet.net](mailto:utthan@icenet.net); <http://www.utthangujarat.org/>

*Recommended for their initiatives on community based technologies established on a substantial scale focussing on rainwater harvesting, aquifer recharging, building check dams etc.*

## ***Recommended Upcoming Events***

**2007 Tech Museum Awards Global Call for Nominations** (from Eric Lemetais, L2i Consultants, Paris; [response 1](#); [response 2](#))

Nomination Deadline: 26 March 2007; [http://www.techawards.org/news\\_events/](http://www.techawards.org/news_events/)

*Honors and awards successful candidates who address universal human needs through cutting-edge breakthroughs or innovative applications of existing technologies*

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## Responses in Full

### [Anjal Prakash](#), WaterAid India, New Delhi

WaterAid India (WAI) has been undertaking research and action on the issue of urban water supply and sanitation and has documented some of its own experiences as well as that of others. Glimpses of some of the best practices are given below. These cases have also been published in a compilation called "Sanitation for all: Still a long way to go".

- **Tiruchirappalli shows the way: Successful management of community toilets and bathing complexes by women groups in Tiruchirappalli City, Tamil Nadu, India:** This study reviews the work done by a WaterAid partner, Gramalaya along with city authorities and communities on successful management of public toilets and bathing complexes in Trichy, which was handed over to women's groups by the municipal corporation. These women's groups are now working as a federation and taking up various activities apart from management of the toilets and bathing complexes. The study examines the sustainability of this initiative six years after it began and makes recommendations for improving sustainability and scaling up to other cities in similar situation.
- **Urban Sanitation for the poor: A case of Ruchika Social Service Organisation (RSSO):** RSSO partnered by WAI for doing the integrated project of water sanitation in the slums of Cuttack in Orissa. RSSO, having a long experience in education and working with slum children, decided to integrate water and sanitation activities for schools. Though the needs of the slums are many, the case study highlights the need to reach out to the communities through school and basti committees. The case shows the acute need of slum dwellers for water-sanitation services and how school sanitation is one step ahead. Models like Ruchika can be made to help Government and others to address these issues in urban slums.
- **Actualization of an idea for urban sanitation with people's participation: A case of Pune Municipal Corporation:** This case study is an attempt to capture efforts of the municipality in partnership with NGOs to address this problem by providing an overview of the intervention, its approach, technology and its implications on lives of the poor in accessing sanitation. Specifically, it looks at the collaborative initiative of the Pune Municipal Corporation with two partner NGOs — Society for Promotion of Area Resource Centre (SPARC) and Shelter Associates (SA).

Apart from these, we can also help you to look into cases from Pakistan, Bangladesh and Nepal, where WaterAid is working.

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### [Eric Lemetais](#), L2i Consultants, Paris (response 1)

Your community is a real pleasure and it is great being a member.

Among examples of innovations in watsan, we would like to suggest the following:

1. Ecotoilets using solar energy in a close circuit during 15 months. For your information, this technology has won international awards.
2. For drinking water, please don't forget the moringa tree, which some Indian agencies have promoted. You can plant the tree as its leaves and pods contain many vitamins, and its seeds purify water.
3. Sodis and solar pasteurization - disinfection inside PET tanks or bottles
4. New sand filter from Nigeria.

I can provide further details of the above, if needed.

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**Eric Lemetais, L2i Consultants, Paris** (*response 2*)

Please find enclosed documents/ links related to my [earlier message](#):

1. The miracle tree with tremendous natural multipurpose activities- Moringa Oleifera – <http://www.solutionexchange-un.net.in/environment/cr/res31010701.pdf> (Size: 1,033 KB)
2. Sand Filter from Nigeria - <http://www.techawards.org/laureates/stories/index.php?id=136>  
Water Filter from Tamil Nadu - <http://www.techawards.org/laureates/stories/index.php?id=132>  
Also, do look at the other innovations featured on this site: <http://www.techawards.org>
3. Project proposal – “Miracle moringa seeds to clean and purify water”  
<http://www.solutionexchange-un.net.in/environment/cr/res31010702.doc> (Size: 64 KB)
4. A waterless sanitation solution developed in South Africa  
<http://www.solutionexchange-un.net.in/environment/cr/res31010703.doc> (Size: 1652 KB)
5. Members may also like to go to also must go on <http://www.developmentmarketplace.org> to fill any forms.

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**John Oldfield, Water Advocates, Washington, D.C.**

Having recently returned from India, I'd like to submit the following organizations/technologies for consideration. I am not sure they qualify as 'innovative' as some have been around for millennia. Yet they certainly deserve the attention of the international community and funding marketplace.

1. Tarun Bharat Sangh's innovative monsoon water harvesting structures.  
Their structures catch water primarily to replenish groundwater tables, thus benefitting both the environment and humans.  
  
<http://www.tarunbharatsangh.org/programs/water/water.htm>
2. The Social Centre for Rural Initiative & Advancement [SCRIA]'s similar work on rainwater catchment structures. SCRIA/community structures typically impound the monsoon waters directly for human/animal drinking purposes as groundwater in Rajasthan is frequently too heavy with fluoride.  
  
[http://www.scria.org/Sampada\\_Prakritik.htm](http://www.scria.org/Sampada_Prakritik.htm)
3. International Development Enterprise, India's water lifting and water saving technologies:

<http://www.ide-india.org/ide/product-technologies.shtml>

4. Sulabh International's toilet technology, currently used by over ten million Indians each day. One wonders how this technology and business model can be exported to other parts of the world.

<http://sulabhinternational.org/pg02.htm>

I appreciate the opportunity to contribute my thoughts and questions.

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**[Nafisa Barot](#), Utthan, Ahmedabad**

I write this to inform you about the following initiatives of Utthan in the field of water and sanitation:

1. We have supported the following community based technologies on a substantial scale:
  - Rain water harvesting in saline areas by lining the bottom of the pond, in Bhal region of Gujarat
  - Shallow aquifer artificial recharging, through filtered borewells in fluoride affected village - Balisana
  - Reducing evaporation losses through multiple pond systems for drinking water in Adhelai of Bhavnagar (together with the local organisation called Mahiti).
  - Roof water harvesting tanks with hand pumps and application of lime (an old traditional technique to keep water pure).
  - Sub surface check dams near the coastal area to prevent sea water from underground through a barrier of liner and fresh water table. So far we have facilitated communities to build over 3,000 such small large structures.
2. There is also a network on watsan in Gujarat, through which initiatives to harvest rain water and recharge ground water aquifers in urban areas (Ahmedabad) have taken place by several housing societies.

[John](#), I hope you would be able to also include these in your promotion of technologies for watsan.

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**[Biplab K. Paul](#), Lokvikas, Ahmedabad**

The Lokvikas team and our SHG members have developed an economically and ecologically sustainable irrigation technology for salinity-affected areas of North Gujarat. It is highly people friendly, cost effective and of a breakeven period of 1 year. The technology is getting popular in whole region and we are proud to share that it is propagating like wild fire. Now we need Geohydrology experts to assist us in developing various models to reduce the cost and make it women friendly. For further details, please see [www.lokvikas.org](http://www.lokvikas.org).

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**[Prabhjot Sodhi](#), UNDP GEF SGP, New Delhi**

Many thanks to members for your comments and information at the Water Community of Solution Exchange.

We would like to bring to your kind notice that the Small Grants Program (SGP), funded by the Global Environment Facility (GEF), seeks to support activities which demonstrate innovative community-based approaches and lessons learned from other development projects that could reduce threats to the local and global environment.

The GEF/SGP was launched in 1991 by UNDP to assist developing countries in fulfilling their commitment towards protection of the global environment. The program is sourced with a belief that global environmental problems can only be addressed adequately, if local people are involved in planning and implementing at all levels. Even with small amounts of funding, communities can undertake activities, which will make a significant difference in their livelihoods and environment. UNDP GEF/SGP is currently offered in 83 countries worldwide. The program started in India since 1996.

One of the focus areas of the program is watershed management and providing low cost, community managed local solutions for safe environment and sanitation to poor marginalized communities.

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*Many thanks to all who contributed to this query!*

*If you have further information to share on this topic, please send it to the Water Community at [se-wes@solutionexchange-un.net.in](mailto:se-wes@solutionexchange-un.net.in) with the subject heading "Re: [se-watr] Handbook on Innovations in Watsan - Experiences. Additional Reply."*

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