



Freshwater Action Network  
South Asia



**VILLAGE**  
OF SOLUTIONS

**Compendium of Solutions**  
presented in the 6th World Water Forum



# FOREWORD

## **Time to Act**

The 6th World Water Forum is calling for commitment to address the most challenging water issues our world is facing today. The crucial issues to be addressed are access to water for all to health, food security, energy, economic and population growth as well as climate change.

We need to work together to make the World Water Forum VI at Marseille as the real “Time for Solutions and Commitments” as pledged by the International Forum Committee. Members of Freshwater Action Network South Asia (FANSA) have succeeded to submit 57 solutions to the forum. It is good news that several FANSA members have been selected to present their solutions in the Village of Solutions.

This Compendium of Solutions has been prepared to provide you the summary of those selected solutions. We are optimistic that these solutions would be helpful to everyone trying to find solutions to the whole range of issues related to water. I am glad that a majority of these solutions have potential to contribute to accelerating the progress on water and sanitation. The gist of solutions presented would also help in cross learning among the global constituency of FAN members.

This document can be found in the resources section of the Freshwater Action Network website [www.fansasia.net](http://www.fansasia.net). For more details on the solutions presented in this compendium, please write to the respective authors. I would like to thank all the members of FANSA for their efforts on submitting these stories of solutions. This Compendium has been prepared by Mr. Prakash Amatya, Regional Communication Officer of FANSA and I thank him for this excellent work.

Thanks to the continuing support of UK's Department for International Development (DFID) which enabled FANSA to bring out this publication as part of its endeavor to build capacities and cross learning opportunities among the grassroots NGOs.



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BANGLADESH



**BANGLADESH**

# Improving accountability and responsiveness of government and service providers in providing pro-poor watsan services through engaging local government and CSOs

The Governance and Transparency Fund (GTF) Project is one of the unique projects in terms of its goal, operational modalities and approach to improve the accountability and responsiveness of governments and service providers in the water and sanitation sector. It is targeted to improve the governance and transparency of the WatSan service providers & services for pro-poor WatSan services, establish decentralized and participatory mechanism in the decision-making process, ensure synergistic effort of the community allies, enhance capacity of Civil Society Organizations (CSOs) and relevant community allies and, develop a network of NGOs a CSOs.

Under GTF Project, NGO Forum has engaged LGs, CSOs and local partners through different mobilization and sensitization initiatives and has been promoting 'Right to Water and Sanitation' of the 'hard-to-reach' areas and communities. At Union Parishad level, more focus is being given to hardcore poor households. Initiatives have also been taken for selecting & orienting the CSO representatives and raising their voice on sectoral policy implementation. By arranging meeting between NGOs and CSOs, some issues like, appropriate selection of hardcore poor families for receiving pro-poor WatSan services; and quality and transparency of the provided services have come in light for further discussion with the concerned authority. Consequently, hard-to-reach communities have been able to raise their voice and service providers have started to deliver pro-poor services to some extent following the existing national policies and strategies. Through this project intervention, all relevant stakeholders of the project area have been mobilized on WatSan rights and have expressed their commitment to secure WatSan entitlement of the hard-to-reach communities. And, to address the left-out pocket and hard-to-reach communities, some of the solutions have been focused such as participation of the marginalized in decision-making process, ensure centralized and supply-driven planning and service delivery, develop capacity of LGs in terms of financial, institutional, and management aspects, increase level of transparency and accountability of the service providers, identify gaps between policy and practice, identify the actual hardcore poor through participatory process and increase coordination among sector stakeholders.

Some of the key lessons learnt are as follows:

- Regular learning and experience sharing is an effective tool to improve the local partner organizations' capacity for effective delivery of the programme.
- Regular collaboration and networking with related stakeholders will be added advantage for ensuring governance and transparency of the service providers.
- LGs especially Union Parishad chairman and members become more responsive to find out actual hardcore poor and deliver services within the hardcore poor families, if they are mobilized with the issue of WatSan as human rights.
- Policy orientation makes CSOs and local allies more sensitized for raising voice and active involvement of CSOs with LGs and evidence based dialogue can make the service delivery organizations more responsible towards the hardcore poor.

# Community managed Arsenic Removal Plant

Arsenic had been detected in Bangladesh in late 90s and soon became the most priority concern among the development organization along with the government agencies. More than 15,000 patients were identified who were victim of the wide spread water borne toxicities ever seen in the region. A large scale survey across the country took place to detect the consequence of the arsenic and it was found that more than 20% of the country is affected from deadly range of arsenic concentration in tube well water. The vast areas in the Ganges Delta, especially South-Western districts were found to be the critical hot spots having 90% of their ground water, which once known to be safe, were contaminated with the deadly arsenic over acceptable limit of 50ppb.

Jessore and Satkhira, the south western districts in lower Ganges Delta are close to the border of India and just some kilometers away from where the poisoning was first detected. In these districts, lives of the people are exposed to threat of high arsenic poisoning and many poor people have been badly suffering from arsenicosis. This has also created another socio cultural problem, as such, the people suffering from arsenicosis of those areas are isolated and discriminated and people became reluctant to develop marital relationships with families whose members suffer from arsenicosis. This has caused serious anxiety for parents of unmarried adult children. The affected people are suffering from mental stress, inferiority complex and uncertainty about the future as there is no medical cure for the disease. Almost all of the arsenicosis patients are having constrained lives and women are more negatively affected than men.

In earlier 2000, many chemical and non chemical technologies were brought in to resolve the problem but in vain. Then, Dhaka Ahsania Mission (DAM) launched community managed solution to address the problem. Finally, SIDCO technology was preferred due to its performance and serving capacity. SIDCO Arsenic Removal Plant is a chemical technology developed by GmBH of Germany using granular ferric hydroxide. The structure of the plant is available in the country while it is manufactured locally in Dhaka and this was the only chemical technology approved by the government. The hourly production of smallest plant is 300L and it can remove arsenic up to an untraceable concentration. It also removes iron and improves taste of water. The key potential is the design of the plant which is simple to operate with plug and play. The replacements are available in the market and SIDCO Company provides after sales service as well as the environmentally safe management of arsenic waste.

Barsa Ganokendra, the local community organization became the receiver of the service. A separate committee was formed for the plant management which along with Ganokendra members worked to aware and motivates people on arsenic safe water and acceptance of the plant. The operation and maintenance mechanism was finalized through series of community meetings and formulated the process of simple social business. Through the awareness raising and motivation, the community spontaneously placed their willingness to pay for water and set a year bound rate for pitcher water within their affordability. A female local entrepreneur from the same village was identified and trained to run the plant. Lack of awareness, absence of strong community organization, availability of electricity, availability of water bearing aquifer to avoid fecal contamination and year round availability and finding suitable local entrepreneur are major challenges seen in these plants. However, the intrinsic potentiality of this initiative is the water demand and people's willingness to pay for arsenic free water that basically developed due to nationwide campaign on arsenic.



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# Grassroots initiative to develop effective sanitation system in rural schools

The Southwest coastal region of Bangladesh is a vulnerable region due to its geographic location and low elevation. Dacope Upazila (sub-district) is under Khulna district of the region where the status of health and hygiene is very poor and the awareness level at the dimming condition. The sanitation status and behavioral practice is below the mark thereby resulting in suffering of the community due to water borne diseases. The whole region has also been neglected and deprived of normal development for decades, resulting in poverty much above the national average. The people mainly depend on natural resources, but their access to natural resources is also very meager. The situation of safe water and sanitation facilities is risky as well.

In this regard, AOSED has taken a pilot initiative to implement the Sustainable School Sanitation Project with financial cooperation of Simavi School Sanitation Fund from December 2008 to November 2009. The main objective of the pilot project was to develop and establish effective school sanitation system in rural area. Through this initiative, a total of nine secondary schools were brought under sanitation coverage. This project promoted ideal hygiene and sanitation practice among the students and teachers. This project developed and improved sanitation infrastructure and facility in the school premises; developed a special room for menstrual period of girls in one of the girl's school; developed easy understating educational and awareness materials about proper sanitation, water management and health hygiene practices; developed School Sanitation Management Committee (SSMC) and separated own fund for maintenance of School sanitation. It also sensitized government officials at local level and local elected bodies about the role of WATSAN in preserving general health in the region.

This is the first time that schools in Dacope are motivated by means of a short term project to take care of the hygiene of the students, especially the adolescent girls. Schools are now providing extra education regarding menstruation problem to the girls and hygiene for all students. Nine schools now have a Sanitation Management Committee that is responsible to maintain school sanitation system by own fund as well as local resources mobilization; the students are gradually changing their behaviour about sanitation and personal hygiene practices and they are sharing obtained knowledge with their family as well as community.

Students are future citizens and if their behaviour is moulded in the right direction, it will last for a lifetime. Schools can be a central point to disseminate knowledge, information and idea to wider community and it was found very effective. The coordination among School management committee, guardians and local elected bodies can effectively bring about any necessary reform. The participation of women among the parents/guardians of the students in the sanitation campaign can also make such program more effective. Through this program, the beneficiaries have learnt about the importance of health and hygiene especially in terms of sanitation. They have been organized and motivated for sanitary hygiene practice and its management. Teachers have learnt about what should be taught to the students regarding sanitation and menstruation while parents of the students have become aware of the necessity of sanitation practice for maintaining good health. Further, the experience of AOSED in Dacope taught that development of WATSAN facilities in the regions such as Dacope is one of the critical factors that can change the lives and livelihoods of the people by providing them with a chance for better health.

# Grassroots initiative to solve the safe water crisis

The Southwest Coastal Region of Bangladesh is a part of the Ganges flood plain and has rich biodiversity and geographically a brackish water regime which has made it vulnerable to natural disasters. Human civilization and culture of the region has developed through the utilization of natural resources. The development activities during the last four decades without considering its sensitive ecology and people's interest have resulted in massive degradation of environment-ecology and tidal water management. Inhabitants of this region are victims of an enduring crisis of water resources for drinking and domestic uses. The crisis has increased the incidence of water-borne diseases. Due to the increased salinity of soil and water, local agriculture has drastically declined and cattle have almost disappeared. Due to water scarcity, Dacope Upazila (sub-district, under the Khulna district) is one of the most vulnerable areas in this region. The local people, specially comprises of the poor and marginal people without access to safe water, and who are highly vulnerable to diseases caused by lack of safe water. This leads to loss of income and unbearable expense for health services.

In this context, AOSSED initiated a project titled Grassroots Initiative to Solve the Safe Water Crisis from 2007 till 2010. This project formed grassroots organizations 'Paani Audhikar Committee-PAC' (Water Rights Committee), conducted awareness & media campaign, identified local problems, needs and resources, developed effective communication with the different administrative strata and policy actors, conducted grassroots and policy advocacy; and repaired and constructed water points with peoples' contribution and participations. The people's organization-PAC, Union Parishad and DPHE jointly work for maintenance and management of the water points ensuring the follow-up of the solution at local level by local resources mobilization.

Post-project period, people have become organized and their knowledge and capacity to conserve safe water resources, conduct grassroots advocacy, local resources mobilization has enhanced and they have developed a participatory management system of water points. Political parties and allies have become unanimous regarding the safe water issue. Legal action has been initiated by the government to prohibit leasing out of water bodies. Environment-unfriendly brackish water commercial shrimp culture has been reduced by 80% in Dacope Upazila through joint initiative of community people and government. Department of Public Health Engineering (DPHE) with relevant Government organizations has become more sensitized regarding the safe water issue. The project has gained justification for expanding into the wider coastal region. And, organization staff gained experience of this kind of multilateral approach and became more confident.

Activities and implementing strategy of the solution can make a precedent for other suffering community to receive and implement this experience in their own context for sustainable solution of safe water crisis. Initially, the grassroots people had no experience of working with NGOs and contributing for implementing any project but later on, they were convinced that their contribution will make them the owner of the benefits of the project. When people rise, no obstacles are too big to overcome. People of Dacope have proved that success can be achieved even out of the mouth of crisis. These successes are only the beginning because in the present context, when world leaders are struggling to reach a consensus about climate change, Dacope has started to make some headway in the struggle for ensuring the right to fresh, pure and safe drinking water for a better humanitarian world.

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# Organic Fertilizer: a possible solution

Organic compost like human excreta can be used to produce fertilizer by digging a pit, adding some other organic reagents, and dumping in excreta collected from latrines. After a few months in the ground, the compost can then be used in the agricultural field to cultivate vegetables, fruits, nuts and trees. If done according to regulation, eventually the spread of fecal-oral diseases can also be avoided. Farmers who use this method are generally of the opinion that the reuse of excreta yields healthier, larger, tastier produce, and provides them with the financial benefit of precluding the purchase of expensive chemical fertilizers.

Bangladesh was facing a new challenge of improved sludge management after successful implementation of Community led Total Sanitation (CLTS) in the country. To deal with this, WaterAid Bangladesh in partnership with Village Education Resource Centre (VERC) initiated a two-year-long pilot study in April 2009. In this study, VERC staff employed the practices of CLTS in four communities in the Rajshahi region in order to implement an exploratory organic fertilizer project involving the compost of human excreta. With the involvement of the communities, filled-up latrines were emptied into designated compost pits. After the sludge was composted for an appropriate length of time, it was then laboratory tested for microbial contamination. Once the lab results showed that the fertilizer was safe to use, the communities applied it to demonstration plots to discover its effective use in agricultural practice.

Bangladesh is an agricultural country and the economy of this country greatly depends on agriculture. Due to the application of chemical fertilizers, a decrease in the fertility of land was observed and these chemical fertilizers have been proven to be harmful to the environment together with the dissemination of salmonellosis etc. Therefore, alternative to these chemical fertilizers is of utmost emergence for sustainable agriculture in this fertile land of South Asia. Present initiatives of using organic fertilizer aims to bring about a great revolution in the agriculture of this country. Besides, this safe strategy of using human feces as organic fertilizers is eco-friendly and thus will support agriculture to be a sustainable one. This pilot initiative has been able to transform readily available low value human wastes into high value organic fertilizers. There is reduction in the dissemination of enteric diseases as there is systemic approach in the deposition of the human feces. The usage of hazardous chemical fertilizers has been replaced by the safe use of organic fertilizers and therefore cost of the farmers in the agricultural land has been reduced and subsequently their economical status has been developed.

Enacting this process in Rajshahi served several purposes: it emptied out the filled-up latrines so that they can be used again, reduced degradation of the environment and the water sources, and bolstered the economic livelihood of this agricultural region. Low-income farmers can produce more food, there is reduction in the pollution effects from unsafe excreta disposal and the use of chemical fertilizers, and surface and groundwater is protected. Water-borne enteric diseases are also reduced due to the less contaminated wastewater. The use of human excreta for fertilizer has been practiced since ancient times by farmers all around the world. As long as the proper techniques are established to eliminate the risk of microbial contamination, organic fertilizer will be faster and cheaper, generate more fertile soil, and be safe for health. And, it was mainly learnt that through engagement of the community and their full involvement in the project, through education and collective decision-making, the problems of sludge disposal could be solved.

INDIA



INDIA

# Artificial recharging of bore wells through an innovative soak-pit technology

The central idea of the proposed technology is to divert rainwater from the catchment area of the bore well and allow it to recharge directly that are located in the low rainfall regions. This technology was brought in the background of the fast depletion of the groundwater resources seriously affecting water levels in the bore wells. The proposed solution therefore aims to answer the issues related to fast depleting groundwater resources and its quality in the arid and semi-arid regions.

Majority of the people in Karnataka and Andhra Pradesh depend on groundwater resources both for drinking and irrigation purposes. There are millions of such bore wells fulfilling their water needs, but these bore wells are drying every year and becoming non-functional. As groundwater resources are depleting, chemical contamination and its concentration is also increasing. Government and NGOs have been applying many water harvesting technologies such as restoration of traditional water bodies, gully control, construction of check dams, percolation tanks etc to minimize groundwater depletion. But, these are not much effective, thus, this solution proposes relatively new method of directly recharging drying bore wells.

The main output from this technology is immediate increase in the groundwater level. The rain water falls on the catchment areas of the bore wells that flows directly into it through many layers of filters such as sand, coal, rocks, aqua mesh, nylon mesh etc through the minute holes made in the casing pipe. Every year, during rainy season, rainwater flows into the well. As a result, groundwater level will be stabilized in the bore wells within 2 or 3 years. The evaporation losses due to run off would also be minimal, because the rainwater flows immediately after it falls on the ground, before it is exposed to hot sun and dry air.

Some of the key lessons learnt are as follows:

The soak pits should not be created for the wells which have failed to yield water at the time of drilling. Only such dried up or drying wells should be selected to which there is a good catchment area at their upper region to harvest rainwater. As far as hand-pump is concerned, soak pits should be dug adjacent to them and for bore wells connected to drinking water schemes are concerned, the soak pits should be created around them to get good results. A strong nylon net should be laid in the soak pit to separate the stones from the sand so that sand and mud does not penetrate between the stones and close the vacant places between the stones. The sand should be replaced once a year because the rain water brings in mud which can reduce water infiltration rate through the sand. After digging pit around the bore well, there is a chance that the casing pipe might slip into the bore well. To avoid this danger cement concrete should be laid around the casing pipe at the bottom of it. The holes made to the casing pipe should be covered to prevent mud and dust from entering these holes. The stones and other material should be put down or arranged carefully around the casing pipe to avoid damage or its breakage. A protection wall (with bricks) with small inlets should be built around the soak pit to protect the soak pit from the force of run-off rate of rainwater and also to increase the infiltration of rainwater into the pit.

# Promotion of biodiversity through natural regeneration of common lands in the interest of the user groups

Even in the driest villages of Anantapur district, which is the lowest rainfall receiving district in Andhra Pradesh, one can see thousands of naturally growing trees / bushes on the hilly regions, tank foreshores, valleys and other low lying areas. These are all naturally grown up trees and were not planted by anyone. But, unfortunately, these trees, particularly those growing in the revenue common lands are carelessly cut down by the influential villagers for commercial purposes or by the live stock rearers, fuel wood collectors and other poor user groups for survival purposes. Normally, villagers won't take care of these naturally growing trees for the sake of sustainable utilization in the future. Neither village based institutions nor the local administration has ever seriously taken the responsibility of conserving the trees, particularly which are growing in the common lands, except in a handful of exceptional villages where local conservation initiatives are promoted by some key community leaders. In the absence of the conservation systems, the naturally grown plants, bushes, or shrubs or trees or grasses have been either over exploited or destroyed in many regions of India.

In this context, natural regeneration on common lands is being implemented in the revenue porumboke common lands of several villages of Anantapur district, A.P, India since 18 years by motivating the village communities on the importance of the conservation through natural regeneration model. This solution is trying to prove that Natural Regeneration of common lands is much more effective and sustainable than the 'Traditional Plantation Programmes', which is being practiced by the Forest Departments since decades with very poor results. The natural regeneration model is a low cost method of regenerating the denuded common lands and it also promotes existing biodiversity compared to artificial and monocultured forests created by the forest departments by investing high costs with poor results or outcomes. This innovative Natural Regeneration programme has resulted in creating lot of green cover in the common lands within a short period with full participation of the village communities.

It was realized that the natural regeneration method should be followed to successfully promote green cover in denuded common property resources as this method is environment-friendly, cost effective and very much in harmony with the natural ecosystems than intensive afforestation programs. This method is people centered model in which social fencing is the vital aspect and it meets the livelihood needs of the user groups such as small ruminant, cattle rearers and poor collectors of minor forest produce. Natural regeneration program preserves the biodiversity unlike afforestation program that disturbs the biodiversity. Moreover, it requires very little fund which is invested on capacity building activities such as awareness generation, trainings, exposure visits etc. The natural regeneration of forests on common lands not only increases the availability of biomass but also arrests the evaporation of surface water, reduces the run-off rate of the rain water, accelerates the percolation rate of rain water and finally helps in increasing the groundwater resources and conserving soil as well. The increased biomass availability and water resources combined with sustainable utilization mechanisms promotes or strengthens the livelihoods of the poor and gives them some strength to cope up during the difficult drought situations. Also, sensitization, motivation and awareness building of the rural communities are the main factors of success of this model.

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# Water-a basic human right of the poor

UN Committee on Economic, Social and Cultural Rights (UN-ESCR) states that water is a limited natural resource and a public good fundamental for life and health. The human right to water is indispensable for leading a life in human dignity. The human right to water entitles everyone to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic uses. An adequate amount of safe water is necessary to prevent death from dehydration, to reduce the risk of water-related disease and to provide for consumption, cooking, personal and domestic hygienic requirements. As such, the quality of water available for each person should correspond to World Health Organization (WHO) guidelines. The water required for each personal or domestic use must be therefore free from micro-organisms, chemical substances and radiological hazards that constitute a threat to a person's health. The water supply for each person must be sufficient and continuous for personal and domestic uses. Water, and adequate water facilities and services, must be within safe physical reach for all sections of the population. Sufficient, safe and acceptable water must be accessible within, or in the immediate vicinity, of each household, educational institution and workplace. All water facilities and services must be of sufficient quality, culturally appropriate and sensitive to gender, lifecycle and privacy requirements. Physical security should not be threatened during access. Water, and water facilities and services, must be affordable for all. Water and water facilities and services must be accessible to all, including the most vulnerable or marginalized sections of the population, in law and in fact, without discrimination on any of the prohibited grounds.

Our rivers in India are dying due to industrial pollution, accumulation of domestic sewage, agricultural runoff, pesticides, sand mining, extraction of water and irrigation etc. The actual problem in India today is the extensive withdrawal of groundwater. Once water was in abundance in those parts of India- Kerala, West Bengal and Chirrapunje- have developed acute shortage of water due to deforestation, which results in the silting up of rivers, thereby reducing their water-holding capacity. Water is nature's free gift to life on earth but it has now become a marketable commodity, with extensive withdrawal controlled by unauthorized agencies, and multinationals licensed by the local governments, selling us our own water in bottles.

Therefore, efforts have been initiated by the sector in order to amend water and sanitation as a basic human right to the people, especially to the poor and vulnerable sections of the society. In this context, Ministerial Declarations during the SACOSAN-III and SACOSAN-IV accelerated processes towards realization of the basic human right of the people on water and sanitation under the preview of UN-ESCR. At present, the process towards realization of Right of the people on Water and sanitation is in progress especially in India. In principle, the Government of India has accepted the concept. The next priority of the Government of India will be "Right to Water and Sanitation" after the milestone judicial enactment of "Right to Education and Right to Food". It should be noted that advocacy is a powerful tool for the realization of right of the people. Therefore, the voice of the civil society was found to be an effective mechanism in order to realize right of the people.

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# Community empowerment based approach of ensuring government commitments to the marginalized communities in India

The solution demonstrates a systematic process of empowering people to hold government accountable for the WATSAN commitments made through laws, policies, sector plans, and programmes which are rooted into the country's constitutional framework. This solution has huge potential to address WASH sector governance problem which is the root cause of various other problems deterring the progress on WATSAN goals. Establishing a mutual relationship between citizens and state is very fundamental for not only achieving the goals of WATSAN but also for the development in all other spheres. The core strength of this solution is the process of making citizens and state behave mutually in a more accountable, transparent and responsive manner. The solution is a systematic process composed of five critical stages of progress sequentially linked. Firstly, the communities are sensitized to demand for 100% WATSAN coverage. The next step is to educate people about different WATSAN policies, laws and programmes of Government and then to assess actual implementation of the commitments. Then, CBOs are guided to represent their WATSAN issues to the concerned Government Agencies which is followed up by repeated visits and meetings. Such a systematic process compels the Government to initiate time bound action to meet the WATSAN demands of the community. The solution achieved through such people centered process guarantees its sustainability and replicability.

Aiming at improved governance in WASH sector, the intervention has been designed and already implemented at the local level in Tadwai & Gudur Blocks of Warangal District in Andhra Pradesh state, India. Collecting the baseline information, situational analysis of water and sanitation status, defining change targets in the local context, community capacity development, formation of community organizations, mobilizing communities for collective action of demanding accountability and responsiveness of service providers, problem solving action by the government agencies responsible for WATSAN services and capacitating communities for responsible use of newly provided WATSAN infrastructure are some of the progresses made in developing the solution.

This solution is all about asserting civil society and citizens' voices to improve governance with particular focus on WASH sector. The solution can be adapted in all diversified contexts where 'governance' is deterrent to development process. The faith in the solution comes from a good understanding of rights and responsibilities of the State actors and citizens. The solution needs civil society organizations who are capable of facilitating and organizing the communities to collectively work for good governance. Communities should have strong leadership and willingness to invest their time and energy to engage in the processes of demanding for good governance. The support of local media and local bodies of governance play a very important role in securing results for the civil society and citizens' efforts aimed at good governance. The international support agencies, development partners need to invest in capacity building of CSOs and community organizations so that they can effectively engage in good governance processes. It was further learnt that the process of empowering communities for good governance in WASH sector very much depends on the social, cultural and political conditions of the given area. And, WASH services is so huge that it cannot be met without ensuring transparency, accountability, responsiveness and efficiency of service providers.



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# Waste utilization by vermicomposting and biogas production in panchayats

All human activities inevitably produce some kind of waste. The modern culture of consumerism has aggravated the waste problem. With population increase, the quantity and concentration of the waste has multiplied tremendously. It has grown beyond the carrying capacity of earth's ecosystem. Therefore, this solution is based on a thinking that "wastes are wealth" or that wastes are resources for conversion into wealth. Several names have been given to the attempts to convert waste into resource such as cash from trash, dollar from dirt, money for muck, gold from garbage and rupees from rubbish. Some of the methods of waste utilisation are discussed below.

Vermi-culture & Vermi-composting is a recent technology to degrade organic waste to valuable manure. Vermi-culture is done for mass production of earthworms. Epigeic species are fast breeders and are active feeders on waste organic matter having high content of Nitrogen. Therefore, species such as *Eisenia foetida*, *Eudrilus euginiae* and *Perionyx excavatus* are used worldwide for waste degradation.

Fossil fuels are the major sources of energy. These are not renewable sources. Among the renewable sources, biomass is one important source. Biomass includes crop residues, agro industrial by-products, urban waste, animal waste etc. Energy can be produced from these waste products by using appropriate technology viz., anaerobic decomposition or fermentation or digestion. This energy so produced is called bio-energy. It is in the form of a combustible gas known as biogas. The process also yields a fertilizer called slurry or sludge. The process in total is called biogas technology.

Prior to the implementation of this initiative, large scale outbreaks of water-borne and water related diseases were reported. After implementation of this initiative, considerable reduction of all types of water-borne diseases were observed. Further, considerable improvement on the quality of drinking water in all water sources especially in dugwell water was also reported.

Conclusively, the programme ensures production of organic manure useful for kitchen gardens and generation of bio-gas fuel for cooking. If proper training is given, environmental health problems arising from unscientific disposal of waste could be avoided. Waste can be converted to useful products and it is also found to be economically beneficial to the villagers.

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# Over exploitation of groundwater and remediation measures

In India, one fifth of urban population and three quarters of rural population do not have access to safe drinking water. Regular monitoring of groundwater (1996-2003) along the Chennai coast shows an alarming doubling and tripling rate of salinity levels. Fluoride is contaminating drinking water all over India whereas there is arsenic contamination in the groundwater of West Bengal. Over exploitation of groundwater in India is reported to be so acute in several regions of India subsequent to the depletion of ground water table in an alarming rate. The indiscriminate exploitation of groundwater has changed the hydro-geo-chemical environment of the aquifers and enhanced the toxic and chemical levels of water beyond the permissible limit, mainly fluoride, arsenic, TDS, nitrate etc. The direct health impact of these toxic chemicals in drinking water leads to manifestation of various water-borne and water-related diseases. Government of India has reported that water-borne diseases have serious health implications due to high morbidity and mortality, and with potentiality of epidemics. Further, young children bear maximum of disease burden. India loses every year about 400000 children of less than 5 years of age mainly due to diarrhoea (GOI, 2003).

Eastern, western and the Deccan parts of India are among the worst water-stressed areas of the world whereas rest of the country follows close behind. Once water abundant areas of India such as Kerala, West Bengal and Chirrapunje have now developed acute shortage of water due to deforestation, which results in the silting up of rivers, thereby reducing their water-holding capacity. When rain falls or snow melts, water spills over and floods adjoining areas causing as great devastation as a drought. In Kerala State (India), over exploitation of groundwater in several Gram Panchayat Blocks reported to be quite vulnerable and acute. It was noted that water table in certain districts of Kerala have been lowering by 0.3 to 0.5 feet per year. Also, another study revealed that water in none of the open dug wells investigated is of drinking water quality standards as prescribed by Bureau of India Standard and this is a major problem since Kerala is the only place in the world having highest density of open dug well (250 per sq.km) and 50% of population use this as the only source of water for drinking. In this situation, the Government of Kerala along with other stakeholders including NGOs, took stock of the situation in order to mitigate the acute shortage of drinking water.

Therefore, Government of Kerala amended the rules on Rainwater harvesting in all new constructions and Central Groundwater Authority came up with regulatory measures to control and regulate the development of groundwater resources in identified overexploited areas of India. Additionally, Ministry of Water Resources circulated a model bill to enact Groundwater legislation to all the states of India.

In conclusion, strict regulation by the Government of Kerala and Central Groundwater Authority was found to be effective and sustainable. Over exploitation of groundwater was observed to be limited and restricted. Recharge of rainwater was noted to be improved and lowering of water table was noted to be minimizing in certain regions based on the data obtained from observatory wells. It was further learnt that strict legislation and guidelines on rainwater harvesting is an important component on the successful and sustainable implementation of programme.

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# Evidence based civil society advocacy action calling for urgent action from the south asian inter-governmental platform (SACOSAN) to end the sanitation crisis in South Asia

MDGs of sanitation cannot be achieved without progress in South Asia where sanitation coverage is only 20% and significant portion of 2.6 billion people defecating in open live in South Asia. CSOs and development partners made collective efforts to hold governments responsive and accountable to the abhorrent realities of sanitation in which millions of people, particularly the poor and marginalized live. Since the organization of the first SACOSAN in 2003 in Bangladesh, the governments of South Asia have subscribed to four Ministerial Declarations, committing to an ambitious programme of action. These commitments must be honoured - the need for more political commitment, better coordination and partnerships and good governance continue to constrain progress in the sector. While there is some progress made against these commitments, there is a need to speed up and scale up the delivery - the human cost of this crisis means that business as usual is not an option.

The solution demonstrates the collective efforts of CSOs for a systematic process of gathering peoples' perspectives and generating evidence on the status of Sanitation in South Asian Countries which was consolidated and fed into the SACOSAN Inter-Governmental deliberations, CSO Statement calling for specific and urgent action and this was further substantiated by the voices of the community leaders and CSO representatives in different sessions of SACOSAN. Situational analysis was substantiated with studies on Peoples' Perception on Sanitation with case studies - successful, unsuccessful as well as slippage - from five South Asian countries (Bangladesh, India, Nepal, Pakistan and Sri Lanka) were documented and a regional-level report collated. Additionally, a Traffic Lights Paper - where performance on sanitation in various parameters were scored using the traffic lights concept of red (for failure), amber (some progress made, but not enough) and green (satisfactory progress) lights - was also done to evaluate the progress in the different countries. The session on "Grassroots Voices" in the SACOSAN IV featured community leaders speaking about the sanitation scenario in their localities. This session immediately following the "Country Progress Reports" served as a reality check on the progress reported by the respective national governments.

The key lessons to be noted are: Voices and perspectives of the real people have greater legitimacy and potential to influence the decision makers in government at the high level policy formulation events. It is absolutely important to identify, encourage and strengthen the right kind of leaders, particularly of the marginalized communities, to speak for them. Also, having a good balance of participation between countries, men and women, geographical areas, areas with varying levels of sanitation

progress, is important to reflect the ground level realities holistically. The key tasks or targets of policy change should be supported and substantiated by the evidence gathered from the real life situation of the people. Also, it is important to build on the existing grounds. Planning well in advance and doing thorough home work is essential to be able to really influence the deliberations and outcome of high level platforms. The attitude and willingness of sharing responsibilities helps in forging relationship and acceptance to allow opportunities to influence. Post SACOSAN, engagement of CSOs in actual implementation of SACOSAN commitments is essential to steer the engagement as a continuous process and to ensure that high level commitments make a difference to the actual living conditions of the people.

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# Law to ban open defecation practices

A sincere commitment or contribution of the Nations to Ensure Right to Sanitation to its people is by making suitable laws that ensure best practices in the country in upholding their rights. In the absence of any Legal framework, commitment and sincerity becomes mere charity. A Law provides the best platform to strive for the right and a context for the nation. A Law makes people raise their voice, question authority and make Government and people work alike. Much is being done on sanitation especially for creating Open Defecation Free (ODF) communities, but in pockets. For example, In India, in the run up for the Nirmal Gram Puraskaar (a President's award for ODF communities), Local Government Institutions (LGIs) have banned open defecation practice and have also created punitive systems for those who violate. But wherever this has happened, there is always an inherent risk of reverting to old practice due to some reasons like toilet pits getting filled up, water problem etc.

This solution has however been tested at local level (Gram Panchayaths) in about 10,000 Gram Panchayaths. The scheme is continuing in the country and more and more Gram Panchayaths are attempting to win the NGP awards. Presently, the passion of winning an award is more compelling than the actual purpose, though education is leading to that, partly. Beginning in 2006 and until 2011, 2,808 Gram Panchayaths have achieved NGPs in the country. But this progress is slow in the run up for MDGs and in a country with 2,65,000 Gram Panchayaths. Thus the result is that 58% of open defecation practice still prevails in the country as per Government records. Moreover, recent studies reveal that, so called ODF communities are slipping to OD communities. The concept of NGP designed by Government of India has ensured participation of Local Governance - Gram Panchayath. These local governments pooled Women groups, youth and community leadership to ensure ODF. Follow up of ODF is now the biggest challenge as it is local initiative and political equations at local level when they change, has adverse impact on managing ODF. The above situation calls for a National Law banning open defecation which helps Local institutions to create and manage ODF communities.

The problem can be solved by scaling up ODF communities through enactment of a Law banning Open defecation. This solution will help Nations opening up a new way to compel the Government and its people to achieve the target before the committed timeline. The solution, on one hand will show Nation's sincerity to ensure Right to Sanitation and compel citizens to abide by the law and not defecate in the open. The solution is highly cost effective as it creates chain of actions at all levels with a single stroke of Law. This solution will enforce open Governments to work for outcomes rather than programmes. The legal enactment will allow the Nations to fulfill their commitments at par with MDGs.

This subject is a matter of advocacy. Like any advocacy movements, enactment of law to ban Open defecation may be a lead. There is a need to peruse, discuss and dialogue on this solution in the run up and at World Water Forum. The existing array of professionals, CSOs and institutions working on WASH can open up on this solution. Investment for enacting the law and implementation is very high from Government's perspective and that is what is required for ensuring Right to Sanitation. This solution to advocate law to ban open defecation will give additional opportunity and space before and after the enactment.

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# Improving livelihoods through rain-fed areas in the productivity

The Jaffergudem cluster of Warangal District of Andhra Pradesh, India has proved to be progressive in terms of the agricultural practices adopted by farmers. However, the shallow and gravelly soil has poor water-holding capacity and needs protective irrigation support for better productivity. Farmers therefore use groundwater for irrigation support. The strategy for rainwater harvesting and use in this cluster is mainly through farm ponds and percolation ponds, and appropriate cropping options. Modern Architects for Rural India (MARI) has been implementing watershed projects in the Jaffergudem Cluster under NABARD's Indo-German Watershed Development Programme (IGWDP) and Watershed Development Fund (WDF) since 2003. One of the important changes happened were improvement in groundwater status. As a result, farmers who own bore wells started cultivating the paddy in both the kharif and rabi seasons, upsetting the water balance. But farmers, besides facing water shortage in rabi season, were struggling due to heavy pest problem, power cut or fluctuations in power supply during crop period, salinity in certain patches and hail storm at harvesting stage. Therefore, farmers growing two crops of paddy were convinced to change their methods, at least for the rabi crop. Then, maize was introduced into paddy fields and was cultivated under zero tillage condition after kharif rice. This practice is aimed at avoiding exploitation of groundwater as well as achieving food security. This intervention resulted in a significant outcome in terms of higher production and income. The trials conducted has demonstrated usefulness of this practice i.e., shorter crop duration, less investment, consumption of less power and water, and more profitable than rice.

MARI has developed this solution with the technical support of CRIDA and has been implementing this pilot initiative since 2010 in Jaffergudem cluster. It may be noted that about 60% of the cultivated area in the cluster is rain fed. Trials were conducted in 2008 covering 5 acres of land which was scaled-up to 20 acres in 2009-10. Based on this experience, one-day training on zero tillage was organized to the farmers in Andhra Pradesh and some farmers practicing paddy-paddy sequence were brought to Jaffergudem for exposure visit to ZTM fields. A one-day training course was also organized to provide skills for taking up on zero tillage maize farming. There are several advantages of zero-tillage system such as it consumes less water, saves time for sowing, germination will be 99%, optimum plant population is maintained at uniform spacing, power consumption is less, pest problem is minimised and net profit is high. Now, zero-till maize has been accepted not only as a viable water conservation option but also a remunerative alternative.

MARI is committed to improving livelihoods in rain-fed areas by improving the productivity and profitability of farming systems while sustaining natural resources. Regular monitoring is the key to achieving desired outcome from the project intervention. The farmers need access to appropriate production technologies. Also, technical support is a critical factor, as the technical feasibility and social acceptance will determine final outcome of intervention. Overall, the catalyst to making technologies work is community capacity and supportive institutions that are able to sustain the change beyond the project period.

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# Waste-free campaign (Malinya Mukta Keralam): a sustainable solution for improved drinking water quality

Kerala State in India is one amidst the most thickly populated region in the world and the population is increasing at a rate of 14% per decade. The rapid urbanization and change in life style has increased the waste and pollution loads on the urban environment to unmanageable and alarming proportions particularly in Kerala where there are severe constraints of land availability, dense population, environmental fragility and expectation for management of solid wastes relies on an overly centralized approach. In earlier days, biodegradable waste of the urban centres was accepted by the suburban rural areas for composting in the agricultural fields. But, with increasing content of non-biodegradable wastes, municipal wastes became increasingly unacceptable to cultivators. Consequently, the excessive accumulation of solid wastes in the urban environment has posed serious threat. As such, the rivers of Kerala have also been increasingly polluted from the industrial and domestic waste and from the pesticides and fertilizer in agriculture. Further, poor sanitation and hygiene are the most critical routes of transmission of infectious diseases. Lack of basic amenities compels people to resort to practices such as open-air defecation. Acute poverty, poor hygiene and inadequate garbage disposal and drainage facilities have further aggravated the matter. This leads to a high rate of waterborne and water-related diseases like diarrhoea, gastroenteritis, worm diseases, typhoid, cholera, polio and amoebic dysentery.

In this context, a campaign entitled "Waste-free Campaign" was launched in connection with the Government initiative on sustainable disposal and management of all sort of waste in the Kerala State called "Malinya Muktha Keralam" for a comprehensive intervention. Apart from number of technology options, following aspects were taken into account during the Waste-free Campaign in Kerala: (a) Safe disposal of human excreta (b) Solid waste management (c) Liquid waste management (d) Safe handling of drinking water (e) Home sanitation and food hygiene (f) Personal hygiene and (g) Community environmental sanitation. These are universally accepted as the seven components of sanitation. Over the years, State has taken various initiatives to improve latrine coverage and waste management through intensive IEC campaign. However, these initiatives are yet to catch up with increasing population, emerging challenges and evolving environment.

Post-campaign, it was reported that the quality of drinking water improved in certain areas of Kerala. Further, a gradual reduction in the prevalence of water-borne and water-related diseases was noted in the area of operation. Various technological options, their salient features, environmental implications, cost norms and suitability to the biophysical environment of Kerala were carried out. It indicated that composting, vermi-composting and bio-methanation are the most appropriate techniques for Kerala. It was learnt that the efficiency of treatment methods depend on the characteristics of waste, such as, vermi-composting to near-homogenous fruit and vegetable wastes, biogas to slaughter house and fish-market wastes and windrow to heterogeneous wastes from any source. Overall, waste-free campaign is milestone in the history of Kerala in order to reduce-reuse-recycle waste in the State by all concerned and should be replicated elsewhere as well.

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# Remediation techniques for drinking water contamination and for elevation of water table

Kerala is a state of south-western India having 38863 km<sup>2</sup> land mass with the population density of 819 persons per km<sup>2</sup> which is thrice as population density of rest of India. Kerala's temperature averages from a minimum and maximum of 19.8°C and 36.7°C respectively. The state has rainfall averaging to 300 cm annually which is 2.5 times higher than the national average. But most of the rain water runs off to the Lakshadweep Sea because of the slanting topography of the state. Thus, lowering of water table and severe water scarcity are experienced during summer months (March - May) in most districts of the state.

Evidently more than 76% of the people in the state extract groundwater for domestic use from the dug wells. Ground water is likely to be contaminated by various causes such as unsafe latrines, domestic waste dumps, and proximity of wells to latrines, waste dumps or cattle sheds. Elevation of water table during rainy season further aggravates the chances of well water contamination. The state authorities have certain action programmes in tackling water contamination and water shortage, but are only partially successful. Therefore, it necessitated evaluation and improvements.

In view of the high population density of the area, the clustered presence of dugwells, latrines, cattle sheds and waste dumps around the premises of almost all households and the water table close to the surface during monsoon season, all together make it difficult to protect dugwells from coliform contamination. Since more than 76% of households depend upon well water, household level solutions appear to be more suitable. Simple devices for raising the pH and removal of iron shall be introduced at household level. For example: a simple filter unit consisting of gravel, sand, coconut shell charcoal and gravel was found suitable for raising low pH. Similarly, excess iron could be removed through filtration of water through cotton cloth followed by boiling. Further, bacterial contamination could also be avoided by heating the water to roll boil. Prevention of contamination of wells of the state, in the present situation, is almost impractical. Thus, the aforesaid simple approaches at household level are reported as promising solutions for solving the water related challenges of the area. Similarly, construction of rain pits near dugwells facilitates recharging of groundwater following monsoon rains which could be easily undertaken at household level to raise the water level during summer.

This programme ensures safe drinking water to the villagers without scarcity. As such, it was learnt that, by providing filter units and by creating awareness on the need for water purification, safe and sufficient drinking water can be made available to the consumers at household level at low cost by their own effort.

# Public Interest Litigations (PIL) for the realization of right to WASH in schools

It is estimated that more than one billion people - about one in eight -do not have access to improved water supply whereas 2.6 billion people lack access to adequate sanitation globally. Open defecation and non-sanitary latrines together account for a high toll taken by water-borne diseases in South Asia. Nearly half of the people in the developing world do not have proper toilet facilities. And, India is one of the developing countries facing serious drinking water problems and lack of adequate toilet facilities. According to a recent World Bank report, the sanitation coverage in India is only 68 percent for its people. India as an emerging economic superpower in the world, open defecation still remains a major public health concern with 6 per cent of its GDP wasted annually due to lost productivity, healthcare provision and other consequences of poor sanitation.

All children have a right to basic facilities such as school toilets, safe drinking water, clean surroundings and information on hygiene. Owing to this, several court orders have been issued by the High Courts and Supreme Courts on the basis of Public Interest Litigation (PIL) filed by civil society organizations in order to ensure the basic right of the child such as safe drinking water and sanitation facilities under preview of Right to Education (RTE). For example: The Supreme Court of India directed all states and union territories to build toilets, particularly for girls, in all government schools by the end of November, 2011. The bench said that in case of any problem, the governments would at least provide temporary toilets for the students and the permanent structure be built later on. The court also passed the order on a PIL seeking directions to the governments to ensure that children are given education in hospitable and safe conditions. In a judgment earlier, much stress was given to the importance of education for all and children availing of primary education in government institutions in different parts of country must be provided with basic facilities that are essential for human life. The Supreme Court of India has taken up the issue of Right to Education to ensure that every government-run school in India has requisite number of teachers, potable water, toilets, safe building and other such facilities for students. In another PIL, the High Court in Bangalore has asked the government to specify whether it is possible to provide drinking water and toilets in all primary and secondary schools across the state. Further, a Campaign on Right to Water and Sanitation (RTWS) has been launched under the auspice of CSO network organizations at the National level in India.

The courts of India have also asked the respective Government departments to monitor the situation of drinking water and sanitation facilities in schools. This should be considered as a positive step on Right to WASH in schools. The momentum has been created in several states of India to draw attention of all on Right to WASH and to ensure adequate toilet facilities and safe drinking water in schools. As such, the recent order of Supreme Court of India that "all government schools must have toilet by 2011, November end" is a landmark verdict in the history of PIL filed by civil society organizations in India which is the example of movement that can be generated by the power of civil society organizations.

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# People's movement on 'Ente Maram Padhathi' (My Tree programme)

The state of Kerala in India is a narrow strip of land, tucked away in the southwest corner of India. Though it covers only 1.18% of the total area of India, it supports about 3.43% of the total population of the country. The phenomenal spurt in the population, demand for more and more forest land, for non forestry purposes coupled with indifferent attitude of those in authority led to the shrinkage of the forests to less than 20% of the land area. Fire, grazing, excessive and unscientific felling etc also resulted in the degradation of forests.

My Tree Program is a part of a massive afforestation programme which was initiated in 2007 with the objective of mitigating the impacts of global warming. It is a joint afforestation programme of Kerala Forest Department and the Kerala Education Department where school students across the State of Kerala participated. The objective of Ente Maram Padhathi (My Tree Programme) was to increase the tree cover outside the forest area and to inculcate love for trees and environment among the younger generation. The scheme is for tree planting with involvement and participation of school children. Under this novel scheme, students participated in planting of trees in their own household compounds and in the places available to them nearby and nurturing them. This programme realized nearly 24.35 lakhs of seedlings being planted. The successful implementation of this scheme was recognized at national level and was awarded the Indira Priyadarsini Vrikshamithra Award-2007. The same scheme was carried forward in subsequent three years by the school students of the state due to its popularity. In total, 42.12 lakhs seedlings were distributed under the scheme for planting among students from 2007-08 to 2009-10 with the average survival percentage as 80%.

A change in the mind-set of all stakeholders in the sector has been created through this program thereby bringing about a change in the attitude and approach of the people in the area. Tree planting can reduce the impact of carbon emission by carbon offsetting. Carbon offsets represent the act of reducing an equal amount of carbon somewhere else to counter balance the carbon emissions from man's energy-using activities called carbon foot print. It is to compensate for the emissions produced, by funding an equivalent carbon dioxide saving somewhere else. Trees reduce carbon-dioxide by a process known as carbon sequestration i.e. trees breath in CO<sub>2</sub> and exhale harmless oxygen. Therefore, "MY TREE" programme is a model for combating the impacts and implications of climate change.

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# Climate change impacts and green technology

Kerala is a small strip of land lying at the south-west tip of India. It lies close to the equator but its proximity with the sea and the presence of the fort like Western Ghats, provides it with an equable climate that varies little from season to season. Several information on temperature, rainfall pattern, water table, and sea level, water borne diseases, agricultural crops and thermo-sensitive crops were noted to understand the impacts of climate change. It was observed that there is an increase in maximum temperature of Kerala by 0.64° C during the period of 49 years while, decreasing trend in monsoon rainfall was seen in Kerala for the period 1901-2007. Further, lowering of water tables in certain regions of Kerala has been reported to be critical and alarming and the observations indicated that the sea level along the Indian coast and Kochi (Kerala) has the rising trend. In 2008, World health Organisation (WHO) reported that an outbreak of Chikungunya in Kerala in 2006 and 2007 was mainly due to climate change. The agriculture sector in Kerala was badly affected due to continuous rain and the thermo-sensitive crops like black pepper, cardamom, tea, coffee and cocoa will also be badly affected as temperature range is likely to increase and rainfall is likely to decline.

Therefore, the Government of Kerala recently created a new Department called Directorate of Environment and Climate Change in order to deal with the emerging impacts and implications of climate change in the State of Kerala in India. An "Environment Impact Assessment Authority" has been formed in Kerala State for monitoring and assessing the environmental impacts. Green Budget has been developed in Kerala which is the first of its kind in India and it would be used for regeneration of forests and related activities. Further, a momentum has been created to utilize more renewable energy sources. As such, subsidies have been given at household level for using renewable energy projects like bio-gas plants, solar energy projects, wind energy projects etc. Implementation of carbon credit programme by supplying CFL (Compact fluorescent light) lamps, the project on "My Tree Programme" for tree planting and transfer of "Green Technology" are also being carried forward as a mitigation programme on the impacts of climate change and to accelerate the efforts on reducing carbon emissions in the State of Kerala.

Various agencies, both governmental and non-governmental are monitoring and studying the impact and implications of climate change in India, particularly in Kerala. It was learnt in the process that utilization of information is the key for success. Technology transfer especially "Green technology" at the grass-root level is important for a change. Advocacy at all level is needed and capacity building is an important component for scaling-up. The stakeholders are fully committed on the adaptation and mitigation measures of climate change impacts and implications, thus programmes should be people-centered and participatory.

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# Children are agents of change: case study from Kerala (India) on WASH in schools

Water, Sanitation and Hygiene (WASH) in schools are reported to be a major issue in developing countries especially in India with the prevalence of water-borne and water related diseases. According to a recent survey conducted in 60 developing countries all over the world, less than half of the countries have information on WASH in schools (UNICEF, 2010). Further, it was noted that less than half of all primary schools have access to safe drinking water and just over a third has adequate sanitation in countries where data are available. Though in certain regions where facilities exist, they are often in poor condition and hygiene education is non-existent.

All children should be seen as agents of change for WASH within their schools, communities and homes. Effective strategies and planning including continuous monitoring and evaluation is required for the scaling up of WASH in school programmes. Therefore, the objective of this intervention is to provide better hygiene behavior and healthy environment in schools in order to improve the quality of life of the future generation. It is universally accepted that schools are the ideal places for learning for children and children have a crucial role in the process of community development. Learning environment in schools can stimulate children for a better behavior change. From our observation, it was noted that if we provide enough safe drinking water, adequate sanitation facilities and information on hygiene in schools, children can act as role models of the society.

The intervention was carried forward in four districts of Kerala State (India): Thiruvananthapuram, Kollam, Alappuzha and Pathanamthitta. The components of WASH in schools included both software and hardware components. Awareness camps, symposia, seminars, children congress, water quiz, rallies were conducted in all selected schools as part of the programme. WASH school committees and eco-clubs with the co-operation and participation of all stakeholders was constituted and environmental awareness/school sanitation/hygiene for a healthy school environment was put forward in school syllabus. As a part of the National Monitoring System (NMS), monitoring is in progress on WASH in schools in India. Considerable reduction in the morbidity pattern was observed in the area of intervention and attendance of children was found to have increased considerably. There were significant positive improvement in the attitude and approach of the community observed. Open defecation in the area of intervention was found to be totally eliminated. The good hygiene practices at the school level were also found to have tremendous impact upon the behavior pattern of children as well as their communities to a great extent.

The key lessons learnt were that children should be seen as agents of change for WASH within their schools, communities and homes. As such, scaling up in WASH in schools should be done with quality because each child will continue to practice behaviors learnt in school for safe sanitation, hand washing and personal cleanliness in the days to come as they become the next generation of adults and this will also have tremendous impact upon the behavior pattern of their communities to a great extent.

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# Innovative Advocacy Action on Sanitation

Improvement in Sanitation services are not scaled up due to several reasons. Major reasons may be the change of behavior of people and change of attitude of service providers and lethargic mentality of the law enforcing agencies. For scaling up, we need to gear up the system which needs innovative methods, strategic planning and building capacity of the citizens. Improved sanitation gives healthy life which is termed as better life. The people should know their rights and also their duties. In order to create an enabling environment in the society, raising awareness and encouraging actions by the people on one hand and streamlining the bureaucratic hindrance on the other is important. Therefore, to take stock of the situation; launching of this initiative in a phased manner is of immense importance which are stated in the order (six phases) as follows: 1: Development and publication of different schemes of government, different acts like RTI, PRA, PESA in a simplified language and also its dissemination among wide population, 2: Analysis of different schemes on WASH, 3: Capacity building of PRIs taking Panchayat as unit, 4: Establishing clearing house, 5: Capacity building of service providers and 6: Dissemination process.

It was identified that Government Policies, Acts and Schemes are mostly framed by the top bureaucrats and legalized by the politicians without informing people and therefore, the schemes on WASH sector is yet to be known to the people. The official language used for communication is mostly in English which most of the rural mass and urban poor do not understand. In addition, the bureaucratic language is very difficult for even common people to understand. People believe that what they get is on the mercy of the service providers and blessing of god but are unaware that they pay for this service to the service providers in the form of taxes. As a result, the service providers treat public as their obliged. This is really an unfortunate situation depriving citizens of the services to which they are entitled. Under usual scenario, the rich have more opportunity than the poor and thereby making life of poor more miserable.

Therefore, this phased initiative was implemented to raise awareness, empower and encourage action from people and communities by building their capacities on governments' laws, policies, administration related to water and sanitation services provision mechanisms in Odisha State of India by Indian Institute of Youth & Development (IIYD), Lower bureaucracy, NGOs, service providers and legal professionals with the support of all stakeholders including CBOs and other grass-root organizations such as FANSA. So far, a momentum has been created among all stakeholders of the programme in order to reduce the vulnerabilities of the poorest of the poor people of the place.

In the process, the key lessons learnt are that the co-ordination of all stakeholders of the sector is important to scale-up the programme. Transparency and accountability at all levels is important for the level of success. And, social audit is an important component for accountability and transparency.

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# ECOSAN in India

There is an acute shortage of water and power, in fact a near crisis situation for water, in some parts of India. Innovative, decentralized solutions that are inexpensive and which can save water have to be developed without any further delay. A paradigm shift that leads from the 'FLUSH & FORGET' systems to 'RECYCLE' in consonance with a 'WASTE TO WEALTH' approach is therefore essential. Among the various sanitation concepts, Ecological Sanitation (Ecosan), is a holistic approach to sanitation and water management and is the most significant and viable solution. It is based on the idea that urine, feces and water are resources in an ecological loop. It is an approach that seeks to protect public health, prevent pollution and at the same time return valuable nutrients and humus to the soil. This recycling of nutrients helps to ensure food security.

In Ecological Sanitation, urine and feces are separated at source and are not mixed with water. Hence, this solution avoids the contamination of large volumes of water with pathogens. The separation of urine and feces also makes it easier to recover and recycle nutrients such as phosphorous and nitrogen. After dilution and/or processing, separated urine can be applied to the soil as a hygienic fertilizer. Feces, on the other hand, can be safely composted and allows for the integration of organic waste treatment into food production. Overall, Ecological Sanitation can provide affordable sanitation options for all.

This solution was first implemented in Kerala, India and then gradually expanded to other parts of India. This solution fits with the target to reduce the number of persons without access to basic sanitation in Asia-Pacific. Ecosan presents an unmatched opportunity for long-term sustainability of created sanitation facilities based on the recycling of nutrients found in human excreta. It constitutes a diversity of options for both rural and urban areas from households, schools to community level. Thus, this solution can contribute to the improvement of access to basic sanitation for all. The Ecosan is a cost-effective solution and is more economical compared to a flush-and-discharge toilet in terms of disease prevention, environmental protection, nutrient cycling, affordability and simplicity. Hence, Ecosan also contributes more to social equity and sustainability. Ecosan also provides holistic approaches that are tailored to the needs of the users and their respective local conditions. Instead of favoring one specific sanitation technology, Ecosan promotes any technology that enables a closed loop material flow. The approach is economically feasible and sustainable as well.

A particular technology or hardware should not be forced upon a community. There is a need to increase public awareness and follow-up the progress of the project. Given the right approach, communities can become motivated to drive the process themselves. It is important to aware people about different aspects in relation to sanitation and better health, and about proposed solution. It is also important to let communities make logical conclusions and allow them time to accept new approaches. This solution would work best in areas where there is no sewerage coverage; the water tables are very high and inundation is frequent; there is perennial flooding, water scarcity; and rocky terrain.

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# Empowering rural women to access their entitlements to water and sanitation

With a population of over one billion, India is well known for being the largest democracy in the world. The primary responsibility of providing drinking water and sanitation facilities in the country rests with state governments. Although the government has made inroads in providing drinking water, there are reports stating that some areas previously supplied with adequate clean water have now partially or totally lost access due to water sources going dry because the groundwater table has lowered or the quality has become adversely affected.

Therefore, a project was implemented in Anantapur district of Andhra Pradesh, South India by the Centre for Rural Studies and Development in partnership with WaterAid, India in which women were selected from the community and were involved in regular advocacy and human rights training so that they could become effective change agents. Women were educated about their right to water and the role of the government machinery and elected representatives. Women's groups were built in the villages, meetings were conducted to create consciousness about their issues and facilitated analysis of what solutions or strategies could help improve their lives.

The women's groups came to a common understanding that it is the constitutional obligation of the state to provide an adequate quantity of drinking water to its citizens and to protect water resources, which are common goods. With the increased number of women participating in training, meetings and advocacy, their ability to be articulate and represent an issue has improved. Men are slowly beginning to accept the new leadership roles of women and the priority that the state government is giving them. The Rural Water Supply Department is more responsive and accountable to empowered communities and its quality of service has improved. Also, workshops were organized with officials from the Panchayatraj Rural Water Supply Department and community leaders to familiarize communities with the services provided. Large meetings, such as World Water Day and International Women's Day, were used to mobilize women on rights issues, including that of water. The local government was also helpful in motivating women and supporting the movement.

Using the media for advocacy proved to be effective, as decision makers and politicians usually follow local newspapers closely. It is the duty of the national governments to ensure that all its citizens enjoy their basic rights especially the human right to water and sanitation, therefore it was learnt that unless the poor are organized and mobilized for their rights, governments do not prioritize, plan, implement or monitor effectively the rights realized by its marginalized citizens. The strategies of empowering women is another crucial factor for demanding for their basic rights including the human right to water and sanitation in a country like India where more than 70% live in the rural areas and 60% of the population is poor, and illiteracy is very high. This has also led to increase in confidence of the women's groups thereby encouraging them to access other rights such as right to work, and right to housing.

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# Making wash rights a reality for the poor and excluded

In India, there is no legislation guaranteeing the right to WASH to its citizens. It is derived from the right to life in the constitution. The Civil Society Organization (CSO)s do not need to wait until the passing of the national legislation to the human right to water and sanitation. The rights based approach can be adopted and other existing legislations such as the right to information, right to free and compulsory education and the existing entitlements in the various schemes of the government ensuring water and sanitation to all can be used to hold the duty bearers to account. The Centre for Rural Studies and Development, WaterAid, DFID, FAN Global and FANSA are currently developing this solution through which they aim that the national governments legislate the right to water and sanitation, the state governments implement the legislation effectively, the legislators and parliamentarians respect the rights of the citizens who elected them, and adequate budgets are allocated for organizing campaign on the right to water and sanitation and education of the service providers etc.

Currently, the actors are in the process of organizing and empowering people around their issue of WASH, capacity building on policies, institutional arrangements and budgets, identifying transformational leadership at all levels, forming peoples committees with representations from excluded communities, women of the Self Help Groups, Asha Workers, Village Sarpanches etc., improving negotiation skills and confidence building of the marginalized community leaders, training on Right to Information Act and accessing information on budgets allocations, integrating sanitation in the Rural Employment Guarantee Scheme, using the right to education to ensure WASH in public schools, capacitating the bureaucracy and politicians on the right to WASH, using government spaces for training and advocacy, making effective use of the government grievance redress mechanism and networking and alliance building to garner support for the WASH movement. So far, government responsiveness to advocacy petitions has increased from 33% two years ago to 78% in 162 villages. Marginalized communities feel empowered and their self respect has increased and they are able to exercise their rights in WASH. The learning and empowerment that communities gain here has led to their ability to claim their rights in other sectors including health, education, work, food security and other basic rights.

A country may not explicitly recognize the right to water and sanitation in its national law, but other laws could be used to secure the right, such as a legal provision guaranteeing the right to health, or an adequate standard of living or preventing discrimination. It is important to note that virtually all states have recognized the right to water and sanitation in at least one political declaration. While such declarations are not necessarily legally binding, in a more narrow sense, they can be understood as a reaffirmation of existing human rights included in legally binding international treaties; and they demonstrate to the international community an individual state's commitment to the human right to water and sanitation. Activists working on the right to water and sanitation can use such declarations to lobby governments to implement their commitments, including the 2010 UN General Assembly resolution.

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NEPAL



**NEPAL**

# Methodology for mapping the poor, gender assessment and initial environmental examination

Recognizing the urbanizing trend all over the world and specifically in Asian cities, there is a huge gap between demand and supply of water and sanitation services. In case of many Asian cities, poor and rich live together in a cluster, particularly in small urban centres. There are rarely clear demarcations between rich and poor neighborhoods. This condition creates the need of identifying the poor households for the equitable distribution of the services within the society. For this purpose, mapping the poor becomes primary activity while designing the delivery of the services. Identifying the poor, their condition and need; and addressing their requirement through pro-poor service delivery approach is the primary course to meet the MDG targets. Water and sanitation issues are more of a cultural and behavioural issue where women play vital roles. Without the meaningful participation of women from the design stage to its implementation and operation, the projects are bound to fail. In the past, most of the water supply projects were limited to supply of water only; undermining the wastewater problems, issues of water rights, up-stream and down-stream effects, social disparities and social, physical and ecological concerns. Therefore, proactive assessment of impacts on environment by the development activities is crucial to be carried out before launching any projects and activities.

As such, the methodologies developed and tested in mapping the poor, gender assessment and Initial Environmental Examination (IEE) have come up with appropriate tools and solutions for implementing water and sanitation projects in Asia and hence provides solution for its implementation in Tigni, one of the poor settlements in Madhyapur Thimi Municipality of Bhaktapur of Nepal. This will also help to meet the objectives of Water for Asian Cities Programme of UN-HABITAT. Recognizing the need to improve the livelihood of Tigni people, CIUD has been working in Tigni settlement for past few months. Along with Water Aid Nepal, CIUD is initiating water and sanitation improvement activities with the participation of local community and the municipality.

It was learnt that institutional arrangement is one of the primary issues that determines the success and sustainability of water and sanitation projects. Water and sanitation projects have a direct link with the daily household chores and thus, meaningful involvement of the beneficiaries is required from the feasibility stage of the project. The coordination of stakeholders like governmental agencies, local government and civil society organizations is essential for the successful operation of the schemes. For the sustainability of the activities, good governance principles need to be incorporated in such projects. Up-scaling the present knowledge by implementing water and sanitation projects with the participation of users, local government and NGOs may bring an additional successful example of managing water and sanitation activities. Mapping is an efficient visualization technique that has capability of pin-pointing each individual household in the settlement and their surrounding environment. Information provided by map is more interactive and user friendly, and is a very good tool for decision making. It should be noted that the indicators used to identify poverty should be defined on the basis of settlements basic requirements to distinguish poor from non poor.

# Water Caravan: Safe Water Campaign

Drinking water supply system of Nepal is very poor and inadequate. The supplied water is usually polluted with harmful pathogens and people also use huge amount of water from alternative traditional water sources as well as private water sources to meet their water demand, which may have high risk of contamination. Poor water quality affects the health of many people, thus, many children as well as grown-ups die in Nepal every year due to diseases caused by consumption of polluted water. Not only the villages, cities including the 'so-called' most developed capital city, Kathmandu is also not free from frequent water borne epidemics. Usually, a significant number of patients visit hospitals for treatment of acute gastroenteritis and cholera during the monsoon period. Addressing the problem of water scarcity as well as safe water supply needs huge investment but it is difficult in context of developing country like Nepal. The only approach in solving this problem is by extending pro-poor WASH services and raising public awareness. In order to mitigate the water borne epidemics and prevent the loss of life, it would be wise to start public awareness raising campaigns on personal hygiene, hand washing and Point of Use (PoU) drinking water in the communities.

Accordingly, Guthi carried out Water Caravan: Safe Water Campaign and disseminated the Point of Use (PoU) drinking water in the communities of the Kathmandu Valley in association with various sector organizations in 2006 which is being continued every year to check the spread of water borne epidemics and generate awareness among people. Guthi organized a public awareness event on Safe Drinking Water through youth mobilization in the Kathmandu Valley. Guthi exhibited household level water treatment technologies such as Chlorination (Piyush and Water guard), SODIS (solar disinfection), Bio-sand Filter and Colloidal Silver Filter, and stalls for dissemination of the PoU drinking water in the community public places and school premises.

This Safe Water Campaign has always set a profound impact among people and in the community. The report of Department of Epidemiology and Disease Control showed that the number of the diarrhea patients is decreasing and there was no case of cholera reported in the hospitals of Kathmandu Valley after the campaign started. The campaign has made many people aware about different water treatment. The volunteers mobilized in this campaign also succeeded in sensitizing many people on water quality, personal health hygiene, environmental sanitation and aware them on using safe and pure drinking water.

Inadequate drinking water is a major challenge in most of the parts of Nepal. People have to depend on the alternative water sources that can cause waterborne epidemics every year claiming lives of many people, especially during the monsoon. Therefore, the campaign should be organized every year to aware people on water quality, waterborne diseases and household water treatment methods. For this, youths and the community people should be mobilized in such awareness campaigns.

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# Integrated water sanitation and hygiene improvement project focused on urban poor communities



Lumanti in partnership with Itahari Municipality has been implementing 'Itahari Integrated Water, Sanitation and Hygiene Improvement Program' (IWASH) in all targeted clusters. Biratnagar Sub-Metropolitan City, the second largest city of Nepal lying in urban terai area of Koshi Zone in the Eastern Development Region (EDR) is selected as the programme area, the reason behind being the less sanitation coverage with more than 40% of the selected households practicing open defecation in the municipality. Although, water coverage of the selected communities are quite high with more than 70% households having their private hand-pumps to extract groundwater, the quality of groundwater being extracted and hygiene is not up to the standard. As the situation of water, sanitation and hygiene is very poor in the selected communities, people of these communities are highly prone to water borne, water based and water washed diseases. Therefore, to promote WASH in the communities, Lumanti encouraged socio-economic development in urban poor sectors. The private sectors were encouraged to initiate the environment and economic incentive based urban sanitation management programme and cooperative management for pro-poor finance mechanism were also introduced. The participation of the local stakeholders and the community members were highly encouraged. Lumanti has also encouraged the participation of women and vulnerable groups through gender equity and social inclusion. Lumanti believes that providing mere facilities are not enough. In fact, the community members should be helped to understand their rights and about the intervention and management of the program.

Several lessons were learnt during the intervention, which are as follows:

- Delivering WASH in slum and squatter settlement is complex because of the negative attitude of government and general public towards illegal settlement.
- Unstable political and economic situation and unclear government policy always affect the implementation of the targeted programs. There is risk of shifting in donor priorities and government's policies.
- Coordination among the sectoral actors, governmental and non-governmental organizations is the basic requirement in order to implement the WASH services effectively.
- Finding relevant information is very difficult as well as sharing and collaboration in the sector.
- Urban poverty is a dynamic phenomenon and the settlement of these people are usually scattered which rises difficulty in identifying, bringing them together and providing them with the WASH services.
- It is very difficult in bringing changes to the ascribed behavioral practice of the people whether in terms of hygiene or changing practices from open defecation to latrine use.
- The poorest and the most vulnerable people live in the scattered and most remote settlement, therefore serving such communities with WASH initiative is costly as it involves trade-offs.

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# Septic tank with up flow bio-filter for Narayan tole community in Kathmandu

Lumanti, a local NGO along with the support of community people constructed septic tank with up flow bio-filter in Narayan tole community of Kathmandu City to improve environment of the community through proper disposal method for human wastes. The community people were interested to improve health, hygiene and environment condition of their community by improving their waste treatment system and thus were involved from planning to implementation and monitoring phase.

Septic tank with up flow bio-filter seemed suitable solution for Narayan tole community as the community is situated on sloppy terrain and it has small land space. Two units of septic tank with bio-filter have been designed. Wastewater flows from the house to the septic tank. The tank is designed in a way that retains wastewater and allows heavy solids to settle at the bottom. These solids are partially decomposed by bacteria to form sludge. Grease and light particles float, forming a layer of scum on top of the wastewater. Baffles are installed at the inlet and outlet of the tank to help prevent scum and solids from escaping. Sometimes interior dividing wall is used, thus making two compartments. This limits the escaping of sludge in the effluent from the septic tank. BOD removal from 30 to 50 percent is expected from septic tank. The effluent from the septic tank can be successfully treated by the use of up flow bio-filter. It is a submerged filter with stone media of 60 to 120m deep. Septic tank effluent is introduced to the bio-filter from the bottom. The microbial growth is retained on stone media making higher loading rates and efficient digestion possible.

This system has improved the sanitary environment of the community and proper disposal method has been established for managing human wastes. The program has been able to raise awareness and sensitize the community on environment sanitation improvement which further improved health and hygiene condition in the community. Since this system is totally closed and needs to be cleaned only once in a year, the operation cost is very low and is therefore affordable to the poor communities. This system could be constructed even in a small area and hence is feasible in those communities where the space is limited.



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# Protection of natural sources of water in Bharatpur

It was identified from the field inspection that various natural sources such as wells, spring water, lakes etc of Bharatpur Municipality were diminished in the past. Therefore, this increasing water problem in Bharatpur Municipality was targeted and in the process of solution, local people were made aware about the importance and protection of such natural water sources. The municipality and local authority were encouraged for the protection and re-construction of the diminished natural sources. Bharatpur municipality was involved in the advocacy program and at present, all the related problems and strategies are in continuous inspection of Citizen Action Forum and Bharatpur Municipality. As observed in many cases, the lower class people are always targeted and semi urban people are always of least target for any NGOs and other organizations. So, this project mainly focused on the semi-urban area people who live in the municipality and nearby area but are not properly concerned for their health and basic needs.

In dry seasons, natural sources are the best alternative. Moreover, in the country like Nepal where load shedding determines the working strategy and collection of basic need of people, natural sources could be the best remedy. Due to load shedding, most semi- urban people cannot store the needed amount of drinking and other water, so in this case natural water source gives them the best alternative for collection of water. Technical and social personnel were made responsible for the field inspection and to present a better alternative for the re-establishment of the diminished natural sources. The report by the socio-technical team was discussed with the local authority and municipality for the generation of awareness program in the community. And, the final advocacy was done to help the community people to reach the government organization to support them for the cause mentioned.

The key lessons learnt during the project are that the traditional water sources should always be properly used and urbanization near the natural sources should be minimized. This type of solution needs time and does not necessarily need money, thus people with low financial status can also contribute to the society by their effort. Bharatpur Municipality has now become more concerned after figuring out the probability of future water crisis and is therefore continuing its effort to reduce the risk by protecting traditional natural sources of water.

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# Improvement of status of poor and marginalize community through the media advocacy and campaign

Access to safe water and sanitation is a main problem and challenge in rural as well as urban areas of far-western region of Nepal. There is lack of adequate knowledge of safe water and sanitation. Polluted water and less attention on sanitation is being big challenge to improve public health. Contextually, media campaign and advocacy could be an effective tool to improve awareness in community towards use of safe water and sanitation. It could also help to identify the main problems and lapses regarding safe water and sanitation programs in rural areas. In-depth reporting, debate on safe water and sanitation among community would help to identify the main problems of community and their aspirations. Likewise, it would also help to develop coordination and collaboration between various stakeholders on safe water and sanitation.

As such, the solution was carried forward in rural areas such as in freed Kamaiyas (bonded labor) settlements, Rautes, Rajis, Byansi, Majhis, Dalits, minorities and ethnic community of far-western region of Nepal. The main focus areas of this solution were as follows:

- Publication of bulletin and broadcasting of radio program for awareness among community people for their right to access safe water and sanitation.
- Publication of success stories from the community.
- Educate, raise awareness and sensitize the community on safe water and sanitation improvement.
- Sensitize government and non-government stakeholders in order to increase access of community people towards safe drinking water and sanitation

Presently, people from rural areas are paying attention on safe water and sanitation, but the poverty and illiteracy is making it more challengeable to change the community's attitude. However, through media advocacy and campaign on safe water and sanitation, effective efforts were made towards raising awareness in community and advocating the water and sanitation related issues. A series of news bulletin with the success stories of community and research report was published and distributed in target groups. In-depth reporting on sanitation and safe water in various rural areas of far-western region is on-going program made by Media Academy Nepal.

The key lesson learnt was that the process of media campaign and advocacy is critical for raising awareness among rural areas and marginalized community and making community people accountable for the safe drinking water and better sanitation. Media campaign and advocacy are the effective tools that can help to change the attitude and habits of community. They are monitoring tools too and with such regular campaigns, the changing patterns on safe water and sanitation can be measured easily in community in subsequent years.

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# Community-led integrated waste and wastewater management

The integrated waste and wastewater treatment system was created to enhance the livelihood of the Nepali Sano Khokana community and to increase residents' access to basic water and sanitation facilities.

Community members constructed the system with support from the local NGO Lumanti Support Group for Shelter and the UN-HABITAT Water for Asian Cities Programme Nepal. The system, which was constructed on land contributed by the community, consists of a biogas plant with a linked compost plant/slurry drier and a reed bed treatment system. It ensures that residents now properly manage their waste and use its outputs for energy generation, irrigation and as fertiliser.

By improving agricultural productivity, the practice has also had a positive economic impact on the community.

It benefits from community support and participation from the very beginning and people are satisfied with the way it functions. However, the major challenge is to provide biogas to all the households of the community.

The system is currently fully operational and benefits all 37 households. With the initiation of this project, appreciable results have been achieved. Improved in-house sanitation conditions resulted in residents almost stopping open defecation, which markedly improved comfort, hygiene and general environmental living conditions of the community. Some components of the system have already been replicated in the Bharatpur squatter settlement and immense benefits have been gained from replicating the integrated waste and wastewater management approach of Sano Khokana in other parts of the country or the Asia-Pacific region.

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PAKISTAN



**PAKISTAN**

# Improvement of watsan & promotion of hygiene practices of rural communities through- community action process

The Community Action Process (CAP) itself is a sustainable program that will empower communities to take part in improving their life standards and find out the solutions to their basic problems including WATSAN at village level. The Community Action Process is targeted to organize, mobilize, motivate, capacitate and empower the communities, ensure WATSAN services, ensure opportunity for participation of rural and marginalized community in decision making process of community development, strengthen the network of like-minded CSOs at district level AND encourage the sector players for the improvement of rural WATSAN services.

The Community Action Process provides an integrated approach to the community's welfare, which tackles these issues directly. Its foundational principle is that sustainable development is based on the capacity of individuals and communities to take responsibility for their own development to fulfill the project's vision. The process involves training community members as Group Facilitators who are in fact the volunteers. Then, they form single-gender groups of community members to discuss and develop solutions for the improvement of lifestyle and development using the Triple-A Cycle. This is a continuous process which entails assessing a situation, analyzing the causes, taking appropriate action and reassessing the situation. Since solutions are developed from within communities, they are sensitive to local ways and needs. The Poverty Alleviation Organization (PAO) coordinates the activities of local CSO partners. It works with the local government and facilitates cooperation and joint activities. Local CBOs are responsible for coordinating and facilitating community groups, mobilizing volunteers, holding awareness activities and supporting community and local government initiatives towards community development.

The Community Action Process is a participatory development model which builds the capacity of stakeholders from individuals to families to the community and local government level. Communities are helped to recognize problems and implement solutions themselves. Instead of imposing development from outside, it encourages development and self-evaluation from within. Simultaneously, it integrates and focuses existing services and initiatives for maximum effectiveness and responsiveness. PAO Balochistan has expertise to extend the CAP intervention in the sector of WATSAN and run the cycle of process with marginalized groups in the remote areas of the Balochistan province of Pakistan. This is a low investment model for development from within. It provides community members with the tools to analyze a situation and identify appropriate solutions and helps integrate and focus services for greatest effect. Its flexibility and expandability and its basis in trusting people's ability to identify their own needs means that it can easily be integrated with service delivery.

It was learnt that the local government's endorsement and support are essential for unhampered operation, to create citizen-government linkages, and to take action against poor service delivery. Religious and community leaders have been key element in motivating their families and neighbors. Volunteers proved to be effective in implementing the Community Action Process. Because Group Facilitators live in the communities they serve, they cite repayment in the better standard of living for themselves and future generations, a respected position in society, confidence in themselves and their communities, and exposure to new ideas.

# Mobile water purification plant for flood (2011) affected people in Pakistan

During monsoon season on August 2011, heavy rains continued for a month which inundated almost 90% of area of Sindh province of Pakistan. Large numbers of people were homeless and had to take shelter in relief camps or moved to safer and higher places in different districts. District Umerkot, Sanghar, Mirpurkhas, Tharparkar, Badin and Tando Mohammad Khan of Southern Sindh were among the worst affected. In this context, AWARE started responding to the emergency by initiating WASH intervention of providing safe drinking water in Tharparkar District. Plants were fixed on large truck vehicles and these mobile water purification plants were an innovative approach to provide safe drinking water in flood affected area by using flood water as raw water. The process was very simple, first of all water was passed through sand filter, then through activated carbon filter and then through ceramic filter and finally passed through UV tube. The resultant was potable water fit for human consumption. WHO representative also visited the sites and collected water and found it best having no coliform, turbidity etc.

In flood hit area, the water sources were damaged and surface water was mixed with flood water. Affected population had no option of safe drinking water in the whole area. In some areas, people took water from open ponds but that resulted in increased incidences of disease. Thus, AWARE team introduced mobile water purification plants and these plants proved very successful. The plants were donated by philanthropists and recurring cost was borne by AWARE. Later, AWARE collaborated with Water Aid in Pakistan to support in responding to emergency situation in WASH of Umerkot and Mirpurkhas Districts.

This water purification mechanism is a very good model that can be replicated in other flood/heavy rain affected areas. This approach is cost effective, easy to use and it saves time and energy as well. It was also found to be user friendly and it provides water fit for human consumption as per set indicators by WHO.

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# Poverty reduction in Pakistan through the achievement of water and sanitation MDGs

According to the PRSP, without governance reforms, the enormous task of reviving growth and reducing poverty cannot be addressed. Thus, improved governance and targeting the poor and vulnerable, both parameters are crucial for poverty reduction. It must be recognized that for the poor across the world, 'poverty reduction' means water, food and livelihood security. The crisis in water and sanitation is, in fact, a crisis for the poor, who have diminishing entitlement, lack of access to common resources and barely survival-level incomes. Poverty reduction is therefore only possible when economic, political and social dimensions of governance are addressed by forging partnerships between the government, the private sector and civil society. This will further result to improved accountability and transparency and efficient delivery of services. For this, CSO must have needed capacity to adequately engage with government, for instance through monitoring budget allocation to the sector, contributing to the national MDG process, raising consciousness about rights and responsibilities and participatory development. This crucial role of CSO has over the years been neglected mainly due to lack of capacity and inadequate awareness.

This project was launched in January 2011 and implemented in Mardan district of Khyber Pakhtunkhwa Pakistan. The Project has completed its one year successfully till date and some of the main achievements are as follows: A network of 14 CSOs at district level has been established, CSOs role has been acknowledged by district government, District WASH Forum has been established that will provide opportunity to all stakeholders for regular discussions on WASH specific issues and solutions at the district level, CLTS has been triggered in some of the communities to stop open defecation in the area and policy advocacy has been done. Government has recognised that involvement of key stakeholders in the WASH projects is most important for the success implementation of WASH. Formation of CSOs Network has created platform at the district level for CSOs to synergize on their efforts on WASH issues. The project has successfully involved females in various project interventions such as formation of WATSAN committees, women groups and hygiene promotion.

Alliance building with CSOs is the key lesson learnt from the project as it has positive impact on the project. Their capacities were built on different themes of Water and sanitation and its implementation which got them projects from different donors. The formation of Water & Sanitation Management Committees and their capacity building on project planning, monitoring & evaluation, hygiene promotion, water resource management and operation and maintenance of the WATSAN schemes is another lesson learnt of the project as they are playing important role in the sustainability of the project and disseminating hygiene promotion messages in the community. The young journalist fellowship program is another important achievement and lesson learnt of the project whereby they were trained on WASH

related issues. As such, they are continuously highlighting the key issues of the Water and Sanitation in different newspapers to influences the policies and service providers.

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# Mobile drinking water provision to drought affected people

Baluchistan has the lowest water and sanitation indicators in Pakistan. The poor are particularly vulnerable in this context. Baluchistan is badly affected by drought and therefore has rivers, lakes and reservoirs drained and drinking water supplies severely affected as well. District Loralai is also badly affected by drought thereby causing decline in water level. Due to this, the people were unable to get water for drinking as well as for daily household usage.

Youth Activists Group of Loralai Area Water Partnership took this issue & discussed on ways to solve this problem and provide drinking water to the drought affected people at their door steps. They came up with a plan to provide clean drinking water to the drought affected communities. Accordingly, they collected money from local philanthropists & bought mobile water tanker to provide free drinking water to drought affected areas. Now, this project is running successfully and people are receiving drinking water on daily basis by paying reasonable fee just to cover the operation and maintenance expenses of the mobile water tanker. This project also helped in spreading message of water conservation and protection. The project is completely operated and maintained by the community people, hence community ownership and sustainability is visible. A joint meeting with the participation of community people and Water Activists Group is held monthly which helps in monitoring of the project work. This project has become a model project of the area because of its total community ownership.

The solution is still continuing on sustainable basis even after six year of the commencement of this project. This project has been able to put forward innovative, positive, sustainable and tangible impact not only in the target community but also in the whole areas of the community. The clean drinking water is available within drought affected communities. The availability of water has improved other sectors like health, education, livelihood and economic opportunities as well. Community is operating this project, therefore community people is now empowered and is encouraged to implement all small scale projects as well. Currently, community is also working towards utilizing their common resources for the best interest of the people.

It was learnt that community participation, community consultation, community contribution and community ownership is very necessary for successful implementation and sustainability of any project. So, the local community must be involved while implementing such type of local level project. Identification of the community, incorporation of the opinion of community people, consultation and their contribution, application of inclusive participatory approach, their feedback and suggestion is also very crucial.

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# Providing clean drinking water to rural women

Baluchistan has the lowest water and sanitation indicators in Pakistan. The poor are particularly vulnerable in this context. The urban poor spend a disproportionately large part of their income buying water from vendors while in rural areas fetching water that is not even potable from long distances is the responsibility of women and children. Inadequate sanitation facilities lead to a prevalence of disease especially among the poor who, as a result, spend a significant proportion of their income on requisite medical care and it also results in lower worker productivity and lower school enrollment. Insufficient attention to wastewater treatment and disposal is also causing severe environmental problems in the province. There are no solid waste management facilities in rural areas and households simply dump solid waste either in their lanes or in adjacent open plots. Also, the increased use of plastic bags has made it very difficult to use the solid waste as manure.

Access to safe water and sanitation and proper disposal of solid waste are basic human rights. They are an essential component of primary health care and are important for poverty alleviation. Loralai Area Water Partnership (LAWP) took the serious notice of these issues & conducted survey of rural areas of the target area. According to the result, Nana Sahab Ziarat Tehsil Dukki District Loralai is one of the most alarming areas in context of water and sanitation. Therefore, LAWP launched & completed provision of clean drinking water project to the rural women in that area whereby LAWP installed 60 hand pumps in the community. Presently, clean drinking water is available at doorsteps of the women. This has resulted in reduction of water-borne disease, decline in child death rate, improved status of women, awareness level increased among community people and improved lives of the people in terms of availability of clean drinking water. The stakeholders of the project were local community, tribal leaders, local notables, children, line department etc. LAWP played strategic role for implementation and it formed monitoring & evaluation committee with support of target beneficiaries. This committee is responsible for monitoring, evaluation, maintenance and follow-up etc.

It was observed that the solution of hand pump installation is best in terms of provision of clean drinking water to poor community because it is very cost effective and simple technology that does not require any energy like electricity, fuel, gas etc. This could be scaled up from grass roots to top level including local & regional as well as political level. It was learnt that identification of community, social mobilization, and participatory approach, maturity with work, honesty, transparency & accountability is must for any intervention to be successful.

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# Rehabilitation & extension of Karazes in district Loralai

In Pakistan, there are issues of water scarcity and energy since long time. These issues are increasing day by day more specifically in Baluchistan which is the largest but the most backward and marginalized province of Pakistan. During 1997-2001, persistent drought occurred in Pakistan, and Baluchistan province was badly affected. As such, drought severely affected Karazes, drinking water system, agriculture water system, irrigation system, people, crop production and livestock with serious consequences for the food security and livelihood for a large segment of population. Karaze is a traditional water management system naturally running without any energy like electricity, fuel, gas, solar & wind. It is hundred years old system used for drinking water, irrigation, agriculture, live stock & household hold water use.

Due to drought, there was dry spell in Loralai District and that in turn affected Karazes which then badly affected lives of the people and their livelihood sources. Consequently, around 50% population migrated to other parts of the province. However, the location is receiving some good rains at present and due to climate change, the seasons have become rainy and water started showing up. In this context, Rural Education Development & Welfare Organization (REDWO) of Pakistan conducted an investigative study & survey of two Karazes of District Loralai named Village Poti Karaze and Village Sultan Muhammad Karaze. It was found that if Village Poti Karaze is rehabilitated and extended, then this Karaze can become functional and can provide drinking water, water for agriculture, live stock and for daily use. Therefore, REDWO launched a project named Village Poti Karaze Rehabilitation & Extension Project which was successfully implemented with the support of community. Presently, Village Poti Karaze is functional providing water to the village population that is used for drinking, agriculture purpose, and irrigation and for livestock. As a result, crops production started, livestock improved in the area, agriculture sector improved, livelihood opportunities of the people improved, their economic sources bettered and people started migrating from other places to their own native village.

The output includes rehabilitation of hundred years old traditional water management system that has several benefits. Karazes are also social institute of the local people where they gather together to interact, share their joys, sorrows, help each other and assist each other on field, livestock and household matters. This solution is good in all aspects like 24 hours availability, free of cost source of water, availability of much water for drinking, agriculture purpose, irrigation purpose, livestock purpose and for use in daily life as well as for conservation of energy. This system also contributed in environment improvement, creating economic opportunities, livelihood opportunities and employment opportunities, increasing gross domestic product etc.

Government and nongovernmental organizations with support and consultation from farmers as well as local communities can upscale this solution to a large level. Innovative, old and traditional water system is the self sustained & durable system for the best interest of the local people, country and environment aspect. So, sustainability of any such systems depends on the contribution of target beneficiaries, strategic planning, social mobilization of the community people, participatory approach and working with maturity, honesty, transparency and accountability. It was also noted that the solution is very easy and cost effective.

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# Awareness of women regarding use of safe drinking water, sanitation in urban and rural areas of Pakistan

The project was initiated by Sindh Development Foundation and is being implemented in the District Khairpur Mir's Sindh of Pakistan. During implementation of the project, various stakeholders were involved such as local government, community elders and government departments. The activities of the project will be followed up by Freshwater Action Network, South Asia- Pakistan. At present, the project is in the initial stage and it has been identified that there is a need of water testing, provision of safe drinking water and improved sanitation in the rural communities. Hygiene education is the main part of this project, so school teachers are being encouraged to educate the students of their schools about the benefits of hand washing and use of latrine. Also, a need to prepare policy for Safe Drinking water, Sanitation and Hygiene and awareness raising on Right to Water and Sanitation was felt that will ultimately support planning and implementation at Government level.

According to the organizational experience on WASH Sector, it is envisaged that this solution will help in implementation of the project activities according to the need of the community and that in turn will help to achieve the MDGs. This project will involve community people in the implementation process and their contribution will add to the benefit of this project in addition to creating community ownership. It is expected that after implementation of this project, mortality rate of children under 5 due to water borne diseases and poor sanitation condition will be reduced, dignity of women will be recognized by declaration of Open Defecation Free area, well skilled, knowledgeable and improved society will be developed, people will be economically developed and the rate of communicable and water borne diseases in the society will decrease eventually.

It was mainly learnt that the community must be involved before implementation of any project. All the stakeholders must also be involved in the project activities whether by updating them with monthly work plan or progress report for the transparency of work done. For the successful implementation of any project; human resources, finance and infrastructure are the main things. The political will is also important, so the organization must mobilize/sensitize the local political leaders to support in the implementation of the project activities in the field.

# Water sources cleaning and disinfection in the flood affected areas of Pakistan

The project was launched in two flood affected districts of Pakistan. The flood had destroyed/contaminated the available water source and the communities were finding it almost impossible to have access to ample water for their daily use and drinking water in particular. The Integrated Regional Support Program (IRSP) in collaboration with Swiss Agency for Development and Cooperation (SDC) therefore launched a project to clean and disinfect the household water sources and train community people on how to keep the sources safe. Capacity building and awareness campaigns were initiated alongside the main activities of cleaning, disinfection and protection of water sources. Then, water quality testing labs were established at each target districts. During the project period, village level committees were trained and were given the responsibility to ensure follow up of the project and coordinate with service providers. As a result, around 2600 water sources were cleaned and disinfected. The cases of diarrheal disease reduced considerably with positive impact on the household economy. Community monitoring committees were also formed and trained for sustainability.

Currently the water sources, especially open wells are safe for drinking which have been cleaned and chlorinated after the flood of 2010. The unprotected sources were covered and communities were advised to provide proper drainage and keep suitable distance between water source and latrines. Also, the communities were capacitated to effectively operate and maintain the water sources. The communities were also capacitated on household water treatments and thus, reduction was recorded in diarrheal diseases. The linkages developed between service providers and consumers resulted in improved access and quality of water. The activity is also supposed to contribute to household economy because of reduced water borne diseases in the target area. The program was cost effective as local communities were fully involved in the planning and implementation. Another important factor is the increased awareness of target communities regarding water quality and their right to water and sanitation.

The key lessons learnt are that the community has key role in designing, implementation and sustainability of the project. In this particular context, it was observed that involvement of community is essential in all phases of the project to achieve the overall goal of the project.

As flood water had contaminated all water sources, the government did not have much resource and capacity to take action for cleaning and disinfection of those sources while well cleaning is necessary in each part of the flood affected areas which will ensure the disinfection of groundwater. Therefore, capacity of the government staff was built on well cleaning and disinfection in order to speed up the well cleaning activity. Thus, it can be learnt that Government should start rehabilitation of water source in the remaining affected areas. For implementation of the project, trained staff is required and strong mobilization of team is required for hygiene promotion, household water treatment and protection of water sources.

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# Water environment health & hygiene education promotions program in flood affected schools

Loralai is one of the hazardous districts of Pakistan where flood affected schools have been facing very bad situation of poor sanitation, environment, unavailability of clean drinking water within the school premises and poor hygiene etc. This project therefore aims to motivate teachers and students about health, hygiene, clean environment, and hand washing and providing clean drinking water facilities thereby changing their behavior, habits and attitude towards better sanitation and hygiene in the area. The project was initiated by Youth Association for Development (YAD) which is the member organization of FANSA-Pakistan.

Both hardware facilities and software education are the vital components and the key indicators of the sustainability of the project results. Hardware components include provision of clean drinking water tanks to concerned schools, hand-washing around the school compound etc while the software includes education which is also the key elements for disease control and prevention because awareness & information regarding hygiene education programs is crucial in helping school children make deliberate choices with regards to water and sanitation related behavior. For this, schools have provided the ideal environment that helps children to adopt good habits that will serve them for the rest of their lives. As such, children can grow as a healthy person and can serve as a change agent of the community mainly in context of health and hygiene.

This project has been successfully implemented and at current, the community is leading and operating this project with the technical support from YAD. YAD has taken their efforts regarding provision of clean drinking water, promotion of hygiene, reduction in poor health of students, cleaning of environment and re-functioning of sanitation facilities, decreasing open defecation, decreasing water-borne diseases in the target area, improving good services in terms of education, health care, sanitation, hygiene and daily medical checkup of students. The incidence of common illnesses has now decreased post-project period, sanitation facilities have improved within the schools premises, the issues of unavailability of clean drinking water have been eliminated and hand washing practice have been widely accepted by the school students of the target 40 schools. A monitoring and evaluation committee has been formed that includes teachers, parents, line departments, journalists, local CBOs, COs, & CCBs and that looks in monitoring of the project and the situation of drinking water and sanitation facilities in schools.

All school children have a right to basic facilities such as school toilets, safe drinking water, health care services, daily hand washing, hygiene education, medical checkup, clean environment and clean surroundings. After successful completion of this project with observation of positive and good impact, it was realized that all government schools must have these facilities in Pakistan either in rural or urban areas as soon as possible. And, in this regard, the role of civil society and media is vital that must play as a change agent to ensure that the government officials provide these necessities to the schools resulting in better and healthier life of school students.

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# Sustaining behavior change through participatory approaches in project cycle

Women and children carry most of the burden created by poor water and sanitation services and inadequate hygiene in informal urban settlements and therefore, are more vulnerable. To change prevailing practices or bring about change in behaviors of a family, UN-HABITAT developed a simple and easily understandable set of messages that are organized and communicated in a manner relevant to improvement of water and sanitation facilities throughout the project cycle. This took into consideration the group psychology of the family to bring about positive and sustainable change in their health, hygiene and nutrition behavior. As such, UN-HABITAT initiated project through implementation partner in the slum of four major cities of Pakistan which is being implemented in 17 flood affected districts of Pakistan.

Women needs (related to water, sanitation & solid waste) were identified and women access to water, sanitation and solid waste facility was improved through the project. Capacity of local authority was enhanced on gender sensitive need identification, planning and implementation. Gender responsive community based approaches were promoted and women were empowered in decision making process. Gender sensitive policy issues were identified and advocated at local and district level. Gender sensitive water, sanitation and solid waste innovative model was also shared for developing public private partnership to diversify the impact of the project on long term basis. Further, series of trainings were conducted to bring positive behavioral change in communities towards health and hygiene issues and, community awareness was enhanced towards CLTS and cleanliness campaigns. As a result, women participation has improved in the project activities and therefore women now understand their role in changing behavior and existing practices regarding health and environment and are committed to improve this.

In developing countries like Pakistan, people are unaware of their basic rights. The human mind naturally absorbs information which becomes visible from time to time. Environmental behavior of any community depends on their awareness level and their access to basic amenities. Behavior change is viable if community members internalize the given information and practice it in their routine life. Hence, targeting various groups by different means helps disseminate information to large number of audiences. This project case study reveals that community involvement throughout the project cycle helps to bring about sustainable behavior change in the inhabitants and is useful in combatting seasonal epidemics due to unhygienic conditions and poor sanitation. Therefore, it was learnt that involvement of community is the key of success/sustainability of any project. Furthermore, close coordination of public & private sector, capacity building of stakeholders and strong linkages between the project management, the contractor, local government, and community are crucial elements in project cycle that ensures continuity and quality in service delivery.

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# National policies reformation and development strategy for constructing water reservoirs and access for clean drinking water throughout rural communities in Balochistan as “Human Right to access Water”

The province of Balochistan is a water-starved and land-rich region. There are limited sources of water available to provide clean drinking water to the entire population of the Balochistan. Lack of planning, corruption in the institutions and lack of interest from the federal Government for the improvement of drinking water system are the major causes for the issue in the province. Besides, the available water in these small towns has risks of contamination due to several factors and lack of education among people makes them believe that as long as they are getting water from well, it is safe. As such, the implication of lack of clean water and access to adequate sanitation are widespread. Thus, mostly children die from dehydration and malnutrition, and from diarrheal illnesses in Balochistan. Also, women and young girls are unable to do income-generating work or attend school, as majority of their day is often spent walking miles for their daily water needs.

A traditional irrigation system (Karazes) of tapping groundwater is practiced in Balochistan for centuries. The system is unique as it does not need energy to pump groundwater flowing under gravity. However, the system has come under great stress over the years because of the commissioning of a large number of deep tube wells in the valleys. These tube wells have been instrumental in causing groundwater mining and therefore, water table has been declining continuously in the province. The lack of water and water storage reservoir has posed severe constrain not only for drinking purpose but also for agricultural purpose, as agriculture is the only major source for earning money and economic benefit of the people. Due to weak governance and corruption in the Government institutions, there is no implementation of the existing laws on to impose strict ban on the installation of tube wells in certain areas where water table is lowering.

Thus, there is a strong need of managing the water resources in the province and to make them effective source for drinking water. To solve the issue, all the stakeholders from environmental institution, water management authority, agriculture department and rural area development departments should be organized at national and provincial level for making a national strategic plan for bringing about the reformation and endorsement of new technological, mechanical and research based strategies and innovations. This will help and provide a roadmap to the national level and provincial level institution to assist the grassroot stakeholders to assess their existing situation and seek funding from provincial and federal ministries/ institutions on logical basis to implement the solution. Some suggestions worth considering are as follows:

- Identify the best water resources available in the province and suggest it to the policy makers for their utilization.
- Launch advocacy campaign at all levels to encourage the construction of check dams or delay action dams.
- Campaign at all levels for utilization of Karaze system (traditional Irrigation system) through technical assistance and advocacy at all level.
- Community mobilization for the utilization of water resources.

# Windpower harnessing for dragging out underground water for drinking and kitchen gardening in thar desert of Pakistan

In Thar Desert, underground water is a major source of drinking water except rainwater. As per an assessment, 98% of Thari inhabitants (1.5million population) have to depend on underground water. There are several issues in pumping out groundwater such as loss of time to fetch water, use of donkey, bull or camel for pulling bucket to withdraw underground water, hardship to women and children, malnutrition and drop out of school going children, women using less water due to difficulty in accessing water, unhygienic conditions, increased incidences of disease and growing rate of chronic poverty.

To solve the issue, Government had installed tube wells along with diesel operated engines but these could not succeed in cushioning the hardships of Thari people mainly because of high recurring cost, lack of technology transfer, communication gap and low literacy rate. So, in the light of the research, it was learnt that, Thar needs such a technology which is appropriate to the location, which requires less recurring cost, requires less maintenance etc, for instance, renewable energy like wind, solar and biogas. In this context, AWARE conducted a research and found out that windmill is a viable option for Thar community as windmill technology is environment friendly, sustainable, incurs less recurring cost and is easy to maintain.

AWARE Team installed first model of windmill in 2004 and later, five more windmills were installed in different villages of Thar. These windmills are used for dragging out underground water for drinking water as well as for kitchen gardening. The average output of water per windmill per day is 3,500 liters. At present, all installed windmills are found to be successfully running and people use the water withdrawn for drinking, watering pet animals and kitchen gardening. The positive impact is widely visible, as such, drought has been reduced, human resources are now utilized in economic activities, health status of women has improved, self hygiene has improved, malnutrition has minimized due to improvement in kitchen gardening, rural to urban migration has declined, and reforestation and agro-forestry have increased as well.

The key lessons learnt were that windmill is environment friendly and long lasting user friendly technology. If area has potential of wind, then this technology is best to be used but in case of places having low wind velocity, it could be hybrid with solar. Thar community has harnessed wind for dragging out underground water but this could be used for electricity generation as well. It was noted that community has high potential but initially a model was developed to educate and aware stakeholders i.e. the community people in order to successfully implement and sustain such technology in the community.

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# Awareness on the water borne diseases and use of improved sanitation in the rural areas of Pakistan

Various water borne diseases are spreading day by day because of use of poor quality water in the rural areas of Sindh, Pakistan and thus, the mortality rate among children is high. The open defecation in rural areas is in practice since long and the hygiene education is also not in practice. Hence, the health condition of people is degrading day by day. The incomes of families are also affected by the poor health conditions.

In this context, the awareness programme will help the poor people to improve their health conditions and support in their economic development process. This project will be implemented in the rural areas of District Khairpur Mir's Sindh, Pakistan. Khairpur Rural Development Organization (KRDO) is the main actor who will implement this project in the targeted area.

At present, KRDO is working on the research and survey of the problem existing in various places of the district. People of the area are demanding implementation of this kind of project in their area. They are willing to participate and support in the project activities at local level. KRDO is continuously working on data collection from the communities so as to implement practice of improved sanitation and safe drinking water in the communities to combat the water borne diseases. Considering importance of WASH sector, KRDO has also got membership in End Water Poverty (EWP), Water Supply and Sanitation Collaborative Council (WSSCC), Water Integrity Network (WIN), Freshwater Action Network (FANSA), Sustainable Sanitation Alliance, Gender and Sanitation Alliance to achieve the objectives of the organization.

This solution aims to support the community in improving health conditions of the people by creating knowledge and awareness about the causes of problems and solutions. The community, local leaders, and government will be involved in all processes thereby making the solution cost effective and sustainable. It was learnt that the involvement of the community, local leaders, and concerned stakeholders is crucial for the successful implementation of the process and to avoid any conflict in any stage. The community involvement will also support the project benefits.

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# Integrated water supply and sanitation project Changa Pani Program

Changa Pani means good water. The Changa Pani Program was designed on the principles of the “Component Sharing Model”. It has three components namely External, Internal, and Main System component. The project will provide efficient, reliable, affordable and environmentally sustainable WATSAN system in poor urban area of Badar Colony of Lahore, Pakistan. Water and Sanitation Agency (WASA) designed the External and Internal components of the project; it was responsible for the design, quality assurance and monitoring of these components with the support of Urban Unit. According to the model, internal development refers to the community’s share of the job; the construction of toilets in houses, and pipe fitting for water supply and sewage pipes from the houses to the main line. This was completely funded by the community itself while the external development of Changa Pani was the responsibility of the Government.

Changa Pani Program was an integrated approach taken to improve the provision of water and sanitation services to residents of a peri-urban center of Lahore. The purpose of the program was to learn from local and global initiatives, evaluate, develop and implement participatory planning processes for an integrated water supply and sanitation system for deprived communities. The major and strategic aspect of the program was mobilization of the communities; community awareness of health and hygiene education and financing of the internal component by them. Thus, capacity of the community was built while implementing CPP and a free dispensary was established within community. Besides, a vocational center for women was established and co-curricular activities for the community youth are regularly arranged. It is to be noted that the fund is acquired for water and sanitation service provision from the community as a monthly fee. Training workshops were conducted to facilitate trainers, teachers and social mobilizers to create awareness among the people of the area. Health, Hygiene and Environmental conservation program were also included in the project and Environmental Education Framework was used to design the teaching and learning strategies in the schools and community.

The Changa Pani Program proved to be a successful intervention in terms of providing a sustainable and effective model of water and sanitation provision. The success of the program can be attributed to the effective mobilization of their community, its active participation and ownership of the Changa Pani. The dedicated leadership of the respective partners as well as the community leaders also played a very important role in leading the program to success. The partnership model of the program led to capacity building of all partners. After the intervention, the condition of the community has considerably improved. This project presents an opportunity for demonstrating methods for improving urban water and sanitation services in a sustainable manner within the current institutional limitations.

A major challenge faced during program implementation was the lack of strategic planning which led to problem in functioning of the steering committee. Therefore, adequate provision should be made from the planning phase taking every aspect into account so as to enhance the project impact. Another issue that needs to be dealt strategically is the release of funds from the finance department as the procedural challenges hamper the program finances. A proper monitoring and evaluation system is also crucial for the success of any program and a baseline survey is essential to assess the program’s accurate impact. Proper documentation of the program is also vital for learning from the program, for policy learning and for dissemination and demonstration of best practices.

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