

## Dr. Pathak shares his reflections and visions on his ongoing quest for clean and dignified lives for all people

Joshua Paglia

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### 1 What does the Stockholm Water Prize mean for your work and for the Sulabh mission?

The Stockholm Water Prize means vindication and a global recognition of our ideals, and our efforts for the last four decades to promote sanitation among the millions of the poor in the world who do not have access to the same. Even if I felt proud learning that I am to receive the prize—and there was nothing wrong in it—I also felt humbled; and had a feeling of happiness to share with others (Fig. 1).

What has added value to the prize is the fact that silent millions have accepted and put to practice the innovations that I have made in the field of sanitation, which have helped them better their lives.

The prize also has a special significance in recognizing that safe water and sanitation go hand in hand for the promotion of health and well-being of the community. I am sure you will agree with me that the prize also recognizes the needs and aspirations of the silent millions in the Third World countries who are presently without even the rudimentary facilities

of sanitation and water supply. On one hand the prize gave me a sense of happiness and satisfaction for the global recognition of my innovations, inventions and our committed mission for providing cost-effective sanitation facilities for the poor; on the other, the prize reminds us of the challenge and the tasks ahead of us for fulfilling the millennium development goal on safe water and sanitation. The prize will give further impetus to the Sulabh family to carry forward the mission of Sulabh for securing sanitation, safe water and restoration of human rights, social dignity and freedom from social discrimination for millions.

### 2 The growth and impact of the Sulabh sanitation movement has been impressive. How would you describe the development and success in the Sulabh mission?

In the colonial era, the British rulers took the first initiative for introduction of sanitary systems in the country, in 1870 when sewerage system was introduced in Calcutta, the then capital of the country. But the sewerage system remained confined to a handful of cities and most of the people living in the urban, peri-urban and rural areas had to cope with extreme difficulties in absence of a cost effective and user friendly system of human excreta disposal. The situation remains largely the same even decades after Independence. The decades were also co-terminus with the prevalence of defecation in the open and use

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Dr. Bindeshwar Pathak received the 2009 Stockholm Water Prize for his lifelong dedication to improve public health, advance social progress, and improve human rights for millions of people in India and internationally.

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J. Paglia (✉)  
SIWI, Stockholm, Sweden  
e-mail: joshua.paglia@gmail.com



**Fig. 1** 2009 Stockholm Water Prize Laureate Dr. Bindeshwar Pathak, founder of the Sulabh Sanitation Movement

of the bucket toilets with human scavenging. Efforts of social reformers, experts and various committees and consultants could not make any significant dent in the situation in the absence of an appropriate technology which could prevent open defecation and remove manual scavenging.

It is at this juncture that I came up with the concept of two-pit pour-flush toilets, popularized it in the name of Sulabh Shauchalayas and mounted a successful and multipronged attack on the prevailing dehumanizing systems and practices. Social mobilization was combined with scientific innovation and invention to develop a delivery system which involved co-operation and collaboration between Government and local bodies/community/civil society organizations and the people. Simultaneously, I introduced and popularized the concept of public toilets run on pay-and-use basis combined with exemplary round-the-clock maintenance. Starting from an obscure town in the state of Bihar in India, Sulabh model of 1.2 million two-pit pour-flush household toilets and more than 7,500 public toilets have been built, run and maintained by

Sulabh International Social Service Organisation all over the country and are being used by 10 million people every day (Fig. 2).

More than 54 million Sulabh model of individual toilets have been built in the rural areas with the efforts of the Government of India and the State Governments, and are being used by about 300 million people every day. In the process we have liberated more than a million scavengers from the demeaning practice of manual collection and carrying of human excreta. Invention, innovation, development and promotion of Sulabh sanitation technologies including the biogas plant linked to Sulabh's Effluent Treatment (SET) system would have far reaching impact on water conservation as well as reduction of emission of green house gases like methane and thus helping reduction in global warming.

### **3 With your background as an “action sociologist” and not as an engineer, how did you develop your sanitation innovations, such as the Sulabh Shauchalaya toilet and the biogas digester?**

I have experienced during the last 40 years that application of the mind is more important than mere knowledge alone. Knowledge can be borrowed but not the mind nor the art of its application. I pick up small pieces of information and strands of thoughts from various sources and start working on them to find answers. To solve the problems I have noticed that if and when technology is needed I get a flash in my mind which provides solution to the problem. Sometimes this may appear to be unconventional and peculiar but it works.

To illustrate, I give the example of the Government of India giving us USD 654,800 to put up five public toilets with biogas plants in Kabul, Afghanistan. It is well-known that Kabul gets very cold during winter. So to design a biogas digester without affecting its functional efficiency due to variations in atmospheric temperature was an uphill task. At extremely low temperature production of biogas ceases completely. To design a biogas digester which would overcome the problem, I started thinking how the negative effect of low temperature could be countered. This, to my mind, could be done by sealing the digester and



**Fig. 2** Puja and hawan being performed outside the Jagannath Temple in Alwar

making it air leak proof. To achieve this I asked my engineers to place the top of the biogas digester, called dome 4 (four) feet below the ground level; and, again by way of further precaution, I asked them to cover the dome of the digester with thermocol functioning as insulator and then to further cover it by filling soil up to the ground level. This made it totally air leak proof and insulated from the atmospheric cold. This design worked well in Kabul, even when temperature went down to  $-30^{\circ}\text{C}$  (thirty degrees celsius) in November–December, 2007 the production of biogas remained more or less constant. Produced biogas is used for cooking, body warming, lighting and even for electricity generation at all the five sites (Fig. 3).

Likewise, I solved many technological problems with application of mind and picking up bits of information from literature and knowledgeable people. With my academic background of an “action sociologist”, I was deeply motivated and inspired by the ideals of Mahatma Gandhi—the Father of the Nation, for the removal of scavenging and untouchability from society and promotion of environmental sanitation by the elimination of open defecation. I realized in the process that to bring out the desired social changes, the movement needs to be supported by cost-effective appropriate technology. Without technical backing and appropriate delivery mechanism, the task of a social visionary has often remained unfulfilled.



**Fig. 3** Lamp powered by local biogas

An in-depth study of sanitation scenario in India, during the pre-Independence and post-Independence era convinced me that neither would the sewerage, nor the septic tank systems, be able to address the gigantic problem of lack of sanitation in urban and rural India.

While trying to develop a sanitation system which is technically appropriate, socio-culturally acceptable and economically affordable and easy to construct with locally available materials and manpower, I came across a WHO publication “Excreta disposal for rural areas and small communities” by Edmund A. Wagner and J. N. Lanoix, which proved to be very helpful. This led me to the design of twin-pit pour-flush compost toilet. The present designs and specifications which could be modified to suit the householder’s need and affordability, were developed through years of experimentation and pilot studies.

As regards biogas digester attached to a community toilet, I recall the instance, when sitting in a restaurant, I overheard a group of people sitting on the adjacent table being told by a tribal, from a village near Indore in the state of Madhya Pradesh, India, how he had used human excreta mixed with cow-dung to produce biogas. I visited the village and saw the working of the biogas mechanism in the house of the tribal. It was this visit which gave me the idea to connect a biogas plant to a public toilet to produce biogas based on excreta. Doing so we also tackled the problem of the design of the dome and settled on the fixed type. The problem then remained of the aesthetically unwelcome colour and malodour of the effluent emanating from the public toilet. This led us to the design and setting up of the Sulabh Effluent Treatment technology linked to the biogas plant. The device renders the effluent colourless, odourless and pathogen free by passing it through sand, over charcoal bed and exposing it to Ultra Violet rays, bringing down the BOD to less than 1 mg/l with the effluent fit to be utilised for agricultural and horticultural purposes as also for being discharged into any water body without fear of polluting it.

The action sociologist in me was thus converted into a social engineer who designed the instrument for far reaching social changes and an environmental physician who developed preventive environmental medicines against environmentally transmitted diseases.

#### **4 What is your vision for Sulabh, and for your work over the next decade?**

My vision for Sulabh and concept of mission for the organization for the next few decades are inextricably linked to the huge problem of lack of sanitation and

safe drinking water in India as well as in the entire Third World countries. Today more than 2.6 billion people in the world lack access to sanitation and over 1.1 billion lack access to safe drinking water. In India nearly 650 million people do not have access to improved sanitation facilities even though 54 million Sulabh design based toilets have been constructed in the rural areas in the country and 1.2 million household toilets have been constructed by Sulabh in the urban areas, and 668,000 Sulabh design based toilets have been constructed in schools. Sulabh public toilets numbering 7,500 are running on pay and use basis and though in the process millions of scavengers have been rehabilitated, a lot of ground, obviously, still remains to be covered. The extent and magnitude of the problem is tremendous and as an organization Sulabh with its family of more than 50,000 dedicated volunteers must rededicate their services to be equal to the challenging tasks. “We have miles to go before we sleep”.

What we have done and propose doing in the light of the dimension of the problem is coupled with sociological as well as scientific aspects. The infusion of social reforms in the working of Sulabh is as important as the technical aspects like the designs and techniques of waste and excreta disposal. Total abolition of scavenging, restoration of human rights and social dignity for the scavengers and total elimination of untouchability from society as well as promotion of a safe system of human excreta disposal in urban and rural areas and ensuring the security and safety of our natural water sources are the basis of our future dream and vision.

We are planning to provide five public toilets linked with biogas plants and effluent treatment technology, 500 Sulabh toilets in individual houses and Sulabh toilets in 100 schools in 50 countries to show them that they can solve the problems of lack of toilets in their own countries. And keeping in mind, the technologies developed by me are free from patent, any organization or country can adopt the same free of charges without any royalty. These technologies developed by me could help other countries to achieve Millennium Development Goal on sanitation (Fig. 4).

We cannot rest on our laurels until and unless, each and everyone in this world has a safe and sanitary home and safe and potable drinking water in adequate quantity. In order to bring the sanitation



**Fig. 4** Sulabh public toilet system

issue at a higher level and also make it technically accessible to the professionals of this sector, Sulabh has prepared a Sulabh Encyclopaedia of Sanitation under my guidance as Editor-in-Chief. Further, to make the sanitation sector more lucrative, technical, and professional I initiated the setting up of a University of Sanitation. It was realized that sanitation is equally a technical as well as a social problem. To overcome the problems in a heterogeneous society with respect to socio-economic and cultural aspects is more challenging. The magnitude of problems also varies widely in different regions of the world. University of Sanitation would help a lot to overcome the problems in different regions/societies. In order to make Sulabh Sanitation Technology more popular and accessible, Sulabh has published literature in 24 Indian languages and four foreign languages (Spanish, German, Chinese and French). Thus our vision and mission go hand in hand with the millennium development goals of the international community.

### **5 What have been the greatest personal rewards from your work?**

I have the most satisfying sense of personal reward when I see that my humble innovations and inventions

are being put to use by the silent millions not only in India but also in other developing countries. It is a matter of pride and satisfaction that our dedicated efforts for promotion of sanitation and restoration of human rights and social dignity have been recognized globally and are being scaled up and replicated in many countries. To see the sense of pride and self dignity on the faces of the erstwhile women scavengers relieved from their humiliating work of scavenging of night-soil, was possibly the most joyful moment of my life. I draw great satisfaction and pride from the fact that I could most humbly contribute to the fulfilment of the dream of Mahatma Gandhi for removing untouchability from society. I feel proud and happy to see the rehabilitated scavengers merged in the main stream of society; to see their wards and children playing, laughing, and mixing freely with the families of the upper classes in the schools that we have set up. I feel joy and happiness to hear the silent steps of social revolution which has crept in, in India and promoted environmental cleanliness together with social harmony. And also, the technologies developed by me will help more than 2.6 billion people to use toilets with safety and human dignity. Apart from restoring social dignity and improving health the Sulabh Shauchalaya has in-built mechanism that reduces green house effect. Gases produced during

decomposition of excreta in the pit, do not escape in atmosphere. Rather they are absorbed in the soil. Thus, it prevents global warming and improves environment. Further, the system is so designed that it requires only 1.5 l of water per use i.e., at least 10 l less water than the septic tank. Thus, it saves enormous amount of water in flushing. Further, digested sludge of Sulabh pit is a good quality manure as it contains nitrogen, potash and phosphate. It acts as soil conditioner. It will help a lot in agriculture production and also save foreign exchange of the concerned government, in importing inorganic fertilizers.

### **6 Are there lessons to be drawn from your experiences in sanitation and health that could apply to other important challenges facing the world?**

My experiences in the field of sanitation and health which have been the major areas of Sulabh's work, I feel, can have some lessons for people working in other areas.

We are already aware of the developing water availability crises calling for effective water management practices. I thought over the matter and found that in the twin-pit pour-flush compost toilet system, a little change in the angle of the decline of the pan would make outflow of excreta smooth and easy and simultaneously, therefore, reduce flushing water requirement. It was this small change in design which produced the result. Against the requirement of 10 l of water to flush, in the conventional system the requirement in Sulabh system stands reduced to only 1.5 l of water per flush. If account is taken of the estimated 700 million people without access to toilet facilities, and, who if are to be provided access thereto viz. through Sulabh system, then the water required for flushing purpose works out to 1,400 million litres per day against the requirement of 11,200 million litres in the conventional toilet system. The overall annual saving thus affected is of 4,088,000 million litres. Considering that Sulabh has built 1.2 million two-pit toilets the water saving effected though Sulabh design is of 134.4 million litres per day or 49,056 million litres per year. The Millennium Development Goal sets forth the target of halving by 2015 the proportion of people without sustainable access to safe drinking water. It is

established that 71% of the earth's surface is covered with water, of which a mere 0.6% is in shape of surface water bodies such as lakes and rivers. These figures only show how important it is to save this meagre percentage, to save it from pollution, to save it from being wasted. It is here that Sulabh has stepped in by designing devices which prevent pollution. Thus innovation has been made of treatment of waste water by implementing Duckweed based treatment technology. Briefly stated, the duckweed treatment of waste water makes use of duckweed plant to cleanse it of most of the impurities barring heavy metals and oil ingredients. It is a free floating plant and the problem it poses is not of scarcity but of excessive growth requiring frequent cleaning. It reduces Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD), and cleanses suspended solids, bacterial and other pathogens from waste water. Besides, it is a complete fish feed increasing its output two to three times.

Another area of water management where Sulabh has taken initiative relates to the use to which water hyacinth can be put. Sulabh was aware of the deleterious effects of wild and uncontrolled growth of water hyacinth. A thought was given to the way by which the problem could be solved. Experiment proved that mixing dried and powdered water hyacinth with excreta, in the biogas increases the yield of biogas plant and makes the working of biogas plant more effective having beneficial environmental impact also.

The purpose of describing water management practices is to establish how Sulabh has taken initiatives to implement techniques and practices by taking initiatives ensuring increased usefulness of water resources and minimising their wastage.

Sulabh has kept pace with developments in the field of environment, mitigating global warming, climate change etc. While designing the two-pit toilet system, care has been taken, as pointed out earlier, ensuring that gases emanating from excreta get absorbed in the soil which faces the pit because of pits being brick lined in lattice formation leading to dispensing with the necessity of installing a vent pipe and thus preventing methane and carbon-dioxide getting released in the atmosphere. The same purpose is served by linking biogas plant to a community toilet and using the biogas for cooking purpose or lighting the mantle lamp which burns of the methane component in the gas.

The most significant lesson I learnt is that to get scavengers relieved from practice of human scavenging an appropriate technology support and delivery mechanism was needed. Just by creating awareness and preaching behavioral changes would not have the desired result until we support the same with an appropriate, affordable and user-friendly technology.

I also found that any innovation initiative or implementation should be based on the requirement of and demand from the people. They should have a wide and large scale acceptability and social relevance. They should be suitable taking into account the social scenario and should be adaptable to varying conditions. Thus for instance and as pointed out the two-pit technology is socially acceptable and suitable to different hydro-hydrological conditions. The techniques involved should be easy of implementation and economically affordable especially in developing countries viz. like India. They should be environment friendly and in implementation should produce no social conflicts.

Sulabh is an NGO whose working can be successful and have a great impact if it works in co-operation with the Government and has both sanction and acceptance of the people. It should also be based on principles of commercial working lest it becomes totally dependent on and guided by the

government financing its activities. It should also have employment potential which can attract a large number of people providing an opportunity to the NGO to take on persons having ability, interest and choose from a wide section of people.

**7 Dr. Pathak, for one person to achieve as much as you have within a single lifetime, you must be a very busy man. Do you have any time for hobbies and interests outside of your work?**

During my childhood and as a boy I had the hobbies of playing football, seeing football matches; to enjoy singing, dance and music. When I went to college I developed the hobby of seeing films and to sing songs, at times I would watch four films in a day. But after 1970, when I founded Sulabh, I did not find time to see films. During the last 39 years, I have not seen more than 20 films because of my preoccupation with the work of sanitation and social reform. However, now, photography, reading, writing and singing songs are my hobbies (Fig. 5).

Occasionally, I write poems and compose music too. Besides, I engage myself in finding information about sanitation technologies and toilet equipments of olden days and medieval periods wherever I go. I have also turned to collecting toilet related artifacts

**Fig. 5** Museum of Toilets



and materials of olden days. Dr. Pathak established the unique museum of toilets on the Sulabh International campus in Delhi during the mid-1990s.

### **8 About the Stockholm Water Prize**

First presented in 1991, The Stockholm Water Prize is the world's most prestigious prize for outstanding achievement in water-related activities. The annual

prize, which includes a USD 150,000 award and a crystal sculpture specially designed and created by Orrefors, honours individuals, institutions or organisations whose work contributes broadly to the conservation and protection of water resources and to improved health of the planet's inhabitants and ecosystems. The Prize celebrates its 20th anniversary in 2010. The patron of the Stockholm Water Prize is H.M. King Carl XVI Gustaf of Sweden.