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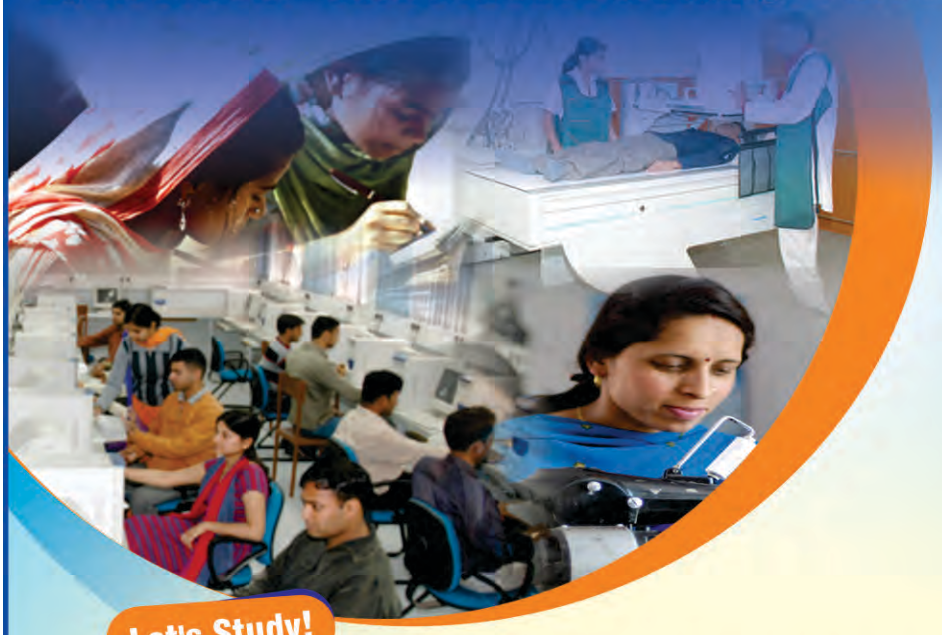

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INSIDE

The call by the Prime Minister for Swachh Bharat, to be taken up by 125 crore Indians as a Mission, is resonating throughout the country. This is a Mission in which every citizen wants to get involved, as poor sanitation conditions remain despite thousands of crores spent in the last sixty years.

Due to poor sanitation conditions people suffer from variety of diseases. It is estimated that the country looses around 2,50,000 crore Rupees each year on account of poor sanitation conditions. Around 123 million of the country's 246 million households do not have access to sanitation.

The Prime Minister wants India to achieve a Open defecation free (ODF) status by 2019-on the 150th birth anniversary of Mahatma Gandhi.

The task for Swachh Bharat is big as nearly 12 crore toilets will have to be built in the next five years to make India Open Defecation Free. Only the zeal of a Mission can help achieve this goal.

All previous efforts by the governments, including the ambitious Total Santigation Mission (TSC) have failed to meet the targets of sanitation. Over 5 crore pit-pour flush toilet rural household toilets have been constructed since 2001 and the goal was to achieve "Open Defecation-Free India" by 2012.

It is for this reason that the Prime Minister keeps reminding the planners and people that the goal of Swachh Bharat has to be met. In addition to funds, a strategy of incentives and disincentives will have to be adopted by the government to inculcate necessary behavioral changes, needed for making India Clean.

Another project which the Prime Minister wants the country to take up as a Mission is the Cleaning of river Ganga. Subsequently an Integrated Ganga Conservation Mission called Namami Gange has been announced by the Finance Minister and an amount of Rs. 2037 crores set-aside for this purpose. The Prime Minister's commitment to clean the holy river is reflected by the renaming of the Ministry of Water Resources as, the Ministry of Water Resources, River Development and Ganga Rejuvenation.

The Union Cabinet chaired by the Prime Minister, on 24th September, 2014 gave approval for establishment of the Clean Ganga Fund (CGF). The "Clean Ganga Fund (CGF)" will be set up with voluntary contributions from residents of the country and Non-Resident Indian (NRIs) / Person of Indian Origin (PIO) and others to harness their enthusiasm to contribute towards the conservation of the river Ganga. ❑

AGRICULTURE: FROM CULTURE TO PRENEUR

Dr. Parveen Kumar

It has been estimated that India losses 6.4% of its GDP annually for lack of basic sanitation and sanitation facilities

Sanitation has become a hot topic in the country these days and a matter of serious discussion at every level. The talk of **'Sauchalaya before Devalaya'** is getting louder and louder and further dimension of achieving the open defecation free status and management of solid and liquid waste has been added to it. In his Independence Day (15 August, 2014) speech, the Prime Minister outlined his Government's priorities, sanitation being one of them and later on unfolded his agenda to achieve status of Swachh Bharat by 02nd October, 2019 during five years from 02nd October, 2014. He explained his Government's sanitation agenda in his speech at the UN General Assembly on 27th September, 2014 and in his address to the Indian Americans at the Madison Square Garden, New York on 28th September, 2014. He has invited 125 cr Indians to be part of it for achieving the goal of Swachh, healthy and prosperous Bharat. The reason for this is not only the socio-economic consequences of poor sanitation but to build India's image as a cultured and developed Nation, which is being scorned internationally due to its poor sanitation and bad sanitation practices like open defecation and its heaps of garbage?

Finally the Swachh Bharat Mission (SBM) (Rural and Urban) has been launched from 02nd October, 2014 with great media hype. For the first time in the history of Independent India important organizations like Indian Armed Forces, University Grant Commission, Industries Associations and State Governments have expressed their solidarity with the PM and taken pledge to be part of the SBM in achieving full sanitation. The electronic and print media for the first time gave full coverage to the event. While appreciating the efforts of previous governments in achieving the present status of sanitation, the Prime Minister has very clearly stated that this is not to draw a political mileage but he actually means it. Suggestions have been invited from the public for drawing a strategy to achieve the goal of sustainable full sanitation. As a prelude to SBM, a month long country wide sanitation campaign has already been launched from 25th September, 2014

and "Swachhta Week" from 26th September-02nd October, 2014 to sensitize the people living in rural areas. An oath has been administered to all concerned on 02nd October, 2014 to all Indians for making India clean. Can India achieve the goal of Swachh Bharat? Or this Mission will also remain like the earlier Central Rural Sanitation Programme(1986), Total Sanitation Campaign (1999) re-named as Nirmal Bharat Abhiyan (2012), no doubt the number of rural households having access to sanitation facilities has increased from 1% in 1981 (9.1 % in 1991, 21.9% in 2001) to 32.7% (Census-2011) by spending Rs. 600 cr under CRSP and Rs.10051 cr under TSC. It can happen, if we look into the support received to SBM from every Indian on 02nd October and especially the Armed Forces, the UGC, the Industries Associations and State Governments? And why not, when poor sanitation is the cause of poverty?

Sanitation

However, before we talk of achieving total sanitation and 100% Open defecation free (ODF) status by 2019, the 150th birth anniversary of the Mahatma 'the Father of the Nation', and the 'apostle of sanitation', it will be more appropriate, first, to understand sanitation in its totality, its socio-economic-physical impact and second, to analyze the causes for the failure of earlier rural sanitation programmes as mentioned above in achieving the goal.

What is Sanitation?

Sanitation is not the disposal of human excreta only as is being understood, it is a comprehensive concept which includes seven components like i) safe disposal of human excreta, ii) usage and maintenance of safe drinking water, iii) personal hygiene, iv) food and home hygiene, v) safe disposal of solid waste, vi) safe disposal of liquid waste, and vii) community/ environment cleanliness. So sanitation is not just creating toilets, it is much larger an issue.

Why Sanitation?

There is empirical evidence to prove that poor sanitation plays havoc with the lives of the people especially children below the age of 5 years. According to an estimate about 88% of the diseases are caused due to poor sanitation which include diseases like Diarrhea, Dysentery, Cholera, Malaria, Hepatitis, Jaundice, Guinea worms, Hook worms, Round worms, Typhoid, Trachoma, Schistosomiasis and Intestinal helminth, causing huge economic loss to the economy in terms loss of health, work days, stunt physical and mental growth, tourism, school days and drop out from schools etc. It has been estimated that India losses 6.4% of its GDP annually for lack of basic sanitation and sanitation facilities (WSP-2006), which comes to about Rs. 2.5 lakh crores. About 25% of total 16 lakh deaths world caused over due to water borne diseases, 4.5 lakh happen in India and of these 90% are children below 5 years.

Performance of Rural Sanitation Programmes in India?

Management Information System of the Union Ministry of Drinking Water and Sanitation shows that during the last one and half decades under Total Sanitation Campaign/Nirmal Bharat Abhiyan shows that 97329728 (52413989 for BPL) individual households latrines, 1344607 School toilets, 472662 anganwadi toilets and 27894 Community Sanitary Complexes have been built between 1999 to 2014 by spending Rs. 15187, however, the Censuus-2011 report has exposed these claims. During this period 28002 Gram Panchayats out of 2.50 lakh, 181 Block Panchayats, and 13 district Panchayats have been declared ODF and have achieved the status of Nirmal Grams, whch is about 10% of the total GPs in India.

According to Cenuss-2011 report, 11.62 cr are without toilets and resort to open defecation. It means 11.62 cr toilets have to be built over the next five year in rural areas .The situation of schools sanitation has also not been very encouraging. If the toilets are built then these are not kept clean and dysfunctional. The problem of migrant labourers in the form of casual labourers, farm labourers, labourers in unorganized sector and rikshawalas etc has its own dimensions. Except the States like Haryana, Himachal Pradesh, Uttarakhand, Punjab, Kerala and Sikkim and eastern states the rural sanitation coverage presents a dismal picture. Six states like Bihar (18.6%), Chhattisgarh (14.8%), Jharkhand (8.3%) Madhya Pradesh (13.6%), Odisha (15.6%), Rajasthan (20.1%) and Uttar Pradesh (22.6%), have where less than 25% households have toilets and states like Andhra Pradesh (34.9%), Gujarat (34.2%), J&K (41.7%), Karnataka (31.9%), Maharashtra (44.2%), Tamil Nadu (26.1%) and West Bengal (48.7%) have household sanitation coverage is between 25% to 50%.

Causes of Failure of CRSP and TSC

Though there are pocket of success, the main reasons for the failure of rural sanitation like Total Sanitation Campaign have been as under:

i) Lack of strong political will at all levels i.e., Central, State and local as has been shown presently though there has been lot of rhetoric.

ii) The bureaucratic and non professional approach, which remained confined to adding figures without actual work in the field.

iii) Lack of dynamic leadership at various levels and lack of guidance to the field functionaries who are the pillars of the programme. Those who tried to implement the programme professionally were also driven by other consideration like self aggrandizement.

vi) The attitude of general masses has also not been less responsible in poor success of the programme. People just like to defecate in the open at free will and every one needs one sweeper to lift the waste thrown by them.

v) Lack of proper approach for demand generation of sanitation facilities.

Strategy to achieve the status of open defecation free and clean rural India?

If India has to progress both socially and economically and fast to realize the dream of becoming the world power, it will have to devise a strategy to achieve total sanitation by taking into consideration all the components of sanitation and hygiene mentioned in section-II in an integrated manner. The task is onerous and old strategy may not help in achieving 100% sanitation and open defecation free status in such a short time**.** Therefore, in addition to financial incentives, a different strategy with out of box thinking in needed to take up the sanitation mission on war footing. Fine, the cost of SBM has been calculated at Rs.1.86 lakh cr, at the same time it is more a the problem of behaviour and mindset of the people and lack of a well knit strategy. Therefore, a multi-pronged strategy-a mix of financial incentives to massive awareness campaign to achieve the goal of 100% ODF and cleanliness including good hygienic practices is recommended for consideration of the Government as under:

i) Behaviour change strategy: To change the casual attitude of '***sab chalta hai***', defecating and throwing waste at free will, an intensive behaviour change campaign is the immediate need of the hour. Aggressive marketing on the pattern of selling mobiles needs to be adopted to convey perceived benefits of toilets, cleanliness and hygiene.

- Intensive inter-personal communication (IPC) should supported by media (electronic, print and social) campaign to change traditional rigid mind set/behaviour of the community and breaking of mental barriers for achieving open defecation free status and solid and liquid waste management.
- An army of trained foot soldiers having strong will power and capacity to work amidst the rural communities in the hostile environment is required to be deployed in the villages for interpersonal campaign and spearheading the campaign in 5.50 lakh villages across the country for demand generation of sanitation facilities (Toilets and SLWM) through triggering techniques.
- We will have to go to the villages for directly approaching the people by shunning the Five star workshop culture and white collar approach as well as high level discussions and sophisticated literary jargon with missing grassroots touch.
- The National/ State level electronic and print should support the IPC and social media should be used to promote good sanitary and hygiene practices.

ii) Capacity building Strategy

Massive capacity building campaign for training of elected representatives of Panchayati Raj, functionaries and communities should be organised. It requires

- Training of Trainers on massive scale .
- Cadre of dedicated and motivated National level /State level, district and Panchayat level trainers for training of PRIs, communities, functionaries and scale in a shortest time period.
- The senior level officers should be sensitised about the spirit behind the mission and their role.
- All the training institutions i.e., National Institute of Rural Development & Panchayati Raj (NIRD&PR), all the State Institutes of Rural Development (SIRDs), all the Govt. training institutions in the Sanitation and Water sector etc and any other institution including well meaning NGOs/CBOs should be fully involved.

iii) Strategy for Involvement of all

Besides the PRIs, motivators and other village level functionaries, everyone in the community like

- All the departments like Education, Women and Child Development, Health and Public Health, Agriculture, Animal Husbandry, Financial

Institutions, Police and Revenue should be sensitized/fully involved.

- Compulsory involvement of about existing 50 lakh Self Help Groups (SHGs) comprising of about 5 cr families.
- Religious leaders / Missions.
- All the Chief Ministers, MP and, MLAs .

iv) Strategy for programme management

There is a saying that 'an army of lions commanded by a donkey cannot win a battle, whereas, an army of donkeys commanded by a lion can definitely win the battle'. In place of routine management of sanitation programme, professionally dynamic programme managers are required at all levels who can take his/her team along and can enthuse the communities for adopting good sanitation practices.

- Besides, introducing the concept of responsibility and accountability, building of conducive environment at the field level is very important.
- There is need for establishing objective monitoring mechanism for tracking the actual progress.
- When there are Angwanwadi workers for ICDS, ASHA and ANM for health, Rozgar Sahayaks and mates for implementation of MGNREGS and teachers for every fix number of students for teaching, there is serious need to think about placing trained and paid 'Sanitation Sainiks' at every 1000 population to carry the sanitation agenda.

v) Strategy for School and Anganwadi Sanitation

Besides building adequate number of toilets separate for boys and girls, maintenance of toilets should be handled with the support of Corporate Sector.

- The Head Teacher of the school should be made responsible for maintenance of toilets as well as creating awareness on hygiene amongst the children including that of Mid Day Meal scheme.
- For Anganwadis, the Anganwadi Worker should be made responsible for proper maintenance of toilets, hygiene among the children and serving hygienic eatables.

vi) Strategy for solid and liquid waste management

First of all the State Governments should be convinced to enforce a strict ban on the production and use of polythene and as far as possible on non bio-degradable packaging, the biggest nuisance and major cause of unhygienic and unsanitary conditions. Low cost and easily manageable solid waste management projects should be set up at village/ward level as against big size with huge investment, as experience of big projects have been otherwise.

vii) Strategy for hygiene management

There should be a separate strategy for promoting personal hygiene, food hygiene and home hygiene including that of menstrual Hygiene Management.

viii) Role of Corporate sector

Besides, supporting maintenance of school toilets the Corporate Sector should be involved in awareness creation, training of stakeholders, school sanitation and maintaining community sanitation like solid and liquid waste management. The salary expenses of foot soldiers should funded by the Corporate.

ix) Special Focus

While not ignoring the states, which have already done better on this front, the focus should be on 13 states as mentioned above and special focus on 6 states, which have sanitation coverage below 25%.

Conclusion

If this country has to come out of poverty trap and develop fast, sanitation will have to be accorded top priority at all levels and above all the programmes along with the programmes on missiles, satellites and mobiles for **'Total Sanitation to Total Development'.** We will have to stop the rhetoric and have to come on the ground to achieve the goal of Swachh Bharat by 2019 and save million of GDP losses suffered due to inadequate sanitation. Having said the above, every one of us in the governance including private sector and communities should realize the importance of sanitation in prevention of common fatal diseases and creating disease free, healthy and prosperous India with smiling faces to realise the Mahatma Gandhi's favourite statement 'Sanitation is more important than Independence'. India will really be independent, when we free ourselves from the shackles of poor sanitation.

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IMPROVING EFFECTIVENESS OF URBAN SANITATION

Dr Kavita G Kalkoti

More than 7,50,000 people die each year from diarrhoea because of, *inter alia,* unsanitary conditions created in communities without access to toilets. According to one estimate, more than 37 per cent of the total human excreta generated in urban areas is unsafely disposed. This costs significantly in terms of public health and environmental hazards. The loss due to diseases caused by poor sanitation for children under 14 years alone in urban areas amounts to more than Rs.500 Crore at 2001 prices, according to the Planning Commission and UNICEF [2006]. A study by the World Bank's Water and Sanitation Program (WSP) estimated that India's lack of sanitation coverage costs the country the equivalent of 6.4 per cent of its 2006 gross domestic product. The Millennium Development Goals of the United Nations as accepted by the signatory nations including India mandates facilitating access to improved sanitation to at least half the urban population by 2015 and 100 per cent access by 2025.

Sanitation

Sanitation broadly refers to the safe management of human excreta which, *inter alia,* includes its safe confinement, treatment, disposal and associated hygiene-related practices. This involves ***effective service delivery system*** and not merely the creation of the physical infrastructure. For this, both service providers and users have obligation to act in a most responsible way. This means that the effectiveness of sanitation project/ program cannot be measured in terms of physical outputs such as the number of toilets constructed but measured in terms of outcomes, primarily the efficient use and proper maintenance of these physical facilities created. Effective human waste management obviously necessitates [i] timely action in related areas such as water supply, drainage and solid waste management system [and ii] effective inter-institutional coordination among the agencies for delivery of these services. Effective urban sanitation and its impact on public health and environment acknowledges integrated approach focusing on other elements of environmental sanitation too, viz. management of solid waste management, industrial and other hazardous wastes, drainage and safe drinking water supply.

Government Initiatives

The objective of Urban Sanitation is to make all cities and towns of the country totally sanitized,

healthy and livable and to ensure good public health and environment for all citizens with focus on hygienic and affordable sanitation facilities for the urban poor and women. To accomplish this, the Government seeks to address following key issues, among others:

- Creating awareness about importance of sanitation associated with public health and environment amongst individuals, communities and institutions.
- Access to and use safe and hygienic sanitation facilities/services to urbanites such that no one should defecate in the open.
- Improving effectiveness of existing legal framework by strict enforcement and compliance to eliminate practice of manual scavenging.
- Crystalizing role, responsibility and functions of the implementers.
- Use of cost-efficient technologies through R &D efforts and ensuring sustainability of investments.

Current Scenario

- India, among BRICS countries, has between 597 million and 627 million [largest in the world] resorting to open defecation as against 14 million in China and half that number in Brazil. The recently conducted Demographic Health Surveys in Bangladesh and India showed that only five per cent of Bangladeshis defecated in the open as against 57 per cent in India. India's neighbour Bangladesh and Vietnam are among the top 10 countries [which do not include India] that have achieved the highest reduction in open defecation since 1990. Vietnam, Bangladesh and Peru have reduced open defecation to single digits.
- In Mumbai, India's largest city, 57 per cent of the city's population lives in slums, and nationally, the 2011 Indian census shows one in six Indians lives in an urban slum. According to the Ministry of Urban Development MouD, in notified slums (slums registered by the municipality), 17 per cent of the population is without access to improved sanitation and in non-notified slums, the average is 51 per cent.
- Where sanitation access is available, many urban residents use toilets that are not connected to underground sewerage networks. It is estimated that 75 to 80 per cent of water pollution by volume is from domestic sewerage. Only 160 out of nearly 8,000 towns have both sewerage systems and a sewage treatment plant and only 13 per cent of piped sewerage is currently treated. Treatment capacity is highly uneven, with 40 per cent of India's total treatment capacity located in just two cities of Delhi and Mumbai.
- According to MoUD report, 2010, in India

[i] 4861 cities/towns out of 5161 do not have (even partial) sewerage network .

[ii] 18 per cent of urban households defecate in the open.

[iii] Lack of treatment of wastewater is costing India $15 billion in treating water-borne diseases.

[iv] Less than 25 per cent of all waste water is treated.

[vi] None of the 423 cities surveyed are healthy and clean.

[vii] Only four cities fared better and 190 cities are on the brink of emergency.

Research Institute for Compassionate Economics [RICE] observed that 40 per cent of households in the sample that had a latrine had at least one person who was still defecating in the open. This number was the highest for Rajasthan (57 per cent) and the lowest for Haryana (35 per cent). In all, over 25 per cent of men and 17 per cent of women with a toilet defecated in the open.

Challenges

- **Field studies show that simply building toilets alone will not eliminate open defecation in India as not everyone who has access to toilet, especially men, consider its necessity and utility. Thus, it is more a problem** of culture, customs and attitude which requires to be changed.
- Over 20 million households that have received financial help in the past for toilets do not have functioning ones.

- Stark reality about building toilets and their use is that proper maintenance and keeping them usable is more important than building toilets. Bangalore Agenda Task Force, a Public-Private Partnership that built two dozen public toilets in the city, found that the real challenge was not finding the resources or technology to build toilets, but maintaining them in a manner that poor slum-dwellers could keep using them.
- The surveys show that most households do not understand that using toilets is positively associated with good health.
- Simpler technologies can be less expensive, but they are often physically unattractive, retain odors and provide suboptimal sludge management solutions.
- Community and public toilets must be available on a big scale so the large homeless population and those living in temporary housing can be served.
- They must also address the deep-seated stigma of handling faecal matter by not requiring people to come into contact with waste.

New Initiative

The urban component of the Mission is proposed to be implemented over five years commencing from October 2, 2014 in all 4,041 statutory towns. The total expected cost of the programme is Rs.62,009 crore. Following actions will help and strengthen implementation to achieve the targeted outcomes.

- **PPP Mode**: A programme of this scale which involves constructing huge number of individual and community toilets and provision of municipal solid waste facilities across 4,041 towns can better be scientifically planned and implemented in a Public-Private-Partnership mode. Even philanthropists and resourceful organizations from within India and abroad can contribute their resources in one or the other forms. A Public Private Partnership framework for integrated waste management as recommended by the Kasturirangan Committee on handling waste can be forthwith implemented. This implies the efficient conversion of household waste [wet waste, dry waste, sewage] into compost, biogas and electricity. Tax holidays and soft credit can be considered to incentivise willing corporates, investors and firms to scale up.
- **Awareness Campaign:** It is necessary to design and implement a location-specific Information, Education and Communication Strategy throughout the country to create a massive awareness among individual households, communities and institutions on the importance of sanitation on the health of individuals, public and environment and bring custom, cultural and attitudinal change in individual households. The government's sanitation policy focussed on building toilets must emphasize positive relationship between good health and using toilets. The campaign should target to remove the socio-cultural biases against sanitation and sanitary works and uphold human dignity by eliminating manual scavenging. Need of the hour is to launch a social movement against caste prejudice and manual scavenging. Households should segregate home-generated solid and liquid waste and municipality workers and others trained to take it to the next stage. While the NGOs, Civil Society, Community-based-organizations and women Self-Help-Groups will have to play significant role in mobilizing individuals and communities and in working with poor to assist them in finding affordable community-managed solutions to day-to-day problems, electronic and print media will have added responsibility to make the awareness campaigns result-oriented. Facebook can contribute to save campaign cost, encourage individuals, communities and entrepreneurs to take ownership of sanitation problem and embrace the solution as their own.
- **Government's Role:** The Union Government will help States and cities to ensure that sanitation is a core responsibility of Urban Local Bodies as envisaged in the Constitutional (Seventy fourth) Amendment Act, 1993. In this process, the Union Government will need to clearly define the role and responsibility of various departments and functionaries under the urban sanitation program and provide financial and human resources, training and

building institutional capacities to achieve the enshrined objectives of the urban sanitation policy. The Ministry will need to put in place a comprehensive Monitoring, Review & Evaluation mechanism to monitor the implementation of the program and evaluate the performance quarterly in terms of measurable performance indicators. Individual and institutional incentives can be considered to yield expected results in difficult terrains viz. hilly, tribal, desert and most vulnerable geographical areas. The robust Management Information System and regulatory arrangements have to be an integral part of the program. The Government can appeal overseas firms to set up facilities in India and create an ecosystem for technology absorption.

- **Elected Representatives** : Experiences suggest that top-down, supply-driven programmes have not worked and will not work. Learning from the experience of a community-led and demand-driven Total Sanitation Campaign, India does not just need toilet technology and a budget, but the involvement of elected officials, effective monitoring, transparency to eliminate corruption and accountability to achieve targeted outcomes. While elected representatives of the municipalities should be primarily responsible to identify, initiate, plan and provide urban sanitation seeking users' participation as an integral part of Swachh Bharat Mission, the Members of the Legislative Assemblies and Members of the Parliament and RajyaSabha will have added role and responsibility in achieving the targeted outcomes under the program through quarterly monitoring the implementation process and resolving the identified issues inhibiting the progress. Urban Local Bodies must completely mechanise sewage cleaning and organise alternative livelihoods for the workforce.

Conclusion

India, as an emerging economy, must introspect as to why it cannot emulate and deal with the issues of urban sanitation and waste management as have been dealt with by developed countries since decades. The stark reality is that India urgently needs commitment of the experienced, seasoned and trained administrators to navigate our way out of this predicament. In today's India, the youth will have to place the demand of neat and clean India on their elected representatives who are policy-makers and administrators who have to implement programs totally involving youths and the users.

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RURAL AND URBAN SANITATION IN INDIA

R.B. Bhagat

India has progressed on many fronts over the decades since independence in 1947. Our per capita income has been rising and the average longevity has increased from about less than 40 years at the time of independence to 66 years now. According to 2011 Census overall literacy rate has also increased to 74 per cent compared to less than 20 per cent in 1951. However, on the other hand, India has the largest numbers of malnourished people in the world. Studies show that malnourishment is not only the product of access to food but also access to safe drinking water and sanitation. Many water borne diseases like diarrhoea, dysentery, typhoid are related to huge morbidity burden and loss of working days. Access to safe water and sanitation has been considered one of the most important social determinants of health. Water related illness constitutes one-third morbidities among adults and two-thirds among children.

It is important to mention that India's 1.21 billion people live in large number of rural and urban habitations. There were 7935 cities and towns and 6.4 lakh villages according to 2011 Census. About one-third population (31 per cent) lived in urban areas and three-fourth lived in rural areas. Rural and urban sanitation should be seen differently due to diverse conditions prevailing in the rural and urban areas.

Rural Sanitation

Sanitation is not only an absence of garbage and waste materials strewn around but also access to toilet facility, safe drinking water and connectivity to a drainage system. In rural India, this is a huge problem. Census of India collected data on access to water and sanitation shows that only 31 per cent rural households were having any toilet facility in their households. The increase in toilet facility during last ten years from 2001 to 2011 was at the rate of just one per cent every year. At this rate India could achieve universal sanitation only by 2081. Thus, progress in the provision of toilet facility in rural areas is very slow and open defecation is a serious problem. Similarly the proportion of households with tap water and drainage facilities also remains at the one-third level. It is worthwhile to mention that due to lack of drainage facility the low lying areas of many villages and towns often get flooded during monsoon season.

The Ministry of Rural Development launched the TSC in 1999 as a demand driven community-led programme. There was also a strong component of Information, Education and Communication (IEC) in this programme to sensitize the rural population about the need of toilet facility in rural areas. The Planning Commission (2013) is of the view that the increase in coverage of toilet facility from about 22 per cent as per the 2001 Census to 31 per cent in 2011 is largely due to the TSC (see Fig 1).

As a result, in order to boost sanitation programme the Government has introduced the Nirmal Gram Puraskar (NGP) in 2005 for those Gram Panchayats, blocks and districts that have attained 100 per cent sanitation coverage. The major problem with TSC was that it provided only a limited range of technology options whereas geographic, hydrologic and socio-economic conditions differ widely in the country. Also there was a lack of convergence between water supply programme and TSC. As a result this programme was not acceptable to many parts of the country. The TSC was changed into a new strategy known as Nirmal Bharat Abhiyan (NBA) in 2012 to facilitate convergence between drinking water and sanitation projects.

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Urban Sanitation

The situation in urban areas is better than rural areas, but still one-third of the urban households have no access to piped drinking water in 2011 and the progress during 2001-2011 was just 2 percentage points. Similarly one-fifth of urban households were not connected to any drainage facilities and similar proportions have no access to toilet facilities in urban areas. Also, in urban areas, there is no difference between the proportions of households with television/ mobile/telephone facilities on the one hand and toilet facilities on the other as observed in rural areas. State level variations in access to water and sanitations remain same as seen in rural areas. Slums add an acute dimension to the sanitation and unhygienic conditions in urban areas as one-fifth urbanites live in slums according to 2011 Census. It is not possible to have toilet facility in every slum household due to space crunch, therefore public toilets were provided in some of big cities like Mumbai. Access to water is a serious problem in maintaining these toilets and more efforts are needed by the communities, NGOs and urban local bodies to provide toilet and sewer facilities in slums along with water supply. Further, the problem of

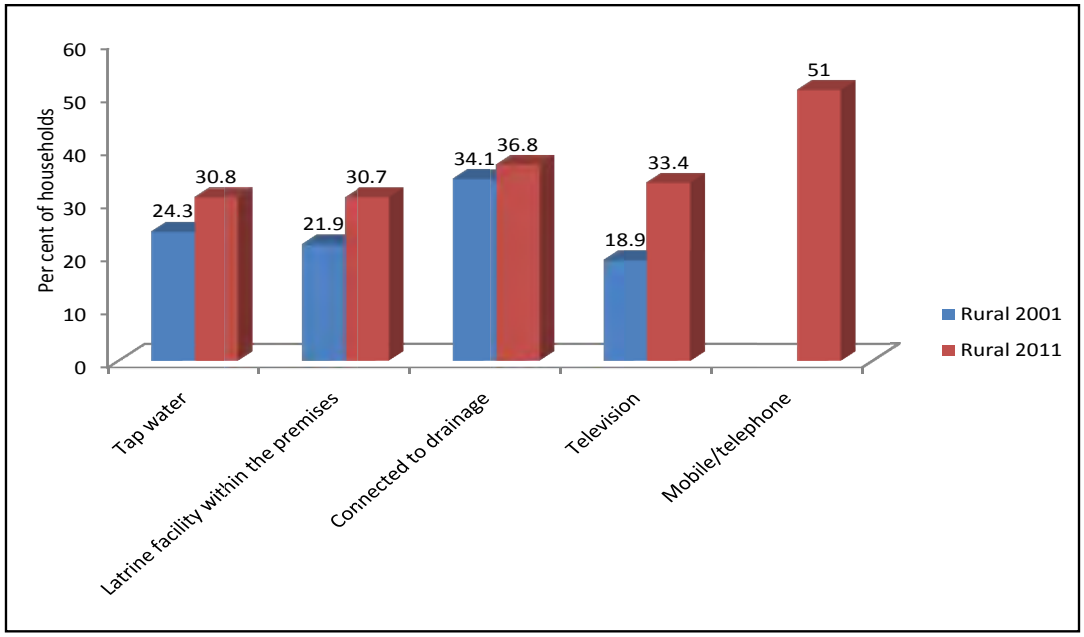

Fig 1: Percentage of households with sanitation facilities compared to television and mobile/ telephone in rural areas according to 2001 and 2011 Census

sanitation is aggravated by the lack of garbage collection system in some parts of the urban areas. In many urban centres, there is no garbage collection system and wastes are thrown in the open spaces along the streets. Outside households, sanitation at schools, public places and railway stations is quite appalling. Most of our railway stations are stinking places as human waste is released on the tracks. We need to better design the toilets in the railway coaches and see that human wastes are not released in the open.

Therefore, water supply is critical for providing sanitation. The toilets cannot be functional without water supply. On the other hand, more use of water generates higher volumes of wastewater which requires good drainage system for its out flow. In many parts of urban areas even if the drainage system exists, it gets choked as people throw garbage in the open drainage. This leads to accumulation of wastewater leading to water logging in many cities and towns. Sewage treatment and recycling of waste water should also be tried as a part of sanitation strategy. Thus, sanitation is a larger issue in urban areas and a holistic view will be helpful.

As per the Millennium Development Goals, India is bound to provide improved sanitation to at least half of its urban population by 2015 and 100 per cent access by 2025.

Policy Perspectives

As per the Millennium Development Goals, India is bound to provide improved sanitation to at least half of its urban population by 2015 and 100 per cent access by 2025. Keeping in view this, Ministry of Urban Development formulated National Sanitation Policy in 2008. The National Urban Sanitation Policy advised state governments to prepare detailed state level urban sanitation strategies and City Sanitation Plan. Environmental considerations, public health implications and reaching the unserved and urban poor are main features of the policy. Funds could be mobilized either through direct central and state government supports or through public-private partnership. At the central government level, urban sanitation is funded under Jawaharlal Nehru Urban Renewal Mission (JNNURM-II).

Urban poor is a major concern under National Urban Sanitation Policy. Naturally focus should be given to the slums where maximum urban poor lives. The Planning Commission advised that provision of basic services to slums should not be contingent upon their legal status (Planning Commission 2013). This is a correct step because every citizen has right to the access of basic services for their survival and dignity and state must ensure this.

Lack of toilet facility affects children, elderly and women more. It is torturous for women who cannot use open spaces as freely as men in the day time and have to wait until the sunset. This incurs health risk to women in want of latrine facilities in both rural and urban areas. Also it is evident from census data that most of the households belonging to SC and ST categories are deprived of water and sanitation facilities. Rural areas are more deprived of water supply and sanitation compared to urban areas and in urban areas small and medium towns are more deprived than the big cities. Thus, the access to sanitation follows our social and economic hierarchy. In a caste based society, a large proportion of the burden of sanitation work fall on the shoulders of the scheduled castes. In 2013, the central government has banned the manual scavenging and those who will employ a manual scavenger will be punished with an imprisonment up to five years.

Like our social spaces, physical spaces are also utilized based on the principles of purity and pollution. For example, in many houses sanctum sanctorum (*Puja Griha*) is treated the purest and kept clean without fail followed by cleanliness of the kitchen and the rest of the house. However, no such sanctity is attached to the surroundings outside the house. The exterior space lying outside the household is little cared rather used unhesitatingly for throwing all sorts of household wastes turning them into a perpetual polluted space.

Swachh Bharat Abhiyan initiated by the government on the birthday of Mahatma Gandhi is a noble initiative. However, cleaning streets and government offices will not suffice because it is also a matter of entitlements and rights for a large number of rural and urban people who are deprived of the

basic necessities of life like access to safe water, toilet and drainage facilities. The preparation of citizens' charters and the enforcement of service guarantee of basic services are necessary and should be made an integral part of the good governance. Also, there is a need to have a plan to reuse the garbage and waste materials. It will help in generating large number of jobs and also making our cities and towns sustainable. Thus, sanitation is also an issue of waste management, keeping the sources of water clean by sewage treatment and recycling of waste water for industrial and agricultural use. It requires not only an integrated plan but also huge investment. As a follow up of the awareness of clean India movement, the government should initiate an integrated action plan for each urban centres and villages in India.

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It needs to be recognized that sanitation is a local issue and any top down approach will not suffice. The local governments for both rural and urban areas need to be made accountable with adequate empowerment, resources and a sanitation strategy. The sanitation strategy should be just, inclusive and suitable. The areas of settlements belonging to marginal and minority communities like scheduled castes and scheduled tribes and Muslim habitations should not be excluded directly or indirectly. Due to prejudices, tensions and occasional occurrence of riots in some cities, the areas of minority habitations may suffer an act of negligence and a situation of discrimination in sanitation services. However, it is essential to emphasize that the health risks arising due to lack of sanitation facilities is not confined to the areas affected per se, but also goes beyond the locality. We live in interconnected and interdependent spaces, and the government, civil society and community should work together to achieve the goal of *Swachh Bharat*.

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IS CLEAN INDIA A FAR-FETCHED DREAM?

Dhurjati Mukherjee

It is well known that Narendra Modi is committed to '***Swachh Bharat'*** that is making the country free of open defecation by the year 2019, which incidentally happens to be the 150th birth anniversary of Mahatma Gandhi. The scheme is no doubt ambitious and imperative at this juncture but extremely difficult to achieve, keeping in view the traditional mindsets of the people as also the financial constraints being faced by the government.

The flagship scheme is the 'Nirmal Bharat Abhiyan', which was launched in 1999 and got its present name in 2001. Under the scheme, each beneficiary is allotted around Rs 10,000 to build a toilet. However, very few such toilets were built, as money was not easily forthcoming. This scheme has now been rechristened '***Swachh Bharat'***. As per the 2011 census, only a little over 32 per cent of the 167 million rural households have access to toilets.

India leads the world in open defecation with around 550 million defecating in the open every day. This also means that around 270 to 300 million women and girls sit out in the open in all types of weather and are in constant threat of being watched. The overall sanitation coverage – both rural and urban – though estimated by the government to be around 50 per cent is actually much less. This means that 123 million of the country's 246 million households do not have access to sanitation. The coverage is worse among marginalized sections and the tribals of whom only around 20 per cent have access to sanitation.

Coming to the question of schools, it was found from a DSE report (2013-14) that 1.9 lakh schools did not have girls' toilets or their toilets are non-functional. Then there are 1.7 lakh schools that have no boys' toilets or toilets are unusable. The biggest reason why toilets fail in rural areas is due to lack of tap water and cleaning facilities.

The ASER survey (of nearly 14,000 rural primary schools in 550 districts) revealed that 47 per cent of the schools did not have useable girls' toilets. Another survey by CRY had still worse result as only 18 per cent of schools had separate toilets for girls and in 34 per cent schools the toilets were in "bad condition or unusable".

Social analysts pointed out that girls are pulled out from school because there are no

separate toilets for the opposite sex. That separate functional toilets for them in schools would encourage their education and reduce in dropout rate would be obvious. Moreover, doctors have unanimously opined that adequate sanitation facilities in educational institutions would bring down the disease rate in rural areas among children.

Meanwhile the government had initiated steps (since mid August) by writing to the state governments to ensure construction of individual and community latrines for BPL families and facilitating micro-finance or priority sector loans to households for setting up latrines. The nodal ministry of drinking water and sanitation has reviewed the present position with the state government and suggested to them a virtual impossible task of ensuring piped water to every household.

In 2012, a report titled ***Progress on Sanitation*** of the World Health Organization (WHO) and UNICEF found that India has the highest number of people who defecate in the open – around 665 million followed by 66 million Indonesians, 52 Ethiopians, 50 million Pakistanis and 37 million Chinese. The report pointed out that 31 per cent of the world's rural population practice open defecation with the problem being acute in southern Asia (which includes India) where 63 per cent (778 million) people indulge in such practice. In India, improved sanitation facilities have increased from a mere 14 per cent in 1990 to 28 per cent presently.

Another study (titled '***The Economic Impacts of Inadequate Sanitation in India'***) undertaken by the water and sanitation programme of the World Bank revealed some startling figures, estimating that the economic impact of inadequate sanitation in the country amounts to an astronomical figure of Rs 2.44 trillion ($53.8 billion) – around 6.4 per cent of the GDP. The per person annual impact comes to around Rs 2180. In fact, the economic impact of inadequate sanitation was as high as the state incomes of Andhra Pradesh or Tamil Nadu and was more than Gujarat's state income in 2006-07.

The study calculated the health-related economic impact of inadequate sanitation at Rs 1.75 trillion ($38.5 billion) which accounts for the largest category of impact. Experts feel that diseases such as diarrhea have conventionally been called 'water borne' diseases but many communicable diseases are overwhelmingly explained by inadequate sanitation, that is, having faecal origin rather than water that acts as a medium to spread diseases. One may mention here that one gram of faeces contain 10,000,000 viruses, 10,00,000 bacteria, 1000 parasite cysts and 100 parasite eggs, as per the WHO.

After health, access time – production time lost to access sanitation facilities (shared or even public toilet) or sites for defecation -- and drinking water related impacts are the other two main losses at Rs 487 billion and Rs 191 billion respectively.

The World Bank study further pointed out that 79 per cent of premature mortality-related economic losses under health impact was due to deaths and diseases in children below 5 years. Diarrhea in children below 5 years accounted for more than 47 per cent of the health-related economic impact. Delhi.

The poorest 20 per cent households living in urban areas bear the highest per capita impact of inadequate sanitation of Rs 1699, which is 75 per cent more than the national average per capita losses of Rs 961 and 60 per cent more than the urban average (Rs 1037). Rural households in the poorest category bear per capita losses of Rs 1000, which are around 8 per cent more than the average loss for households on rural areas (Rs 970). However, the total losses for rural households in the poorest quintile are enormous (Rs 204 billion) as compared to their counterparts in urban areas (Rs 16 billion).

Earlier the '***Total Sanitation Mission'***, which was to become operational in 590 districts, has failed to achieve the target or is expected to become a reality by the year 2015. Over 5 crore pit-pour flush toilet rural household toilets have been constructed since 2001 and the goal was to achieve "***Open Defecation-Free India***" by 2012.

South Asia's rate of sanitation will have to rise from 25 million people a year to 43 million a year. At any given time close to half the people

in the developing world suffer from one or more of the main diseases associated with inadequate provision of sanitation as also water such as diarrhea, guinea worm, trachoma, schistosomiasis and hepatitis. These diseases fill half the hospital beds in developing countries, specially in the rural areas where the problem is very acute.

Proper sanitation along with clean water is among the most powerful medicines for reducing child mortality. They are to diarrhea what immunization is to measles or polio. In addition to saving lives, upstream investments in sanitation and water make economic value because they would reduce the downstream costs faced by health systems. Although Modi's target may be extremely difficult to accomplish but if sincere efforts are made, one can expect that a lot could be accomplished in the coming years.

Thus, it is imperative at this juncture that there has to be coordinated action between the government and the NGOs and CBOs to sanitize all the districts of the country, including the backward ones. The government should rely on the grass root organizations, specially led by girls, as they are capable of carrying the work faster and with efficiency. This would help generate awareness and motivation about the need for not just setting up but also using sanitary latrines. This is very much necessary as evidence has shown that well-off farmers in Haryana, Punjab and other places, where people can afford to build sanitary latrines as they use modern mobile phones, prefer to defecate in the open.

The whole idea should be to keep the neighbourhood environment clean and hygienic and the whole community has to be made aware and fully involved in the process. Then only will Modi's '***Swachh Bharat***' programme become a reality, at least to a significant extent, and bring down the quantum of water-borne and sanitation related diseases.

Table-I: Rural Households Having Access to Sanitation

A - Poor Performing States

State	*Percentage covered by sanitation*
Jharkhand	8.35
Madhya Pradesh	13.58
Chhattisgarh	14.85
Odisha	15.32
Bihar	18.61
Rajasthan	20.13
Uttar Pradesh	22.87
Tamil Nadu	26.73

B-Top 5 Performing States

Kerala	94.41
Manipur	87.73
Mizoram	87.10
Punjab	71.89
Assam	61.54

Source: 2011 Census

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CHOKHO CHURU: AN AMBITIOUS CAMPAIGN TO ACHIEVE AN OPEN DEFECATION FREE DISTRICT

Hundreds of Gram Panchayats in Rajasthan have won the Nirmal Gram Purskar, an incentive offered by the government of India to those achieving Open Defecation-Free (ODF) and clean villages. This is one of the success stories in Rajasthan when a District Collector initiated a campaign to make the entire district of Churu ODF, this goal was largely dismissed as unrealistic.

To the surprise of many, however, within a few short months an entire block (sub-district) containing about 28 GPs, in addition to another 50 Gram Panchayats, effectively became ODF. The district is progressing swiftly towards declaring itself entirely ODF.

A strong leadership with an active interest in promoting sanitation was at the heart of this change. The campaign was launched in November 2013, facilitated by Rohit Gupta, District Collector of Churu.

Within a month, all key stakeholders in Churu district—including the Chairperson of Zilla Panchayat and other elected representatives—had embraced this common vision. They were able to witness the emergence of a mass community-led campaign that resulted in the cessation of open defecation in more and more villages. Apart from the proactive leadership of the District Collector and Zilla Pramukh, the initiative's success is largely due to the campaign's design, which addressed all critical components, such as institutional arrangement, communication, capacity building, phasing, financing, monitoring and rewards, as detailed below.

Institutional Arrangement

A campaign of this scale would not have been possible without the robust institutional arrangements established at various levels.

District Level:

The **District Sanitation Mission** chaired by the Zilla Pramukh and co-chaired by the District Collector is the supreme authority overseeing the campaign. The Chief Executive Officer of the District Panchayat has a key role in this institution in his capacity as Member Secretary. District-level officers of various government departments are members of the mission. The mission is supported by a **District Support Unit,** headed by District Coordinator and consisting of professional staff members in various fields responsible for running the campaign on a day-to-day basis, as well as by a **District Resource Group,** consisting of around 30 empanelled members. The resource persons are engaged on an as-needed basis to facilitate training and programs or Community-Led Total Sanitation (CLTS) triggering in the villages.

Block Level:

At the block level, the campaign is facilitated by a core group, including the Pradhan (chairperson of block panchayat), the SDM, the BDO and the Block Coordinator.

Gram Panchayat Level:

At the Gram Panchayat level, the campaign is facilitated by a core group consisting of the Sarpanch, the GP Secretary and a *prabhari* (a nodal officer selected from government staff posted in the GP). In addition, two motivators are engaged in selected Gram Panchayats to support the campaign.

Village/Habitation Level:

For each habitation, a *nigrani* committee was instituted, including 10-20 natural leaders (natural leaders are identified during the process of community triggering, using CLTS techniques). To coordinate the nigrani committee, the GP-level prabhari is empowered to depute a village-level *prabhari* from among the ANMs, anganwadi workers, or school teachers.

Communication and Outreach

A district-specific communication strategy was developed by the stakeholders in the district, with support from the World Bank's Water and Sanitation Program (WSP). The key components of the communication strategy are:

Branding of the campaign focused on Dignity and Pride

The campaign's behavior-change communication strategy is based on dignity and pride within the community. The branding of the campaign done through the following initiatives.

- The campaign is named "*Chokho Churu*" (*chokho* means "clean and beautiful" in the local dialect)
- An attractive logo is used to represent the "*Chokho Churu*" campaign, with design support from WSP.
- A stencil of *Chokho Ghar* (a clean and beautiful house) is painted on households having stopped open defecation.
- Recognition boards are placed at government offices marking ODF Gram Panchayats as *Chokho*.

Target the community rather than individuals

The district decided to focus all of its communication on achieving community outcomes, such as making entire villages, Gram Panchayats, and Blocks ODF, rather than encouraging individual outputs, such as the construction of household toilets. This strategy was based on the realization that widespread behavior change is influenced to a greater extent by community norms than by individual preferences. Targeting the community as a whole also creates a social pressure among its members, motivating all people to construct and use toilets.

Community-led approach

Prior experiences revealed that the campaign would be successful only insofar as it was community-led. While CLTS triggering is effective in achieving the sort of immediate and collective action critical to the campaign's success, the target population's expectation of subsidies can seriously undermine this approach. To counter such expectations, it was necessary to communicate at all levels that the government's financial support under Nirmal Bharat Abhiyan was in fact an incentive, which would be provided only to those households that constructed their toilets themselves. This prompted the community to act immediately after triggering by the district resource group, rather than waiting for government support in undertaking construction and embracing behavior change.

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A stencil of Chokho Ghar (a clean and beautiful house) is painted on households having stopped open defecation.

Focus on interpersonal communication

The campaign in the context of a Gram Panchayat begins with two days of intensive triggering and a community outreach program facilitated by the district resource group. This exercise, implemented under the direct supervision of District Coordinator Shyam Lal and following a systematic calendar, ensures the establishment of an enabling environment for the campaign with the proper communication strategy in all Gram Panchayats.

Integrated campaign

Chokho Churu has been on the discussion agenda in all government outreach programs, whether in the context of *rathri chopal (*meetings held at night to promote development schemes) or *prashsan gaon ka sangh* (a state-level government campaign to promote rural schemes).

Capacity Building

A campaign on this scale requires intensive capacity development programs targeting various stakeholders, which has been supported by the World Bank's Water and Sanitation Program (WSP). The WSP engaged expert agencies and resource personnel to facilitate various training programs. Most notably, a five-day training program on Community-Led Total Sanitation (CLTS) was arranged for motivators and resource group members, facilitated by Feedback Ventures. Similarly, technology training programs were facilitated in all blocks by the distinguished expert Shrikant Navrekar. In addition, the WSP enlisted the support of Bhorukha Charitable Trust, which provided two full-time consultants (with expertise in communication and capacity development as well as in monitoring and evaluation) for the regular capacity development of PRI members, motivators, and nodal officers through routine meetings and field visits.

Phasing

The campaign was launched in Tarangar block with a one-day workshop led by the District Collector and Zilla Pramukh in November 2012. The selection of Taranagr block as the kick-off site helped to provide a necessary momentum for the Chokho Churu campaign. Thanks to the proactive leadership of SDM Haritima, BDOs Imilal Saran and Gopiram Mehla, along with that of Pradhan Ankori Devi Kaswa, all the GPs in the block became ODF within two months. This accomplished, the campaign was extended to Sardarseher and Churu blocks in January 2013. By May 2013, the campaign was further extended to the entire district, covering all six blocks. This phased approach and the success of Taranagr block not only helped the stakeholders to gain confidence but also helped to elucidate and replicate successful strategies from the project's initial phases.

Financing

It is widely known from experience that providing toilets alone would not ensure the desired result. The true indicator of real and sustainable behavior change would be for people to construct toilets for themselves. However, the financial circumstances of poor households do not always permit this sort of undertaking, a fact that cannot be ignored. The district administration made every effort to provide labor through MGNREGA and to release NBA incentives immediately after the desired outcomes were achieved. Monitoring and Verification.

People constructing toilets for themselves, is a true indicator of real behavior change.

Traditionally, government sanitation programs monitor the number of toilets. But a campaign that aims to make more and more villages ODF has to monitor nothing but the number of ODF villages. This shift in monitoring outcomes rather than outputs has been evident in routine review

meetings at the district and block levels. All are concerned about how many ODF Gram Panchayats are achieved in each block. Additionally, a monitoring board was installed at the office of the District Collector with the names of all GPs and highlighting those of ODF Gram Panchayats in green.

Key learning

The following are the key factors that contributed to the success of Chokho Churu campaign:

- To achieve the desired results, the NBA was implemented in a campaign mode.
- Administrative and political priority was critical for initiating a successful campaign.
- An effective institutional arrangement was instituted to facilitate the campaign.

- The campaign was designed in such a way that the community takes initiative rather than waiting for government support. The government's financial support is delivered effectively as incentives and rewards for community-level outcomes.
- An effective communication strategy promoting the community-led approach was adopted.
- In each village the campaign starts with a two-day intensive community outreach and triggering exercise to motivate the community to change its behavior for reasons of dignity and pride.
- *Nigarani* committees are coordinated by *prabhari* in each village to provide regular follow-up after the triggering exercise.
- Capacity development was undertaken for using the CLTS approach and with respect to technology options.
- No contractors or NGOs were hired to construct the toilets. Toilets were constructed by the users themselves, according to their individual preferences and by investing their own efforts and resources.
- Incentives available under NBA were directly transferred to beneficiaries' bank accounts.
- Available funds for SLWM under NBA have been used as an effective community reward for achieving ODF status.

More details about the campaign and regular updates can be accessed at www.facebook.com/chokhochuru

[Source: Excerpt from Compendium of Best Practices on Rural Sanitation titled 'Pathway to Success'-Volume II by Ministry of Drinking Water and Sanitation with the assistance of Water and Sanitation Program]

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HYGIENE AND HEALTH FACILITIES IN RURAL INDIA

Ramchandra Pramanik

About 75% of India's health infrastructure, medical man power and other health resources are concentrated in urban areas whereas only 27% of the population lives. Contagious, infectious and waterborne diseases such as diarrhoea, amoebiasis, typhoid, infectious hepatitis, worm infestations, measles, malaria, tuberculosis, whooping cough, respiratory infections, pneumonia and reproductive tract infections dominate the morbidity pattern, especially in rural areas. However, non-communicable diseases such as cancer, blindness, mental illness, hypertension, diabetes, HIV/AIDS, accidents and injuries are also on the rise. The health status of Indians is still a cause for grave concern, especially that of rural population.

What affects health in general?

It is estimated that 22 million people are pushed below poverty line annually due to health care expenditure alone, 40% of hospital expenditure is funded by borrowed money or sold assets. The availability of drugs is inadequate in all of the government run PHEs, Sub-Centres and hospitals. Huge infrastructure is lying unused merely because of sharp decline in public expenditure on health, and focus on privatization of health services. The mission of 'Health for All' must address the issues of child health in a holistic way. This calls for a scientific study for proper development of child from its conception to adolescence.

The Role of ICDS:

The functioning of Integrated Child Development Services in strengthening maternal and child development in India is a major indicator for assessing the condition of rural health. Since the First Five-Year Plan (1951-1956), the Government of India has initiated several programmes to strengthen maternal and child development in India. In 1975, the Department of Women and Child Development in the Ministry of Human Resource Development launched the Integrated Child Development Services programmes. The programme is run through a network of community level *Anganwari* Centers (AWC) for giving health nutrition and education services to children from birth to six years of age

and nutritional and health services to pregnant and breast feeding women. Over the years, the coverage of ICDS has rapidly widened. According to a recent report, the programme is operational in almost every block and the country has more than 7,00,000 *Anganwaris.* As the child's health is intimately associated with the mother's health, the Reproductive and Child Health Programme, as launched by the Government of India, aims to provide key maternal and child health services to women during the antenatal period, during delivery and during post natal period. Antenatal care involves pregnancy related health care which is supposed to be provided by a doctor or health professionals. It is recommended that women should receive at least three antenatal checkups during pregnancy that should include measuring weight, checking blood pressure as well as anemia management. In brief, the objectives of the Integrated Child Development Services are:

1) to improve the nutritional and health status of the children in the age group of 0-6 years;
2) to lay the foundation of proper psychological and social development of the child;
3) to reduce the incidence of mortality, morbidity and school dropout;
4) to achieve effective coordination of policy and implementation amongst the various departments to promote child development; and
5) to enhance the capability of the mother to look after the normal health and nutritional needs of her child through proper nutrition and health education

A Micro Level Survey on Rural Health

The 69th round of the National Sample Survey Office (NSSO) in its nationwide survey on "Drinking water, sanitation, hygiene and housing in India" has sketched a shaky picture on these basic requirements of civic life. The survey was conducted from July to December, 2012, covering 4,475 villages and 3,522 urban blocks. The survey reveals that nearly 60 per cent of rural households in India do not have latrine facilities as late as 2012. The micro level data is somewhat encouraging. 33 per cent of the people in region under study do not have latrine facilities as compared to 80 per cent in rural areas and 20 per cent in urban areas of the national level. Rural urban difference on the access of sanitation facilities is very high and that consequently affects the rural health adversely.

This is true in case of drinking water facilities. People in the study area entirely depend on tube wells for their drinking water. Improved source of drinking water which is an indicator for the Millennium Development Goals remains a dream to them. While the corresponding NSSO data represents that Kerala had the highest (97.2 percent) and Jharkhand the lowest (7.5 percent) percentage of households having improved source of drinking water and sufficient water in 2012. The nationwide survey found that 86 per cent and 89.5 per cent of household in rural India and urban India respectively got sufficient water throughout the year.

The present study shows that 99% people depend on the tube wells for their drinking water that lack adequate minerals and in most cases, are full of germs. Safe drinking water plays a vital role in the overall well being of the people, with a significant bearing on infant mortality rate, longevity and productivity. 33% people of the study area have no sanitary latrine and use open field for evacuation and become prone to bacterial attack. But sanitation facilities are the important indicators of health system. Proper sanitation is very much essential for improving the quality of life of the rural people and to provide privacy and dignity to women. Affordable sanitation undoubtedly remains a challenge. Thus, the mission of "Health for All" in the 21st Century still remains a mere slogan written on a beautiful canvas. To improve the prevailing situation, the problem of rural health needss to be addressed both at the macro (national and state) and micro-level (district and regional) in a holistic way with an objective to bring the poorest of the population to the centre of Health Policies. State intervention instead of commercialisation of health is a priority that must be taken into consideration while formulating any long term plan exclusively for the promotion of rural health.

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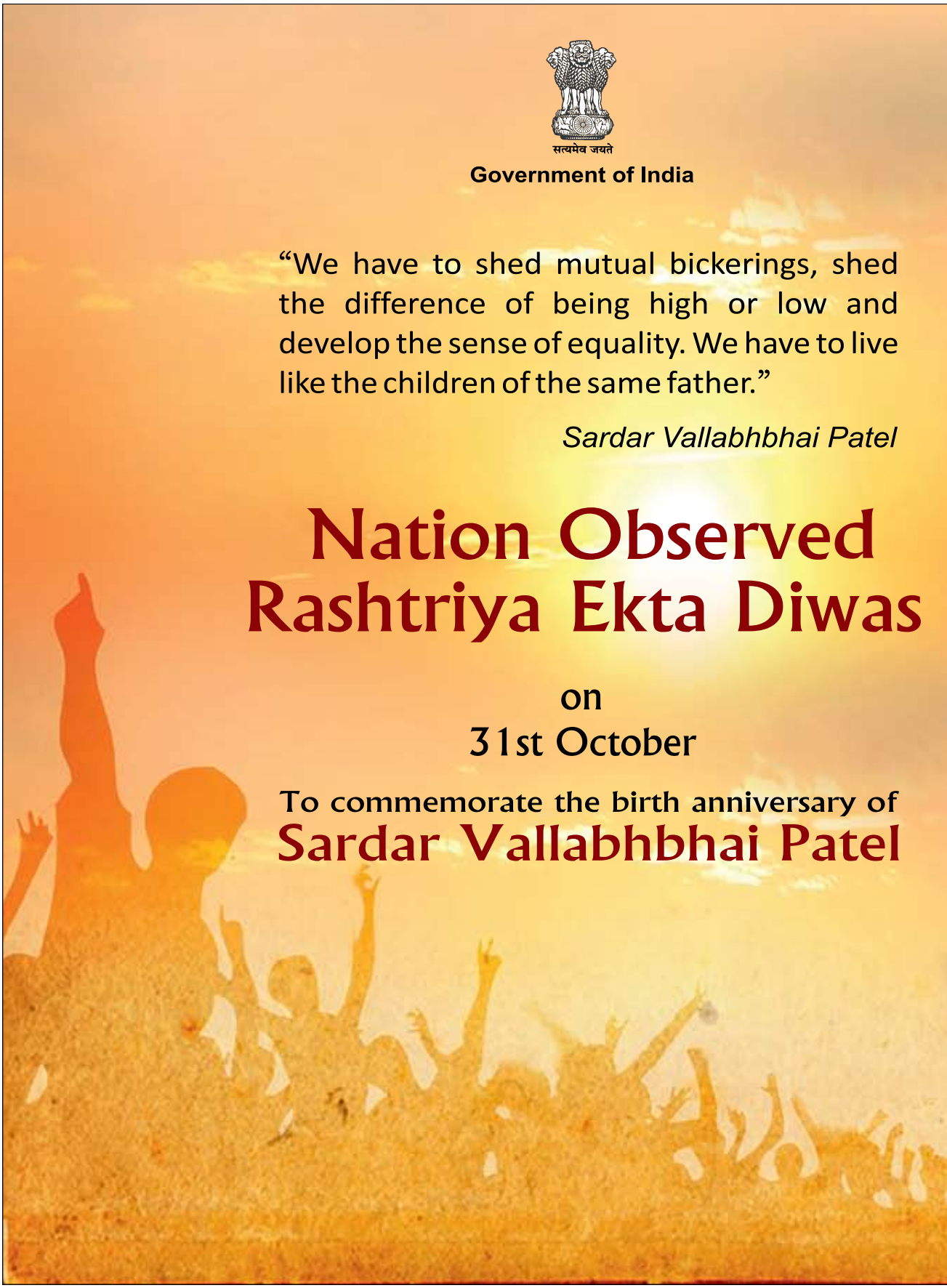
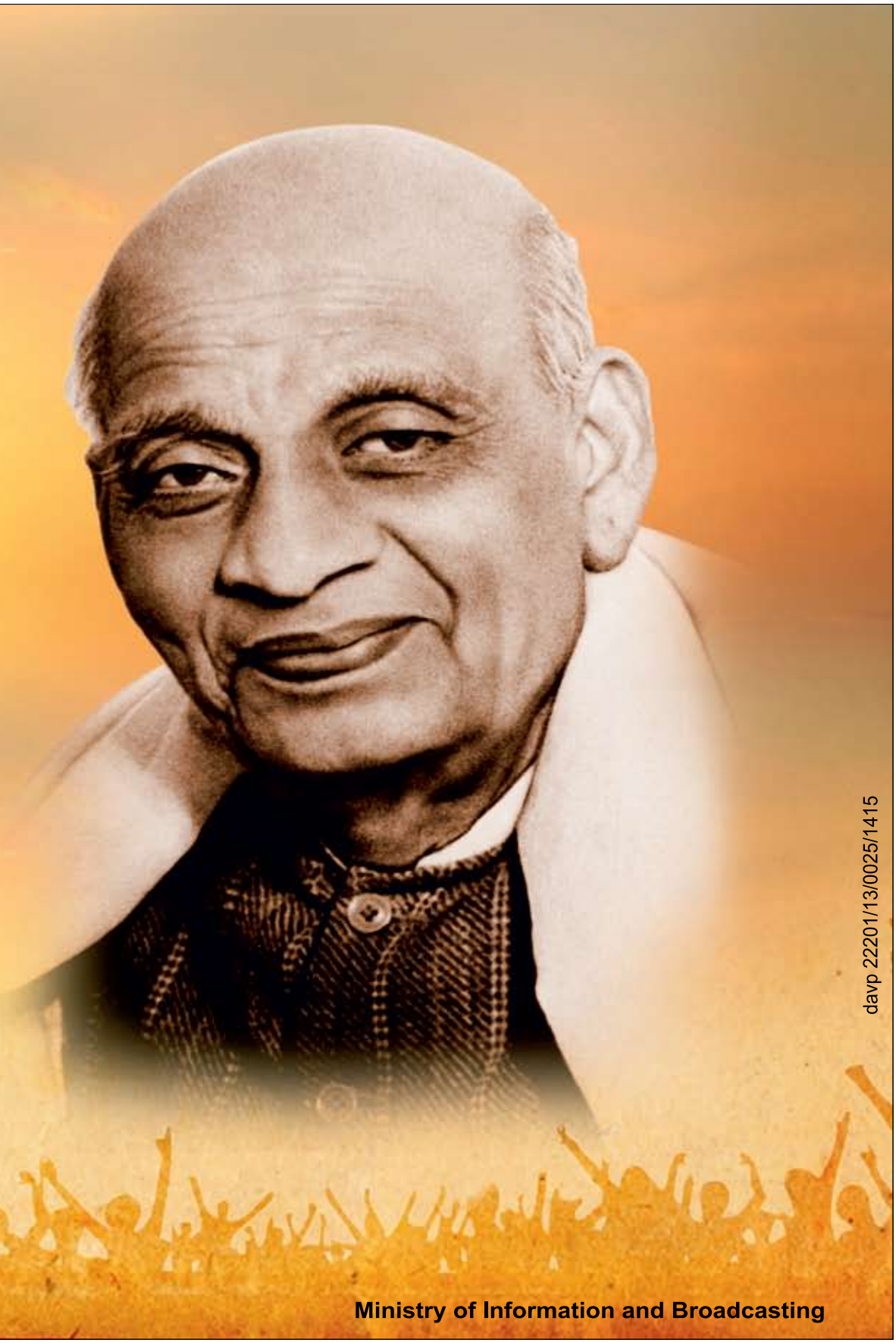

सत्यमेव जयते
Government of India
"We have to shed mutual bickerings, shed the difference of being high or low and develop the sense of equality. We have to live like the children of the same father."
Sardar Vallabhbhai Patel
Nation Observed
Rashtriya Ekta Diwas
on
31st October
To commemorate the birth anniversary of
Sardar Vallabhbhai Patel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Ministry of Information and Broadcasting

ROLE OF RURAL SANITARY MARTS & PRODUCTION CENTRES

Rasmita Sahoo

The main goal of the government is to eradicate the practice of open defecation by 2010(Sulabh, 2006). After Prime Minister Narendra Modi publicized the formulating of 'Swachh Bharat' in to a mass movement and linking it to economic activities to ensure greater involvement, Mission Swacch Bharat/Clean India has been launched on October 2, 2014, with Gandhi as inspiration, to create a clean India of his dreams by 2019. The Campaign is a wide-ranging programme to ensure sanitation facilities in rural areas with broader aim to get rid of the practice of open defecation and is part of reform principles was initiated in 1999 when Central Rural Sanitation Programme was restructured making it demand driven and people centered. It follows a principle of "low to no subsidy" where a nominal subsidy in the form of incentive is given to rural poor households for construction of toilets. It lays strong emphasis on Information, Education and Communication (IEC), Capacity Building and Hygiene Education for effective behavior change with involvement of PRIs, CBOs and NGOs, etc. The key involvement areas are Individual Household latrines (IHHL), School Sanitation and Hygiene Education(SSHE), Community Sanitary Complex, Anganwadi toilets supported by Rural Sanitary Marts (RSMs) and Production Centers (PCs).

The strategy of Total Sanitation Campaign was to bring about the relevant behavioural changes for improved sanitation and cleanliness practices and get together their sanitary hardware necessities in a reasonable and reachable manner by presenting a wide range of technological choices. The thrust has been on generating demand for better sanitary facilities and approve an alternative delivery mechanism to meet the claim. Rural Sanitary Marts and Production Centers are supposed to provide the alternative delivery mechanism not only to accomplish the community needs but also to endorse cost effective and appropriate technologies for ecological, safe and sustainable sanitation. It was predicted that the RSMs and PCs would endow with materials, services and guidance needed for making different types of latrines and other sanitary facilities which are technologically and financially suitable to the locale. Hence, it was assumed that by setting up

RSMs and PCs following can be achieved:

=> Affordability and accessibility for the sanitary facilities.

=> Ecological, safe and sustainable sanitation.

=> Technology improvisation for sanitation.

=> Locally suitable and preferred sanitation.

Establishment of RSMs and PCs

RSMs and PCs can be opened and operated by NGOs/SHGs/Women Organisations/ Panchyats/ etc. RSMs/PCs should have a Memorandum of Understanding (MoU) with the District Implementing agency. RSMs must have hardware materials and design for the construction of IHHL/ Institutional Toilets/CSCs. They should also deal with the other sanitary facilities like soakage and compost pits, vermin-composting, domestic water filters etc. They should also ensure that a range of multiplicities are available for the choice at an inexpensive cost. It is the reponsibility of the district executing agency to monitor the working of RSMs and PC sand ensure that RSMs/PCs have a suitable method of quality certification and trained masons and motivators. Production Centres are also needed for cost effective production so that low cost and good quality materials appropriate for the local preference can be produced. If an RSM makes a decision not to open a production centre, it has to make sure that diversity of pans is available. They may procure specific quality materials through competitive bidding.

Out of 1207 selected Gram Panchayats only about 29% have reported that there exists any RSM/PC. Only 32% selected households have said that RSMs/PCs are available. Bihar, Jharkhand and West Bengal are the only selected states where the majority of the selected Gram Panchayats and households have reported about the availability RSMs/PCs**.** The authorities of the state and the selected districts have also reported ample number of operational RSMs/PCs. So it appears that these three states have completely adopted this mechanism. But observations from the field study reveal that the situation is not as good. In West Bengal except in the District of East Medinipur, all RSMs are actually functioning as production centres. They are producing pans and constructing latrines. In Bihar only one RSM is functional in the selected districts and in Jharkhand no RSM is functional in the selected districts. So we can say that in the three selected states the mechanism is being operated mostly by production centres. Furthermore, in Bihar and Jharkhand the production centres are opened temporarily as "Mobile PCs" only for the construction work. The role of production centres in these two states is limited to digging the pit and constructing the latrines. Even pans are bought from other agencies in most cases. Odisha is the other state where the state authority claimed a large number of functional RSMs/PCs. Our visiting team has found that the SHGs and Panchayats are managing some production centers. They are mobilizing the masons and materials for constructing the toilets. There is very little support from the government.

In Maharashtra the state and district authorities have claimed to have opened a large number of RSMs and PCs. Only few PCs are functional and only about 59% of the selected Gram Panchayats have reported the availability of RSMs/PCs. But most importantly, only 16% of the households have said that any RSM/PC is available in their locality. It indicates that RSMs/PCs have not been very successful in Odisha and Maharashtra. In the three states Bihar, Jharkhand and West Bengal, are mainly operating and maintaining the RSMs and PCs in most cases. In Maharashtra and Uttar Pradesh the Gram Panchayats and in Kerala and Gujarat the SHGs are taking the leading role in managing the RSMs and PC. In rest of the selected states, it is the NGOs that have been given this job. The area covered by an RSM does not depend on the number of RSMs opened in the states since all the villages have not been covered by RSMs/PCs. There are no guidelines for the number of RSMs and PCs to be opened in a state/district. But it appears that funds are available for maximum of 10 RSMs and PCs in a district, though there is provision for mini RSMs and PCs.

Bihar, Jharkhand and West Bengal, are mainly operating and maintaining the RSMs and PCs in most cases.

On an average one RSMs/PCs cover about

60 villages. A few blocks in West Bengal block level are not having any functional RSM/PC. In such cases, the adjacent blocks cover such blocks. If we analyze the accessibility, it appears that in Jharkhand most of the PCs are located closest to the households. About 70% of the households have told that the RSMs/PCs are available within 2 kms. However, the average number of villages covered by an RSM/PC is least in Bihar. It may be kept in mind that in Bihar and Jharkhand the production centres are opened temporarily as "Mobile PCs". In almost all RSMs (86%) toilet seats are available except in West Bengal where almost half of the selected RSMs did not have toilet seats. Non-availability of toilet seats in West Bengal is due to the fact that the main job of the RSMs has been to construct toilets for BPL households. After the construction of toilets they get the payments from the block office. Once the work of construction of toilets for BPL households is over or there is no demand from BPL households the RSMs have no work to do. Some RSMs have stopped producing toilet seats as a large amount of payment is still due with the block office and they cannot run the RSMs. In all the states RSMs (76%) are keeping ceramic pans except in Rajasthan and West Bengal. In Rajasthan RSMs are selling HDP pans while in West Bengal RSMs had mosaic pans. Soakage materials are available in all RSMs in Haryana, Tamil Nadu and Meghalaya. In West Bengal half of the RSMs are having soakage materials. In Haryana and Meghalaya all RSMs have material for vermin composting and in Gujarat most of the RSMs (83%) have the material for vermin composting. While, in Karnataka, Rajasthan, Uttar Pradesh not a single RSM has the material for vermin composting. In Haryana, Tamil Nadu and Uttar Pradesh 50% RSMs also deal in certified domestic water filter. In Bihar, Karnataka, Rajasthan and Uttar Pradesh all the managers of RSMs/PCs have received training from the district agencies. In Bihar, Jharkhand and West Bengal where most of the villages are roofed by RSMs/PCs more than 90% managers of the RSMs/PCs have received training from the district agencies.

In all the states RSMs (76%) are keeping ceramic pans except in Rajasthan and West Bengal. In Rajasthan RSMs are selling HDP pans while in West Bengal RSMs had mosaic pans.

Signing of MoU is also essential but only 59% RSMs/PCs have signed MoUs with the district implementing agencies. In West Bengal which is the pioneer in adopting RSM/PC model, only 36% of RSMs/PCs have signed MoUs with the district agencies. Existence of quality certification process for the materials is also one of the essential conditions for the opening of RSMs/PCs. But, only 34% of RSMs/PCs have reported to have this facility. Though there is no specific guideline about the type of quality certification method. About 58% of that RSMs/PCs which had reported of having quality certification method have reported that they deal in only ISI certified materials from the official dealers. About 19% have said that they themselves verified the quality and about 14% have said that the district officials check the quality. It cannot be said whether availability of these methods satisfy the requirement of quality certification.

Conclusion

Social sector spending remains a critical part in which to ensure that government priorities are guided by principles of equitable access to resources and services for all. The planning process is the first step to bringing about transforms in the implementation of government programmes catering to providing access to basic rural water supply and sanitation to everyone. In this regard, it is necessary to decentralize the planning process to ensure that the plans are reflective of the ground realities.

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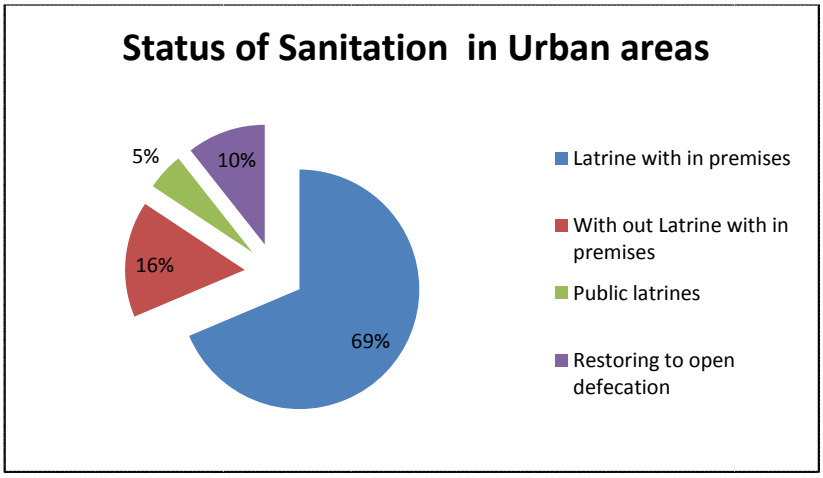
Rural Sanitary Marts and Production Centers are supposed to provide the alternative delivery mechanism.

SANITATION INTERVENTIONS FOR PUBLIC HEALTH & HYGIENE

Vaishali Jaiswal

The Modern concept of sanitation embodies liquid and solid waste disposal of excreta, food hygiene, personal, domestic and environmental hygiene, determining quality of life and human development index. earlier the concept of sanitation was confined to the disposal of human excreta by cesspools, open ditches, pit latrines, bucket system etc. Modern sanitation was one of the greatest public health accomplishments of the late 19th and early 20th centuries. Access to safe drinking water and sanitation is essential for protection and promotion of health. It is a basic human right and a key component of effective public health delivery system. The importance of community water supply and sanitation as a key health and development issue has been highlighted in a number of international policy forums, such as the Alma Ata Conference on Primary Health Care 1978, and the Mardel Plata World Water Conference, 1977, which launched the Water Supply and Sanitation Decade of 1981-1990 and, the Millennium Development Goal adopted by the General Assembly of the United Nations in 2000. The MDG Goal 7, which is to ensure environmental sustainability and the Target 10 is to reduce by half the proportion of people without sustainable access to safe drinking water and basic sanitation.

According to World Bank study, lack of toilets and other proper sanitation facilities costs India nearly $54 billion a year through hygiene-related illnesses, lost productivity and other factors stemming from poor sanitation. The problem is especially acute in rural areas where women suffer the most due to lack of proper sanitation facilities. A UN study in 2010 observed that more people in India had access to a mobile phone than to a toilet. India's mobile subscribers totaled around 894 million at the last count, enough to serve more than half of the country's 1.2 billion people. But just 366 million people [30.5%] had access to proper sanitation. A recent UNICEF report says 638 million people [54%] defecate in the open in India as against just 7% each in Brazil and Bangladesh. Only 6% rural children below five years in India used toilets and about 50% of all



Source: Census 2011

Indians regularly wash their hands with soap after contact with excreta.

State of Sanitation

Sanitation includes interventions for the safe management and disposal/re-use of waste. The delivery of safe sanitation services includes infrastructure, associated behaviors and a requisite enabling environment. Lack of adequate sanitation is a pressing challenge in both rural and urban India. Sanitation-related diseases take a heavy toll on lives and are a drain on productivity and incomes impacting economic progress. India over the last decade has made rapid strides in sanitation. Out of 35 states and UTs, two states have become totally 'Nirmal' (Open Defecation Free). The country aims to achieve total sanitation by the year 2022.

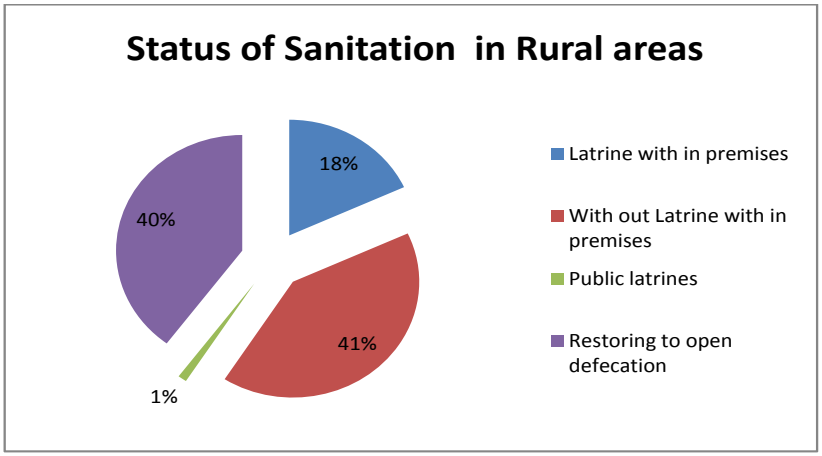
Access and Practices:

The 2011 Census of India found that almost 50% of nearly 250 million households surveyed had toilet facilities on the premises, but many more of these (81%) were urban households and far fewer (31%) were rural households.

Interventions of the Government

The responsibility for provision of sanitation facilities in the country primarily rests with local government bodies – municipalities or corporations in urban areas and Gram Panchayats in rural areas. The State and Central Governments act as facilitators. In the Central government, the Planning Commission, through the Five Year Plans, guides investment in the sector by allocating funds for strategic priorities.

Urban Sanitation: The Ministry of Urban Development and Ministry of Housing and Urban Poverty Alleviation (MHUPA) are the nodal agencies for formulation of policies, strategies and guidelines and assist the States by providing financial assistance for the development of ***urban water supply and sanitation*** schemes in cities and towns. The Central Public Health and Environmental Engineering Organization (CPHEEO) is the technical arm of the Ministry and assists in preparing policy guidelines, technical manuals etc. related to urban water supply and Sanitation. For U**rban Sanitation**, the National Urban Sanitation Policy (NUSP) of 2008 articulated, for the first time, a vision for urban sanitation in India: 'All Indian cities and towns should become totally sanitized, healthy and liveable and ensure and sustain good public health and environmental outcomes for all their citizens with a special focus on hygienic and affordable sanitation facilities for the urban poor and women'. The ***policy goal*** identified in the NUSP was to transform urban India into 'community-driven, totally sanitized, healthy and



Source: Census 2011

liveable cities and towns'. The policy lays out funding options including direct central and state support through existing schemes, public-private partnerships and external funding agencies. The policy directs that at least 20% of the funds should be earmarked towards servicing the urban poor.

The key goals and objectives of the Urban Sanitation Policy include:

i. **Awareness Generation and Behavioral Change.**

ii. **Open Defecation Free Cities.**

iii. **Integrated City Wide Sanitation.**

iv. **Sanitary and Safe Disposal.**

v. **Proper Operation and Maintenance of all Sanitary Installations.**

Rural Sanitation:

The Ministry of Drinking Water and Sanitation (MDWS) is the nodal agency for the overall policy, planning, funding and coordination of programmes of rural drinking water and sanitation in the country. MDWS provides financial and technical support in sanitation to all the states and UTs, while the respective state governments are vested with the responsibility of implementation of the programme in their respective regions. In most states, the Rural Development department or the Public Health Engineering department has the responsibility for management of the rural sanitation programme-known as "Nirmal Bharat Abhiyan (NBA)" while the Sarva Siksha Abhiyan (SSA) of the Ministry of Human Resource Development is the nodal programme for School Sanitation. In addition, the Central Pollution Control Board (CPCB) and the State Pollution Control Boards (SPCBs) look into establishment and the violation of norms of Solid and Liquid Waste Management, which is the main responsibility of ULBs in urban areas and district administration in rural areas.

Under the NBA, fund utilization is planned and implemented through an institutional set-up comprising of State Water and Sanitation Mission (SWSM) which is a multi stakeholder body consisting of all relevant government departments and non government stakeholders mandated for planning, supervising and monitoring the programme in the district. The SWSM prepares the annual implementation plan for each district and supervises the implementation of NBA in the project districts. The District Water and Sanitation Committees/Zilla Parishads ensure fund flow to the Gram Panchayats while Village Water and Sanitation Committees play a crucial role in social mobilisation and planning. It is the Gram Panchayats which play the pivotal role in actually carrying out the implementation of the programme.

The main objectives of the NBA are to:

- Bring about an improvement in the general quality of life in the rural areas.
- Accelerate sanitation coverage in rural areas to achieve the vision of *Nirmal Bharat* by 2022 with all GPs in the country attaining *Nirmal* status.
- Motivate communities and Panchayati Raj Institutions (PRIs) to promote sustainable sanitation facilities through awareness creation and health education.
- Provide proper sanitation facilities to schools not covered under the *Sarva Shiksha Abhiyan* (SSA) and to all *Aanganwadi* (Child Day Care) Centres in rural areas
- Undertake proactive promotion of hygiene education and sanitary habits among students.
- Encourage cost effective and appropriate technologies for ecologically safe and sustainable sanitation.
- Develop community managed environmental sanitation systems focusing on solid & liquid waste management for overall cleanliness in the rural areas.
- Achieve sustainable behavior change with provision of sanitary facilities in entire communities in a phased, community saturation mode with 'Nirmal Grams' as outcomes.
- Drainage, soakage of channels/pits, reuse of waste water and proper system for the collection, segregation and disposal of household garbage are taken up.

Approaches for achieving adequate sanitation:

Despite the efforts of the government, we need to accelerate the implementation of the programme. This can be done in following ways:

- Sanitation promotion through
  a. Increase in health and hygiene awareness
  b. Social marketing
  c. Community and individual incentives and sanctions
- Different implementation models
  d. NGOs and/of externally funded projects
  e. City or country-wide government programs
  f. Public-private partnerships
  g. Appropriate Technologies for Sanitation
- Shift from individual household toilets to area coverage of Open Defection Free area through constructing number of community toilets
- Integrating water supply and environmental engineering and public health engineering in the curriculum of BE/BTech/ Polytechnic courses for getting trained manpower in this field
- Training model for water and sanitation professionals (similar to DIET)
- Develop decentralize, low cost waste water treatment for rural areas
- Improve intersectoral integration and increase ratio of Public Health Engineers to rural population

Way Forward

- Get political support and consensus on vision and approach, including subsidy policy
- Understand the drivers for demand
- Improve the enabling environment (financial resources allocation, policies, institutional arrangements, M&E, regulation)
- Mainstream hygiene promotion in all programs to install a culture of hygienic lifestyle
- Build on the potential of the local market to develop strategy and program
- Support SSIPs and the local sanitation industry to supply what people want, are willing to pay and will use and maintain:
  - Access to credit and/or building materials
  - Capacity building and skills development
  - Accreditation of workshops and show-rooms
  - Supply chains
- Allocate public resources strategically to maximize public and private benefits (hard/ soft ware, waste final disposal & reuse, marketing, R&D, capacity building and training, urban/rural, smart subsidies, etc).
- Provide a range of technologies that can be improved over time: “sanitation ladder”.
- Decentralize planning, implementation, and monitoring to adapt strategies and programs to contextual factors.
- Prioritize sanitation and hygiene to scale-up programs and interventions especially in financial settings.
- Target the poor through better demand assessment and segmentation

Monitoring & Evaluation to learn and improve services and infrastructures delivery

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The 2011 Census of India found that almost 50% of nearly 250 million households surveyed had toilet facilities on the premises, but many more of these (81%) were urban households and far fewer (31%) were rural households.

CLEANING RIVER GANGA–A NEW APPROACH

Dr. Barna Ganguli

A number of initiatives have been undertaken to clean the river but failed to deliver desired results. After getting elected, Prime Minister Narendra Modi declared to work for cleaning the river and controlling pollution. Subsequently, Integrated Ganga Conservation Mission called '**Namami Gange'** was announced by the Finance Minister and an amount of Rs. 2037 crores was set-aside for this purpose. The PM's commitment to clean the holy river is reflected by renaming of the Ministry of Water Resources as the Ministry of Water Resources, River Development and Ganga Rejuvenation. But his mission is not going to be easy. comparison with river cleaning programmes for Thames, Rhine and Danube in Europe, it is clear that river cleaning programmes have a long history. It was observed that actions in these programmes have been taken over a period of 20 years or more. Therefore, it would be herculean task for a developing country like India to expect to achieve in 10 years, what western countries with more resources could achieve in over 20 years.

Establishment of the Clean Ganga Fund

The Union Cabinet chaired by the Prime Minister, on 24th September, 2014 gave approval for establishment of the Clean Ganga Fund (CGF). The 'Clean Ganga Fund (CGF)' will be set up with voluntary contributions from residents of the country and Non-Resident Indian (NRIs) / Person of Indian Origin (PIO) and others to harness their enthusiasm to contribute towards the conservation of the river Ganga. The Fund would be managed by a Trust to be headed by Finance Minister. The secretariat of the Trust will be set up in Ministry of Water Resources, River Development and Ganga Rejuvenation under the Mission Director, Clean Ganga. The proposal to set up CGF is to attract private contributions globally for increasing people's participation in this massive task. Considering that there is a need to increase people's participation from across the country and abroad, it is proposed to set up a 'Clean Ganga Fund (CGF)' with voluntary contributions.

The main features of CGF are:

- CGF will have the objective of contributing

to the national effort of improving the cleanliness of the river Ganga with the contributions received from the residents of the country, NRIs/ PIO and others.

- CGF will be operated through a bank account by a Trust.
- Domestic donors to the fund shall be eligible for tax benefits as in the case of **'Swachh Bharat Kosh'**. Foreign donors could get suitable tax exemptions in domestic law, wherever permissible.
- CGF will explore the possibility of setting up daughter funds in other jurisdictions/ countries of high donor interest such as the USA, the UK, Singapore, the UAE, etc. to enable tax benefits to donors in their respective jurisdictions.
- CGF will be catalytic in nature and will identify and fund specific projects which could be pilot projects, R&D projects, innovative projects or other focused projects. The Fund will define specific and measurable objectives to form the basis for planning, funding, and evaluation.
- Broad activities proposed to be financed from CGF include, inter alia, Activities outlined under the 'Namami Gange' programme for cleaning of river Ganga; control of non-point pollution from agricultural runoff, human defecation, cattle wallowing etc.; setting up of waste treatment and disposal plants along the river around the cities; conservation of the biotic diversity of the river; community based activities to reduce polluting human interface with the river; Development of public amenities including activities such as Ghat redevelopment; R&D and innovative projects; Research and Development projects and innovative projects for new technology and processes for cleaning Ganga; independent oversight through intensive monitoring and real time reporting; any other activity as approved by Governing Council. This is an indicative list and can be expanded within the overall objective by the Governing Council. The Fund shall not be utilised for activities such as dredging.
- CGF will be subject to such audit as required by law as well as audit by any agency determined by Government. CGF would be administered by a Trust to be chaired by Finance Minister and upto 8 members from different fields including NRIs, nominated by the Government. Secretary (Economic Affairs), Secretary (Overseas Indian Affairs), Secretary (Environment, Forest and Climate Changes) and Secretary (Water Resources, River Development and Ganga Rejuvenation) will be members. The CEO of the Fund will be the Member Secretary of the Trust. Two Secretaries from the concerned state governments shall be additional members on a rotation basis. Government may also nominate experts and/or persons of eminence in public life as expert invitees. The Secretariat of the Governing Council shall be set up in Ministry of Water Resources. The Mission Director shall be the CEO of the Fund unless a separate CEO is appointed.
- The Governing Council will prepare the norms, procedures, cost norms and operational guidelines for obtaining financing from the Fund, which will be notified by the National Mission for Clean Ganga.

Ganga, the longest river in India has a unique position in the Indian psyche. Apart from geographical scale and spread, she has played a vital role in the social, cultural, economic and political life of the country. The socio-economic changes in the post industrialization era have adversely affected the flow and quality of the river water leading to pollution of the river. In order to reduce the pollution of this river the Government of India (GoI) has been implementing a pollution abatement program for the last 25 years. India is endowed with rich water resources.

Rapidly increasing population, rising standards of living and exponential growth of industrialization and urbanisation have exposed the water resources, in general and rivers in particular, to various forms of degradation. Many Indian rivers, including the Ganga in several stretches, particularly during lean flows, have become unfit even for bathing. Comprehending that the rivers of the country were in a serious state of degradation, a beginning towards their restoration was made with the launching of the Ganga Action Plan (GAP) in 1985.

Ganga Action Plan (Gap)

The Ganga Action Plan or GAP was a program launched by Rajiv Gandhi in April 1986 in order to reduce the pollution load on the river. Under GAP-I, pollution abatement schemes were taken up in 25 Class-I towns in three States of U.P, Bihar and West Bengal. The programme included 261 schemes. The main focus of the Plan was on Interception & Diversion and treatment of sewage generated from these identified towns. GAP-I was completed in March 2000 at a cost of Rs. 452 crores. As GAP-I addressed only a part of the pollution load of Ganga, GAP-II was launched in stages between 1993 and 1996, 59 towns along the main stream of river Ganga in five States of Uttarakhand, U.P, Jharkhand, Bihar and West Bengal are covered under the Plan and included the following tributaries of the Ganges, Yamuna, Gomti, Damodar and Mahananda. GAP-II was expanded in 1996 into the National River Conservation Plan (NRCP), which presently covers polluted stretches of 36 rivers in 20 States in the country. In August, 2009 GAP was re-launched with a reconstituted National Ganga River Basin Authority (NGBRA).

The GAP was conceived with three components: the largest and most capital-intensive was supporting investments in sewer lines, drains and in rehabilitating sewage treatment plants (STPs) along the river. The second component was to build crematoria in the large urban centres, so that the ancient practices of cremating bodies using firewood could be replaced with more sanitary and respectful disposal of the dead. The third component was to beautify riverfronts or "ghats", many of which had great historic and cultural significance but had over the centuries been reduced to unsanitary bathing and washing spots for pilgrims and the urban poor alike. Although the second and third components of the GAP were of more direct local community interest, the anxiety to disburse central funds quickly in the three states (none of which were known for administrative efficiency) led the central government to focus on the "hardware" part. This included monitoring of investments in civil works schemes (for example, laying of sewer lines, interceptor drains and refitting dilapidated STPs with new electrical and mechanical equipment).

Ganga Action Plan was a static plan which did not consider population increase or phenomenal growth in Indian economic activities. In addition, the co-ordination of activities between the Central and state organizations were very poor. The designs of sewage treatment plants were done without considering the State level requirements. Many urban centers did not even have adequate sewage network for carrying wastewaters to the treatment plants. Hence most of the sewage generated has to be discharged untreated into the river. The design capacities of the plants were often lower than the incoming loads. Furthermore, even the plants that were built became increasingly less efficient

Table 1: Difference between actual and measured sewage generation

States	Official Estimation of Sewage Generation (MLD)	Number of drains	Actual measured Sewage Flow (MLD)	Gap (Untreated Waste) (%)
Uttarakhand	61	14	440	95
Uttar Pradesh	937	45	3289	86
Bihar	407	25	579	71
West Bengal	1317	54	1779	69
Ganga Main Stream	2723	138	6087	80

Source: Central Pollution Control Board, 2013

Table 2: Sewage generation and treatment capacity created in the Ganga

	2009	2012
Sewage Generation (MLD)	2638	2723
Treatment Capacity (MLD)	1174	1208
Gap (MLD)	1464	1514
% gap : treated vs untreated	55	55

Source: CPCB 2009 and 2013

or nonfunctional with time. Frequent changes in administrative or institutional power and personnel contributed to serious disruptions, delays and shoddy implementation. Meanwhile Ganga has continued to suffer from over-extraction of water, along with steadily increasing volumes of wastewater. Not surprisingly the river is more polluted than ever.

Ganga was made a National River in 2008. World Bank has sanctioned a loan of 1 billion USD over the period of 2001-2019, under the National Ganga River Basin project that would assist in capacity building and provide technical assistance to local and central organizations. The main items include municipal wastewater management, industrial pollution control, solid wastes management and river front beautification. Unfortunately, after three years of running the program, the World Bank, concluded in February 2014 that overall progress and implementation is unsatisfactory.

Present State of River Ganga

The July 2013 report of the Central Pollution Control Board (CPCB) shows that the holy river is, thus, converted into a stinking sewer, due to unacceptable levels of faecal coliform, a clear sign of human excreta, all along the river's mainstream.

Reason behind Pollution

Thirty-six settlements, classified as Class-I cities, contribute 96 per cent of wastewater draining into the river. According to CPCB's report, 2723 million litres per day (mld) of domestic sewage is discharged by cities located along the river. But even this may be a gross underestimate as the calculation is based on the water that is supplied in the cities. As all the water that is used by city is not supplied by corporation—much is groundwater—the actual sewage is often higher. This is what CPCB found when it measured the discharge from drains into the Ganga—6,087 mld was discharged into the river.

Even if the treatment capacity is added, more sewage gets added because of population growth. The situation worsens if the actual measured discharge from drains is taken to estimate the pollution load. Then the gap between what is installed and what is generated goes up to 80 per cent. From Table 2, it is clear that the gap between untreated and treated waste remains same between 2009 and 2012. The sewage treatment is not growing at par with sewage generation. Over and above this, 764 industrial units along the main stretch of the river and its tributaries Kali and Ramganga discharge 500 mld of mostly toxic waste. All efforts to rein in this pollution have failed.

The terror does not end here. These cities have grown without planning and investment, so most do not have underground drainage networks. In Allahabad and Varanasi 80 per cent of the areas are without sewers. Waste is generated but not communicated to treatment plants. There is no power to run treatment plants; bankrupt municipalities and water utilities have no money to pay for operations. CPCB checked 51 out of 64 sewage treatment plants (STPs) along the Ganga in 2013. It found only 60 per cent of installed capacity of the plants was being used; 30 per cent of the STPs were not even operational. So actual treatment is even less, and untreated waste discharged into the river even more. In 2013, CPCB identified 33 drains along the Kanpur-Varanasi stretch with high biological oxygen demand (BOD), the key indicator of pollution. Of the 33, seven are big degenerators, with high BOD load.

Uttar Pradesh has 687 grossly polluting industries, finds CPCB. These largely small scale, often illegal units—tanneries, sugar, pulp and paper and chemical—contribute 270 mld of wastewater. But what really matters is the location of the plants. While over 400 tanneries contribute only 8 per cent of the industrial discharge, they emit highly toxic effluent into the river and are located as a cluster near Kanpur. So the concentration of pollution is high. It is alarming that not much is happening to control pollution. The law is feeble. In 2013, an inspection of 404 industrial units by CPCB showed that all but 23 did not comply with the law. Directions have been issued and closure notices served. But nothing has been implemented.

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RURAL YOUTH AND CLEAN GANGA MISSION

Samit Kar

The Union Ministry of Water Resources River Development and Ganga Rejuvenation has launched the National Mission for Clean Ganga (NMCG) to make Ganga get rid of endemic pollution to create a sustainable pollution-free environment as far as possible. Considering the tremendous relevance of the clean Ganga Mission in order to allay the problem of pollution of the river water, a perusal of the experience with regard to the implementation of the Ganga Action Plan (GAP) may be worthy for consideration. The most important point which needs to be mentioned at the outset, the participation of the Rural Youth is the *sine qua non* of the programme. Without their active involvement, the avowed impact of the mission may remain elusive. Moreover, the concerns of siltation and erosion need to be incorporated in order to achieve the mission to make river Ganga pollution-free as stated by the NMCG.

River Ganga is an integral part of the Hindu civilization, culture and mythology. The traditional India, the water of River Ganga was considered to be so pure and holy that the river water was often referred to as the *nectar* and *'Ganga Tera Pani Amrit'* was inherent in the mindset and belief-system of the Indians at large. However, the river Ganga which was considered as the *lifeline of India* had to face a terrible brunt of three major problems- Pollution, Siltation and Erosion. The National Mission for Clean Ganga is known to remain dedicated to the abatement of the pollution of the river water. However, the problems related to erosion and siltations need to be given a similar weightage.

The river Ganga which is rightly believed to be the *lifeline of our country* originates in the snowbound heights of the Himalayas nearly 4000 metres above sea level, from a dark, icy cavern shaped like the mouth of a cow known as *Gaumukh*. This glacier which maintains the eternal flow of the Ganga has a backdrop of the three Bhagirathi peaks. From this glacier, huge chunks of ice break down to fall into the rushing waters of the Bhagirathi. At Devaprayag, the Bhagirathi is joined by the Alakananda which originates above Badrinath near the Indo-Tibetan border and receives the waters of Mandakini at Rudraprayag to form the great Ganga River.

From a swift moving stream, the Ganga grows into a wide river just before it touches the plains at Rishikesh. Then begins its, over 2525 km long journey through the heart of India – the Indo-Gangetic Plain – before it falls into the Bay of Bengal. On its way, the Ganga is joined by many rivers: Ram Ganga at Kannauj, the Yamuna and the Saraswati at Allahabad. In its 2525 km long course, the Ganga dramatically

varies her pace and form. No more than a few feet wide in the Himalayas, it is a tumbling, boisterous stream in the hills and a deep, fast flowing river at Rishikesh where it enters the plains. In the plains, of Uttar Pradesh, it is a bed of sand in summer. In Bihar, it is a vast expanse of water, 4 to 14 km in width.

The imperative of people's participation under the leadership of the Rural Youth in various parts of adjoining regions through which river Ganga flows stems from the past experience when it was seen that contrary to the instance of the Plan Document, the Clean Ganga Programme remained restricted to the activities of the Government without achieving adequate public involvement. This was a major lacuna in the past effort and the present endeavour should get rid of this shortcoming in order to achieve the pristine water quality of the lifeline of our country. Therefore, a plan of action has to be chalked out about how this people's participation can be put into effect by forming a large number of locale-specific Environment Brigades. The members of these brigades may be formed by involving physically challenged youth and women, amongst others. The role of the physically challenged youth may prove to be very effective and they may find enough esteem in this effort.

River Ganga is a very valuable treasure of our nation which has to be protected and conserved with utmost care and affection. About 50% of the Indian population lives around the Ganga Basin and adjoining areas. The Ganga basin waters and drains 9 States – Rajasthan, Haryana, Uttar Pradesh, Bihar, Jharkhand, West Bengal, Madhya Pradesh, Himachal Pradesh and Delhi. The Ganga basin is extensively cultivated. About 50% of the total irrigated area in the country is in the Ganga Basin. A variety of crops are raised in the basin – rice, wheat, sugarcane, cotton and jute. More than 75% of the annual rainfall in the Ganga basin occurs in the four monsoon months: June to September. Also, the Ganga has been a major source of communication since ancient times.

In simple terms pollution makes the water unsuitable for a specific use. When the water is very clear as in Devaprayag, we can drink it straight from the river. When it is a little muddy and mixed with dirt and waste, we can neither bathe in it nor drink it. The principal sources of pollution are:

1) The waste waters from our towns and villages, the drains and sewers that carry these wastes to the river. It is estimated that 900 million litres of sewage is dumped into the Ganga every day.

2) The garbage we throw by the riverside or sometimes even into the river.

3) The chemical and water wastes from industries

4) The harmful residues and insecticides and pesticides draining away from the agricultural fields.

5) Throwing of animal carcasses and half-burnt and unburnt human carcasses into the river especially in the villages.

6) Defecation on the banks of the river.

The causes are almost endless but all these acts of pollution are not accidental. We may not deliberately wish to pollute the Ganga but somehow end up doing so pathetically.

Problems

Experience reveals that the basic problems of the river Ganga emanates from pollution, siltation and erosion. In the course of the long 2525km stretch of the river, the cause of pollution is related to erosion and the resultant siltation in many segments of the course since the early 1970s, the impact on Green Revolution in many states of North and Western India was substantial. As a result, there was a huge diversion of the river water in various parts of Uttar Pradesh through endless number of canals and streams in order to feed the agricultural fields with a steady flow of irrigation water since the HYV pattern of cultivation as envisaged in Green Revolution needs more water supply, amongst others. In this way, huge stretch of the River Ganga suffers from tremendous water scarcity since the glacial water from the snow-clad Himalayas – which had been the main source of river water, was unable to flow down the river. Inadequate water-flow led to a very severe form of siltation as the mud and clay inherent in the river water could not be pushed ahead alongwith the strong water-current to the Bay of Bengal. Thus, constant deposition of mud and clay on the riverbed leads to severe siltation causing

alarming form of impediment to the free flow of the river water. A worse form of siltation had raised the river-bed so alarmingly that the space of the volume of water movement got constricted and during the monsoon i.e. between June and September when the volume of water-flow increases, the increased volume of water, unable to get the needed space for forward movement lashes on the river bank leading to an agonizing form of erosion of the bank and the resultant siltation which becomes more hazardous, leading to increased volume of water movement after September–October every year. As the discharge of pollution to the river continues, the river-water gets severally polluted round the year, especially in winter and summer. Therefore, one of the main reasons for a very high level of pollution in the river Ganga is based on very inadequate volume of water-flow – which intensifies the content of pollution due to less volume of water flow. Moreover, a huge volume of poisonous discharge from the agricultural fields is a matter of serious concern as this is very detrimental to the sustenance of various forms of algae, bacteria and other biological content in the river water which keep the river water fresh and are the basic source of fish-food. The loss of vital biological content is dangerously robbing the fish population in the river Ganga and worsening the river quality, since these biological species had all along played a very meaningful role to maintain a perfect aquatic balance of the river Ganga. In the light of this reality, the present Clean Ganga Mission needs to take into account the concerns of siltation and erosion of the river to allay the pollution content.

Measures

Apart from various measures undertaken in the Clean Ganga Mission, the leadership of the rural youth in order to elicit people's participation in the Clean Ganga Mission is very necessary. Without the participation of the people, the mission is unable to achieve its goal. The rural youth may incite public involvement through a number of ways and action plans need to be designed in a locale-specific way and there should not be any pan-Indian guideline. Some of the action plans are indeed mentioned by the Union Ministry of Water Resources while introducing the NMCG. However, based on the activities of the CSME, some of the proposed action plans may include:

1) Plantation of saplings along the river-banks to check erosion of the soil significantly. There are some specific types of trees like sal, sonajhuri and casurina which are found to have strong soil-binding features,

2) Organized *Shramdan* i.e. voluntary labour in order to maintain, protect and upkeep assets like river-front facilities, ghats, embankments, riverside gardens, trees etc on holidays, Sundays and on various festival days as something one may call *Festival of the Masses*,

3) Popularize a slogan among the people at large to implement *GAESD* i.e. Don't throw Garbage, Don't throw Animal Carcasses, Don't through Human or Animal Excreta, Don't throw effluents of Soap and Detergents,

4) Translate the content of various Pollution Control Laws and Rules to mitigate water, air, sound, soil etc in lucid, local language and distribute the same in the form of pamphlets in order to arise public consciousness and empower them with the provisions of the law by virtue of which they may be able to lodge complaint against erring bodies with the local Pollution Control Authority,

5) Sit and Draw, Essay Writing, Debate and Elocution Competitions may be organised among the youth and school children to sensitize them about the hazards of river pollution and what can they do to mitigate the same.

Moreover, Film, Television, Radio, Singers, Local Chroniclers, Folk Artists, Poets, Writers etc may be supported by the Authority in order to imbibe an intrinsic culture and moral habit among the people to make them conscious about preserving the pristine water quality of River Ganga, the symbol of Indian Culture and Heritage and the practical lifeline of our country. Without achieving public involvement in various regions of our country along the river-basin, it may be difficult to emancipate the holy river Ganga from an endemic danger which she faces so alarmingly.

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RURAL POST OFFICES BRIDGE FOR UNREACHED FARMERS

S. K. Dubey

Linking the agricultural farmers of India with technology and institution have always been the priority since the planned development of the country. In this direction, several experiments using different methods and means of communication have been done. Since sixties, a large number of studies were conducted on farmers and extension interaction, and these were mostly focused on the communication behaviour of these two important elements. Most of the Indian reports reveal diverse communication channels/sources utilized in the different stages of the innovation decision process. It was found that personal cosmopolite channels were more important followed by personal local channels at the knowledge stage. Similarly, importance of these channels/sources was also recognized at persuasion stage and at decision making stage in the innovationdecision process. It was recognized that for technically complex information, cosmopolite channels were important. Studies in later eighties showed the influence of mass media on Indian farmers as a source of information. Various research studies conducted in India maintained that agricultural communication by and large, followed a system approach (Singh, 1988). This consisted of three distinctive subsystems; the research system, the extension system and the client system. This approach, however, was highly topdown in nature and suggested that the functions of client system were the adoption of innovation and 'feedback'.

Of late, linkage perspective in extension-farmer communication is being recognized and the linkages activities predominantly included input supply and services as the important communicating activities apart from advisories, training and feedback sharing. The researchers from the global experiences comprehend that the parameters like planning and review, collaborative activity, resource exchange, knowledge dissemination, feedback and coordination are important to strengthen the linkage between farmer and extension. Dubey et al (2011) also identified input supply and services as the important linking activity between farmers and

extension and they reported that with particular case of dairying in Haryana, the strength of linkage was stronger on input supply and services than other components. This article highlights how the main extension systems of the country have rearranged its structure and function for making their communication effective with farmer, how it is justified to include rural post offices of the country as an alternative communication link with farmers, what are the possibilities which make the strong case of using village post offices as the linking institution with the farmers, experiences of technology dissemination through post offices on pilot basis and its economic impact as well as implications. Based on the empirical knowledge base and field experiences, future roadmap for making postal agri-extension system as an alternative frontline extension system of the country has been suggested.

Why Post-Office as the communication link for technology delivery!

The Indian Postal Service, with 1,55,015 post offices and 4,74,574 staff, is the most widely distributed post office system in the world. On an average, a Post Office serves an area of 21.21 sq. km and a population of 7,175 people. Of the total post offices, 1, 39,144 (89.76%) are in the rural areas. Rural branch post office caters to 5-15 villages and the branch post masters (BPM) are mostly the farmers. Owing to this far-flung reach and its presence in remote areas, the Indian postal service is also involved in other services such as small savings banking and financial services. The trend analysis of post office works showed that during last 10 years, the use of postal communication system was reduced to a greater extent. There was a sharp decline (about 50%) in the mail and delivery of ordinary post. This has happened mostly after some of the e-governance initiatives of state governments, internet and accessibility and affordability of mobile phone by the rural people and hence the sale of postal stamp and revenue stamp had declined to the same extent. The collaborative activities and tie-up with other agencies like bank, investment agency, insurance departments, such as SBI, ICICI, mutual funds agencies, Oriental Insurance, etc. had also increased (15–20%) (Dubey *et al*, 2014). From the experience of Republic of Korea, postal services were found successfully utilized for e-commerce and farming particularly fish farming for marketing of the produce using ICT enabled technologies (ITU, 2010).

Possibility of institutional linkages with the postal department

The analysis of organizational structure, staffing, work load and profile of the post office workers was done to study the possibility of such linkages. A research study conducted in the Sitapur district of Uttar Pradesh revealed that there were 370 branch post offices (BPOs) at the village level manned by 700 Grameen Dak Sevaks (GDS); which should have been 1121, as each BPO is expected to have at least one each of Branch Postmaster (BPM–GDS), Postman and Runner. The general profile of GDS/BPM indicates that they are mainly the rural farmers living in the same village and discharging the role of GDS/BPM as part-time public sector workers and availing partial benefit from the Department. This indicates the possibility of their inclusion in the additional work of farm technology dissemination in the nearby villages of their operation. The work load of these GDS showed that each of them had to cover on an average of 6–10 villages, 1200 households around the periphery of 8–10 sq. km. The exploratory analysis of postal systems showed the possibilities of farm technology dissemination through post offices mainly on the ground of decreasing conventional roles of post offices and increased inter-departmental partnership activities. As a result, the following subsequent activities were carried out.

Actual Dissemination of crop varieties through post offices

Through Institute–post office–farmer linkage pilot experiments (2009-2013) executed by the premier institution - Indian Agricultural Research Institute (IARI), New Delhi, a total of 1921 farmers from 181 remote villages under 18 post offices in five states of India namely Uttar Pradesh, Madhya Pradesh, Bihar, Rajasthan, Jammu and Kashmir were reached by the end of 2013. Eight major improved wheat varieties and nine popular rice varieties (both basmati and non-basmati) were disseminated in five states based on the farmers

demand. Beside rice and wheat, other popular high yielding varieties like Pusa Jaikisan, Pusa Bold of Mustard, Pusa 383, Pusa 443 of Bajra, Pusa Naveen of Bottlegourd, Pusa Viswas of Pumpkin, were disseminated. Over the years, the project expanded both horizontally and vertically. Similarly, the confidence and expectation of farmers from this premier institute also steered up. The varieties disseminated though the post office were assessed under different biophysical situations prevailing at the farmers' level which helped to identify the location specific improved varieties. Based on the suitability, farmers are being encouraged and facilitated to form seed production associations for farmer-to-farmer diffusion of the preferred crop varieties. Through this linking instrument, other technologies like bio-culture, bioformulations, *etc*. may be disseminated through post offices.

Economic efficacy of the Model

The economic viability of IARI-Post Office linkage extension model was assessed considering the cost of cultivation and net income from crop. The seed was distributed free of cost under the project. However, we consider the actual cost of seed if they purchased to calculate the net benefit from improved varieties. It was evident from the experiences that from 1000 **mt²** area, a farmer could make net profit of Rs. 3171 with B:C ratio of 1.92 from wheat while in case of Mustard and Bottlegourd the B:C ratio was 4.07 and 2.71 respectively. The operational paradigm of extension-farmer linkage through post office has been illustrated in figure 1 below:

The findings proved that the model was highly economically viable even if farmers bear the full cost of seed. The major factor for this economic efficacy is the high yield potential of improved varieties.

Lessons learnt

Experiences of the experimentation confirmed that post offices may be the effective and successful means for making the improved agricultural technologies available in the remote rural areas in relatively lesser time and cost. However, the capacity building of BPMs in this process as well as the technology was found essential, which in turn would benefit the farmers of the area. Hence, seed variety dissemination through post offices has emerged as an alternate extension mechanism and BPMs as community based extension agents. This was a successful outreach of institutions to farmers living in remote areas and was found as an effective means for assessment and developing location-specific farm technologies.

Conclusion

The findings of the present study indicated the scope for developing post offices as the means of agricultural technology transfer in India. The major implication of the study affirms the potential of such experimentation for strengthening public–public linkage for farm technology dissemination, which can later be institutionalized as the effective model of frontline transfer of technology by the large number of research institutions. Also, the strong manpower of village-level postmasters will complement the existing cadre of public sector extension personnel which, in turn, would reduce the extension worker: farmer ratio in the country.

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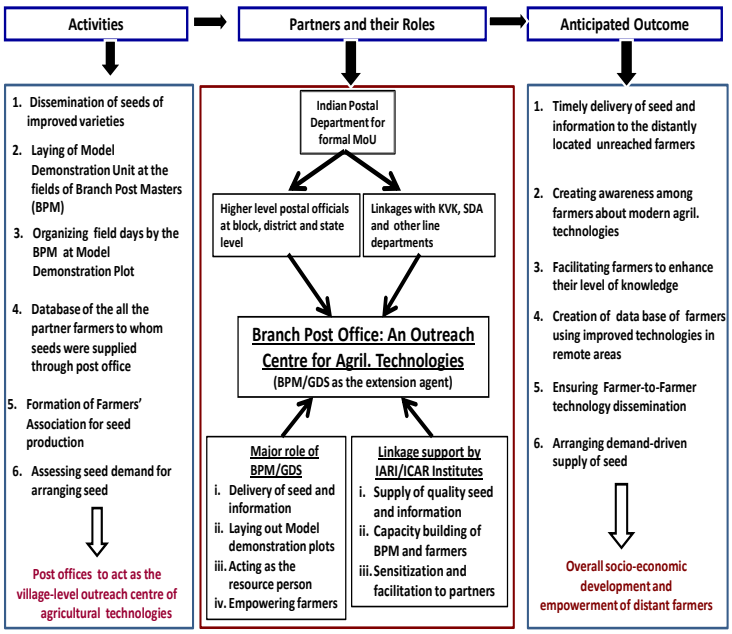
Fig 1: Operational paradigm of postal communication bridge for extension-farmer linkage



PROCESS INNOVATION : A CASE STUDY OF LAND RECLAMATION IN UTTAR PRADESH

Monika S. Garg

The challenges of governance are now more complex than ever before. The importance of cross cutting themes and cross sectoral issues has grown. The themes are more complex, the issues more diverse than they appear. Matters are not simple, they are much deeper than they seem.

However, the solutions are simple. I quote from the book 'Jugaad Innovation' by Jaideep Prabhu & others: Simplicity is the most powerful antidote to complexity. But simple does not necessarily mean simplistic - realistically, complexity cannot either be ignored or avoided. Rather, the attempt should be to embrace the complexity of the problem and then find a simple way through it.

A case study in point pertains to a World Bank Project being implemented in the state of Uttar Pradesh, for reclamation of sodic land. Ironically, socio-economic and even political considerations often become extremely important in accentuating problems like land degradation and in managing them, even though through scientific means.

When the Project stated in 1998, more than one million hectares of land in Uttar Pradesh (almost 10% of the state's total cultivable area) was lying barren. It is not as if these sodic lands were beyond reclamation or that the technical know how to do that was not available. But given the socio-economic-political reality of development works and land reforms in India (factors which are beyond the control of individual farmers), appropriate policy decisions and corrective measures became the need of the hour and the responsibility of government, who initiated the Project with the help of the World Bank.

The case study discusses two aspects of the Project: Reclaiming the sodic land, and Arresting further degradation of land. These issues and the existing practice posed problems that threatened the survival of the project and that required to be resolved within the given boundary conditions. This experience is expected to provide solution to similar problems being faced in developing and under developed countries, suggesting simple ways to achieve quality outcome, minimizing the

What are sodic lands?

Sodic lands are those lands which have a high content of alkali salts like sodium carbonate and bicarbonate in the earth's crust. In areas where water table is high or where drainage is inadequate, these salts get dissolved and then rise through capillary action to the surface, where the water evaporates, leaving behind a salt crust that makes the land unsuitable for crop cultivation.

The chief characteristic of sodic soils from the agricultural point is that they contain sufficient exchangeable sodium to adversely affect the growth of most crop plants. For the purpose of definition, sodic soils are those which have an exchangeable sodium percentage of more than 15. Excess exchangeable sodium has an adverse effect on the physical and nutritional properties of the soil, with consequent reduction in crop growth, significantly or entirely.

scope of pilferage. The report will be of interest especially for people associated with irrigation projects and cleaning of rivers and drains.

Reclaiming the barren land

Basically, reclamation (i.e. improvement) of sodic soils requires removing part or most of the exchangeable sodium and replacing it by the more favourable calcium ions in the root zone. This can be accomplished in many ways, depending upon the local conditions, local resources, indigenous know how, and the crops intended to be grown on the reclaimed area. However, studies show that application of chemical soil amendments, followed by leaching (for removal of salts derived from the reaction of the amendment with the sodic soil), produces reasonably quick results. One of the recommended chemical amendments for sodic soil reclamation is use of soluble calcium salts, e.g. gypsum, calcium chloride. Being cheapest and most abundantly available, gypsum is the most widely used amendment.

The situation It is interesting to note that gypsum can be used as a fertilizer, is the main constituent in many forms of plaster and is widely mined. In fact, it is useful in a wide variety of purposes, including the following **applications which often compete with each other in rural areas:**

- Gypsum board is primarily used as a finish for walls and ceilings, and is known in construction as drywall, sheetrock or plasterboard.
- Gypsum blocks are used like cement blocks in building construction.
- Gypsum mortar is an ancient mortar used in building construction
- Gypsum is used as Fertilizer and soil conditioner

The Problem

In this scenario, a common complaint was that the farmers sold their gypsum to contractors, brick kiln owners and construction agents. This was a deep rooted nexus. **Diversion of gypsum supplied for land reclamation for other purposes** amounted to leakage, pilferage and corruption, apart from negating the desired outcome of reclaimed land. As a result, during mid-term review of Phase II of the Project, the World Bank had rated it as 'unsatisfactory' in 2005.

New Approach Required We studied the stakeholders, interest groups and the products / outcomes intimately. The situation posed an arduous challenge. However, the team perceived it as an opportunity to learn and innovate. When confronted with a seemingly insurmountable nexus, I was reminded of what Justin Menkes calls 'realistic optimism'. The team discussed the issue in depth with agricultural scientists and underlined the fact that gypsum could be used in the fields and leaching could be done only before the onset of monsoon. We concluded that any gypsum supplied after that was useless for the farmer and would certainly be sold by him. And ironically, the cycle had become such that gypsum supply from Rajasthan continued throughout the year. In this complex situation, we could not work on logic or spreadsheets. We thought of **a very simple solution, took a very simple decision (though it was viewed by most as a diktat) that no rake of gypsum will enter the state after 30th June, i.e., a fortnight before the arrival of monsoon. This simple step, coupled with raising awareness amongst the beneficiaries, did the trick.** The change implied less

supply of gypsum and consequently, less reclaimed area (theoretically, on paper) in that year. But the strategy prevailed in the succeeding years; more area was reclaimed than targeted in Phase II, in fact 20% additional area was reclaimed (of course, this was possible due to many other factors also leading to cost saving). This was a pragmatic, though radical innovation that delivered more sustainable results in the long term. The World Bank rated the Project as 'satisfactory' in 2007.

Preventing sodicity: Addressing Drainage Issues

Any practice which allows excess moisture to migrate downward through the soil can contribute to the formation and extension of sodicity. Although Uttar Pradesh lies across the highly fertile Gangetic plain and has ample supplies of surface and ground water, this seemingly favorable situation is actually becoming its bane , due to heavy monsoon followed by dry spell, coupled with an ailing irrigation and drainage system, which leads to a high build - up of salts in the soil.

Surface drainage in the recharge area is an effective method of controlling excess water in the seepage areas. The objective is to lower the water table and desalinize the root zone through leaching.

The remodeling and rehabilitation of main drains in the Project was undertaken by Irrigation Department through participatory processes that involved stakeholder consultations on planning, design and execution of physical works. The work related to link drains and field channels was done by beneficiary groups.

The Challenge

A well designed and operated drainage system can greatly increase the productivity of irrigated agriculture if it is effective down to the farmer's fields. The individual farmer's cooperation is ensured to maintain the field ditches and interception drains. However, more often than not, the solution to the sodicity problem lies outside the capability of a single farmer or even a group of farmers. Such is the case where natural drainage channels do not allow adequate run-off of water due to silting. And this was the case in most of the Project area. Rivers and streams had become silted by the runoff caused by heavy rains. As they filled with soil, their capacity decreased, thereby reducing their capacity to drain, consequently increasing sodality, apart from causing floods. Thousands of kilometers of drainage network required rehabilitation, remodeling and maintenance with the objective of removing leach effluents, excess rain and irrigation water from reclaimed and adjoining areas. This was expected to result in increased drainage capacity, relieving the area from water logging**. Drains in the area had to be cleaned and river beds had to be desilted to stop water - logging. This was an exercise fraught with several lacunae. Measurement of the work done and silt removed was difficult, post- completion assessment was near impossible, given the fact that one rain would spoil any chance of getting it done.**

The Bigger Challenge A big drain, nay, a river existed in the project area which fell in the VVIP constituency, it had got huge silt in its bed, reducing its drainage capacity, increasing water logging, leading to sodicity and causing floods in 67 villages. This river required cleaning and desilting. The length of the river was 81.8 Km and the project cost was Rs 328 lakh (in 2005).

The Perception No outsider dared to enter the area and bid against the tender (global tender) floated; the contract would, in all probability, be awarded to a local man. The officials of the implementing agency were too 'scared' to enter the villages and check the Measurement Book, a very sensitive area. On top of all this bureaucracy, political upheavals are a fact of life. And inquiries by succeeding governments are a reality.

The Dilemma

The situation was so complex, stakes so high and interests so varied that we had to either adapt or quit. We did not want to seek perfection by over engineering, but certainly, we wanted a good enough solution that could get the job done. Most certainly, we did not want audit objections and a charge sheet by the successor government. Probably, these extreme circumstances heightened our internal resolve to succeed sustainably. We had to think out of the box, experiment and improvise. In some ways, I would say that the harsh environment, uncertainty, volatility and unpredictability

demanded unconventional, nonlinear thinking and induced flexible thinking and action on our part.

A New Aspect

It struck us that **in general, the silt is fertile in nature and farmers would love to have the desilted material into their fields. But this aspect was, so far, unnoticed, inconsequential and unimportant. The team drew the local farmers' attention to this alluvial soil, 'real gold', and made them natural partners in the desilting process by announcing that the silt removed from the river bed would be distributed to the farmers (according to a formula arrived at after wider consultations). This simple announcement made them stakeholders in the process.** The team held formal and informal discussions with various interest groups - beneficiaries, implementing agency, NGOs, village leaders, people's representatives and other identified groups. **Each farmer became aware of the advantage and wanted to have the maximum possible silt for himself. They became an interested group having local influence and hence able to influence and persuade the contractor (another local man) to do his job well, removing all the desired silt from the bed.**

Rather than relying on expert opinions to make a decision, we decided to listen to our intuition and processed sensory information from the real world, relying mainly on common sense and social intelligence. The idea culminated in an affordable solution to meet the needs of the undeserved segments and to achieve the desired outcome of 'actually and effectively' cleaning the river.

The impact There was no need of a strict outside supervision; the (equally powerful and influential) locals were keeping a vigilant eye on the operations. The job was completed so well that the World Bank officials got it videographed; the Chief Minister personally appreciated the work that the 67 villages would now remain flood- free for next 10 years, in addition to the problem of sodicity being tackled.

A critique: In Retrospect A new dimension was added to the matter by involving the local population. In hindsight, I can say that we attempted to seek out the marginal, undeserved target groups and pull them into the mainstream. They were, till then, inconsequential, unprofitable, too complex to serve, and not sufficiently valuable. But once they became stakeholder, the task became easier. This was an attempt to commercialize the idea which required knowledge of fields such as public awareness, raising awareness - skills that technologists, scientists and engineers may not have.

This intervention, an inclusive experiment, was to involve low-income and low profile groups, not as passive participants but as active value co-creators. This can be termed as an inclusive technology solution that was sensitive to local needs and local circumstances.

[The technical details of the Project may be seen from the websites of UPBSN and World Bank, The World Bank in India journal September 2006 Vol. 5 / No 2 and Yojana January 2007 issue.

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Some procedural issues

Desilting needs to be done by skilled labour under supervision of technical persons.

The silt disposal at fields needs to be evenly done and be properly mixed with native soil to avoid dusting. This is because silt is lighter and can cause dust problem during high surface winds; its proper mixture with the native soil allows weight gain.

The quantum of desilted material received by a farmer for his field should not be so much that it raises the ground level of field.

The contractor must get written receipt from all farmers about the quantity of silt received by them and these receipts should be an integral part of the Measurement Book. Provisions should be clearly made in the contract document so that there is no possibility of back- track by the contractor.

BAEL- A FRUIT OF HIGH MEDICINAL VALUE

Dr. Kirandeep Kaur

Bael (Aegle marmelos), a plant indigenous to India has been used by the inhabitants of the Indian subcontinent for over 5000 years. It is present throughout Southeast Asia as a naturalized species. The tree is considered to be sacred by Hindus and is also known as "bilva" or "bilpathre".

Climatic requirements

Owing to its hard nature, bael tree has a wide adaptability to adverse soil and climatic conditions. It requires subtropical climate where summers are hot and dry and winters are mild. It has a reputation for being able to grow in places that other trees cannot. It copes with a wide range of soil conditions, is tolerant of water logging and has an unusually wide temperature tolerance (from -7°C to 48°C). It requires a pronounced dry season to give fruit.

Fruit properties

The bael fruit has a hard wood like rind which is pale green when unripe, changes to pale yellow peel to brown as it ripens. It takes about 11 months to ripen on the tree and can reach the size of a large grapefruit and some are even larger. Fruit is astringent and bitter in taste. The fibrous yellow pulp is very aromatic.

Nutritional composition

Bael fruit is rich in carbohydrates (30.6%). It also contains proteins (1.8%), Vitamin A (186 IU) Riboflavin (1.2%), Iron (0.3%), Potassium (0.6%) and Fibre (2.2%). Its fruit contains high amount of moisture content (64.2%) which is very good particularly useful during summer season.

Religious significance -The Holy Bael

The fruit is also used in religious rituals. In Hinduism the tree is considered to be sacred. It is used in the worship of Shiva, who is said to favor the leaves. The tri-foliate form of leaves symbolize the trident that Shiva holds in his right hand.

Medicinal uses

- Respiratory infections

The leaf decoction is an effective remedy to relieve asthma and bronchitis. The bitter, pungent juice from the leaves mixed with honey is given to reduce mucous discharge from nose and throat.

- Constipation

Ripe bael fruit is regarded as best of all laxatives. It cleans and tones up the intestines. The fresh ripe pulp and the "sherbat" made from it, is taken for their mild laxative and digestive effects. Marmelosin derived from the pulp is very useful as a laxative and also has a diuretic effect.

- Diarrhea and Dysentery

The unripe or half ripe fruit is used as the most effective remedy for chronic diarrhea and dysentery.

- Peptic Ulcer

An infusion of bael leaves is regarded as an effective food remedy for peptic ulcer. The leaves are soaked overnight in water. This water is strained and taken as a drink in the morning. Bael leaves are rich in tannin which reduces inflammation and helps in healing of ulcers.

Bael squash preparation

Ingredients: Bael fruit-1, sugar -2 tsp (optional), Cumin Powder (roasted) – ½ tsp, Black Salt – ½ tsp, water- 500 ml

Method

- First break the bael fruit and scoop out the fruit pulp with the help of a spoon.
- Soak the pulp in water for 2-3 hours and then sieve it to remove seeds and discard the remaining pulp.
- Mix salt, cumin powder and sugar in sieved juice.
- Serve chilled.

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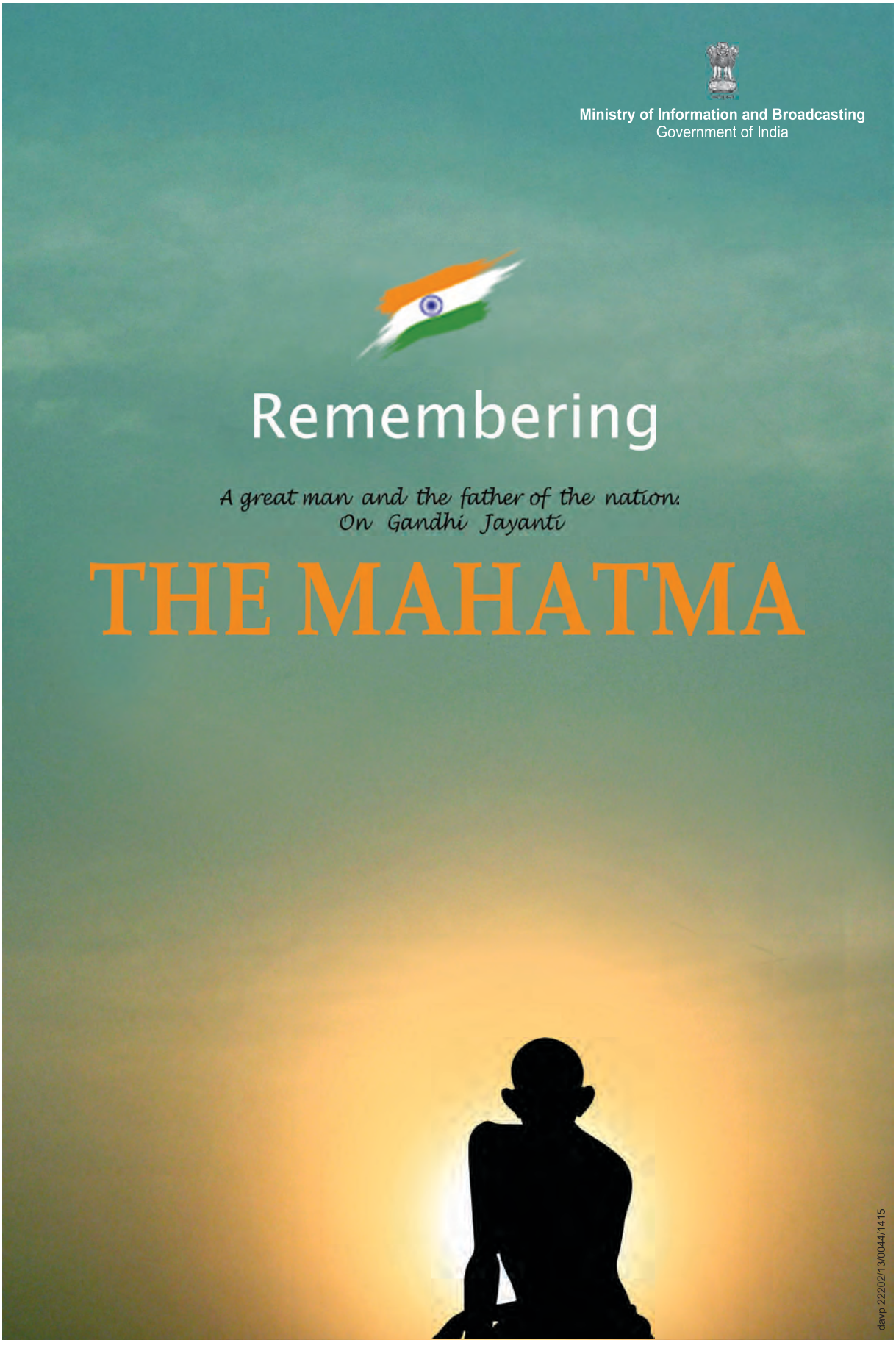
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