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Let noble thoughts come to us from all sides
Rig Veda

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Chief Editor's Desk

The 'Who' Question

Let us begin with a story, in fact an episode in Gandhiji's life. Year 1998. Durban, South Africa. Gandhijee was practising as a lawyer and often his office clerks stayed with him at his house. Once a Christian clerk born of 'panchama parents' stayed with him. The rooms had provision of chamber-pots for collecting excreta which were cleaned by Kasturba in the morning. However, she was not happy cleaning the excreta of a lower caste person, nor did she want Gandhijee to do the same. Gandhijee insisted that she do it and do it cheerfully. He writes in his autobiography, *'I forgot myself, and the spring of compassion dried up in me. I caught her by the hand, dragged the helpless woman to the gate, which was just opposite the ladder, and proceeded to open it with the intention of pushing her out.'* Gandhi recollects it with a sense of shame on himself.

This story has an important insight into Gandhi's understanding of the linkage between the issue of cleanliness and the caste dimension of it. Gandhi's deep involvement with the issue of sanitation was not merely a question of personal hygiene or even municipal cleanliness but it linked with his holistic understanding of the world. It, in a sense, defined the multi-dimensional relationship between the individual, society and the state. He understood that in South Africa, sanitation was a political question that gave the British the alibi to perpetuate apartheid and racial segregation. The struggle for the rights of Indians and coloured Africans could not be de-linked from the imperatives of cleanliness and personal hygiene. There is a consistent thread running from his South Africa days to the time in 1947-48 when he made it a point to stay in the colony of manual scavengers in Delhi. He understood and believed that merely talking about sanitation would be meaningless unless the stigma and social exclusion associated with it is not challenged. Indeed, sanitation for Gandhi had a radical content, a transformative potential.

Once again, the issue of sanitation has come into the mainstream with the government launching a nation-wide programme of cleanliness. It is true that sanitation programme has been part of government policy for a long time but earlier it did not get the 'big push' both in terms of administrative effort as well as media coverage. Now, the government is committed to spend a large sum of money over the next few years on urban waste management, construction of toilets, public education on the issue of hygiene and cleanliness in close cooperation with the state government and private sector like industries, corporate bodies, NGOs etc.

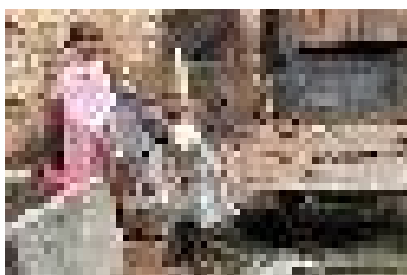
However, special attention needs to be paid to the people on whose shoulders the day to day responsibility of ensuring cleanliness of the sewers, latrines, offices and municipal spaces rests. There are lakhs of sanitation workers who are working at very low wages and suffering inhuman conditions of work. Socially, these workers belong to the weakest section of society. There are also a huge number of people working as rag pickers and waste-collectors, a large number of them below the age of 14. They have no social security. It is shocking to know that '90 percent of India's sanitation workers die before they turn 60 after contracting various infectious diseases'. Clearly, in the context of cleanliness, questions relating to exclusion and dignity need to be fore-fronted and to be tackled with the same determination and political will as is being done in case of financial resources and administrative mainstreaming of the programme.

It has a great symbolic value that Gandhijee has been brought into the centre of this exercise by the government as an icon and inspiration. The symbolic value of the pair of Gandhi's spectacles would be truly respected when the country does not have a single death of a sewer worker cleaning the manhole or a rag picker child dying of an infectious disease. And yes, Gandhiji would flash his contented smile when persons from all castes and not only Dalits, willingly and happily come up to take up the job of a *Safai-Karmachari* in a modernised sewerage cleaning municipal system in the country. Babu, bless us that it does not take too long!



Sanitation and Social Change in India

*Vijayan K Pillai
Rupal Parekh*



...modernization plays a significant role in improving sanitary conditions. More importantly, we suggest that in order for the programme to be successful, we need strong political will which will bring modern amenities and public health education to the door steps of people

OF THE 2.6 billion people who lack toilet facilities, nearly 650 million live in India. In order to address this gigantic problem of sanitation, the Government of India has launched a nationwide "Clean India Program." The success of this programme and in particular, its sustainability is likely to depend upon its coherence with the social structural forces, which drive poor sanitary conditions. The purpose of this study is to explore the social structural context of sanitation in India. We propose a multivariate model of sanitation and assess its empirical validity with data from the National Family Health Survey – III. We find that modernization plays a significant role in improving sanitary conditions. More importantly, we suggest that in order for the programme to be successful, we need strong political will which will bring modern amenities and public health education to the door steps of the people.

The world population is expected to reach about 9.6 billion by 2050 and nearly 66 per cent of this population will be living in urban areas (Porter, Dyball, Dumaresq, Deutsch &

Matsuda, 2014; Evans, 1998). This means an addition of nearly 2.4 billion to the current population with the percentage of population urban increasing 12 per cent by 2050. Population growth is high in developing countries such as India where, though there has been a decline in total fertility rates in recent decades, the population size continues to increase rapidly owing to population momentum (Chandrasekhar, 2013). Although, the proportion of urban population is lower in developing countries than in developed countries, nearly 53 per cent of the world's urban population lives in developing countries in Asia. Perhaps, one of the most undesirable consequences of rampant population growth and urbanization is the collapse of sanitary conditions resulting in poor population health (Rayner & Lang, 2013).

The failure of public programmes and policies in most developing countries to address basic sanitation issues is indicated by the fact that between 1990 and 2008, the share of the world's population with access to basic sanitation increased only from 54 per cent to 61 per cent and that, even today, nearly 2.6 billion people world-wide have no toilet facilities (Majra & Gur, 2008; Moe

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& Rheingans, 2006). The gravity of this issue led to the formulation of a Millennium Development Goal in 2000 to reduce the number of people without toilet facilities in developing countries by half (Canaday, 2011; Bartram & Cairncross, 2010).

Poor sanitation has been linked to a number of economic and social issues. According to the Water and Sanitation Programme Report, inadequate sanitation resulted in a loss of 53.8 billion US Dollars accounting for 6.4 per cent of India's gross domestic product (GDP) in 2006. (Water and Sanitation Program, 2011). Nearly 72 per cent of this impact was attributed to health related causes. The social consequences of poor sanitation have not been adequately investigated. Most of the evidence on the social consequence of poor sanitary conditions appears to be poorly documented and inadequately explored (Chu, 2013).

In India, nearly 650 million people lack toilet facilities. Efforts toward addressing this massive problem of sanitation appear to be bi-pronged involving both the government and the Non-Governmental Organizations. The government programmes have focused mainly on community campaigns. The main goal of this is to eliminate open defecation by 2017 through peer pressure and to reward communities, which achieve 'open defecation free' status. The current government has initiated a 'Mahatma Gandhi Clean India Programme', to clean up nearly 1000 towns and to put an end to the practice of manual scavenging. The success of this program and in particular, its sustainability is likely to depend upon its coherence with the social structural forces, which drive

poor sanitary conditions. The purpose of this study is to explore the factors related to sanitation levels among Indian households.

[Data from the Third National Family Health Survey (NFHS-3) of India are used in this study (International Institute for Population Sciences, 2006)].

Measures, Analysis and Results

At a theoretical level, we suggest that sanitary conditions are a function of the extent of modernization, level of poverty, religious affiliations, and educational level. The focus of this study, sanitation level, is measured at the nominal level indicated by three categories: access to toilet facility;

The government programmes have focused mainly on community campaigns. The main goal of this is to eliminate open defecation by 2017 through peer pressure, and to reward communities, which achieve 'open defecation free' status. The current government has initiated a 'Mahatma Gandhi Clean India Program', to clean up nearly 1000 towns and to put an end to the practice of manual scavenging.

no toilet facility, pit and flush. The proportion of respondents in each of these categories is presented in Table 1. Nearly 51 per cent of the sample have access to flushing toilets while 40 per cent have no toilet facility at all. The per cent sample distribution of respondents with flushing toilets across the 29 states is presented in Table 2. The top four states leading the nation with high proportion of respondents with flushing toilets are

Kerala, Delhi, Sikkim and Mizoram. The bottom four are Rajasthan, Jharkhand, Chattisgarh and Orissa.

The suggested theoretical determinants of sanitation are measured using a set of nine variables. Five of these: availability of pipe water, electricity, and possession of TV, type of occupation (modern vs. informal sector jobs) and knowledge about HIV transmission are related to the level of modernization. These indicators are related to the utilization of modern amenities such as electricity and water and goods such as TV. The variable type of occupation (modern or not), connotes the extent of modernity possibly absorbed through exposure to modern scientific jobs and organizations. Level of knowledge of HIV is expected to indicate awareness of modern health concepts essential to personal hygiene and sanitation. Religious affiliation is measured as a dummy variable, Hindu or Not. Poverty is measured nominally, derived by re-categorizing the well known NFHS wealth status measure. The middle and above categories are coded 0 and the rest, 1. Education is represented by a dummy variable coded 1 for more than primary education and 0 for the rest. The per cent distribution of respondents among the various categories of the determinants selected in this study is presented in Table 3. Table 4 presents the cross – tabulation of the three dependent variables categories, no facility, pit and flush with the nine independent variables. Since the outcome variables are multi-categorical, we use multinomial logistic regression to assess the independent effects of the variables on sanitation levels. The regression results are presented in Table 5. The base category is 'no facility'. The first

Table 1: Frequencies (Proportions) of the Dependent Variable, Level of Sanitation. NFHS-III (N = 124,385)

Sanitation Category	Description	Frequency
No facility	No facility/Use of bushes/fields	50,298 (40.5 Per cent)
Pit	All varieties of pit latrines	9,878 (7.9 Per cent)
Flush	Flushed to a wide variety of latrines.	64,096 (51.5 Per cent)

Table 2: Per cent Distribution of Sample Population with Flushing Toilets by Indian States

State	Per cent of Sample with Flushing Toilets	Rank
Kerala	88.3	29.0
Delhi	87.9	28.0
Sikkim	78.2	27.0
Mizoram	72.1	26.0
Maharashtra	69.3	25.0
Nagaland	66.5	24.0
Goa	65.9	23.0
Andhra Pradesh	62.5	22.0
Punjab	62.0	21.0
West Bengal	61.9	20.0
Uttaranchal	57.0	19.0
Tamil Nadu	53.7	18.0
Gujarat	53.1	17.0
Manipur	51.3	16.0
Himachal Pradesh	50.9	15.0
Meghalaya	50.8	14.0
Madhya Pradesh	48.4	13.0
Tripura	47.8	12.0
Haryana	45.4	11.0
Assam	42.7	10.0
Uttar Pradesh	41.7	9.0
Arunachal Pradesh	36.8	8.0
Karnataka	36.6	7.0
Bihar	34.6	6.0
Jammu and Kashmir	33.4	5.0
Rajasthan	32.0	4.0
Jharkhand	29.0	3.0
Chhattisgarh	24.1	2.0
Orissa	19.6	1.0

section of the table presents the odds of having 'flushing toilet' against the odds of having 'no facility'. The second section presents the odds of having 'pit latrine' against 'the odds of having 'no facility'. The odds ratios presented in column 6, inform us how the odds of having 'flushing toilet' (or pit latrine) is influenced by each of

the independent variables. Those who have electricity at home are three times more likely to have 'flushing toilet' compared to those who do not have electricity. Having electricity increases the odds of having 'pit latrine' also. However, the odds are much in favour of having 'flushing toilet' than 'pit latrines'.

Having more than primary education, pipe water at home, television, employed either in the modern sector or having manual jobs against having other types of jobs, and having knowledge about pathways of HIV transmission may improve the odds of having 'flushing toilet'. The two variables which decrease the odds of having 'flushing toilet' are being a 'Hindu' or belonging to any of the poor wealth categories'.

The direction of association of the selected independent variables with the odds of having 'pit latrine' vs. 'no facility' is similar to the direction of having 'flushing toilet'. However, the associations of the independent variables are much stronger with having 'flushing toilet' at home than with 'having pit latrines'. In general, our results support the wide-spread belief that Hindus are much more likely to ignore sanitary conditions outside the home than inside. We found the odds of Hindus having 'no facility' are significantly higher than other communities. Modernization processes also contribute to levels of sanitation. Consumption of modern amenities and goods such as electricity, pipe water and television appear to be more compatible with 'having a flushing toilet' than otherwise. Furthermore, workers in the modern sector whose day to day work experiences are influenced by scientific and rational processes are more likely to adopt modern methods of sanitation improving the odds of having a 'flushing toilet'. Not surprisingly, we found that low socio-economic class characterized by low levels of education and income appear to be more likely to belong to the 'no facility' sanitation group.

Conclusion: In general, our results support the well established finding in the field of public health, which suggests that modernization improves sanitation resulting in significant gains in health for individuals. Within this broad based generalization, our findings underscore the importance of

Variable Name	Description	Values	Frequency (Per cent)
Educ	More than Primary	1	66848 (53.7)
	Primary or less	0	57525 (46.3)
SafeWater	Pipe Water / Bottled Water	1	99382 (79.9)
	Other Sources	0	24990 (20.1)
Elec	Electricity Available	1	95764 (77.0)
	Electricity not Available	0	28598 (23.0)
Tel	Television at Home	1	71081 (57.1)
	No Television	0	53304 (42.9)
Hindu	Hindu	1	89957 (72.4)
	Other Religions	0	34270 (27.6)
Wealth	Poor or poorest Income Category	1	31729 (25.5)
	Middle Income or higher	0	92656 (74.5)
Modern	Partner holds modern Occupations	1	33460 (26.9)
	Partner not in modern sector	0	90634 (72.9)
Manual	Partner holds manual Jobs	1	34385 (27.7)
	Partner holds jobs other than manual	0	89729 (72.3)
Aids Know	Has knowledge about HIV/AIDS	1	71025 (57.1)
	Has no or little knowledge about HIV/AIDS	0	53360 (42.9)

Variables	Type of Sanitary Facilities in Use				
	Per cent	Per cent	Per cent	Per cent	N
	No Facility	Pit	Flush	Total	Pearson Chi-Square (p-value)
More than Primary education	23.5	7.4	69.2	66,797	19050 (0.000)
Pipe Water / Bottled Water	35.8	6.5	57.7	57,296	7560(0.000)
Electricity Available	28.4	7.5	64.0	95,687	27590(0.000)
Television at Home	20.4	6.2	73.4	71,020	32440(0.000)
Hindu	46.1	5.2	48.7	89,878	6090(0.000)
Poor or poorest Income Category	84.5	9.2	6.2	31,693	37470(0.000)
Partner holds modern Occupations	22.9	6.5	70.6	33,452	6819(0.000)
Partner holds Manual Jobs	45.3	7.5	47.2	34,353	459(0.000)
Aids Knowledge-Yes	26.0	8.4	65.6	70,971	14890(0.000)

a social-structural and multi-variable approaches towards improving levels of sanitation. The current campaign in India such as the Total Sanitation Campaign and Clean India Program focus on eradicating public defecation by providing individual household latrines. Such campaigns are founded on the assumption of an unmet need for flushing

toilets and pit latrines. However, whether the recipients of household toilets use them or not remains an open question. Furthermore, the assumption that increases in toilet facilities will produce declines in the incidence of infectious diseases, spread through fecal matter, has not been adequately tested. Clearly, sanitation programmes will have

to be integrated with meaningful behavioral changes to achieve public health gains. In this regard, the results of our study have implications for a social-structural and cultural context in which sanitation campaigns are based. Our study presents a number of variables, both social-structural and cultural, associated with levels of sanitation. Variables such as

Table 5: Multinomial Logistic Regression of Levels of Sanitation with the Set of Nine Selected Categorical Variables

Flush vs No Facility							
Variable	B	SE B	Wald's Chi Square(df=1)	P value	Exp(B)	CI Upper	CI Lower
Intercept	-1.825	0.034	2892.0	0.000			
Educ	0.928	0.018	2655.0	0.000	2.530	2.442	2.621
Safewater	0.887	0.021	1731.0	0.000	2.427	2.328	2.531
Elec	1.177	0.027	1911.0	0.000	3.245	3.078	3.421
Tel	0.932	0.019	2426.0	0.000	2.541	2.448	2.637
Hindu	-1.087	0.020	3090.0	0.000	0.337	0.325	0.350
Wealth	-2.067	0.028	5476.0	0.000	0.127	0.120	0.134
Modern	0.813	0.020	1617.0	0.000	2.255	2.168	2.346
Manual	0.420	0.019	464.7	0.000	1.522	1.465	1.582
Aids Know	0.441	0.018	622.5	0.000	1.554	1.501	1.609
Pit vs No Facility							
Variable	B	SE B	Wald's Chi Square(df=1)	P value	Exp (B)	CI Upper	CI Lower
Intercept	-1.038	0.040	679.846	0.000			
Educ	0.364	0.027	184.926	0.000	1.440	1.366	1.517
Safewater	-.202	0.026	60.003	0.000	0.817	0.777	0.860
Elec	0.449	0.031	211.259	0.000	1.566	1.474	1.664
Tel	0.249	0.029	74.496	0.000	1.283	1.213	1.358
Hindu	-1.703	0.024	4833.0	0.000	0.182	0.174	0.191
Wealth	-.383	0.031	157.795	0.000	0.682	0.642	0.724
Modern	0.271	0.031	78.629	0.000	1.311	1.235	1.392
Manual	0.002	0.028	0.005	0.944	1.002	0.948	1.058
AidsKnow	0.532	0.026	406.452	0.000	1.702	1.616	1.792

Likelihood Ratio Test: 69050 (Chi-Square), 18 (df), P=0.000 . Cox and Snell R Squared =0.427. Nagelkerke R-Squared (Max rescaled R Squared)=0.510. McFadden=0.307

education and type of occupation are related to sanitation levels. Broadly speaking, social institutions such as schools and labour markets have an influence on sanitation levels. In the case of the labour market, as its composition changes from informal to formal occupations, there will be gains likely in sanitation levels. To this extent, it is necessary to involve and engage religious groups, schools, and labour markets with the sanitation campaigns.

We pointed out that there is a dearth of literature on the social consequences of poor sanitation levels. Though this study makes no attempt to address this issue, research on the social consequences of poor sanitation is necessary to improve population health. We end this paper with a few remarks for framing studies on the social consequences of poor sanitation as follows. The failure of the public sector to provide adequate sanitary infrastructure presents opportunities for the private sector

to cater to the unmet needs for public sanitation. However, the emergence of a private sector providing sanitary services calls for governmental regulations owing to the public health consequences of sanitation. Often, the weak governmental organizations are ineffective in implementing, regulating and maintaining adequate public sanitation standards (Trémolet, Cardone & Fonseca, 2013). This provides many private providers of toilet facilities to engage in illegal dumping of refuse in un-authorized locations in urban areas resulting in

stench and piling up of refuse. Residences of areas with perceived high levels of filth are likely to be associated with poor environmental quality of their living spaces and are more likely to be poorly treated and socially marginalized (Agrawal, 2014). In congested urban areas, public spaces for toileting are scarce, placing groups such as children at a disadvantage while being left feeling uncomfortable and vulnerable. Finally the younger generations are more likely to perceive themselves as being more informed and aware of the importance of hygiene and sanitation. They may attribute poor sanitary conditions to the uninformed and poor sanitation behavior of older cohorts resulting in potential threat to social cohesion of communities (Biritwum, Mensah, Minicuci, Yawson, Naidoo, Chatterji & Kowal, 2013).

Readings

Agrawal, V. (2014). Slums: Affects on environment. *Recent Research in Science and Technology*, 6(1).

Bartram J, Cairncross S. Hygiene, sanitation, and water: Forgotten foundations of health. *PLoS Medicine* (2010);7(11): e1000367, doi:10.1371/journal.pmed.1000367.

Biritwum, R. B., Mensah, G., Minicuci, N., Yawson, A. E., Naidoo, N., Chatterji, S., & Kowal, P. (2013). Household characteristics for older adults and study background from SAGE Ghana Wave 1. *Global health action*, 6.

Canaday C. Simple urine-diverting dry toilets built with recycled or readily available materials.

Chandrasekhar, S. (Ed.). (2013). *Infant Mortality, Population Growth and Family Planning in India: An Essay on Population Problems and International Tensions*. Routledge.

Chu, C. (2013). *Combating Nuisance: Sanitation, Regulation, and the Politics of Property in Colonial Hong Kong*. *Imperial Contagions: Medicine, Hygiene, and Cultures of Planning in Asia*, 17.

Evans, L. T. (1998). *Feeding the ten billion: plants and population growth*. Cambridge University Press.

International Institute for Population Sciences (IIPS) and Macro International. *National Family Health Survey (NFHS-3) India 2005-06*. vol.1., IIPS, Bombay, 2006

Majra JP, Gur A .India needs a great sanitary awakening. *Indian J Occup Environ Med*. 2008;12(3):143-150.

Moe CL, Rheingans RD. Global challenges in water, sanitation and health. *Journal of Water and Health* (2006);4(Suppl.):41-57.

Porter, J. R., Dyball, R., Dumaresq, D., Deutsch, L., & Matsuda, H. (2014). Feeding capitals: Urban food security and self-provisioning in Canberra, Copenhagen and Tokyo. *Global Food Security*, 3(1), 1-7.

Rayner, G., & Lang, T. (2013). *Ecological public health: reshaping the conditions for good health*. Routledge.

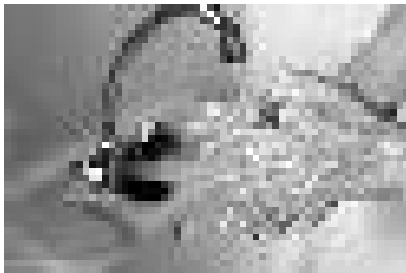
Trémolet, S., Cardone, R., & Fonseca, C. (2013). Investing in urban water and sanitation systems. *The Urban Transformation: Health, Shelter and Climate Change*, 149.

Water and Sanitation Program. (2011). *INDIA, I. S. I. Inadequate Sanitation Costs India Rs. 2.4 Trillion (US \$53.8 Billion)*. □

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Obstacles to 'Total Sanitation' : Evidence from District Level Household Survey

Gregory Pierce



...data for sewerage coverage exist at the city scale, in sources such as the Census Town Directory, but remain underexplored. Although urban rates of toilet use are markedly higher than in rural areas, under-utilization of adequate sanitation remains an important obstacle to health in Indian cities, and we know little about spatial trends in urban areas.

IN A D E Q U A T E TOILET use¹ directly contributes to high rates of morbidity and mortality within India. Approximately, one-fourth of the global population without access to adequate sanitation resides in India; and over 600 million people in India defecate in the open (UNICEF, 2012). The combined lack of access and use decreases India's GDP by at least 6.4 per cent annually (WSP2011; Chambers and Von Medeazza 2013). Despite a strong research focus on sanitation interventions, understanding of the determinants of inadequate sanitation remains poor.

This paper uses spatial analysis techniques to explain variation in toilet use at the district scale across India. A test of global spatial autocorrelation confirms that sanitation use is strongly clustered at the district level. Tests of local spatial autocorrelation also reveal that poor sanitation is clustered in districts that have high under-five mortality rates. A spatial lag model is employed to demonstrate the persistence of spatial clustering even after accounting for standard socioeconomic and institutional correlates of toilet use. The location

of these clusters and the explanatory power at district level appear to reflect the mechanisms that are not captured by state-level analysis.

Much of the spatial research focus on sanitation use remains tightly focused at either the village/neighbourhood scale, or at the state or even supra-state scale (Manikutty 1998; Chambers 2009). A more recent exception to this extreme micro or macro focus is a burgeoning literature on sanitation inputs and outcomes at the district scale. The Central government operates the Total Sanitation Campaign (TSC) in 95 per cent of the country's districts. Under the TSC, funds are transferred to the state level, on to the district and eventually to village level—with the goal of eliminating open defecation in all Indian villages—but fundamental control and assessment remains at the district scale.

Until very recently, rigorous research on the determinants of inadequate sanitation across India was also rare (UNICEF, 2008). Spears uses all-India data to find significant, positive impacts on child height and infant mortality stemming from the TSC district-wise allocations (2012). On the other hand, Stopnitzky (2012)

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concludes that the TSC programme, as of 2008, had not increased latrine ownership across Indian districts in a significant way. Hueso and Bell, using a qualitative approach, remain skeptical about local uptake of TSC resources, despite the programme's efforts to encourage demand (2013). Ghosh and Cairncross, using 2001 and 2011 Census data, suggest that the regional variation in toilet access at the state and district scales is influenced by female literacy rates and urbanization (2013). The present study complements this emerging literature by introducing and testing a district-wise theory of spatial variation in sanitation use across India.

The Spatial Dimensions: Role for the District

There are a few studies which attempt to explicitly measure the effect of geographic proximity, after controlling for socioeconomic status, in determining toilet use. A comparison

...the spatial relationship of district level toilet use cannot be viewed solely as a process of physical transmission. Rather, the potential spatial relationship of use across districts must be viewed as a result of variation in the supply and demand and supply for sanitation. The demand for toilets largely operates through social norms, whereas the supply is mediated by institutional actors.

can be drawn, however, between research assessing spatial variations in health outcomes closely related to sanitation— such as under-five mortality rates in India— and the present study (Singh, Pathak and Chauhan 2011; Kumar, Singh and Rai 2012).

As mentioned above, it is easiest to conceptualize the spatial dynamics of inadequate sanitation in the rural or urban neighbourhood. At these scales, there are direct, negative spillover effects from open defecation (Karn and Harada 2002; George 2009). When a

few households continue to defecate in the open, disease vectors can easily spread throughout the community. Conversely, sub-national states in India wield a large amount of discretion over basic service policy, as compared to sub-national units in other LMICs, so differences in sanitation outcomes are often attributed to state policy (Eldon and Commins 2012; Ghosh and Cairncross 2013; Rao and Singh 2003).

Districts are administrative subdivisions of the states and union territories and may span several urbanized areas or hundreds of rural villages depending on the location. Individual districts' populations range between a few hundred thousand to a few million people. Accordingly, a spatial theory of district-scale sanitation is not immediately apparent. Clearly, the spatial relationship of district level toilet use cannot be viewed solely as a process of physical transmission. Rather, the potential spatial relationship of use across districts must be viewed as a result of variation in the supply and demand for sanitation. The demand for toilets largely operates through social norms, whereas the supply is mediated by institutional actors. There are at least four potential explanations for current district equilibriums and only one which suggests a true district-level mechanism.

Variation in toilet use at the district scale could simply reflect the modifiable areal unit problem. Accordingly, arbitrary district boundaries could dampen or enhance the measurement of true spatial variation in toilet use. Alternatively, district variation could merely account for state-level supply differences. Third, India's current administrative boundaries are relatively recent and continue to shift. Accordingly, severe clustering of sanitation use could be better explained by cultural preferences— or differences in demand— of people which cross the state and district boundaries.

Finally, there is a conceptual case for a 'true' district effect which explains spatial patterns in sanitation use. As shown in the TSC literature, decision-

making and resource allocation at the district level could affect levels of toilet access and use. Individual districts may greatly improve access due to the efforts of specific leaders and campaigns. Improvement in sanitation in one district may encourage or compel adjoining districts to improve service. This process of adaptation between proximate districts need not stop at state borders. On the other hand, policy makers may channel resources or efforts to favoured (clusters of) districts within states, contributing to variation in use. In short, the TSC provides the rationale for exploring spatial relationships in sanitation at the district scale.

Methods

The dependent variable in this study measures the percentage of households in the district that use a toilet, derived from the 2007-2008 District Level Household Survey (DLHS-III). Households that do not use a toilet either use facilities that do not sufficiently manage waste storage, or more commonly, defecate in the open. Three other independent

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variables were also derived from the DLHS-III, with land area and density data collected from the 2001 National Census.

To perform spatial analysis, a choice must be made about how to characterize the spatial relationship of sanitation levels between districts. For the purpose of this study, the Queen weighting technique was deemed most appropriate, since a

given district will be influenced by the neighbours that reside in its policy sphere, whether they share a large border or meet at a single juncture. The most common test to measure whether phenomena are correlated across space is the global Moran's I test. The global Moran's I measures spatial auto correlation—how related the values of the outcome of interest are, based on their location across the entire distribution. A local indicator of spatial auto correlation (LISA) test is also run to identify clusters of districts with like and unlike sanitation levels. Finally, a spatial lag regression was specified to test whether the spatial trends were robust to socioeconomic controls.

Results and Discussion

A global Moran's I test— 0.75, significant at the 0.01 level— shows that districts with similar values of toilet use tend to be located near each other.

Additionally, the result of a LISA test of under-five mortality rates in India, performed by Singh, Pathak and Chauhan (2011) using data from the DLHS-II survey conducted

between 2003 and 2004 illustrates that where sanitation use is low, under-five mortality is high. Further, the spatial shape of relationship suggests that clustering of extreme values does not adhere to state borders. Singh, Pathak and Chauhan suggest that clustering may be better explained by long-standing cultural differences between regions at a scale not typically used in comparative analysis. The potential to further examine this relationship is outlined in the conclusion of this study.

Having established spatial proximity as an important factor, spatial regression is used to test the strength of the geographic relationship, after controlling for socioeconomic correlates of toilet use.²All independent variables were significantly correlated with toilet use in univariate associations. First, access to an improved water source is expected to be positively and strongly correlated to toilet use, although in fact, the data shows a robust, negative relationship (Black and Fawcett 2008; George 2009; Ganguly 2008). Because income data are not available in India, the percentage of

households in the district that have a natural gas connection (LNG) is used as a control variable for economic status, and be positively and strongly correlated to toilet use (Deaton and Grosh 2000.³

There are theories regarding the effect of density or urbanization on toilet use conflict. Only highly urbanized areas provide the economies of scale required for trunk sewerage to function economically. In very low-income areas, however, the trunk sewerage is too costly to be installed at any level of density, and high density may hinder the installation of more basic sanitation technology (Mara and Evans 2011). Given this ambiguous effect, no direction is hypothesized for the relationship between density and sanitation.

Another variable of interest measures the percentage of households in the district that have a 'Below Poverty Line' (BPL) card. While BPL cards are nominally allotted to households below the national poverty line, there is significant leakage (Besley 2011). Accordingly, BPL card status should be negatively correlated to toilet use, but the strength of the relationship is unclear. Total land area and population density of the district serve as proxies for urbanization. There are theories regarding the effect of density or urbanization on toilet use conflict. Only highly urbanized areas provide the economies of scale required for trunk sewerage to function economically. In very low-income areas, however, the trunk sewerage is too costly to be installed at any level of density, and high density may hinder the installation of more basic sanitation technology (Mara and Evans 2011). Given this ambiguous effect, no direction is hypothesized for the relationship between density and sanitation.

Table 1.Spatial Lag Model Predicting Toilet Access

Independent Variables	Coefficient (Standard Error)
Drinking Water	-0.12*** (0.03)
LNG Connection	0.67*** (0.04)
'BPL' Card	-0.07** (0.03)
Land Area	-0.0002 (0.000001)
Density	1.71 (0.0003)
Lag Term	0.75*** (0.02)
Constant Term	11.80*** (2.65)
<i>Model Statistics</i>	R ² : 0.85 Moran's I: 0.065**

N=591. *p < 0.10, **p < 0.01, ***p<0.001

Table 1 shows the results of the spatial lag model. The spatial lag term is both statistically significant at the .001 level and vastly improves the explanatory power compared to an OLS model including all other independent variables (Adjusted R-squared=0.49).

Over four-fifths of variation in toilet use is explained by the spatial lag specification, and the model fit is superior to a pure state-wise analysis. While drinking water access, LNG connections and BPL cards are statistically significant predictors of sanitation use, both the geographic variables lose significance in the model. When data on district-wise performance in the TSC are included as independent variables,⁴ they do not markedly change the model results. In short, the findings suggest that a district-wise diffusion process operates in addition to both the standard socioeconomic drivers and the measurable inputs of the TSC.

Findings suggest that the sensitivity of toilet use to spatial mechanisms at scales smaller than the state and larger than the village/neighborhood is an area for further scholarship. The district, city/tehsil and agro-climatic region remain the most fruitful, viable avenues to understand spatial trends. Modeling results suggest that the district level is an important scale for intervention but that programs such as the TSC need further refinement.

Conclusion

This study demonstrates that sanitation use is strongly clustered at the district level in India. Tests of local spatial auto correlation also suggest that poor sanitation is clustered in districts that have high under-five mortality rates. Moreover, spatial variation remains important

after controlling for socioeconomic determinants, state indicator variables and measurable TSC performance.

Findings suggest that the sensitivity of toilet use to spatial mechanisms at scales smaller than the state and larger than the village/neighborhood is an area for further scholarship. The district, city/tehsil and agro-climatic region remain the most fruitful, viable avenues to understand spatial trends. Modeling results suggest that the district level is an important scale for intervention but that programs such as the TSC need further refinement.

Moreover, there remains unexplored potential to explain clustering using the agro-climatic region as the unit of analysis. Clustering at this scale may reflect broader cultural differences within India that are not captured by state-level analyses. Finally, the data for sewerage coverage exist at the city scale, in sources such as the Census Town Directory, but remains underexplored. Although, the urban rates of toilet use are markedly higher than in rural areas, under-utilization of adequate sanitation remains an important obstacle to health in Indian cities and we know little about spatial trends in urban areas.

Readings

Besley, T., R. Pande & Rao V. (2011) Just rewards? local politics and public resource allocation in South India. *World Bank Economic Review* 3 (8).

Black, M. and Fawcett B. (2008) *The Last Taboo: Opening the Door on the Global Sanitation Crisis*. Earthscan, London.

Chambers, R. March (2009) *Going to Scale with Community-Led Total Sanitation: Reflections on Experience, Issues and Ways Forward*. Institute of Development Studies, Working Paper 1.

Chambers, R., & von Medeazza, G. (2013) Sanitation and stunting in India *Economic & Political Weekly*, 48(25).

Deaton, A. & Grosh M. (2000)

Consumption, in Margaret Grosh and Paul Glewwe (eds), *Designing Household Survey Questionnaires for Developing Countries: Lessons from 15 Years of the Living Standards Measurement Study*. The World Bank.

District Level Household and Facility Survey, DLHS-III. (2008) Household questionnaire. Mumbai, India.

Eldon, J. & Commins, S. (2012) *Towards a Framework for Better Donor Engagement in Fragile Federal States: Lessons from Balochistan*. HLSP Institute.

Ganguly S. (2008) India's National Sanitation and Hygiene Programme: from experience to policy, West Bengal and Maharashtra models provide keys to success. In *Beyond Construction: a Collection of Case Studies from Sanitation and Hygiene Promotion Practitioners in South Asia*. Water Aid & IRC International Water and Sanitation Centre.

George, R. (2009) *The Big Necessity: Adventures in the World of Human Waste*. Portobello Books, London.

Ghosh, A., & Cairncross, S. (2013) The uneven progress of sanitation in India. *Journal of Water, Sanitation and Hygiene for Development*, In Press, Uncorrected Proof.

Hueso, A. & Bell, B. (2013) An untold story of policy failure: the total sanitation campaign in India. *Water Policy*.

Indian Census. (2001) Provisional population totals. Ministry of Home Affairs, Government of India.

Karn S.K. & Harada, H. (2002) Field survey on water supply, sanitation and associated health impacts in urban poor communities – a case from Mumbai City, India. *Water Science and Technology*, 6 (11–12), 269–275.

Kumar, C., Singh, P.K. & Rai, R.K. (2012) Under-five mortality in high focus states in India: a district level geospatial analysis. *PLoS ONE* 7(5), e37515.

Manikutty, S. (1998) Community participation: lessons from experiences in five water and sanitation projects in India. *Development Policy Review*, 16, 373-404.

Mara, D. and Evans, B. (2011) Sanitation & Water Supply in Low-income Countries. Ventus Publishing, Telluride, Colorado.

Rao, M.G. & Singh, N. (2003) The political economy of center-state fiscal transfers in India. In *Institutional Elements of Tax Design and Reform* (ed John McClaren). World Bank, Technical Paper No. 539.

Singh, A., Pathak, P.K., Chauhan, R.K. & Pan, W. (2011) Infant and child mortality in India in the last two decades: a geospatial analysis. *PLoS ONE* 6(11): e26856.

Spears, D. (2012) Effects of rural sanitation on infant mortality and human capital: evidence from India's Total Sanitation Campaign. Working paper.

Stopnitzky, Y. (2012) Throwing money down the toilet? India's toilet subsidies and sanitation investment. Working paper.

UNICEF. 2008 *International Year of Sanitation (2008)*.

UNICEF. (2012) *Progress on Drinking Water and Sanitation: 2012 Update*.

Water and Sanitation Program, World Bank. (2011) *Economic Impacts of Inadequate Sanitation in India*.

Endnotes

- 1 Throughout this study, the terms 'toilet' and 'sanitation' are used interchangeably. Distinctions between 'access' and 'use' are drawn, when relevant.
- 2 Conceptualizing toilet use as a political and cultural diffusion process between adjoining districts makes a spatial lag model more appropriate than the spatial error specification.
- 3 A variable measuring the quality of housing stock was also considered as an economic indicator, but was highly collinear with LNG status.
- 4 Not shown here to adhere to word limits. □

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Revised Scheme to Counter Drug Abuse

The Ministry of Social Justice and Empowerment has decided to revise its scheme for Prevention of Alcoholism & Substance (Drug) Abuse. Under the revised scheme, which will be effective from 1st January 2015 rehabilitation centres for addicts can increase their capacity from 15 to 50 beds. They will also be given Rs 75 per inmate for providing them with three meals per day. The ministry will also help the industry set up rehabilitation centres in their premises by funding 25 percent of their costs. The government will also fund awareness and de-addiction camps providing them with a grant of Rs 63,000 per camp. It will also reach out to local bodies, schools and universities giving them financial assistance for creating awareness of the problem and meeting the objectives of the scheme.

In the third 'Mann ki Baat' programme, the Prime Minister had said that the drug menace is a 'national pain' and that drugs should be shunned.

Factor Income Inequalities In India: Contours and Implications

Tulsi Jayakumar

“Any city, however small, is in fact divided into two, one the city of the poor; the other of the rich; these are at war with one another.”

–Plato, Greek philosopher (427-347 B.C.)



...government in the form of tax breaks / rebates for firms which use variants of profit-sharing wage arrangements. These would not only help in reducing inequality, but also ensure better macroeconomic outcomes through generating regular private consumption and maintaining aggregate demand

THE INTELLECTUAL discourse on income distribution (and its inequalities) and its implications for growth and development has undergone “dramatic transformations” in the past century (Galor, 2011). We have witnessed a paradigm shift from the classical view that inequality has a beneficial impact on growth, to the neoclassical suggestion that income distribution has a limited role in the growth process, onto the modern view that has emphasized the potential adverse impact of inequality on development. Yet, with the publication of Piketty’s ‘Capital in the 21st century’ (Piketty, 2014) and its emphasis on *functional income distribution*, such a debate seems to have come full circle from the days of classical economists. While the post-World War II period has been dominated by the conception of inequality as that inherent in *personal or household income distribution*, much of classical economics was actually concerned with the distribution of income between labour and capital – the functional income distribution.

How does this change in perspective from personal to functional income distribution (and the resultant inequalities) affect the growth-

development debate in India? How are inequalities measured in India and what are the drivers of functional inequalities? Finally, what are the policy implications of such a changed perspective? These are the issues that we will consider in this article.

Relevance to the Inequality

Income inequality can be analyzed along two dimensions – household income distribution and functional income distribution (Box 1).

While the former studies the distribution of income across households within the economy, the latter studies the distribution of income between different factors of production such as land, labour and capital.

The Gini coefficient – the most commonly used measure of income inequality- captures personal (household) inequalities, usually based on secondary income distribution (post taxes and transfer payments). Yet, it is clear that even from the limited perspective of household incomes, it is the tertiary income distributions that are more relevant to developing countries like India. More importantly, measures of personal inequality fail to capture the manner in which such incomes are generated in the production process, and the resulting functional inequality.

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Box 1: Concepts of Income Inequality

Income Equality: Measures the distribution of income across households or individuals in an economy. This is usually measured using the Gini Coefficient of Inequality ranging from zero to 1. 0 indicates complete equality and 1 indicates complete inequality.

Two conceptions of inequality:

Household Income Distribution: This is the distribution of income across households within the economy. It can be further decomposed into:

- a) **Primary Income Distribution:** The distribution of the household incomes consisting of the different factor incomes in each household **before** taxes and subsidies, as determined by markets and market institutions
- b) **Secondary Income Distribution:** The distribution of household incomes **after** deduction of taxes and inclusion of transfer payments
- c) **Tertiary Income Distribution:** The distribution of household incomes when imputed benefits from **public expenditure** are added to household incomes **after** taxes and subsidies.

Functional Income Distribution: This is the distribution of income between different factors of production such as land, labour and capital. It is typically measured as the share of wages or profits in national income.

Source: UNDP 2013, p.20

differential movement between the rate of return on capital (r) and the rate of economic growth (g) – as a means of protecting democracy.

When the rate of return on capital significantly exceeds the growth rate of the economy as it did through much of history until the nineteenth century and is likely to be the case again in the twenty-first century), then it logically follows that inherited wealth grows faster than output and income. People with inherited wealth need save only a portion of their income from capital to see that capital grow more quickly than the economy as a whole. Under such conditions, it is almost inevitable that inherited wealth will dominate wealth amassed from a lifetime’s labour by a wide margin, and the concentration of capital will attain extremely high levels the levels that all potentially incompatible with the meritocratic values and principles of social justice fundamental to modern democratic societies. (emphasis mine). (Piketty, 2014:26)

Inequalities in India

Inequalities in India have been measured using Gini coefficients for per capita consumption expenditure at the all-India, as well as state-level (Table 1). The data for 1973-74 to 2009-10 indicates that there hasn’t been much decrease in inequality in terms of consumption expenditure. However, even this has to be interpreted with caution, since consumption inequalities usually underestimate the extent of inequalities¹. It is household income (rather than consumption) inequalities, which could provide better indicators of the extent of inequality.

The India Human Development Survey (IHDS), 2010 has estimated income distribution across households in India. The results, not surprisingly, demonstrate a greater income inequality than that captured by Gini coefficients of consumption. Thus, the Gini index for consumption inequality is about 0.38 for India, while the Gini Index based on income is about 0.52. The

Daudia and Garcia Penalosa (2007), for instance, have proved that personal income distribution is dependent on factor income distribution and the relationship is statistically significant. Thus, an increase in the share of labour will result in a lower Gini Index of personal incomes. Other compelling arguments to understand functional income distributions have rested on the notion of understanding the micro foundations of macro-level national income accounts data, social justice and fairness considerations, as also to provide a better understanding of inequalities in personal income distribution (Atkinson, 2009; Glyn, 2009).

The issue of functional inequalities, together with the macroeconomic implications of inequalities in ‘wage economies’ was taken up by Harvard Economist, Martin Weitzman (1984). Weitzman attributed the problem of cyclical unemployment in capitalist economies to the particular wage compensation system followed- namely the fixed wage system. Such wage inflexibility led to the tendency to lay off workers during periods of recession, exacerbated the problem of lack of aggregate demand and led to a further

downward spiral. He asserted that the replacement of the fixed wage system by a profit-sharing based wage system would reduce labour costs during periods of slack *product* demand, preventing retrenchment of labour. In fact, by setting average compensation per worker to vary inversely with employment, it would promote excess demand for labour. Weitzman proposed that profit-sharing wage arrangements offered a permanent solution to the problem of stagflation. Their success though critically dependent on “all (or almost all) firms of a wage economy *simultaneously* convert(ing) to profit-sharing plans” (Weitzman, 1985: 945). To do so, Weitzman suggested that the government rewards profit-sharing workers by preferential tax treatment of share income. This sounds infeasible, especially in the Indian context. However, his example of the Japanese bonus system of labour compensation, along the lines of a share economy, merits a deeper look for its role in stabilizing Japanese unemployment at comparatively low levels in the pre-1990 era.

More recently, Piketty (2014) has argued for preventing the growth in functional inequalities- based on a

Table 1: Gini Coefficient of Distribution of Consumption: 1973-74 to 2009-10

State	1973-74		1977-78		1983		1993-94		1999-2000		2004-05 (URP)*		2004-05 (MRP)*		2009-10 (URP)*		2009-10 (MRP)*	
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
India	0.281	0.302	0.336	0.345	0.297	0.325	0.282	0.34	0.26	0.342	0.3	0.371	0.266	0.348	0.291	0.382	0.276	0.371
Andhra Pradesh	0.288	0.288	0.298	0.319	0.292	0.306	0.285	0.32	0.235	0.313	0.289	0.37	0.252	0.342	0.278	0.382	0.269	0.353
Arunachal Pradesh											0.27	0.244	0.24	0.213	0.333	0.325	0.293	0.299
Assam	0.2	0.296	0.179	0.323	0.192	0.248	0.176	0.286	0.201	0.309	0.195	0.316	0.182	0.301	0.244	0.324	0.22	0.328
Bihar	0.273	0.265	0.258	0.304	0.255	0.297	0.222	0.307	0.207	0.319	0.205	0.33	0.185	0.312	0.226	0.332	0.215	0.319
Chhattisgarh											0.295	0.434	0.251	0.354	0.276	0.326	0.234	0.305
Delhi	0.149	0.353	0.29	0.33	0.289	0.331	0.236	0.207	0.294	0.343	0.264	0.329	0.262	0.324	0.253	0.345	0.233	0.352
Goa											0.294	0.405	0.267	0.333	0.214	0.406	0.219	0.251
Gujarat	0.234	0.246	0.285	0.308	0.252	0.264	0.236	0.287	0.234	0.286	0.269	0.305	0.251	0.295	0.253	0.328	0.252	0.309
Haryana	0.291	0.31	0.288	0.313	0.271	0.304	0.301	0.28	0.239	0.287	0.322	0.36	0.295	0.326	0.301	0.36	0.278	0.357
Himachal Pradesh	0.243	0.273	0.255	0.297	0.266	0.313	0.276	0.435	0.235	0.295	0.296	0.318	0.26	0.261	0.305	0.399	0.283	0.351
Jammu & Kashmir	0.224	0.224	0.222	0.334	0.221	0.235	0.234	0.281	0.173	0.224	0.237	0.245	0.197	0.241	0.235	0.305	0.221	0.307
Jharkhand											0.225	0.351	0.199	0.326	0.24	0.358	0.212	0.343
Karnataka	0.277	0.291	0.321	0.342	0.299	0.33	0.266	0.315	0.241	0.323	0.263	0.364	0.232	0.358	0.235	0.334	0.231	0.375
Kerala	0.314	0.37	0.353	0.356	0.33	0.371	0.288	0.338	0.27	0.321	0.341	0.4	0.294	0.353	0.417	0.498	0.35	0.4
Madhya Pradesh	0.286	0.27	0.331	0.377	0.292	0.29	0.277	0.327	0.242	0.315	0.265	0.393	0.237	0.351	0.292	0.364	0.276	0.365
Maharashtra	0.264	0.331	0.462	0.362	0.283	0.329	0.302	0.351	0.258	0.348	0.308	0.372	0.27	0.35	0.268	0.41	0.244	0.38
Manipur											0.156	0.174	0.136	0.149	0.173	0.213	0.159	0.193
Meghalaya											0.157	0.258	0.136	0.24	0.2	0.256	0.17	0.243
Mizoram											0.193	0.244	0.167	0.213	0.237	0.23	0.194	0.228
Nagaland											0.207	0.235	0.173	0.214	0.186	0.237	0.181	0.222
Odisha	0.262	0.342	0.301	0.324	0.266	0.294	0.243	0.304	0.244	0.292	0.281	0.35	0.254	0.33	0.262	0.389	0.247	0.375
Punjab	0.27	0.287	0.303	0.38	0.279	0.321	0.265	0.276	0.239	0.29	0.279	0.393	0.263	0.323	0.288	0.371	0.285	0.358
Rajasthan	0.276	0.287	0.464	0.296	0.34	0.301	0.26	0.29	0.209	0.282	0.246	0.367	0.204	0.303	0.225	0.378	0.214	0.316
Sikkim											0.266	0.254	0.236	0.232	0.275	0.194	0.259	0.186
Tamil Nadu	0.269	0.305	0.319	0.333	0.324	0.347	0.307	0.344	0.279	0.381	0.316	0.356	0.258	0.345	0.264	0.332	0.257	0.327
Tripura											0.216	0.338	0.203	0.3	0.205	0.294	0.197	0.288
Uttar Pradesh	0.236	0.293	0.299	0.327	0.29	0.312	0.278	0.323	0.246	0.328	0.286	0.366	0.234	0.339	0.356	0.329	0.438	0.321
Uttarakhand											0.279	0.323	0.223	0.302	0.263	0.361	0.231	0.395
West Bengal	0.296	0.315	0.292	0.317	0.284	0.328	0.251	0.334	0.224	0.341	0.27	0.378	0.241	0.356	0.239	0.384	0.22	0.384
A&N Islands											0.29	0.351	0.253	0.305	0.246	0.271	0.256	0.316
Chandigarh											0.24	0.344	0.244	0.341	0.193	0.449	0.308	0.373
Dadra & N. Haevli											0.351	0.296	0.324	0.295	0.206	0.208	0.22	0.224
Daman & Diu											0.223	0.258	0.209	0.242	0.305	0.283	0.287	0.264
Lakshadweep											0.24	0.383	0.167	0.236	0.32	0.336	0.314	0.279
Puducherry											0.337	0.312	0.281	0.302	0.307	0.307	0.254	0.378

* URP - Uniform Reference Period; MRP - Mixed Reference Period [Source : Unofficial estimates of Planning Commission; 61st Round 2004-05 MRP & 2009-10; 66th Round]

Note : Gini coefficient is calculated assuming that all individuals within each state have gross income equal to per capita GSDP. This method ignores the inequality arising out of the unequal distribution within each state, and focuses only on inequality

Source: Planning Commission, India. Available at http://Planningcommission.Nic.In/Data/Datatable/0814/Table_105.Pdf. Accessed on December 9, 2014.

Table 2 - Per cent of Households Drawing Income From Various Sources

Cultivation	Wage Work	Business	Other	Rural	Urbant	Total	Medion Income
✓	✓	✓	✓	1.14	0.26	0.89	35,755
✓	✓	✓		2.78	0.61	2.16	32,938
✓	✓		✓	8.69	1.12	6.52	25,507
✓	✓			23.55	3.83	17.89	23,536
✓		✓	✓	1.4	0.51	1.15	54,850
✓		✓		3.9	1.28	3.15	36,000
✓			✓	5.48	0.56	4.07	31,265
✓				11.27	1.03	8.33	20,964
	✓	✓	✓	0.81	1.61	1.04	47,400
	✓	✓		2.43	5.98	3.45	40,900
	✓		✓	6.33	12.1	7.98	33,600
	✓			24.23	48.46	31.18	27,000
✓		✓	✓	0.99	3.71	1.77	52,000
		✓		3.39	14.1	6.47	40,000
			✓	1.98	4.15	2.6	18,000
Negative or no income				1.61	0.69	1.35	-985
Grand Total				100	100	100	

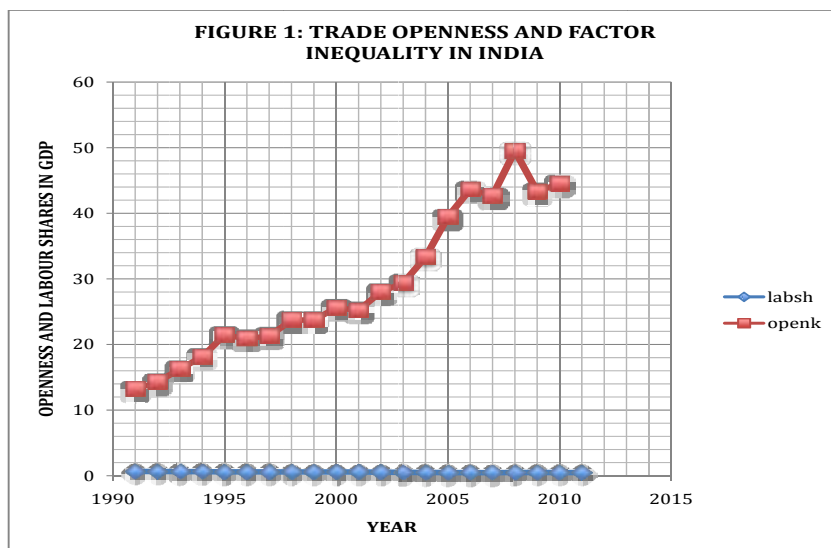
Notes: Wage work includes agricultural and non-agricultural wage, and salaried work.
Other sources include pensions, family transfers, and income from governmental programmes.

Source: IHDS (2010), p.17

Table 3: Capital- Labour Ratio and Labour Income Shares in India: 1991-2011

year	labsh	emp	hc	L input	rkna	K/L
1991	0.650768518	332.6175537	1.601656795	532.7391649	2419680.25	4541.960512
1992	0.643848956	341.3132935	1.616979837	551.8967138	2537396.5	4597.593058
1993	0.630940259	350.0163879	1.632449389	571.3840385	2656039.75	4648.431827
1994	0.617426753	356.3805847	1.648066998	587.3390802	2798128.75	4764.07725
1995	0.600267887	361.8991699	1.663833976	602.1401347	2989167.5	4964.238933
1996	0.598698258	367.3492737	1.682567358	618.0898969	3171277.25	5130.770242
1997	0.59725076	372.7568359	1.701511621	634.2500883	3346763	5276.724531
1998	0.585653543	378.1624756	1.717826843	649.6176517	3547055	5460.219547
1999	0.577172458	383.5910645	1.732384801	664.5273298	3776547.75	5683.05859
2000	0.570156574	391.8108521	1.747066259	684.5195197	3989632.5	5828.369221
2001	0.558769822	401.0491333	1.76388669	707.4052283	4225362.5	5973.043923
2002	0.534032524	410.5091553	1.780869007	731.0630318	4481763.5	6130.474809
2003	0.526317477	420.1240234	1.798014879	755.3892453	4802591	6357.769892
2004	0.491828084	434.0855408	1.815325737	788.0066542	5217105.5	6620.636351
2005	0.480967939	439.8279419	1.832803369	806.1181335	5725997.5	7103.174165
2006	0.464551449	449.974823	1.851765513	833.2478591	6327201.5	7593.42065
2007	0.465148509	460.3553772	1.870923877	861.289867	7044530	8179.046648
2008	0.483262241	467.7654724	1.890280485	884.2079441	7770282.5	8787.845157
2009	0.488592803	475.3091431	1.909837365	907.7631614	8561358	9431.268379
2010	0.485937476	485.173584	1.929596543	936.1892706	9407726	10048.9573
2011	0.485937476	495.7492371	1.929596543	956.5960142	10298478	10765.75466

Source: Author calculations (Based on data from PENN WORLD TABLES Version 8.0, Fenestra, Robert C., Robert Inlier and Marcel P. Timmer (2013), "The Next Generation of the Penn World Table.")



labsh stands for labour share; openk stands for trade openness

survey results also dispel the myth of a higher relative urban inequality. While urban incomes are higher than rural incomes, they are less unequal – with a Gini coefficient of 0.48 compared to the rural Gini income coefficient of 0.49. Moreover, much of the unequal rural incomes are dominated by unskilled wage labour. Thus, it would appear that intra factor income (intra-labour) inequalities- of skilled urban, industry-centric labour versus unskilled, farm (as also factory) labour, as also inter-factor income inequalities -viz. labour versus capital- would be accentuating.

Table 2 depicts the percentage of households drawing income from multiple sources. On the one hand, the table shows the diversification in income sources and hence the “interconnections between different sectors of the Indian economy and suggests that policies that affect one sector of the economy could have a widespread impact on a large number of households” (IHDS, 2010:17). More importantly, however, it indicates that a majority (about 57.4 per cent) of the households derive their income from wage work or cultivation. Given such a large share of wage income, factor income inequalities are likely to be the major drivers of personal income inequalities.

Global and Domestic Drivers of Factor Inequalities

The drivers of factor inequalities can be characterized broadly into two categories- exogenous (attributed to globalization) and endogenous (resulting from domestic policies). The degrees of trade openness, financial market liberalization (capital openness) and technical change have been identified as the broad exogenous drivers of factor inequalities. Additionally, monetary, exchange rate and fiscal policies act as the endogenous drivers of such inequalities through affecting growth, investment and employment adversely (UNDP, 2013).

We use the export + import (trade) figures as a percentage of real GDP as a measure of Trade openness. Financial liberalization is measured through the volume of net portfolio flows into India, while Technical change is measured through the capital-labour (K/L) ratios.

Figure 1 depicts the relationship between trade openness and labour shares, while Figure 2 depicts the relationship between financial openness and labour shares. As seen, while India became more open to both trade and capital flows, labour shares deteriorated.

Next, we needed to derive an estimate of technical change. We used the approach used by Feenstra et al. (2013) (quoted in Inklaar & Timmer, 2013) to estimate labour input as the product of the number of workers in the economy ‘E’ times their average human capital ‘hc’. The resultant ‘L’ captures the trends in labour inputs used in the standard Cobb-Douglas production function. We combined this L with ‘K’ –the capital input in order to calculate the capital/ labour ratio in the Indian economy. The results in Table 3 indicate that the capital labour ratio in India has risen by about 2.37 times since 1991. At the same time, the share of labour compensation in GDP (at current national prices) has actually diminished from 0.65 to 0.485. Table 3 also depicts the rise in Total Factor Productivity at constant national prices from 0.77 to 1.07 (base 2005=1). We can infer thus, that much of the gains in total factor productivity would have accrued to the owners of capital rather than labour.

Thus, as India became increasingly integrated with the rest of the world, in terms of flow of goods, services and capital, as also benefitted from technical innovations, the impact on relative labour shares seemed to deteriorate in the period 1991-2011. Even so, the available data fails to point out the relative inequalities among skilled and unskilled wage labour – intra-factor inequalities – in the Indian context.

The broad trends seem to match global experience pertaining to the impact of openness and technical change on labour shares. In fact, as the Trade and Development Report (UNCTAD) 2013 demonstrates, while labour income shares as a percentage of GDP fell almost globally over the period 1995-2013, India fared lowest among its regional peers in this regard. Such low and declining labour income shares have had an impact on private consumption expenditure and through it, on the India growth story.

How do domestic factors affect factor income inequalities? A shift in emphasis took place post 1980s in the aftermath of the debt crises, from Keynesian macro-stability towards greater fiscal balance and price stability. Such a shift in emphasis has proved to be the new driver for growing inequalities. Thus, contractionary monetary policies, with their adverse impact on interest rates, investment and growth, led to the surge in unemployment. Financial liberalization had an impact on the Real Effective Exchange Rate (REER), which surged, leading to greater imports, thereby affecting domestic production and employment adversely. Similarly, fiscal balance was sought to be achieved through expenditure cuts on items such as infrastructure, as also education and health, all of which affected the income earning potential of the poor and opportunities for social mobility (UNDP, 2013).

Thus, national policies that seek to achieve price stability and fiscal balance may have the unintended consequence of reducing labour shares in GDP.

India, especially in the aftermath of the global financial crisis post 2010, has pursued tight monetary and fiscal policies aimed at consolidation. Such policies have had a limited (if at

all) impact on achieving their stated goals, viz. maintaining price stability and reducing fiscal deficits. These have however, been at the cost of growth and employment, reflected in the growing factor inequalities in the form of declining labour shares. However, such national policies should aim precisely to counter the effects of external shocks, which act as the global drivers of factor inequalities.

Policy Implications

It is time to examine the vexatious issue of inequalities through a different lens-view, namely of labour compensation and labour shares in national income. Policy considerations should focus on the tricky question of how to handle such inequalities and the government's role in the same. Government regulations to protect the share of labour, as in India's antiquated labour laws, would not work, leading either to greater unemployment (in the form of more contractual labour) or increased automation. A system of progressive taxation of capital would not work as well, leading only to greater tax evasion.

On the one hand, we prescribe social nudges by the government in the form of tax breaks / rebates for firms which use variants of profit-sharing wage arrangements. These would not only help in reducing inequality, but

also ensure better macroeconomic outcomes through generating regular private consumption and maintaining aggregate demand (Jayakumar, 2014, April 30).

On the other hand, government macropolicies may need to shift attention from growth and inflation towards employment and skill generation to mitigate the deleterious impact of globalization (especially financial globalization) and technical change on relative factor shares. Cash transfers, especially targeted at the rural wage earners may help in reducing the functional inequalities in India.

To sum up, a combination of measures aimed at reducing functional rather than personal inequalities may have a longer term impact on reducing inequalities.

Readings

Atkinson, A. B. (2009). "Factor shares: the principal problem of political economy?", *Oxford Review of Economic Policy*, Vol. 25, No. 1, pp. 3-16.

Daudey, E. & C. Garcia-Penalosa (2007). "The personal and the factor distributions of income in a cross-section of countries", *Journal of Development Studies*, 43(5), pp.812-829.

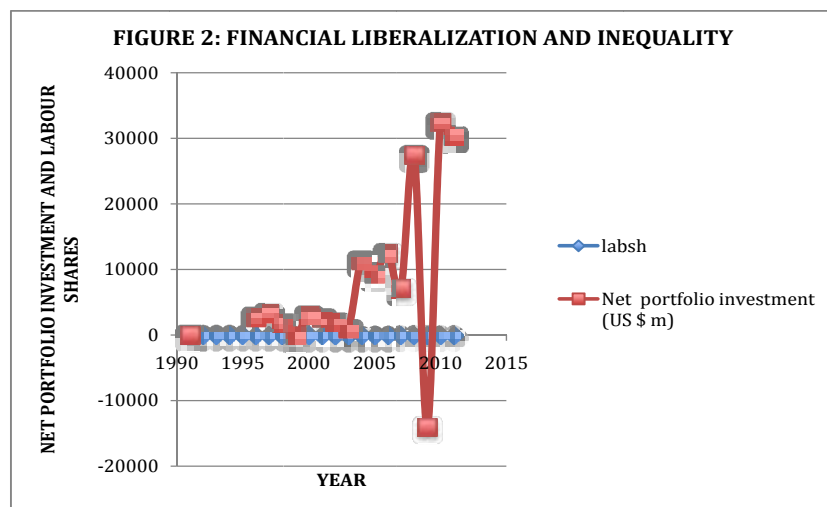
Feenstra, R.C., R. Inklaar & M. Timmer (2013). "The Next Generation of the Penn World Table," NBER Working Papers 19255, National Bureau of Economic Research, Inc.

Galor, O (2011). "Inequality, Human Capital Formation and the process of Development", NBER Working Papers 17058, National Bureau of Economic Research, inc. Accessed December 10, 2014.

Glyn, A. (2009). "Functional Distribution and Inequality", in W. Salverda, B. Nolan and T. M. Smeeding (eds.), *The Oxford Handbook of Economic Inequality*, pp. 101-126. Oxford: Oxford University Press.

India Human Development Survey (2010). Available at <<http://www.ihds.umd.edu/report.html>>. Accessed December 8, (2014)

Inklaar, R. & M.P. Timmer (2013). "Capital, labour and TFP in PWT8.0",



SOURCE: RBI ANNUAL REPORTS, PENN WORLD TABLES, VERSION 8.0

Available at <http://www.rug.nl/research/ggdc/data/pwt/v80/capital_labour_and_tfp_in_pwt80.pdf>. Accessed December 8, (2014).

Jayakumar, T. (2014, April 30). "Nudging towards Reduced Inequality", *Mint*. Available at <<http://www.livemint.com/Opinion/HiITpCfJIEz5B9c7AQURW0M/Nudging-towards-reduced-inequality.html>>

Piketty, T. (2014). *Capital in the 21st Century*. Harvard University Press.

UNCTAD (2013). *Trade and Development Report 2013*. Geneva.

UNDP (2013). *Humanity Divided: Confronting Inequality in Developing Countries*. New York: United Nations Development Program.

Weitzman, M. L. (1984). *The Share Economy: Conquering Stagflation*. Cambridge: Harvard University Press.

Weitzman, M.L. (1985). "The Simple Macroeconomics of Profit-Sharing", *American Economic Review*, 75 (5), pp. 937-953. Accessed December 8, 2014

Endnotes

- 1 Consumption tends to look more equal than income, since the gap between rich and poor consumption is lower- rich households tend to spend lesser than their income on consumption, while poor households consume more than they earn.

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Establishment of Science Cities

National Council of Science Museums (NCSM), an autonomous organization under the Union Ministry of Culture is engaged in establishment of Science Centres throughout the country. NCSM is developing a Science City at Guwahati, Assam which will subsequently be handed over to the Govt. of Assam for future operation and maintenance. Proposals from various state governments have also been received for setting up of Science Cities. The Science Centres/Cities projects are taken up by NCSM in a phased manner depending upon the availability of resources, project handling capacity of NCSM and the existing level of science centre activities in that particular State.

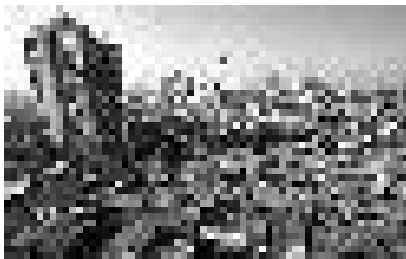
The following proposals have also been received by NCSM for establishment of Science Cities:-

- 1) Science City, Sampla, Govt. of Haryana
- 2) Science City, Bengaluru, Govt. of Karnataka
- 3) Science City, Navi Mumbai, Govt. of Maharashtra
- 4) Science City, Hyderabad, Govt. of Andhra Pradesh (before bifurcation into Telangana and Andhra Pradesh).
- 5) Science City, Patna, Govt. of Bihar
- 6) Science City, Nagpur, Govt. of Maharashtra
- 7) Science City, Bhubaneswar, Govt. of Odishab
- 8) Science City, Kumhari, Govt. of Chhattisgarh

Science Park is now an integral component of all Science Centres and Science Cities.

Urban Sanitation in India: A Growth Story Gone Awry

Trisha Agarwala



Policies and schemes on urban sanitation would have a limited impact unless they are backed by adequate budgets and effective implementation. Strong political will on the part of state and municipal governments can make a substantive difference to urban sanitation

IT IS a well known fact that a country's progress is determined not only by its economic indicators, but also by its human development indicators. In case of India, which is being projected as the next superpower after China, this would not hold true at all as seen by its dismal social indicators. More people in India have access to a cell phone than to a toilet and improved sanitation as reported in a UN-IWHE Study¹. In India, an estimated 626 million people practice open defecation which amounts to 60 per cent of open defecation in the world. In addition, the total economic impact due to inadequate sanitation in India is estimated at an amount of Rs. 2.44 trillion (US\$53.8 billion) a year, which is equivalent to 6.4 per cent of India's GDP in 2006. (Water and Sanitation Programme, 2007). The Ministry of Drinking Water and Sanitation has committed to achieving open defecation free status by 2020; however, it is to be seen whether this can be attained or not.

Recognition of the right to water and sanitation by the UN General Assembly in July 2010 has given the water and sanitation sector the much needed impetus in terms of placing it amongst

other rights based movements such as education, food security and health. Clean drinking water and improved sanitation are key drivers in poverty reduction and leads to the realization of all human rights (UNDP, 2011). In addition to this, ensuring adequate financing is crucial to successful planning and implementation of water and sanitation projects. As per the Report of the Special Rapporteur on the human right to safe drinking water and sanitation, adequate financing not only relates to service provision, but also to the costs of regulatory measures, strengthening institutional capacity as well as the planning exercise itself. (United Nations and Human Rights Council, 2011)

Urban Sanitation in India

Ever since the inception of the first Five Year Plan, programmes for drinking water supply and sanitation have been under implementation. State Governments have the responsibility to provide sanitation in the rural areas and urban areas. The Union government supports and supplements efforts of the State Governments. The sector also does not get stand-alone priority in comparison to other sectors. This is further highlighted when we see that the overall percentage of government

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spending on the sector is not only less than 1 per cent, but has actually reduced from 0.57 per cent in 2008 to 0.45 per cent in 2010, hence bringing into focus the paucity of funding in this sector. (WaterAid, 2011)

Sanitation is, therefore, one of the major development challenges in India. A fourth of the urban population in India lacks access to safe sanitation facilities and only 30 to 40 per cent are served by sewerage and wastewater treatment systems. The level of urbanization increased from 27.8 per cent in 2001 to 31.2 per cent in 2011 (Census, 2011). Open defecation is widely prevalent in many cities and towns resulting in undermining environmental sanitation and public health.

Policies and Schemes

To get a comprehensive picture on the urban sanitation scenario in the country, there needs to be a close assessment of the schemes at the central government level that are dealing with sanitation. Some of the policies and schemes are:

- Jawaharlal Nehru National Urban Renewal Mission (JNNURM): (a) Basic Services to the Urban Poor (BSUP), (b) Rajiv Awas Yojana (RAY), and (c) Integrated Housing Slum Development Programme (IHSDP);
- National Urban Sanitation Policy, 2008;
- National Urban Habitat and Housing Policy, 2007;
- Integrated Low Cost Sanitation (ILCS) Programme.

The JNNURM under the Ministry of Urban Development, provide facilities for water supply and sanitation in urban areas and aimed at improving and augmenting economic and social infrastructure facilities of the cities, extending basic services to the urban poor including security of tenure at affordable prices and strengthening municipal governments and their

functioning in accordance with the provisions of the 74th Constitutional Amendment.² Services to the urban poor included access to water supply and sanitation which largely hinges on an effective local government. The cities under JNNURM are supposed to develop City Development Plans (CDPs) demonstrating their plans and commitments to JNNURM's objectives. Plans have been developed for all the cities in the Mission but these have not been done in a consultative manner involving all sections of society. This non-consultation has mainly been attributed to the inadequate capacity of urban local bodies which form the pivot in the Mission. This is adjunct to the 74th Constitutional Amendment Act which calls for devolution of funds, functions and functionaries to ULBs.

The BSUP scheme under JNNURM stressed on the development of basic services for the urban poor which includes water and sanitation. To maintain these basic services, one of the objectives of the scheme was to secure effective linkages between asset creation and asset management so that they become self-sustaining over time. However, there is no mention of a separate fund for water and sanitation.

The RAY had a vision of a "slum free state". It seeks to bring existing slums within the formal system while redressing the deeper issues of slum creation. The scheme talks of earmarking for basic services to the urban poor within the local body budgets. As one of its reformative measures, it also mentions provision of basic services to the urban poor which includes water supply and sanitation. The intention of the scheme belies the fact that no separate funds have been earmarked to achieve its vision.

In addition to providing shelter through up grading and constructing new houses, IHSDP also aims to

provide community toilets, water supply, storm water drains, community baths, widening and paving of existing lanes, sewers and street lights. Slum improvement and rehabilitation are part of the scheme, which focus on inclusive urban planning. The funding mechanism has been explicitly laid out.

National Urban Sanitation Policy, 2008 aimed to transform urban India into community-led healthy and liveable cities and towns that have universal sanitation coverage. It had an ambitious plan focusing on the urban poor and women whereby, the vision for Urban Sanitation in India is that "all Indian cities and towns become totally sanitised, 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" (Ministry of Urban Development, 2008). The main goals of the policy were awareness generation and behavioural change; open defecation-free cities, integrated city-wide sanitation, sanitary and safe disposal, and proper operation and maintenance of all sanitary installations. Here too, the policy rests on the assumption that the states would draw up State Urban Sanitation Strategies and City Sanitation Plans. The urban poor were confronted with the issue of land tenure which created uncertainty and insecurity regarding their place of residence. There was the constant threat of eviction and the areas lacked basic services such as safe water and sanitation facilities where the burden of collecting water and maintaining household hygiene fell on women who suffer the most from inadequate and inappropriate services in slums. The sanitation policy dwelled on these issues but did not suggest ways to deal with the multiplicity of agencies and stakeholders involved in the implementation of water and sanitation services.

National Urban Habitat and Housing Policy (2007)“intended to promote sustainable development of habitat in the country with a view to ensure equitable supply of land, shelter and services at an affordable price to all sections of society”. It also planned to involve women at all levels of decision making to ensure participation in the formulation and implementation of housing policies and programmes. Further, it aimed to address the special needs of women-headed households, single women, working women and women in difficult circumstances in relation to housing serviced by basic services, which included water and sanitation. This was the only policy which tried to include women in its guidelines.

The Ministry of Housing and Urban Poverty Alleviation (MoHUPA) administered a Centrally Sponsored Scheme called the ILCS Scheme³, for urban areas. The main objectives of the scheme were to convert existing dry latrines into water seal toilets with super structure and construction of new ones to households belonging to EWS category who had no latrines in urban areas of the country to improve the overall sanitation in the towns. But it aids more importantly in removing

the inhuman practice of manual scavenging. In the evaluation report of ILCS (Ministry of Housing and Urban Poverty Alleviation, 2007), it was found that one of the major impacts of the scheme was the improved social prestige endowed on the owners of the sanitary latrines.

Despite the fact that policies and schemes do mention the issue of sanitation, however, it is difficult to trace the amounts allocated to urban sanitation through these schemes. The ILCS scheme is the only programme in which the budget can be traced. Table 1 shows that the allocations made under HUPA for ILCS are minimal, showing a downward trend in the current year. This is significant, since as per the House listing and Housing Census, 2011, there were 7.94 lakh latrines in the country from which the night soil was removed by humans implying that there are a large number of manual scavengers still existing and continuing this inhuman practice. (Census of India, 2011)

Other than the Urban Sanitation Policy and the Integrated Low Cost Sanitation (ILCS) Programme, none of these policies and schemes deals with sanitation and water supply directly.

Water and sanitation is either linked with housing for the poor or with employment generation, and have not been treated as a standalone issue. This shows that the policymakers have not directed enough attention to the needs of the urban poor relating to water supply and sanitation, especially in the urban slums.

Urban Poverty and Sanitation

Urban slums are a fact and the most tangible form of urban poverty. Some of the key indicators of urban slums are given in Table 2. The non-notified slums are 42 per cent with 45 per cent lacking drainage facility. Since sanitation is not just about creating toilets but also about a hygienic environment, one also needs to take into account the absence of garbage disposal facilities which was found to be 38 per cent in non-notified slums.

To elucidate the issue of sanitation in urban slums, Tiruchirappalli in Tamil Nadu is a good example of how city authorities, communities and NGOs worked together in partnership to address the problem of sanitation in the city. The urban slum dwellers of the city brought in the model of community managed toilets with bathing and washing facilities. (WaterAid India, 2008). This was mainly due to receptive city authorities, communities and NGOs working together. It was found out that achieving clean and healthy slums did not require huge financial investment. Rather, it required a city authority receptive to the problems faced by slum communities and supportive of community action, dedication of communities and their support to NGOs. Since the community managed their own toilets, it led to empowerment of women with many positive impacts in terms of personal and community development.

On the other hand, an International Development and Research Centre (IDRC) study on ‘Women’s Rights and Access to Water and Sanitation in Asian

Table 1: Budgetary Allocation for ILCS Programme under MoHUPA (in Rs. crore)

2009-10	2010-11	2011-12	2012-13		2013-14		2014-15
			BE	RE	BE	RE	BE
55	106.01	69.76	25	100	125	22	5

Source: Expenditure Budget Vol. II for various years

Table 2: Key indicators of urban slums in India (in %)

Key Indicators for Urban Slums	NT	NN
No Latrine Facility	16	42
Slums without Drainage Facility	11	45
Slums without Garbage disposal arrangement	11	38

NT = Notified; NN = Non-Notified

Source: Key indicators of Urban Slums in India, NSS 69th round, National Sample Survey

Office, Ministry of Statistics & Programme Implementation, GoI, 2013.

Cities (2009-2011) conducted by Jagori and Women in Cities International, found that the Delhi government spends a mere Rs. 30 (\$0.66) on water supply and Rs. 80 (\$1.78) on sanitation per JJ colony resident in 2011-12. (IDRC, 2011). Since water and sanitation were handled by multiple agencies in Delhi, there was no sense of ownership and hence no accountability. Also, low allocations towards the sector reflected the lack of political will to improve urban water and sanitation services; more so, in JJ re-location colonies, where a paternalistic attitude was observed among the ULBs towards the residents. Hence, these two examples prove that experiences in urban sanitation vary across the country and its success depends on various factors wherein a 'one size fits all' approach does not work.

Conclusion

India's growth story, albeit a matter of interesting discourse, does not hold much water when one analyses its sanitation statistics. With the continuous rise of slum population, basic amenities such as water and sanitation would only get severely stressed. Toilets are only a part of the sanitation solution. Sewage, waste water and solid waste management must also be tackled and city authorities must play a pivotal role.

Safe and sustainable sanitation in slums have immeasurable benefits to women and girls, in terms of their health, safety, privacy and dignity. However, women do not feature in most of the schemes and policies on urban sanitation. The fact that even now, the manual scavenging exists, only goes to show that not enough has been done to promote pour- flush toilets and discontinue the use of dry latrines. A more sustained and rigorous campaign needs to be launched towards the 'Right to Sanitation' on a very large scale. This should primarily focus on the abolition of manual scavenging. New and innovative technology for toilets should

be encouraged while simultaneously promoting greater awareness on safe sanitation practices.

Macro issues such as land tenure rights, livelihood options, and education and health facilities in slum colonies also need to be resolved to make sanitation schemes more impactful in urban slums. (Panda and Agarwala, 2013). Policies and schemes on urban sanitation would have a limited impact unless they are backed by adequate budgets and effective implementation. Strong political will on the part of state and municipal governments can make a substantive difference to urban sanitation.

When 'smart cities' have become the term *du jour*, it is a welcome step that the current government has turned the spotlight on sanitation through the 'Swachh Bharat Abhiyan' and the multi-million dollar sanitation programme, 'Mahatma Gandhi Clean India Programme'. However, only time would tell if sanitation stops becoming a 'dirty' word and becomes a priority sector in the country.

Readings

Census (2011), Office of the Registrar General of India & Census Commissioner, Ministry of Home Affairs, Government of India

Evaluation and Impact Assessment of ILCS Scheme, (2007) Agricultural Finance Corporation Ltd., Ministry of Housing and Urban Poverty Alleviation

Integrated Low Cost Sanitation Scheme, Revised Guidelines, (2008) Ministry of Housing and Urban Poverty Alleviation, GoI

International Development and Research Centre, (2011), Gender and Essential Services in Low-income Communities: Report on the Findings of the Action Research Project Women's Rights and Access to Water and Sanitation in Asian Cities

National Urban Sanitation Policy, (2008) Ministry of Urban Development, GoI

Panda, G. R and Agarwala, T (2013), Public Provisioning in Water and Sanitation: Study of Urban Slums, Economic and Political Weekly, Vol XLVIII, no 5, February 2, 2013

UNDP (2011), Human Development Report 2011 Sustainability and Equity: A better Future for All, UNDP, (2011)

United Nations and Human Rights Council (2011), Report of the Special Rapporteur on the human right to safe drinking water and sanitation, Catarina de Albuquerque, United Nations, General Assembly, July (2011)

Water and Sanitation Program (2007), The Economic Impacts of Inadequate Sanitation in India, World Bank, (2007)

WaterAid India (2008), Tiruchirappalli Shows the Way, WaterAid India, (2008)

WaterAid (2011), Off-track, off-target: Why investment in water, sanitation and hygiene is not reaching those who need it most, Policy Report, November (2011)

Endnotes

- 1 <<http://unu.edu/media-relations/releases/greater-access-to-cell-phones-than-toilets-in-india.html>>. As accessed on 15th December, 2014
- 2 The 74th Constitutional Amendment is a path-breaking development in strengthening the urban local bodies in the country. It was passed by the Parliament of India in December, 1992 and received presidential assent on April 20, 1993. The main characteristic of 74th Constitution Amendment Act, 1992 is that it provides Constitutional recognition to the powers and functions of the urban local bodies.
- 3 The Centrally Sponsored Scheme of Low Cost Sanitation for Liberation of Scavengers started from 1980-81 initially through the Ministry of Home Affairs and later on through the Ministry of Welfare. From 1989-90, it came to be operated through the Ministry of Urban Development and later on through Ministry of Urban Employment and Poverty Alleviation now titled Ministry of Housing & Urban Poverty Alleviation. □

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Technology and Public Policy Interaction: The Green Revolution

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Policies that were meant to encourage initial adoption and experience profitable cultivation of HYVs were continued beyond the initial stage. It is time that the government takes steps to phase out these policies gradually or at least reform them in a way that alleviates their socially costly distortions while sustaining their social benefits

IN THE 1960s, the new technology of India's Green Revolution was enthusiastically adopted within a decade by millions of farmers. It was one of the most well-known examples of technological advancement in agriculture and in 1968, the then Prime Minister Smt. Indira Gandhi commemorated this success by issuing a postage stamp entitled 'The Wheat Revolution'. As Dr. M.S. Swaminathan, the architect of the Green Revolution puts it: "The scientific and public policy initiatives... [including] interdisciplinary research and international collaboration... led to the Green Revolution of the 1960s... [In terms of Public Policy],... assured and remunerative marketing opportunities [held] the key to stimulating and sustaining farmers' interest in achieving higher productivity and production... [Entirely indigenously designed wheat improvement and production programmes] achieved rapid progress... because [India] could achieve synergy among packages of technology, services and public policies." (Swaminathan, 2013, emphasis added).

Almost five decades ago, very soon after the New Agricultural Strategy based on HYV was launched, B.S. Minhas and T.N. Srinivasan analyzed it in an article in the January 1966

issue of YOJANA.¹The then editor of YOJANA was the late H.Y. Sharada Prasad, (affectionately called Shouri by his friends), before he became Information Adviser to Prime Minister Mrs. Gandhi.

Factors that led to Green Revolution in India

The Green Revolution refers to technology transfers that helped boost agricultural yields per unit of land, and effectively maximized total agricultural production in India and other developing countries. With an inherent potential for producing a higher yield per unit of land than traditional varieties, the use of HYV seeds along with increased application of fertilizers, pesticides and irrigation per unit of land led to a substantive increase in agricultural production in India and in other developing countries. As a consequence it helped avert food crises.

Limited Agricultural Production and the Growing Need for Food

Several factors led to the Green Revolution in India, including the fact of relatively limited agricultural output, with per capita availability of food grains (inclusive of imports) being a meagre 395 grams per day. The dominant mode in agriculture was Subsistence Farming, with farmers growing crops primarily for personal

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and family consumption rather than for generating marketable surpluses. Crops depended heavily on unpredictable monsoon rains and limited irrigation. The government gave priority to industrialization with an emphasis on heavy industry over agriculture (Bhagwati & Desai, 1970) resulting in the relative neglect of agriculture. The growth rate of agricultural production fell behind the accelerating growth rate of population with faster decline in mortality rates relative to the fertility rate. The per capita availability of food grains (except for wheat) during 1961-66 fell to a level that was comparable to 1950-51. Indeed in 1959, the Ford Foundation warned India of foreseeable food shortages and amid speculations about an impending severe global food shortage, laid down some steps to avert it.

Further, India was perceived as having limited potential for increased agricultural output. Initiatives such as the Grow More Food (GMF) campaign and its failure to achieve targets, (MoFA, 1952), the continued use of traditional cultivation methods with little or no use of chemical fertilizers and pesticides, and ongoing subsistence farming practices severely compromised India's potential. Private tube-wells for irrigation were non-existent and public canal irrigation projects were growing slowly. Rural electrification was limited and most of the energy requirements of agriculture were met by animals and farm workers. Taken together, all these factors constrained agricultural output; wheat and rice yield per hectare at 851 kg/ha and 1013 kg/ha respectively in 1960-61 as contrasted to 3177 kg/ha and 2393 kg/ha in 2011-12 (DES, 2013).

Constraints on Food Imports

An alternative to domestic production of food is to import food grains from other countries. The Reserve Bank of India (RBI) 2014 Handbook of Statistics on Indian Economy shows that India's foreign exchange reserves depleted substantially from Rs. 9.11 billion in 1950-51 to an all-time low of Rs. 1.16 billion in 1964-65.

Also, over valuation of the exchange rate and export elasticity pessimism (see Singh (1964) and Wolf (1982)) had significantly weakened India's international trade position making it difficult to import food from other countries.

Concessional imports, partly as grants and partly with payments in rupees to the United States (US) under its Food for Peace program or PL-480, were constrained due to the prevailing international political climate. Although the US Congress enacted Public Law 480 authorizing food aid to India, President Lyndon Johnson censured India by staggering food shipments, signaling dissatisfaction with India's anti (Vietnam) war position and creating uncertainty. Two consecutive droughts in 1965-66 and 1966-67 exacerbated both the domestic shortage in food production as well as the export of agriculture based commodities. India's balance of payments became critically worse and it was forced to approach the International Monetary Fund (IMF) and the World Bank to tide over the crisis in March 1966. Predictably both institutions conditioned their assistance on Rupee devaluation and liberalizing restrictions on foreign trade.

Domestic Politics

The Green Revolution was also prompted by evolving politics in India. In the backdrop of the prevailing political background, the then PM Mrs. Gandhi was compelled to take immediate action; to devalue the rupee in June 1966 at the insistence of IMF and World Bank. However devaluation failed to increase exports or to attract much capital. Early on, Mrs. Gandhi's government had suffered severe political humiliation due to the PL-480 fiasco and in her search for ways to reinvent her government, to reduce India's dependence for food on the US, she embarked on a mission to increase domestic agricultural production¹ culminating in the formulation of the 'New Strategy for Agricultural Development' spearheaded by C. Subramaniam, Minister for Food and Agriculture.

A Personal Note

Almost five decades ago, very soon after the New Agricultural Strategy based on HYV was launched, B.S. Minhas and T.N. Srinivasan analyzed it in an article in the January 1966 issue of YOJANA. The then editor of YOJANA was the late H.Y. Sharada Prasad, (affectionately called Shouri by his friends), before he became Information Adviser to Prime Minister Mrs. Gandhi.

Both were well known for their integrity; Minhas resigned from the Planning Commission with the nationalization of Wholesale Trade in Wheat, a move that he strongly opposed and predicted would fail, and also over the unrealistically large size of the Draft Fifth Plan. His advice was rejected and the policy of Nationalization failed miserably forcing its abandonment.

Shouri was a man of principle. Although he was privy to many critical decisions made by Mrs. Gandhi including her rationale behind the declaration of The Emergency, unlike other advisors and bureaucrats who later chose to critique the Prime Ministers they served, Sharada Prasad chose not to write his memoirs.

Yet they were both a study in contrasts. Shouri was as much a cultured, soft spoken, Khadi-clad Gandhian as Minhas was an earthy, sharp tongued and strong willed farmer. He was the first in his family to go to school and to become a globally renowned scholar and Member of the Planning Commission. The families of Minhas, Shouri and Srinivasan including their children were abiding friends.

This paper is dedicated in fond memory to Minhas and Sharada Prasad, and to their spouses Raj and Kamamma respectively.

T.N. Srinivasan

Agricultural Research

C. Subramaniam had consulted extensively with Dr. M. S. Swaminathan, Dr. Norman Borlaug, and other agricultural scientists and economists from the Ford Foundation, the Rockefeller Foundation and the US Department of Agriculture. He assured

the Lok Sabha that his Ministry would adopt and implement programmes that would boost India's food production (Frankel, 1969). His assurance was based on the phenomenal potential of newly developed HYV seeds to increase food production. The research and development of these varieties was conducted by The International Maize and Wheat Improvement Center (CIMMYT) in Mexico, The International Rice Research Institute (IRRI) in the Philippines, and the Indian Council of Agricultural Research (ICAR) in India. They were instrumental in adapting the HYVs developed elsewhere to Indian ecological conditions.

The Technology of High Yielding Varieties: From Laboratories to Farmers' Fields

Turning our attention from 'what' led India to a green revolution to 'how' it managed to initiate and sustain it; it turned out that farms of all sizes could profitably adopt HYVs and reap the benefits of higher yields as compared to yields of non-HYVs. HYVs are highly responsive to chemical fertilizers per ha and the controlled supply of water. Use of appropriate amounts of fertilizers, pesticides and irrigation resulted in the optimization of production, and in turn maximized revenue per hectare of land net of costs of inputs - of fertilizers, water, animal and manual effort. These seeds popularly came to be known as "miracle seeds".

An essential component of the HYV Programme was the demonstration to farmers of the yield raising potential of HYVs. Until the mid-1960s, these miracle seeds were mainly cultivated as part of experimental research under controlled conditions. Large scale experiments on farmers' fields by agricultural scientists followed later.

Characteristics of HYV Technology

A distinguishing characteristic of HYV of wheat and rice is their semi-dwarf stature which indirectly contributes to higher yield per hectare by reducing the risk of 'lodging'.

"Stem lodging" is caused by various fungi that weaken plant stems resulting in "lodging" or falling over. It is compounded by external factors like wind, heavy rainfall or hail and results in loss of grain once the plant is lodged. This type of lodging is called stem lodging (Pinthus, 1974). Taller plants have a higher risk of lodging since they experience more torque than the shorter ones. Thus, while cultivation of traditional non-dwarf varieties using chemical fertilizers and proper irrigation usually results in taller plants, they are also exposed to higher loss of grain due to lodging. The dwarf and semi-dwarf stature of HYV wheat and rice reduces the risk of lodging and displacement of the stem which holds the grains at its end. Additionally, for rice crops, wet and loose soil can cause "crowning" or "root lodging" where

Indeed, the fortuitous availability of HYVs of rice and wheat was one of the most significant and important pre-cursor to the Green Revolution in India. Yet sustainability remained a critical issue. Could these varieties be adaptable in the Indian ecological framework? Had it not been for international cooperation, India would not have succeeded in getting HYV seeds to establish suitability.

the plant succumbs at its base, typically as in paddy fields (*ibid.*). It seemed therefore, that the semi-dwarf varieties of wheat and rice then in existence in Japan and China (Dalrymple, 1974 & 1979) were the ideal choice for further research and development.

Semi-dwarf Varieties and HYVs

After World War II, a semi-dwarf Japanese wheat variety (Norin 10) was taken to the US by a scientist of the US Department of Agriculture and cross-bred with another variety of wheat (Brevor). That was later sent to Mexico, where Dr. Norman Borlaug further crossed it with other varieties

at CIMMYT (Dalrymple, 1974 & 1979).

As early as 1950, research on improving rice varieties by crossing a Japanese dwarf variety (Japonica) with a local variety (Indica) was carried out at The Central Rice Research Institute (CRRI), Cuttack, in Orissa (Dalrymple, 1986), but with limited success. Similarly, in 1961, a programme to develop high yielding, lodging-resistant semi-dwarf, disease-resistant rice varieties suitable for various ecological conditions was initiated at the International Rice Research Institute (IRRI) in the Philippines. In November, 1966 a rice variety called IR8 was released which had those intended technological features. Indeed, the fortuitous availability of HYVs of rice and wheat was one of the most significant and important pre-cursor to the Green Revolution in India. Yet sustainability remained a critical issue. Could these varieties be adaptable in the Indian ecological framework? Had it not been for international cooperation, India would not have succeeded in getting HYV seeds to establish suitability.

HYVs for Indian Ecological Conditions: A Brief History

In 1961, the Government of India on the advice of M.S. Swaminathan invited Norman Borlaug to India to hold consultations and field experiments on the adaptability of international HYVs of wheat to Indian ecological conditions. It took Dr. Borlaug two years to arrive in March, 1963. Swaminathan, Borlaug and a few other eminent scientists travelled the Indian wheat belt to examine growing conditions. Subsequently, Borlaug agreed to send selected strains of Mexican dwarf wheat (Sonora 63, Sonora 64, Mayo 64 and Lerma Rojo 64-A), which had demonstrated good performance in Pakistan (Swaminathan, 2013), to India. Soon, with financial support from the Rockefeller Foundation and agricultural research assistance from the Mexican Ministry of Agriculture, scientists in India started extensively

testing five dwarf wheat varieties, viz., Lerma Rojo 64-A, Sonora 63, Sonora 64, Mayo 64 and S 227 and 200, as well as some additional breeding lines of dwarf wheat, for their suitability to Indian ecological conditions. By 1964, it was clear that Lerma Rojo 64-A, 'Sonora 64' and 'PV 18 varieties had a high potential for yield in India.

Trials and Tribulations of HYV Cultivation in India: Some Politics

Despite strong opposition from members of the Planning Commission, C.Subramaniam, the Food Agriculture Minister with strong support of the PM, decided to import nearly 18,000 tonnes seeds of 'Lerma Rojo 64-A' and 'Sonora 64' in 1966 for sowing nearly 4 lakh hectares of agricultural land in India. Wheat production soared in one year, from 11.3 million tonnes in 1966-67 to 16.5 million tons in 1967-68. However, the Consumer and the Farmer were culturally constrained. They preferred the traditional wheat grain to this new "red" grain. The white wheat grain produced familiar qualities in their "chappatis", with familiar taste and which could be stored well under primitive storage conditions (Swaminathan, 1969). Similarly, the taste of rice grains produced by HYV cultivation also did not find much consumer acceptance in India (*ibid.*).

Public Policy Interventions

In the mid-1960s, India was not in a position to fully exploit the benefits of HYVs. First, cultivation was heavily dependent on monsoons. The per centage of gross irrigated area over gross cropped area was 18.3 per cent and 19.3 per cent in 1960-61 and 1964-65 respectively (DES, 2012). Secondly, the domestic capacity to produce chemical fertilizers or the financial ability to import them to make them available for large scale use was limited. Yet policy makers knew that HYVs were highly responsive to fertilizers and controlled irrigation and that the use of these inputs could maximize the yield. Therefore, public policy interventions became imperative to achieve large scale improvements in

irrigation capacity, fertilizer production and imports.

Implementation of such targeted public policy necessitated interventions at multiple levels. First and foremost, given that Indian agriculture was overwhelmingly a private sector enterprise undertaken by millions of farm households, most of whom cultivated less than a hectare of land, it was essential that the farmers were provided adequate incentives to accept and adopt HYVs. Second, the type of incentives required depended on the inputs that needed to be augmented. Third, and collaterally, for adequate and timely availability of inputs, appropriate institutional mechanisms had to be created. The features of HYVs influenced all three factors.

As Swaminathan (2013) puts it, "green revolution became possible only because of synergy between technology, public policy and farmers' enthusiasm." The policies put in place at that time aimed at achieving the wide spread adoption of HYVs by farmers through the HYV Programme.

As Swaminathan (2013) puts it, "green revolution became possible only because of synergy between technology, public policy and farmers' enthusiasm." The policies put in place at that time aimed at achieving the wide spread adoption of HYVs by farmers through the HYV Programme. It included the expansion of public irrigation facilities, subsidies for increased fertilizer and pesticide use, rural electrification and subsidies on electricity and diesel used for agricultural purposes, expanded credit availability for the agricultural sector, agricultural price policy and broader public investment in rural infrastructure development.

To ensure wide availability of chemical fertilizers, policy makers incentivized greater domestic production of chemical fertilizers through producer subsidy schemes,

increased demand through user subsidies and stepped up fertilizer imports. Further, agricultural credit became more easily available and they subsidized diesel and electricity to support farmers in pumping out ground water for controlled irrigation. Soon farmers were sufficiently incentivized to reduce their dependence on rainfall and increase the use controlled irrigation for HYV cultivation.

The above mentioned input side policy interventions were mainly undertaken to ensure that a farmer would, in principle, be able to procure all the required inputs at 'affordable' prices. However, the rate of return on cultivation to farmers depended in addition on output prices as well. Hence, policy makers provided further support by assuring remunerative prices for their output through ex ante price interventions at sowing time.

While public investment in irrigation, fertilizers and other industries contributed to increasing output whether or not these interventions were worthwhile in a social cost/benefit perspective needed to be assessed because they also created many unforeseen and unintended negative fiscal and environmental distortions.

The HYV Programme

A major component of the New Strategy for Agricultural Development adopted in 1966-67 (Planning Commission, 1971) was the HYV programme (HYVP). Since HYV cultivation was water- and fertilizer-intensive, selecting areas for such cultivation was crucial for the success of the HYVP. A conference organized by the Union Government in late 1965 recommended that in the initial years (Vyas, 1975):\

- i) Areas to be selected should already have the necessary organization and facilities built up. Hence, the natural choices were districts that were under Intensive Agricultural Development Programme (IADP) and Intensive Agricultural Area Programme (IAAP).

- ii) 80 per cent of each selected area must be under irrigation and a major part of that must be under minor irrigation because it allows greater control over water supply.
- iii) Areas that were not under IADP or IAAP could be selected for such cultivation provided a substantial area was already being irrigated and that the area had wheat growing tracts.

An all-India Chief Ministers' meeting in 1966 used the above parameters to identify areas and cultivators to be chosen as participants in the HYV programme. In addition, some of the assured rainfall areas in India were also selected as vanguard areas for the cultivation of HYVs.

Institutional Support

The complexity of the new technology, and its scope and span in the context of Indian agriculture demanded extensive institutional support. The government created "a complex of institutions" (Vyas 1975) including the National Seeds Corporation of India for the provision of new seeds and block level depots to sell seeds to the farmers in the vanguard areas under the HYV programme.

Farmers Cooperatives in the Supply of Fertilizers

Cooperatives were assigned a significant role in supplying inputs such as fertilizers and credit to farmers. Village level cooperative societies were to indicate their requirements to the District Cooperative Warehousing Societies which were to consolidate all the requirements and to give them to their respective State Cooperative Marketing Federation. The Secretary of the Agriculture Department would ensure that the State Cooperative Marketing Federations received adequate supplies of fertilizers, which were then to be distributed through the district to village level cooperatives which sold those fertilizers at subsidized rates to the farmers.

Credit Supply

Cooperatives were also assigned the role of strengthening the credit

base for easier availability of credit to farmers. District cooperative banks took the lead role in arranging credit supplies to farmers. The village cooperatives were to consolidate credit demand and forward it to district cooperative banks which then reapplied for appropriate credit to the Reserve Bank of India through the State Cooperative Bank. The sanctioned credit was then to be distributed down through the cooperative structure to the farmers.

Marketing of Output

Orderly marketing of food grains was conducted through the Food Corporation of India (FCI) at the

"The newly started agricultural universities forged a linkage between the scientists and the farmers. The new varieties found ready acceptance by the farmers, who adopted tractor cultivation, tube-well irrigation and the use of chemical fertilizers and plant-protection chemicals. Owing to the acceptance of modern technology by the farmers, production of food-grains increased remarkably..."

central government level. It was responsible for procuring food grains from farmers and distributing them to State Governments which then sold it to consumers at low prices through the fair-price/ration shops of the Public Distribution System (PDS). The Agricultural Prices Commission (APC) was established to advise the central government on the prices at which the FCI should procure food grains from farmers, prices that were designed to be remunerative to farmers while taking into consideration the supply and demand dynamics of the market for food grains.

Agricultural Research

Thirty-five Coordinated Research Programmes in different commodities were pursued with the intention of improving the technical base for

agricultural research related to HYVs in India. Many new agricultural universities were established in different States and existing ones were strengthened through increased funding, and by improving research and extension facilities.

The Indian Council for Agricultural Research (ICAR) was given more authority, financial and human resources to oversee agricultural research activities in government institutes. "The newly started agricultural universities forged a linkage between the scientists and the farmers. The new varieties found ready acceptance by the farmers, who adopted tractor cultivation, tube-well irrigation and the use of chemical fertilizers and plant-protection chemicals. Owing to the acceptance of modern technology by the farmers, production of food-grains increased remarkably. It almost trebled within 12 years, taking 1965-66 as the base. Increases in the production of wheat was most spectacular" (Randhawa, 1979).

Clearly, much of the institutional infrastructure supporting the success of the Green Revolution was established under the high-yielding varieties programme or in support of it.

Increasing Domestic Availability of Fertilizers

The success of the HYV programme depended on wider and cheaper availability of fertilizers for farmers to use. For this to be realized, investment in domestic production capacity through domestic and foreign investment as well as imports when needed, were critically important.

Foreign Private Investment

In the 1960s, when external investment by private entities was discouraged, C. Subramaniam announced a new policy for foreign private investment in India, with special emphasis on the Indian fertilizer industry. At this time, the foreign producers were not particularly enamoured of the investment climate in India preferring instead to export from

their own domestic output. India, on the other hand, wanted them to create domestic production capacity in plants operated by Indians. The government also wanted Indians to be involved in the design of plants on steel (Posgate, 1974, on fertilizers and D'Costa, 2009, on steel). This was true for the fertilizer industry as well.

However, this policy to attract external investment did not succeed; the government turned to investment in public sector units, and licensed domestic private sector investment to enable the establishment of production plants. Total investment fell short and was inadequate for meeting domestic demand. India was forced to continue importing fertilizers.

Economic Incentives for Domestic Production

Nitrogenous fertilizers are produced by combining nitrogen from the atmosphere with hydrogen to produce ammonia which is then interacted with acids such as sulphuric, nitric and phosphoric etc. to produce ammonium sulphate, nitrate, phosphate etc. There are several processes to produce hydrogen including by electrolysis of water using electricity and various hydrocarbons such as naphtha fuel oil as well as coal. These are known as feed stocks. Except coal and electricity, other feed stocks were mostly imported. The cost and availability of imported feedstock varied over time. The plants, established at different times used different feedstock material and their unit cost of production also varied.

Heavy demand for fertilizers required full capacity production and to make production viable, government introduced the Retention Price Scheme (RPS), in 1977 as recommended by the Fertilizer Prices Committee. In effect, this was a price at every fertilizer factory gate assuring a 12 per cent post-tax return over costs on net-worth to each plant, on condition that the production plants met the prescribed norms of efficiency. Selling prices of fertilizers to farmers were heavily subsidized. The difference between the higher retention prices for the

producers fixed by the government and the lower selling prices was borne by the government. Thus, the interest of both the producers and consumers of fertilizers were presumably protected. The overall effect was that lower prices led to higher consumption by farmers which in turn provided investors with assured returns and an incentivized investment in domestic fertilizers. The impetus to fertilizer production (and consumption) is believed to have contributed substantially to the success of the Green Revolution.

However, the RPS scheme was used to subsidize only the production of nitrogenous fertilizers, mainly urea. Potassium-based fertilizers (MOP) and almost 90 per cent of phosphorous based fertilizers (DAP) were entirely imported, (Planning Commission, 2011) so there was no RPS like scheme for them. Meanwhile farmers, already incentivized to higher utilization continued to increase overall consumption: consumption of

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fertilizers per ha of the gross cropped area went up from 13 kg in 1970-71 to 31 by 1980-81 and continued to grow at a rapid rate.

Expanding Irrigation Facilities

Besides seeds and fertilizers, the third input to HYV cultivation was water from rain and artificial irrigation. It is not that HYVs needed more irrigated water per hectare of cultivation but a more controlled way of watering them as compared to other local non-HYV varieties (Kanwar, 1969). Water dispensation at particular stages of plant growth is a necessary fact and not watering

appropriately at each stage reduces yields. As (Cassman & Grassini, 2013) note, "it is difficult to envision a green revolution ... without substantial investments to expand irrigated area and to maintain and refurbish existing irrigation infrastructure" – which is what happened in India.

The Fundamental Shift in Irrigation

Public Irrigation policy in India until the early 1960s was largely characterized by protective irrigation, based on the principle that water available from river flow or public reservoirs is to be equitably supplied to as many farmers as possible spread out over a wide geographical area so as to insure (protect) them against crop failure or famine due to lack of adequate rainfall (Jurriënset *al*, 1996). Thus social risk minimization rather than maximizing social returns was the guiding principle of policy.

However, farmers' private incentive was to grow cash crops such as sugarcane that yielded higher returns than staple crops, adjusted for private risk. To dis-incentivize the cultivation of cash crops, cesses or taxes on their cultivation were levied, often evaded by farmers.

To induce the cultivation of HYVs required that farmers be socially [and] privately profitable, with adjustments for risk. This required a shift in irrigation policy, from protective to productive irrigation based on making water use profitable both privately and socially, and adjusted for risk. A larger aggregate supply of water to meet the water requirements of HYVs also required public and private investment in irrigation.

Such a shift happened at two levels. At the government level, irrigation facilities were expanded by public investments in large scale development of canal systems for surface water irrigation and also in minor irrigation. At the level of the farmer, it was done by facilitating the investment of private tube-wells for ground-water irrigation

by providing institutional credit, and subsidized diesel and electricity.² Quite possibly, owing to this fundamental shift in irrigation policy, gross irrigated area (GIA) [and area under HYV] increased from 38.2 Mha (15.3) Mha in 1970-71 to 89.4, (64.9) Mha by 2010-11 (1990-91) (DES 2013). These increases played a substantial role in increasing agricultural production because they enabled multiple cropping particularly that of cultivation in summer crops such as HYVs that require controlled irrigation. Food-grains' production went up, including production of food grains, from 108.4 million tonnes in 1970-71 to 255.36 million tonnes in 2012-13 (DES 2013).

Cost Recovery

More directly however, the primary reason for increases in irrigated land continued to be the low prices charged by the government for canal water, electricity and diesel for irrigation. Beginning in the early 1960s, the government's thinking on cost recovery for the water supplied centered on covering costs of Operation and Maintenance of the facilities by Public Investment.

According to the Planning Commission (1992), investment in public irrigation projects were approved only if they met a Benefit-Cost ratio of 1.5:1, where the Benefit-Cost ratio was defined as the ratio of net annual benefit (the increase in output due to the project) from irrigation to annual cost of operation and maintenance along with interest on capital calculated at 10 per cent and depreciation (Irrigation Commission, 1972).

Whether the cut-off 1:5:1 in the benefit cost ratio was strictly enforced is doubtful. State governments had the authority to price irrigation water. Almost surely the low and stagnant prices for water supplied through public irrigation facilities were heavily influenced by political rather than social cost benefit considerations.

With the adoption of HYV and the new strategy for agricultural development in mid-1960s, tube-wells

(mostly private) diffused rapidly across India. In 1965 the estimated stock of private tube-wells in India was 1,00,000. It rose to 3,60,000 by 1969 and to 11,84,800 by 1974 (Dhawan, 1979). This rapid rise in private tube-wells in India was achieved through an increased availability of subsidized credit for investment in drilling tube-wells and in pump-sets and subsidies for diesel and electricity used in pumping ground water.

Agricultural Price Policy

The new agricultural strategy of 1965 focused on increasing agriculture production - first, by using newly available HYV, and second by providing incentives to farmers for adopting HYVs to increase agricultural output. The strategy included price supports to incentivize farmers to absorb the higher cost of HYV cultivation and raise their returns from HYV cultivation (Krishna, 1971). One essential component of incentive price policies was the Minimum Support Price (MSP), which was contingent on a collapse of harvest prices prevailing in the market, at which the government stood ready to purchase from farmers whatever they wished to sell. In fact, there was need to provide insurance against a potential market price collapse because of an anticipated excess supply of food grains due to large scale HYV cultivation.

In 1965, the Agricultural Prices Commission (APC), later renamed in 1980 as Commission for Agricultural Costs and Prices (CACP), stood ready to advise the government on the pricing policy of agricultural commodities with a view to evolving a balanced price structure and protecting the interests of producers, consumers, the society and the economy as a whole (MoFA, 1965).

The APC (or CACP after 1980) recommended three kinds of prices: minimum support price, procurement price and issue price. The first, as noted earlier, was aimed at protecting farmers against a market price collapse and was originally set below the expected average market price that

would have prevailed in the absence of a price collapse. The second enabled the government to purchase limited amounts for supply in the public distribution system at a modest cost to government. It was set above support price but below expected market price. The third price at which government sold grain from storage for distribution to consumers at ration/fair price shops was set below the economic cost of procurement, transport and storage. The last included a significant subsidy relative to retail price, since it was meant to protect the interests of consumers, particularly the poor. Unfortunately, due to intense lobbying by the farm lobby, the distinction between support and procurement prices was eliminated as well as the limit on the amount of food grains to be procured. Thus the government stood ready to buy at the support price as much food grains as was offered. Moreover, the lobby ensured support prices rose steadily over time. For more details on price policy and agricultural marketing.

Distortions

Price supports, input subsidization and a ready buyer for agricultural output resulted in a significant boost in agricultural production during the Green Revolution. However, in this entire process, policy focus was on increasing agricultural production and productivity in the short and medium term, and interventions were for that purpose. They did not take into consideration whether they needed to be sustained in the longer term; even after most farmers had adopted HYV and in the context of the economic and environmental distortions that they were creating.

Thus, although technological characteristics of HYVs necessitated an increased use of fertilizers, irrigation, labour and other inputs and though the increase in use of inputs led to substantial increases in agricultural production and productivity of land, it did not necessarily translate into efficient use of inputs due to the distortions from subsidies and also

raised fiscal stress at the Centre and the States.

Fertilizer Policy

Millions of farmers readily adopted HYV cultivation; however the subsidies for nitrogenous fertilizers created large imbalances in the proportionality of various fertilizers used when compared to scientific recommendations (Gulati *et al*, 2010) with the result that soil conditions and consequently productivity, were negatively impacted (Swarup, 2000).

While a reduction in average marginal response rates are to be expected with increasing use of fertilizers, the observed decline as seen from a report of the Planning Commission and cited by Birner *et al*(2011) suggests a steady decline in marginal soil productivity measured in terms of the average response rate of crops to the amount of fertilizers used (kg grain per kg NPK). In fact the marginal soil productivity declined steeply - from 7.5:1 (i.e. 7.5 kg of grains produced per kg of NPK fertilizer used) in 1992-97 to 7.0:1 in 1997-99 and 6.5:1 in 1999-2000.

Second, the prolonged subsidization support of low efficiency methods of fertilizer production through the RPS necessarily made all existing plants break-even whatever be their unit cost of production. Fertilizer production is a highly energy-intensive process and the important determining factor of energy efficiency in fertilizer production is capacity utilization, which in turn is a function of the feedstock used. Usual feedstock materials are natural gas, naphtha, fuel oil, coal etc. In general, the production cost of urea when natural gas is used as feedstock is substantially lower than when other materials are used and contributes far less to air pollution when compared to that of other feedstock (*ibid.*).

The New Pricing Scheme (NPS) of 2003 signaled an intention to stop keeping naphtha based plants viable and in April, 2014, the government mandated all naphtha-based fertilizer

A Note from Dr. M.S. Swaminathan (the architect of Green Revolution)

I am glad that Prof T N Srinivasan and Pavan Katkar have summarized the technological and public policy interventions which lead to the green revolution in the 1960s. I have frequently compared the green revolution to a symphony where there is harmony among the steps taken by different agencies. Synergy among technology, public policy and farmers' enthusiasm has been the major trigger for the rapid advances made in wheat and rice production during the 60s. I am glad that the authors have not only referred to the packages of technology, services and public policies which were introduced during the 60s for enabling small and marginal farmers to take advantage of the new seeds, but have also referred to the consequences of the abuse of technologies. This is why I coined the term, "Ever-green revolution" to emphasize the need for increasing productivity in perpetuity without associated ecological harm. Unfortunately, distortions have taken place in the support given for ground water use, fertilizer application and energy supply. Subsidies have been given for what I often refer as "subsidies for ecosides", ie ecological suicide.

I am happy that the article draws attention to the critical role played in the 60s by new institutions like the Food Corporation of India, National Seed Corporation and the Agricultural Prices Commission. Ultimately it is only opportunities for assured and remunerative marketing that can help to stimulate and sustain farmers' interest in producing more.

I am sure all those who are interested in the historical aspect of our agricultural transformation will go through this paper with interest. It is a matter of pride for all Indians that we have graduated from a "ship to mouth" existence to one of conferring "the right to food with home grown foods".

M S Swaminathan

plants to switch over to natural gas, failing which they would not receive any subsidy after June 30, 2014 (Business Line, 2014).

An important point that follows is that the price distortions in the production of fertilizers were not inherent in the fertilizer intensiveness of Green Revolution technology. Those distortions were created due to ad hoc policy interventions undertaken to keep fertilizer production plants with different feedstock operating and viable.

Another negative effect of these policy interventions is the fiscal burden imposed by fertilizer subsidies on the Indian economy. Ever since the introduction of the RPS scheme there has been an upward trend in government subsidies to fertilizer producers and users (Birner *et al*, 2011; Gulati and Narayanan, 2003).

While reducing fertilizer subsidies will ease the burden on the exchequer

and also help reduce the use of N fertilizers relative to P and K fertilizers, it also has the potential to negatively impact food production since farmers may reduce or even forego use of fertilizers owing to higher prices. Put differently, the cost of distorted low price of fertilizer is the implicit higher cost of food produced with it as compared to the opportunity cost.

Moreover attempts at reforming, or even phasing out fertilizer pricing policies have met with opposition from various pressure groups and the farm lobby in India. They are believed to be politically costly for the political parties and hence there is little impetus to remove subsidies.

Distortions from Irrigation Policy

The deliberate policy for expanding irrigation in India in support of HYV cultivation increased pressure to maintain a low price for water, and the government continued to provide water

for irrigation at low rates for roughly two decades (from 1965 to 1985) in order to support and incentivize HYV cultivation. In 1987, growing concerns of cost-recovery from public irrigation systems indicated that water rates should be set to adequate levels “to cover the annual maintenance and operation charges and a part of the fixed costs” (Planning Commission, 1992). However, the cost-recoveries done at the state levels still do not reflect that the National Water Policy is being implemented.

These unrecovered costs contribute significantly to government’s fiscal deficit. They also constrain the availability of resources for augmenting productive capacity and improving other forms of social services (Vaidyanathan, 2010). Any attempt to hike the price of water faces immense opposition from the farm lobby. This, however, is only half the picture of distorted pricing of irrigation water. The other half manifests itself as electricity and diesel subsidies for pump-lifting underground water for irrigation, and is more closely tied to green revolution.

Fuel and Electricity Subsidy

Electricity subsidies caused increased use of groundwater sources and thereby increased agricultural profits and rural incomes. Farmers, recognizing the importance of a stable and predictable source of water, underpinned by power subsidies, increasingly organized themselves into a more powerful voter base (Badianiet al, 2012). Secondly, agricultural incomes in India are free from income tax. This led to pseudo farmers laundering non-agricultural incomes as agricultural incomes, strengthened the in-voter base even more (Dubash and Rajan, 2001; Birner, 2011). Collaterally, growth in irrigation facilities coupled with the subsidization of power and even free power for the agricultural sector has led to many serious environmental and economic problems. Problems like water-logging and salinity of soil

due to excessive and inefficient use of ground water for irrigational purposes, and a significant drop in ground water tables which has increased the cost of lifting ground water besides creating serious water logging and salinity in parts of India (Planning Commission, 2013).

Free and subsidized electricity for irrigation has significantly contributed to increase in fiscal deficits at all levels, and also resulted in increased power theft. Transmission and Distribution losses aka T&D losses which were large compared to other countries, came to be known as Theft and Dacoity losses, contributed to substantial power shortages across India, not to mention the revenue losses incurred by State Electricity Boards. (Badiani, 2012) has explored in detail many problems/costs associated with electricity subsidies for agricultural purposes.

Indeed subsidies are one of the most important factors responsible for poor, unreliable and unpredictable electricity supply in India. According to some observations, 12.5 per cent of the demand for electricity was not met, which manifested as frequent blackouts, load-shedding and power cuts lasting up to 4 hours a day in urban areas. Industrial and commercial sectors have suffered substantial costs on account of the subsidized or free provision of electricity to the farm sector. Average charges for Industrial and commercial users across India are substantially higher than the average cost of electricity. For example, in Karnataka (and Gujarat) the commercial sector is charged 153 per cent (130 per cent) of the average cost of electricity. Despite paying such high rates, they receive low quality power supply with frequent power cuts. According to the World Bank, “the poor quality of electricity has been the single greatest deterrent to India’s economic growth and development.” It took until 2003, when the Electricity Act unbundled the generation, transmission and distribution of electricity, which were

under the control of State Electricity Boards, which experienced losses every year.

Distortions from Output Price Policy

Though the new price policy institutionalized by the Food Corporation of India (FCI) contributed to ushering in the Green Revolution, both have had some negative effects as well.

First, fiscal stress in large part arose from the ever increasing share of non-merit subsidies that served no social or economic purpose. The subsidies, channeled through Food Corporation of India arose in part from its inefficiency in procuring and transporting food grains, and in part from financing growing user subsidies from higher economic costs incurred by the FCI.

Motivated by market mechanics, consumers were incentivized to profit by purchasing from the government at issue prices and selling it back at procurement prices. Any attempt to ease fiscal stress by reforming pricing policy was vehemently opposed by the farm lobbies in Indian agriculture.

Secondly, price policy created systemic incentives for the circumvention of controls and the leakage of commodities from the system (*ibid.*). Price policy along with the Public Distribution System (PDS) created dual markets: a government controlled market operated through fair-price shops and another open market led by private actors. In the controlled market, prices are set by the central and state governments and in the open market, prices are dynamically determined in general market equilibrium. Dual markets and associated dual prices contribute to leakages of commodities from lower to higher price markets. Furthermore, issue prices of food grains varied across states thereby creating incentives for price arbitrage and associated movements from one state to another. In response, the government imposed

restrictions on the movement of food grains by private traders. Predictably, such restrictions created black markets for food grains and also deprived farmers from realizing higher profits for their output.

Thirdly, pressure groups such as farm lobbies were formed to pressurize the government to set prices and change them to their advantage. Thus pressure on the government to raise support prices was intense whenever international market prices for food grains soared. In fact, most of the protests, agitations and hunger strikes of the farm lobby were centered on seeking increases in support prices (Lenneberg, 1988) and often, they lobbied successfully to force the Government to raise prices of agricultural commodities (Lenneberg, 1988; Karnik, 1996). Indeed minimum support prices were set higher than those recommended by the CACP and over time, it has become the norm, rather than the exception for successive governments to set support prices above recommendations by the CACP.

Fourth, not all agricultural markets are purely competitive, and are also distorted resulting in price distortions, inefficient procurement and storage including open air storage and marketing policies (Ganguli & Gulati, 2013). At times, stocks of food grains reached unprecedented levels, much in excess of any reasonable buffer stock requirements. The excess had to be exported with export subsidies as of June 2002, when food stocks had attained a record high of 82 million tonnes (*ibid.*).

Fifth, some policy interventions have also impacted India's commitments under the Agreement on Agriculture, a part of the Uruguay Round agreement that established the WTO on reductions in its aggregate measure of support (AMS) to agriculture in the context of domestic stockholding for food security purposes (Srinivasan 2014a, 2014b).

In December 2013, the Bali Ministerial meetings of the WTO concluded the Trade Facilitation

Agreement (TFA), the very first "early harvest" multilateral agreement of the Doha Round of Multilateral Trade Negotiation initiated in 2001. India, signed the agreement. A working group that was setup proposed a Protocol of Amendment to Annexure I of the Uruguay Round Agreement (UR) of 1994 that established the WTO (hence called WTO Agreement) to include TFA among the list of multilateral agreements of the WTO. Had this protocol been approved (by the deadline of July 31, 2014), the TFA would have come into force on January 1st, 2015, once enough WTO members ratified it by that time.

India chose not to approve the protocol of amendments by the deadline of July 31, 2014. Thus, the TFA agreement went to a limbo due to lack of consensus on the approval as required under Article 9 of the WTO agreement.

In addition to TFA agreement, the Bali Ministerial agreed on a Ministerial Decision on Stockholding for Food Security Purposes. This decision had two important provisions: first, was a so called "peace clause" precluding WTO members from bringing before the WTO's Dispute Settlement System for violation of their AMS commitments as long as a final solution to the stockholding issue has not been reached. Second, was that a final decision was to be reached on Stockholding for Food Security Purposes no later than the 11th Ministerial 2017 with a progress report on negotiations on the issue to be presented at the 10th Ministerial in 2015. Clearly, this Ministerial Decision allowed adequate time for a discussion of all issues relating to stockholding for food security as well as the formulae for calculating AMS as it impacts the peace clause.

India's decision not to join the consensus was for the ostensible reason that in the work programme for 2014 of WTO following the Bali Ministerial, although there was a lot of discussion on other aspects of TFA,

no discussions had taken place on stock holding for food security issues as of mid-2014. Moreover, India feared that the developed countries, primarily interested in the ratification of TFA would not be interested in coming to a final agreement on stock holding once the Protocol is approved and TFA is ratified.

It must be noted that other than Venezuela, none of the developing members of the WTO including those in SAFTA and BRICS joined India in its decision not to join the emerging consensus on the Protocol of Amendment. This is where matters stood until the announcement in mid-November 2014 of a deal between India and the United States on the issue. The precise details of the deal are yet to be announced. From newspaper reports and the exclusive interview to a TV channel of Minister Nirmala Sitaraman on November 15, 2014, it appears that the US has agreed to India's demand for an indefinite extension of the peace clause so that India is free to subsidize domestic agricultural production at any level it desires. By the same token, as far as India is concerned, the US is free to set its producer support at any level it chooses.

The US-India deal is yet to be considered by the WTO's General Council, the supreme decision ruling body of the WTO. When it meets it could choose to extend the US-India deal to all members of WTO and resume Doha Round negotiations. Alternatively, it could ignore the India-US deal and put the Protocol of Amendment to vote as permitted by Article 9 on WTO's Decision when a consensus cannot be reached. If the vote were to take place, India would most certainly lose and the rest of the WTO members will decide whether to let India continue as a member of the WTO. The geopolitical reality suggests that there will be no such vote and some mealy-mouthed compromise will be reached such as extending peace clause until 2019 rather than indefinitely as India wants and to resume Doha Round

negotiations. In sum, due to previously implemented policy interventions in support of green revolution, India today is making trade decisions that yield little or no benefit.

Summary and Conclusions

Many factors enabled India to avert an impending food crisis in the mid-1960s with the most important being a sustained boom in agricultural production and land productivity from the successful adoption and cultivation of HYV seeds of the technological breakthrough that came to be called Green Revolution.

HYV seeds had an inherent potential to produce a higher agricultural yield provided they were cultivated along with adequate use of fertilizers and with a controlled supply of water. Recognizing their potential, the government of India, supported by eminent agricultural scientists adopted a New Agricultural Strategy in 1965 which centered on the widespread adoption and cultivation of these technologically advanced HYVs. This adoption was incentivized by a number of policy interventions, closely tied with the nature of the technology in a complex interaction of technology, policy, institutions, and politics which eventually resulted in a successful green revolution. However, the incentivization also resulted in economic and environmental distortions that are arguably undercutting agricultural production and distribution significantly, in India today. This paper has attempted to document those technology-policy interactions that underpinned the Green Revolution in India.

Substantial increases in agricultural production using HYV technology is possible only if adequate amount of fertilizers and a controlled supply of water is available. Hence, the government incentivized domestic fertilizer production through pricing that ensured adequate returns to investment in fertilizer industries and increased availability to farmers at affordable prices. It also supported

widespread diffusion of tube-and dug well irrigation through increased agricultural credit for investment in wells and pumps and subsidized electricity (and diesel) for pumping water from wells. While these policy instruments addressed the input side of agricultural production, there were also a number of policy interventions on the output side as well. They were aimed at incentivizing farmers to raise their farm production and productivity through highly remunerative prices. It also insulated agricultural markets in India from the risks and fluctuations of global food and fertilizer prices. Food grains were procured by the government to support and build buffer stocks of grains for ensuring food security to consumers, particularly the poor.

The enabling role of these public policy interventions and their synergy has been as important as that of the technological break-through in ensuring a boom in India's agricultural production. However, the interventions have also contributed to environmental and economic distortions. First, assured net returns on investment in fertilizer production have blunted the incentives for minimizing costs, be it environmental or other costs. Pricing subsidies on fertilizer production and use have contributed to significant fiscal stress on the economy. Cheaper prices of nitrogenous fertilizers relative to others, has led to imbalances in use of fertilizers, and over time the marginal productivity of soil has declined. Second, subsidized electricity has led to wasteful use of ground-water irrigation which has contributed to water-logging, salinity and fall in watertables. Subsidization of electricity and free electricity has also led to financial losses to state electricity boards and power theft. It did not provide incentives for efficient and uninterrupted supply of electricity to the rural sector. Lastly, distorted support prices, procurement prices and issue prices have contributed to high rise in food subsidies and subsequently to enormous fiscal stress on the economy. Controlled markets or lack

of competition in agricultural markets have led to inefficient procurement, storage and distribution policies of the Food Corporation of India. It has led to damages to significant quantities of food grains due to inadequate storage facilities. The operation and maintenance costs have soared due to unprecedented levels of food grains stocks. These have posed a substantial burden on the exchequer.

In all these interactions of technology and policies related to the green revolution, a common theme can be noticed. All of them have contributed to the success of green revolution in India but all of them now contribute to worrying environmental and economic distortions that are, in fact undercutting the agricultural production and productivity. Not all of the distortions served a social purpose and many were politically driven. Policies that were meant to encourage initial adoption and experience profitable cultivation of HYVs were continued beyond the initial stage. It is time that the government takes steps to phase out these policies gradually or at least reform them in a way that alleviates their socially costly distortions while sustaining their social benefits. It turned out these policies were introduced without a 'sunset clause' that would have mandated a review of their performance after an appropriate time to decide whether it warranted their renewal or phase out. It appears that policies were made on an ad-hoc basis to address the immediate concerns facing the government instead of providing long term sustainable solutions to those problems.

Readings

Badiani, Reena, Katrina K. Jessoe, and Suzanne Plant. (2012) "Development and the Environment: The Implications of Agricultural Electricity Subsidies in India." *The Journal of Environment & Development*: 1070496512442507.

Bhagwati, Jagdish N., Padma Desai, and Organisation for Economic Co-operation and Development. *Development Centre. (1970.) India: planning for industrialization: industrialization and trade policies since 1951.* Oxford: Oxford University Press.

Birner, Regina, Surupa Gupta, and Neeru Sharma.(2011)*The political economy of agricultural policy reform in India: fertilizers and electricity for irrigation*. Vol. 174. International Food Policy Research Institute.

BusinessLine, (2014) "Subsidy for naphtha-based fertiliser units must continue", BusinessLine Bureau, June 10, 2014

Cassman, K. G., &Grassini, P. (2013). Can there be a green revolution in Sub-Saharan Africa without large expansion of irrigated crop production?.*Global Food Security*, 2(3), 203-209.

D'Costa, Anthony P. (2009). "Economic nationalism in motion: steel, auto, and software industries in India." *Review of International Political Economy* 16, no. 4: 620-648.

Dalrymple, Dana G. (1986). *Development and spread of high-yielding rice varieties in developing countries*. International Rice Research Institute.

Dalrymple, Dana G. (1979). "The adoption of high-yielding grain varieties in developing nations." *Agricultural History*: 704-726.

Dalrymple, Dana G. (1974). *Development and spread of high-yielding varieties of wheat and rice in the less developed nations*.No. 145638.United States Department of Agriculture, Economic Research Service.

Department of Fertilizers (DoF), (2008). "Annual Report 2007-08", *Ministry of Chemicals and Fertilizers*, Government of India

Department of Food and Public Distribution, (DFPD), (2014). "Food Subsidy", *Government of India*, <<http://dfpd.nic.in/fcamin/policy/sub-statement.doc>>Accessed on July 23, 2014

Dhawan, B. D. (1979). "Trends in Tubewell Irrigation, 1951-78." *Economic and Political Weekly*: A143-A154.

Directorate of Economics and Statistics (DES), (2013), "Agriculture at a Glance 2013", *Ministry of Agriculture and Cooperation*, Government of India, <<http://eands.dacnet.nic.in/Publication12-12-2013/Agricultureat%20a%20Glance2013/page90-127.pdf>>Accessed on 20-Nov-14

Directorate of Economics and Statistics (DES), (2012) "Land Use Statistics 2011-12", *Ministry of Agriculture and Cooperation*, Government of India, <<http://eands.dacnet.nic.in/LUS-2011-12/>

[LUS2011-12.xls](#) >Accessed on 10-Aug-14

Directorate of Economics and Statistics (DES), (2010). "Agriculture at a Glance 2010", Ministry of Agriculture and Cooperation, Government of India, <[http://eands.dacnet.nic.in/At_Glance_2010/4.6\(A\).xls](http://eands.dacnet.nic.in/At_Glance_2010/4.6(A).xls)>[http://eands.dacnet.nic.in/At_Glance_2010/4.7\(A\).xls](http://eands.dacnet.nic.in/At_Glance_2010/4.7(A).xls)>http://eands.dacnet.nic.in/At_Glance_2008/ch_4/tb4.5aFU.xls>Accessed on 10-Aug-14

Directorate of Wheat Development, (2002) "History of Wheat Production in India", Ministry of Agriculture, <http://dwd.dacnet.nic.in/wheat_prod/history.htm> accessed on 20-Jun-14

Dubash, Navroz K., and SudhirChellaRajan.(2001). "Power politics: Process of power sector reform in India." *Economic and Political Weekly*: 3367-3390.

Ford Foundation. Agricultural Production Team, and India. Ministry of Food.(1959). *Report on India's food crisis & steps to meet it*. Govt. of India, Ministry of Food and Agriculture.

Frankel, Francine R. (1969) "India's new strategy of agricultural development: Political costs of agrarian modernization." *The Journal of Asian Studies* 28, no. 04: 693-710.

Ganguly, Kavery, and Ashok Gulati. (2013). *The political economy of food price policy: The case study of India*. No. 2013/034.WIDER Working Paper.

Gulati, Ashok, and Sudha Narayanan. (2003). "The subsidy syndrome in Indian agriculture." *OUP Catalogue*.

Gulati, Ashok, Pradeep Kumar Sharma, and SatuKähkönen.(1996). *The Food Corporation of India: Successes and Failures in Indian Foodgrain Marketing*. Center for Institutional Reform and the Informal Sector, University of Maryland at College Park.

Gulati, Ashok, Monica Dutta, and D. Dawe.(2010). "Rice Policies in India in the context of the global rice price spike." *The Rice Crisis: Markets, Policies and Food Security*: 273-295.

Hodge, Charles A. (1996). *Pollution control in fertilizer production*.CRC Press.

Jurriëns, R., Mollinga, P., &Wester, P. (1996). "Scarcity by design: Protective irrigation in India and Pakistan", International Institute For Land Reclamation

And Improvement/ILRI

Kanwar, J. S. (1969). "From protective to productive irrigation." *Economic and Political Weekly*: A21-A26.

Karnik, Ajit, and Mala Lalvani.(1996). "Interest groups, subsidies and public goods: Farm lobby in Indian agriculture." *Economic and Political Weekly*: 818-820.

Krishna, Daya. (1971). "The New Agricultural Strategy: The Vehicle Of Green Revolution In India."

Lenneberg, Cornelia. (1988). "Sharad Joshi and the farmers: The middle peasant lives!" *Pacific Affairs*: 446-464.

Minhas, B. S., & Srinivasan, T. N. (1966). New agricultural strategy analysed. *Yojana*, 10(1).

Ministry of Food and Agriculture (MoFA), (1952). "Report of the Grow More Food Enquiry Committee", *Government of India*, New Delhi.

Ministry of Food and Agriculture (MoFA), (1965). "Government Resolution on the Terms of Reference of the Agricultural Prices", *Government of India*.

MSSRF, (2007). *Measures of Impact of Science and Technology in India: Agriculture and Rural Development*, MS Swaminathan Research Foundation

NAAS, (2009). "Crop Response and Nutrient Ratio", Policy Paper No. 42, *National Academy of Agricultural Sciences*, New Delhi. <<http://naasindia.org/Policy%20Papers/policy%2042.pdf>>Accessed 30-Jul-14

Parayil, Govindan. (1992). "The green revolution in India: A case study of technological change." *Technology and Culture*: 737-756.

Planning Commission, (2013). "Report of the High Level Expert Group on Water Logging in Punjab", *Government of India*.

Planning Commission, (1992). "Report of the Committee on Pricing of Irrigation Water", *Government of India*.

Planning Commission, (1971). *High-Yielding Varieties Programme in India – Part I – 1971*, Programme Evaluation Office (PEO) Study No. 84.

Pinthus, Moshe J. (1974). "Lodging in wheat, barley, and oats: the phenomenon, its causes, and preventive measures." *Advances in Agronomy* 25: 209-263.

Posgate, W. D. (1974). "Fertilizers for India's green revolution: the shaping of government policy." *Asian Survey*: 733-750.

Randhawa, M. S. (1980). "A history of agriculture in India. Vol. 1. Beginning to 12th century." *A history of agriculture in India. Vol. 1. Beginning to 12th century.*

Randhawa, M. S. (1979). "A History of the Indian Council of Agricultural Research 1929-1979."

Repetto, Robert. (1994). "The" second India" revisited: population poverty and environmental stress over two decades." *WRI PUBLICATIONS BRIEF*: 1-4.

Rud, J. P. (2012). "Electricity provision and industrial development: Evidence from India." *Journal of development Economics*, 97(2), 352-367.

Singh, Manmohan. (1964). *India's export trends and the prospects for self-sustained growth*. Clarendon Press.

Singh, N. P. (2002). *Integrated Nutrient Supply Management System*. Concept Publishing Company.

Srinivasan, T.N (2014a), "On Food Security", Chapter 4 in, Max Merbis and Lia van Wesenbeeck (Eds.), *Real and Integer*, Centre for World Food Studies, SOW-VU, VU University, Amsterdam, p.41-59

Srinivasan T.N, (2014b), "Food Stocks, Food Security, and India's Stand On WTO Trade Facilitation Agreement: A Shot in

the Arm or Shooting Yourself in the Foot?" Indian Institute of Technology, Madras, September 9, 2014, ppts

Swaminathan, M. S. (2013). "Genesis and Growth of the Yield Revolution in Wheat in India: Lessons for Shaping our Agricultural Destiny." *Agricultural Research* 2, no. 3: 183-188.

Swaminathan, M. S. (1969). "Scientific implications of HYV programme." *Economic and Political Weekly*: 67-75.

Swarup, Anand. (2000). *Three Decades of All India Coordinated Research Project on Long-Term Fertilizer Experiments to Study Changes in Soil Quality, Crop Productivity and Sustainability*. Indian Institute of Soil Science.

Vyas, V. S. (1975). "India's high yielding varieties programme in wheat 1966-67 to 1971-72."

Wolf, Martin. (1982). *India's exports*. World Bank.

Endnotes

1 This is evident from Swaminathan's (2013) account: "Ms Indira Gandhi ... clearly saw the link between food self-sufficiency and [India's] ability to adopt an independent foreign policy.

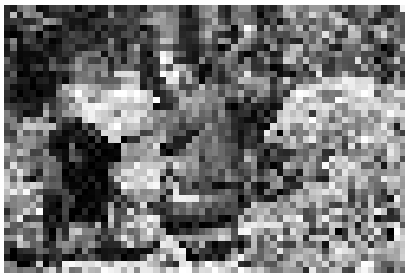
No wonder that when Dr. Vikram Sarabhai (Chairman of the Atomic Energy Commission) and I met her at her residence in late 1966 (the year she had taken over as Prime Minister) for discussing the opportunities opened up by remote sensing in natural resources mapping and management, the first question she asked me was, 'how soon can we build a food grain buffer stock of 10 million tonnes?'. It is ironic that almost five decades later the issue of stock holding for food security purposes led India not to join the consensus on the Protocol of Amendment relating to the Trade Facilitation Agreement of WTO by the deadline of July 31 2014 and to negotiate a bilateral deal on it with the USA. See Section 5.3 below and Srinivasan (2014b).

2 There are complex analytical issues involved in incorporating risk preferences (trade-offs between risk incurred and returns achieved) at the private and social level and in measuring risk. Availability of adequate and reliable data is another issue. □

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Swachh Bharat Abhiyan: Marginalising the Mainstream

Poornima Chikarmane



It is incumbent upon the hordes of cleanliness campaigners within and outside government to ensure the enforcement of labour standards, minimum wage laws and occupational health and safety of waste workers. The onus is upon the government of the day to lead by example and guarantee workers' rights to dignity (sanman), living wages and earnings (dhan), social security and association

WHETHER it is the Nirmal Bharat Abhiyan of the previous government or the Swachh Bharat Abhiyan of the present one, there is more to cleanliness campaigns than the broom wielding brigade. This article reaches into the rotten underbelly upon which the edifice of cleanliness campaigns is constructed to examine the reality of how garbage is managed and mismanaged in Indian cities. The formal system is the municipal establishment which is constitutionally obligated to carry out the solid waste management function either directly or through its contracted agents. The informal system comprises the chain of informal waste pickers and itinerant waste buyers and trade enterprises that recover recyclables from waste generators and the municipal waste stream, for supply to recycling enterprises. The author suggests that along with the environment, any cleanliness campaign must be foregrounded in the dignity and justice considerations of workers involved in the formal and informal solid waste handling systems. It must also build upon and strengthen the complementarities of the formal and informal through appropriate institutional arrangements.

Successive Indian governments were made aware of the connection between the formal and informal

systems of solid waste management, and the need to integrate the informal, by the Committees that they constituted from time to time. Way back in 1995, some valuable observations were made by the High Power Committee on Urban Solid Waste Management in India that was constituted by the Planning Commission¹ and chaired by Mr J.S.Bajaj. Some compiled excerpts from the report of the Bajaj Committee are presented below.

“India has set an example for developed countries. Paper, plastics, glass and textiles are also reprocessed leaving virtually no recyclable material in urban solid waste. Waste recycling is to be encouraged and strengthened; the salvaged material is free of any material cost except the cost of collection. Materials for recycling should be segregated at source. Presently, the informal sector of rag pickers is contributing substantially to the recovery of recyclable material from urban solid waste. However, the rag pickers, mostly women and children, live under and work in extremely unhygienic conditions. It is essential to improve the present system of collecting and utilising the recyclable material. These rag-pickers could be organised by setting up cooperatives. These workers can then collect recyclable material right at the household level; incidentally, they could also collect at the same time organic waste material from the

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household and deposit at the roadside collection sites. The present system of scavenging of recyclable matter from roadside dumps and disposal grounds by the informal sector of urban poor should be replaced by organised ward-level recovery centres for recyclable material connected with the transfer stations where primary collection carts transfer their collection to the transport vehicles. These recovery centres could be managed by cooperatives of rag pickers or by NGOs. Alternatively, the rag pickers could be employed by the Municipal Authorities for recovery of recyclable material. This would get rag pickers the recognition that they are an essential link in urban solid waste collection and recycling system. This will also prevent health hazards associated with rag picking in garbage dumps and provide them better working conditions and possibly better economic returns. It is also possible that their intimate insights into the recycling trade makes them the best suited to make optimal use of the recyclables and some day, their cooperative units may grow into small scale reprocessing units which are profitable and at the same time, useful in reducing the burden of non-biodegradable urban solid waste.

The growing cities will have to evolve their mechanism to solve waste disposal in the near future. The mounting cost of raw material and for prevention of environmental degradation, waste recycling is important and should be promoted at all levels. Considering these and the huge cost of the waste disposal in the city, which is increasing day by day, the ragpickers theoretically contribute to the urban economy by providing labour to cleanse the city of utilisable, recyclable material and provide material for several industries. In the light of these, rag pickers become an important occupation group and deserve to be considered with respect and organised.

The major components of the Action Plan of Urban Solid Waste Management shall include establishment of rag pickers cooperatives in association with NGOs.”

The Report on Solid Waste Management in Class I cities of India²

and that of Second National Labour Commission³, followed close on the heels of the Bajaj Committee and made similar recommendations, as did the most recent High Powered Committee on Forest and Environment related laws, chaired by TSR Subramanian, that submitted its report in November 2014.

What came through in the recommendations of the committees was the market driven nature of the recycling industry in India, and the fact that it works without any government support. Hundreds of thousands of tonnes of recovered materials that would have otherwise been destined for burial in landfills re-enters the manufacturing process saving natural resources, energy and money. The recycling chain diverts garbage from dumping sites for productive use and provides employment. An estimated 1-2 per cent of the urban workforce is engaged in recovery, trading and intermediate processing that enable the transit of materials back into the production stream.

Solid Waste Management and Recycling

If recycling is so indubitably advantageous and beneficial, and the integration of the informal with the formal has been endorsed by experts, it begs the question why the implementation of recommendations has been so slow paced over the last two decades.

We first take a look at the factors from the point of view of the municipalities, the demand side. To begin with, there is a perception mismatch. Municipal administrators across the country are tasked with managing what is referred to as municipal solid waste as part of their city cleansing and public health function. Waste by its very definition, consists of discards, unwanted stuff, something that needs to be disposed because it has no use or value. Established practice in municipalities is therefore, to collect, transport and dump, and more recently even to incinerate because most often the municipalities do not concern themselves with the composition

of waste or the destination of its constituent materials. What is often not understood is that waste management is essentially about identifying and appropriately handling the different materials entering the collection system from different sources so that what can be reused, repaired, processed is diverted to those streams leaving only the residuals to be consigned to landfills. Second, municipalities find it hard to resist the allure of magic bullet techno-managerial solutions from vendors. Third, politicians find it inconvenient to force waste generating voters to pay additional taxes and to enforce rules that require source segregation of waste. Fourth, waste generators are not unduly concerned about dumping wastes on neighbouring villages or indeed about what happens to their waste as long as it is not on the streets. Lastly, the policy makers and institutional investors exhibit greater affinity towards capital intensive, technology centric, centralised solutions rather than decentralised ones. While the responsibilities for service delivery have devolved to the municipalities, the tax structure is such that they have few revenue sources and are dependent upon funds provided by the central and state governments.

Examining the issue from the angle of informal recycling workers, the supply side, we find that there is no system for registering and recognising such workers. Waste work is stigmatized work, carried out by socially excluded and economically marginalised Dalits, adivasis and minorities. Waste pickers and itinerant waste buyers are own account workers, who work alone or in family or kinship groups, that are largely ignored by worker organisations and trade unions. Sorting and categorisation of recyclable materials is an integral part of the process of value addition and it is skilled work. There is no market for assorted materials. In the absence of designated workspaces, they operate in public spaces on account of which the municipal administration and city residents alike, harbour the misconception that they are a part of the problem, when in peality, they are a part of the solution. Harassment

Collective losses to waste pickers on account of deficits in provision of equipment, safety gear and welfare benefits during the five year period of the MoU

- Loss to waste pickers on account of non-payment of welfare benefits Rs. 80 lakh 50 thousand
- Loss to waste pickers on account of non-payment of slum subsidy Rs. 50 lakh 16 thousand.
- Net value of equipment not provided to SWACH Rs 4.67 crores.
- Loss to waste pickers on account of increased maintenance costs due to non replacement of Collection equipment Rs 1 crore 38 lakhs.

Cumulative loss to SWaCH waste pickers over the period of the MoU = Rs.2 crore 68 lakhs and 66 thousand

from municipal workers and law enforcement agencies is a common occurrence. Informal recycling workers for the most part, rely on the scrap trader to whom they sell the scrap for protection and assistance in times of need.

The formal and the informal systems of waste management operate parallel to each other, the point of convergence being the points of waste aggregation at which informal workers access waste for recovery of recyclables. In the next section, we reflect upon some of the attempts at formally integrating informal workers into the system.

Integration of Workers and Systems

Collection of source segregated waste from waste generators and maintaining the sanctity of different materials streams during transportation is the most important segment of the entire solid waste management and recycling chain. A greater number of processing options are possible for well-segregated materials collected through dedicated collection and transport systems. On the other hand, the landfill can be the only destination for mixed garden waste, debris and domestic waste. Waste collection and sweeping are labour intensive activities

so the employment of labour is the highest in the conservancy department of municipalities. Collection and transport are therefore two of the most cost intensive segments in the solid waste value chain. For all these reasons, integration of informal recycling workers at the point of collection carries distinct advantages. Two different examples of integration, implemented by Pune Municipal Corporation and the Pimpri Chinchwad Municipal Corporation in the state of Maharashtra are examined here.

Integration of Informal Waste Pickers by Pune Municipal Corporation (PMC)

SWaCH is a wholly owned autonomous cooperative of self employed waste pickers and other urban poor that came into existence in 2007, with the support of the Kagad Kach Patra Kashtakari Panchayat and the Pune Municipal Corporation. 2300 members of SWaCH recover user fees and service about 4 lakh households (including 28000 slum households) for daily door to door waste collection. While the minimum user fee is prescribed, it is periodically revised by mutual agreements between the service provider and the service users. The worker also retains the right to the earnings from the sale of recyclable materials. Each SWaCH member contributes 5 per cent of the earnings to the cooperative. The Pune Municipal Corporation and SWaCH, had a Memorandum of Understanding between 2008 and 2013. As per the terms of the MoU, the PMC was to provide office space; uniforms, raincoats, footwear and safety gear; collection equipment (push carts and buckets); recycling sheds for waste categorisation; subsidy for collection from slums; welfare benefits and operational costs of supervision, training and citizen outreach to SWaCH. According to the MoU, over a period of five years, the PMC was to spend Rs.206 per household by way of operational costs to SWaCH, against which it actually spent only Rs.98 per household. The MoU is currently in the renewal process with revision of some of the terms and conditions, based upon the experience of the first five years.

Integration of Informal Waste Pickers by Pimpri Chinchwad Municipal Corporation

Since November 2012 Pimpri Chinchwad Municipal Corporation (PCMC) indirectly employs about 300 waste pickers under 3 contracts for door-to-door collection of waste. Each contractor, operating under the aegis of self-employed/unemployed persons' Co-operatives is required to pay minimum wages to workers under law and contract. The PCMC pays the contractors a fixed consolidated monthly fee termed as "eki-ata maanaQana" (consolidated honorarium) towards every contracted worker. This Maandhan of Rs.200 per worker per day is expected to cover workers' wages, operations, equipment, insurance, service tax (where applicable), office expenses, overheads and the contractors' profits. Workers are actually paid between Rs.75 and 120 per day by the contractors. The total amount of the Maandhan is itself less than the Minimum Wages prescribed for these workers (Sweepers and Scavengers) under the Minimum Wages Act, 1948 and the Maharashtra Minimum Wages Rules, 1963. The term Maandhan is a travesty because it gives the workers neither dignity nor wealth.

The workers are also denied statutory entitlements, such as an eight hour workday, weekly offs,

Annual Savings to PMC on account of SWaCH

- The PMC saves Rs.7 crores 22 lakhs in waste transport costs each year (90 MTPD diverted into recycling x 365 days x Rs.2200 per tonne)
- Savings of Rs.30 crores in door to door waste collection contracts (Rs.10000 minimum wage x 2300 workers x 12 months = 27 crores + minimum 10 per cent overheads of service provider)
- Savings of 1 crore in tipping fees to waste processing operators
- Total annual savings to PMC on account of SWaCH = 38 crores

paid leave, bonus, gratuity, health care and provident fund contributions and maternity benefits. The collective annual arrears of prescribed statutory wages (includes Minimum wages, PF & ESI contributions, leaves, bonus etc.) due to the workers was about Rs.2.3 crores per annum in 2014. The municipal body is at direct fault here, because the tender amounts proposed by it preclude the possibility of minimum wage payments to workers. Besides this, the PCMC also has another end to end waste collection to processing contract with a company, where it has chosen not to enforce the minimum wage clause. The non payment of minimum wages to contracted waste workers is not unique to Pimpri Chinchwad. The municipal government, being the 'State' within the ambit of Article 12 of the Constitution, is expected to be a model employer in setting standards that ensure the welfare of its workers. Yet, it carries out core functions by engaging workers in a manner which can only be termed as 'Forced Labour' (the term forced labour is borrowed from the Supreme Court's landmark judgment in Sanjit Roy vs. State of Rajasthan [1983 (SCC 1 525)]. The Hon'ble Supreme Court has also held that "*when a person provides labour or service to another against receipt of remuneration which is less than the minimum wage, he is acting under the force of some compulsion which drives him to work though he is paid less than what he is entitled under the law to receive.... Such a person would be entitled to come to the court for enforcement of his fundamental right*

under Article 23 by asking the court to direct payment of the minimum wage to him so that the labour or service provided by him ceases to be 'forced labour' and the breach of Article 23 is remedied." [Peoples Union for Democratic Rights v. Union of India (1982 AIR 1473)].

Conclusion

The process of formalisation of the informal recycling worker is different in the two models of integration presented in this article. The waste picker in the SWaCH Pune model remains an independent federated service provider, who retains greater control and choice over her own labour and motorised or non-motorised method of collection. Depending upon market conditions, she also has relatively more 'freedom' to negotiate user fees and conditions of work (weekly off, leave, annual Diwali bonus) with service users and assured access to recyclable materials which is codified in the MoU. The waste picker in Pimpri Chinchwad is notionally entitled to a minimum daily wage and benefits but no paid weekly off, leave or Diwali bonus. She has access to larger quantities of recyclable materials because it's a motorised collection system but her access is continually under threat. Her freedom to seek grievance redress is severely undermined.

What is common between the two, to lesser and greater degrees, is the abysmal failure of the State, in this case, the urban local bodies, to protect the rights of their weakest

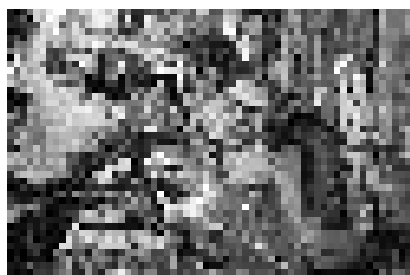
and the most vulnerable workers. The PCMC has completely abdicated its role and left workers to cope as best as they can with the intimidation by contractors. Relatively speaking, the Pune Municipal Corporation exhibits a greater degree of concern for workers. The PMC and PCMC examples are just illustrative. Informal waste workers across the country, work in sub-human conditions. It is incumbent upon the hordes of cleanliness campaigners within and outside government to ensure the enforcement of labour standards, minimum wage laws and occupational health and safety of waste workers. The onus is upon the government of the day to lead by example and guarantee workers' rights to dignity (sanman), living wages and earnings (dhan), social security and association.

Endnotes

- ¹ Report of the High Power Committee: Urban Solid Waste Management in India, Planning Commission, Government of India, New Delhi 1995
- ² Report on Solid Waste Management in Class I cities of India of the Expert Committee on Solid Waste Management (1999) constituted by the Hon. Supreme Court of India in Civil Writ Petition No. 888 of 1996 Almitra Patel and Another vs. Union of India. Mr A. Burman was the Chairman of the 8 member committee.
- ³ The Report of the IInd National Labour Commission, Ministry of Labour, Government of India, 2002. Page nos. 639 to 643. □
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Social Exclusion in the Context of Swachh Bharat Abhiyan

Kanika Kaul



The launch of Swachh Bharat Abhiyan marks the beginning of the most ambitious programme on sanitation in the country till date. The high degree of policy priority accorded to sanitation and the proposed budgetary outlays could go a long way in achieving an open-defecation free India. The effective implementation of the programme would translate into improved human development indicators for the country

THE NEED to prioritise sanitation in the country's policy agenda has been underscored by the senior most leaders across political spectrum, emphasising '*pehle shauchalaya, phir devalaya*' (toilets first, temples later). Though drinking water and sanitation are recognised as state subjects under the Constitution of India, Union Government programmes on sanitation have played a significant role in increasing the coverage of household toilets in rural areas from 9 per cent in 1991 to 22 per cent in 2001 and 32.7 per cent in 2011.

The first major Union Government programme on sanitation, Central Rural Sanitation Programme (CRSP), was launched in 1986 with a view to accelerate sanitation coverage in rural areas. The CRSP was restructured into 'Total Sanitation Campaign' in 1999, which marked a paradigm shift to a 'community led' and 'people centered' approach. The programme was revamped as *Nirmal Bharat Abhiyan* (NBA) in 2012 and aimed to accelerate sanitation coverage in rural areas to achieve the vision of '*Nirmal*' Bharat by 2022. The launch of *Swachh Bharat Abhiyan* (SBA) on 2nd October, 2014 marks the beginning of the largest programme on sanitation by the government in the country till date.

The introduction of SBA, that aims to achieve an open defecation free India by 2019, has generated wide interest among the media, policy makers and common citizens. However, an aspect that has largely been missing from the discussions about the proposed scheme pertains to how well the concerns regarding social inclusion would be addressed by the programme.

Access to water and sanitation and the quality of these services in our country is strongly influenced by identities of caste, class and gender. Some UNICEF reports indicate that it is the poorest quintile of the population which has the least access to sanitation. Likewise, significant variations persist in the access of Scheduled Caste (SC) and Scheduled Tribe (ST) households to toilets. Data from Census 2011 reveals that while 35 per cent of the total rural population has access to water within the premises, the corresponding figures for SC and ST households in rural areas are 28 per cent and 14 per cent respectively. It is also estimated that nearly 68 per cent of women headed households in rural areas do not have toilets within the premises. In such a context, it is important to look at water and sanitation services from the point of equity and analyse the extent to which these policies and programmes for water and sanitation are addressing

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the needs of disadvantaged sections of the population.

The introduction of SBA provides an opportunity to address concerns in rural drinking water and sanitation services from the perspective of social inclusion and equity. Though the detailed guidelines of the programme are yet to be issued, a draft Action Plan for the programme has been put forth by the Ministry of Drinking Water and Sanitation. This article examines how conducive the policy and budgetary framework for rural sanitation is for promoting social inclusion. It also analyses the responsiveness of the erstwhile NBA and the newly proposed SBA to the needs of SCs, STs and women in the rural context.

Investments in Rural Drinking Water and Sanitation

A key concern with rural drinking water and sanitation services has been the low magnitude of public spending on these services. Inadequate budgetary resources for sanitation have affected both the quality and coverage of these services. Given the high dependence of vulnerable sections (SC, ST, women etc) on public provisioning of these services, inadequate public spending on them is likely to have a disproportionately adverse impact on these sections of society. The allocations to the Ministry of Drinking Water and Sanitation for the 11th and 12th Plan Periods, i.e. Rs. 45,740 crore and Rs. 98,015 crore respectively, were 21 per cent and 41 per cent lower than what had been proposed by the Ministry to the Planning Commission. The Union Government expenditure on rural water and sanitation was less than 1 per cent of the Union Budget during the 11th Plan period (except in 2007-08), and has remained in the same range in the 12th Plan period so far.

The report of the Standing Committee on Rural Development has also taken note of the need to step up allocations to rural water and sanitation programmes. In reference

to the budgetary allocations to the Ministry of Drinking Water and Sanitation in 2012-13, the committee observed, "This amount is simply not commensurate with the task of providing safe drinking water and sanitation facilities to the 740 million rural population of the country. In view of the fact that the expenditure to fight diseases borne out of contaminated water and open defecation account for about 6 per cent of the GDP, this amount, which constitutes less than 1 per cent of the GDP for the sector hardly seems adequate to address the problem in a holistic manner."

It is in this context that the proposed investment of Rs 1.96 lakh crore over the next five years (1.34 lakh crore for rural areas and Rs. 62,009 crore for urban areas) under SBA, as has been reported in the media recently, is significant. The unit costs of toilets constructed under the programme have also been enhanced. The unit costs for toilets will be enhanced for Individual

...while the estimates of the total magnitude of funds for sanitation have increased substantially, the unit costs for IHHLs, the key component of rural sanitation programmes, have witnessed a marginal increase. The increase in the unit costs of IHHLs (i.e. of Rs.2,000) has been increased to provide for water availability, including for storing, hand washing and cleaning of toilets.

Household Latrines (IHHLs) (from Rs. 10,000 to Rs. 12,000), school toilets (from Rs. 35,000 to Rs. 54,000), *anganwadi* toilets (from Rs. 8,000 to Rs. 20,000) and Community Sanitary Complexes (CSCs) (from Rs.2,00,000 to Rs.6,00,000). However, it is also important to note that while the estimates of the total magnitude of funds for sanitation have increased substantially, the unit costs for IHHLs, the key component of rural sanitation

programmes, have witnessed a marginal increase. The increase in the unit costs of IHHLs (i.e. of Rs.2,000) has been increased to provide for water availability, including for storing, hand washing and cleaning of toilets.

The recent discussions on SBA have focused on the significant increase in the proposed budgetary outlays for sanitation. At present, it is not clear whether and to what extent, outlays for drinking water will also be increased. Lack of water is a key factor affecting usage of toilets. Achieving '*swachh bharat*' by 2019, thus, would require not only a substantial increase in the number of toilets constructed, but also water supply to ensure that the toilets constructed are used.

Likewise, the lack of resources for maintenance of school and *anganwadi* toilets could result in rapid deterioration and subsequent non-usage of these over time, impacting the sustainability of the programme. Additionally, the reduction in the budget for the Information Education and Communication component (from 15 per cent to 8 per cent), which is critical to trigger behavioral change to ensure usage of toilets, is a matter of concern.

Public Private Partnerships in Drinking Water and Sanitation

A concern with the overall framework for the newly proposed SBA is the reliance on Public Private Partnership (PPP) for both drinking water and sanitation, as mentioned in the Action Plan of the Ministry of Drinking Water and Sanitation. Though the extent to which PPP will be employed is not clear at present, relying on PPP for water and sanitation programmes could constrain the ability of the government to address the already existing inequities in the access to these services. The experience of PPP in many sectors has raised concerns for the vulnerable sections of population.

Proponents of PPPs argue that they bring in much needed private investments and can provide services at cheaper rates, thereby benefiting the vulnerable sections of society. It is also claimed that services provided under PPPs by private corporations are more efficient. However, the experience of PPPs in drinking water in the country, in several cases, is plagued with significant delays and unsatisfactory service delivery. Moreover, there are concerns that services delivered through PPPs may have higher user charges. This, in turn, could further reduce the access to services for vulnerable and poor sections of society. Typically, PPP projects do not invest in processes for public participation in planning and implementation of projects, thereby reducing the scope for transparency and accountability in their functioning.

Strategies Drinking Water and Sanitation for Vulnerable Sections

Scheduled Caste Sub Plan and Tribal Sub Plan in Rural Drinking Water and Sanitation

Water and sanitation have long been characterised by strong caste based inequities and discrimination, especially in the rural context. Likewise, the access to water and sanitation services by tribal populations is significantly lower than that of other households. An acknowledgement of this is found in the 12th Five Year Plan document that states “...there are also some disturbing reports about social exclusion, with SCs, STs and minorities being discriminated against.”

A manifestation of the inequity in rural sanitation programmes is the difference in the coverage of household toilets for different social groups. While the proportion of rural households with access to toilets is still as low as 30.6 per cent, as revealed by Census 2011, the coverage for scheduled caste households and scheduled tribe households in rural areas is even lower at 23 per cent and

16 per cent respectively. Recognising the need to bridge this gap, the Ministry of Drinking Water and Sanitation has initiated the implementation of the Scheduled Caste Sub Plan (SCSP) and Tribal Sub Plan (TSP). Accordingly, 22 per cent and 10 per cent of the Plan outlays of the National Rural Drinking Water Programme and the Nirmal Bharat Abhiyan are being earmarked under SCSP and TSP respectively since 2011-12.¹

While the implementation of these policy strategies is a welcome step and it is hoped that the same would be done under SBA, there is a need to recognize that simply earmarking of funds for SC and ST households would have a limited impact. Not much effort is made to modify the scheme design and address the factors restricting the access of SC and ST households

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to these services in the planning and implementation of schemes. The experience of implementation of these budgetary strategies shows that for most schemes, allocations under SCSP and TSP are reported as earmarked for SCs and STs after the budgets for these programmes have already been prepared.

SC and ST households are confronted with specific challenges in accessing water and sanitation services that need to be addressed through the respective schemes. SC households, for instance, as a result of the historical discrimination faced

by them, are typically concentrated on the periphery of the village, where water supply tends to be limited and erratic. This has an adverse impact on the construction and usage of toilets in these habitations. Likewise, tribal populations tend to be located in geographically isolated terrains where ensuring access to water is a challenge and the cost of construction of toilets may be higher. Addressing such challenges would require not only earmarking of funds, but also introducing specific measures in the respective government programmes.

Access to drinking water and sanitation facilities for SC and ST communities is also hindered by their restricted participation in decision making processes of these programmes. The Report of the Working Group on Rural Domestic Water and Sanitation for the 12th Five Year Plan also recognises low levels of public representation by tribal communities as contributing to their inequitable access to these services. In this context, ensuring adequate representation of SC and ST communities in village water and sanitation committees and strengthening their functioning is critical.

Another manifestation of caste based inequity in drinking water and sanitation is the practice of manual scavenging. Most of those engaged in the practice, belong to scheduled castes and a large proportion of these are women. Data from Census 2011 indicates the existence of 7.94 lakh latrines in the country from which night soil is removed by humans. Though the discussion on SBA has included references to abolition of the practice, there is a need to clearly articulate it as an objective of the programme and emphasise the same in the guidelines that will be formulated.

Gender Concerns in Swachh Bharat Abhiyan

The inextricable link between access to safe and hygienic sanitation services and the well-being and

safety of women, has been well recognized, in both the policy and public discourse. Women, more than men have to bear the brunt of the lack of toilets and other sanitation facilities. Though the Ministry of Drinking Water and Sanitation has not yet initiated reporting in the Gender Budget Statement, the draft Action Plan for SBA recognises some critical gender concerns pertaining to sanitation. However, how well this recognition is reflected in the design of the programme needs to be analysed.

An important concern in the design of both the Nirmal Bharat Abhiyan and the newly proposed SBA is the lack of priority accorded to CSCs. In the absence of household toilets, CSCs are important to ensure access

women lacking access to toilets and using open spaces, often wait till dark and drink less water or modify their diet, which has adverse health implications. Moreover, it also increases their vulnerabilities to various forms of violence. Sanitation programmes, therefore must focus not only on constructing household toilets, but also on safe and hygienic sanitation services through community sanitary complexes.

to sanitation facilities for women. It is well recognised that women lacking access to toilets and using open spaces, often wait till dark and drink less water or modify their diet, which has adverse health implications. Moreover, it also increases their vulnerabilities to various forms of violence. Sanitation programmes, therefore must focus not only on constructing household toilets, but also on safe and hygienic sanitation services through community sanitary complexes.

Although the unit costs for CSCs under the newly proposed programme have been enhanced to Rs 6 lakh, the conditionalities attached to their

construction, as were laid down in NBA, have been retained. The construction of CSCs being contingent on a mandatory 10 per cent community contribution could prove to be a hurdle in achieving the goals of this mission in the long run. Additionally, a large proportion of CSCs that have been constructed are not in use owing to poor maintenance and lack of water supply. It is important to include measures to convert defunct CSCs functional under the programme.

While programmes on sanitation have clearly recognized the importance of toilets from a gender perspective, the need to provide enclosed and safe bathing spaces for women has not found recognition in the policies and programmes. Government schemes on sanitation do not make provisions for construction of bathing spaces within homes, which is critical to ensure privacy and safety of women. Lack of enclosed bathing spaces compromises the privacy of women and increases their vulnerabilities to various forms of violence, while also adversely impacting their hygiene, health and well-being.

The designs of toilets, especially in schools, Anganwadis and CSCs must factor in the different needs of women, including pregnant women, women with disabilities and elderly women. It is hoped that the guidelines of SBA would recognise and address this concern. Moreover, mechanisms for participation of women in the planning and implementation of the programme need strengthening. The experience of implementation of NBA shows that village water and sanitation committees have by and large, remained ineffective, limiting the scope for women to participate in decision-making processes in sanitation programmes.

Conclusion

The launch of Swachh Bharat Abhiyan marks the beginning of the most ambitious programme on sanitation in the country till date.

The high degree of policy priority accorded to sanitation and the proposed budgetary outlays could go a long way in achieving an open-defecation free India. The effective implementation of the programme would translate into improved human development indicators for the country.

However, it must be kept in mind that given a short period of five years to achieve the goals of the programme also makes it one of the most challenging programmes to be implemented. The extent to which the programme is able to achieve its goals would depend on how well the concerns pertaining to social inclusion are addressed since it is the vulnerable and socially excluded sections of population that depend the most on public provisioning of sanitation. Apart from addressing the above described concerns, the successful implementation of the programme would require a number of stakeholders, including line ministries, state governments and other actors in the sector to own the programme.

Readings

Department-Related Parliamentary Standing Committee on Rural Development (2013): Report on the "Demands for Grants 2012-13) of Ministry of Drinking Water and Sanitation (Ministry of Rural Development)", Twenty Seventh Report; Lok Sabha Secretariat, New Delhi.

Dwivedi, Gaurav (2010): *Public private Partnerships in Water Sector: Partnerships or Privatisation?* (ManthanAdyayan Kendra: Madhya Pradesh)

Economic Times (2013): "Toilets first, temples later, says Narendra Modi", October 2 (PTI: New Delhi)

Government of India (2012): "Twelfth Five Year Plan (2012–2017): Faster, More Inclusive and Sustainable Growth", Planning Commission

Government of India, (2014): "Swachh Bharat, Swasthh Bharat, Action Plan", Ministry of Drinking Water and Sanitation"

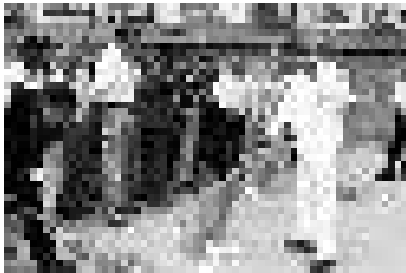
Endnotes

1 As per the Recommendations of the Task Force to Review Guidelines on Scheduled Castes Sub-Plan & Tribal Sub-Plan, 2010

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Swachh Bharat Abhiyan: A Tool for Progressive India

K N Pathak



To achieve the target of total sanitation by the year 2019, government needs additional support from all sections of society. It is imperative that the Indian corporate sector takes this challenge within the ambit of Corporate Social Responsibility (CSR). If sufficient manpower/material support could be generated through the funds available under CSR in addition to governmental efforts, it may help in translating the goal of Swachh Bharat by 2019 a reality

TAKING A cue from Gandhian philosophy (cleanliness is next to godliness), the emphasis laid on Swachh Bharat Abhiyan is for a very noble cause. A country with 74 per cent population being literate is still grappling with the problem of sanitation and lack of cleanliness even after 67 years of independence. It is recognized worldwide that while inadequate sanitation causes diseases, improvement in it contributes in bringing positive health and decent living.

The Millennium Development Goals (MDGs) enjoin upon the signatory nations to extend access to improved sanitation to at least half the urban population by 2015 and 100 per cent access by 2025. This implies extending coverage to households without improved sanitation and providing proper sanitation facilities in public places to make cities open defecation free. However, some times, there are assessments causing worry regarding sanitation scenario in our country. The WHO/UNICEF joint monitoring programme for water supply and sanitation has said that at its present pace, India would take time till 2054 to meet its Millennium Development Goals 2015 on sanitation. Orissa will take longest time – till 2160 to reach there, according to a worldwide survey released on 27th March, 2012.

There are a few key issues which need to be looked at for making Swachh Bharat Abhiyan successful. These are mainly the following:

- i) Availability of water in all habitations;
- ii) Availability of private or public toilets in all habitations;
- iii) An appropriate sewage and garbage disposal system;
- iv) Basic facilities to maintain cleanliness;
- v) Mass awareness to make this Abhiyan successful;

Availability of Water

As on 1st April, 2014, out of 16,96,664 habitations in the country, only 12,49,695 have adequate (40 litres per capita per day) provisions for drinking water. A large number of villages still depend on village ponds or wells or other natural resources which in some cases, even dry during peak summer. In fact, we have no certain way of really estimating the load of sewage in our cities, because of the different ways in which people source water and the different ways in which people dispose sewage. The present method of measuring sewage is most rudimentary. It is assumed that 80 per cent of the water officially supplied by municipalities is returned as sewage. As per the data available through the National Family Health Survey (NFHS-3), 2005-06, the toilets

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connected to piped water system are only 18.8 per cent.

To maintain cleanliness all around, we need appropriate quantity of water. It seems that more than the quantum of water that is supplied, the problem is its management and equal supply to all. In the current water system, there are enormous inefficiency – losses in the distribution system because of leakages and bad management. Effective measures are, therefore, required to ensure that water reaches everybody in the city and not just a few if Swachh Bharat Abhiyan has to be made successful.

Availability of Toilets

Worldwide, around 2.5 million people lack access to basic sanitation facilities such as a latrine, a third of whom live in India. As per a UN MDG report, it is estimated that around 626 million people in our country don't have access to a closed toilet and consequently practice open defecation. As per NSSO 69th Round (2012), 59.4 per cent of Rural and 8.8per cent of Urban Households do not have latrine facility.

Appropriate Sewage and Garbage Disposal System

It is important to note that unsafe disposal of the human excreta imposes significant threat to public health and environmental cost particularly to urban areas. A study has shown that it costs around 60 per cent of the country's GDP. As indicated in the National Urban Sanitation Policy, impacts of poor sanitation are especially significant for the urban poor (22 per cent of the total urban population), women, children and the elderly. It is also observed that inadequate discharge of untreated domestic/municipal waste water has resulted in contamination of 75 per cent of all surface water across India.

Facilities for Cleanliness

The success of the abhiyan could be ensured only if the basic facilities such as water supply, provision of washing soap/ powder/ liquid, appropriate sewage/ disposal system for excreta/

garbage are available to all the house holds. There are a few who have them, some others can afford it but are not giving it due priority and a sizeable number of people are either deprived of it or can not afford it. For such people, some special efforts have to be made.

Need for Mass Awareness

Every segment of population, from primary school children to elderly persons need to be properly sensitized about inherent linkages of sanitation for public health. Besides roping in the educational institutions, particularly the schools in awareness campaigns, optimum use needs to be made of social media as well as electronic and print media to spread the message to grass root level.

There should be no piecemeal approach for improving sanitation in our country. Investment in sanitation, as suggested under National Urban Sanitation Policy, should take into account, the full cycle of safe confinement, treatment and safe disposal.

For ensuring an effective sanitation policy, the following also need to be considered:

- i) Need for mass awareness;
- ii) Social and occupational aspects of sanitation;
- iii) Coordination among administrative bodies/institutions;
- iv) Comprehensive approach;
- v) Optimum use of technology;
- vi) Reaching the unreached;
- viii) Bridging the demand-supply gap.

Social and Occupational aspects of Sanitation

A lot more is needed to be done towards elimination of manual scavenging. Effective steps are required to be taken for remedial measures to deal with the occupational hazards faced by sanitation workers in our country. This can be made possible

mainly if we ensure construction of toilets for those households which have none so far.

Coordination among Administrative Bodies/Institutions

The role of administrative bodies and line departments dealing with sanitation should be clearly delineated. Every institution should fulfil its identified role and duplication should be avoided to ensure attainment of optimum results.

Convergence

Convergence is essential to make such a nation-wide programme successful. Through convergence with MNREGS, MPLADS and other schemes, the following steps should be taken up:

- i) Construction of toilets in households, schools, anganwadis, SLWM and community sanitary complexes.
- ii) Construction of individual household toilets based on a community approach, under the MPLAD scheme and one time grant for operation and maintenance of the community toilets.
- iii) Adopting convergence of TSC with other Centrally Sponsored Schemes like PURA, IAY, NRHM, Adarsh Gram Yojana and other schemes and Departments/Ministries.

Operation and Maintenance of Sanitation Installations

Operation and maintenance of sanitation installations needs to be given due importance. This can be made possible by promoting proper usage, regular upkeep and maintenance of households, community and public sanitation facilities. There is also a need to strengthen urban local bodies to provide or cause to provide, sustainable sanitation services delivery.

Comprehensive Approach

There should be no piecemeal approach for improving sanitation in our country. Investment in sanitation, as suggested under National Urban Sanitation Policy, should take into account, the full cycle of safe

confinement, treatment and safe disposal.

Sanitation programmes would also have to use a menu of different approaches, such as financing at the household level and a range of affordable sanitation options for potential consumers. This may require working with a range of new partners, including public health officials, grass-root organizations and private sectors.

Optimum Use of Technology

Various cost effective tools and techniques for water supply and sanitation have been evolved by many agencies at international level. In this regard, it may be suggested that various cost effective measures and techniques demonstrated by institutions like Sulabh International should be applied widely.

Reaching the Unreached

It has been observed that urban poor communities as well as residents in informal settlements have been constrained by lack of tenure, space or economic constraints, in obtaining affordable access to safe sanitation. This issue needs to be addressed effectively, particularly to make Swachh Bharat Abhiyan a success among the unserved and poor segments of our society. The National Urban Sanitation Policy has also suggested that atleast 20 per cent of the funds under the sanitation sector should be earmarked for the urban poor. Similarly, some subsidy may also be considered for rural poor to enable them to undertake the construction of toilets in individual households.

It has been accepted that smaller cities cannot afford a sewage drainage system, let alone a sewage treatment system. The waste system requires capital investment in infrastructure and more important than that, it needs funds for operation, particularly energy costs for pumping and treatment. The cost of capital investment or the cost of operation and maintenance are not paid for by even the richer users who use water and thus generate waste. Large parts of the modern cities remain

unconnected to the sewage system as they live in unauthorized or illegal areas or slums, where the State services do not reach.

Bridging the Demand Supply Gap

To address the problem of sanitation, the supply should be as per demand. This means that the basic facilities and support should be provided to the unserved areas and deprived population residing in specific pockets rather than the Urban Local Bodies (ULBs) or PRIs expecting them to move around as per available infrastructure.

...a National communication strategy should be in place laying emphasis on flexibility of approach including regional and sub-regional strategies. Training frontline workers and community leaders such as PRIs, religious leaders etc. to communicate effectively on sanitation and hygiene would certainly increase the knowledge and understanding among family members on the importance of sanitation and hygiene.

Capacity Building and Training

To ensure the success of the programme, it is necessary to mobilize mass support. Hence, specific agencies need to be identified to train the functionaries at the State level, elected representatives and officials/ functionaries of PRIs and ULBs.

Monitoring and Evaluation

A mechanism needs to be introduced for monitoring the progress and performance of sanitation programmes at the State/District and City levels. The use of report cards and review of progress through citizens, monitoring committee also may be considered.

Rewarding the Successful Districts/Cities

Though it is for common public interest, suitable reward for districts/cities having attained sanitation beyond

an identified level may be considered. This will generate a competitive spirit among different districts/cities striving for total sanitation.

“National Rural Sanitation and Hygiene Strategy 2012-2022”, which was formulated by the Ministry after a long consultation needs to be given due consideration to achieve the goal of Swachh Bharat Abhiyan in a time bound manner. Besides, other efforts which are required are performance benchmarking of states and districts, improving behaviour change communication strategies, streamlining and strengthening institutional structures for planning, implementation and monitoring of sanitation at all levels, attention to incentives and capacity building issues, and according special attention to special segments and difficult areas.

Credit Facilitation

As a large number of BPL families and weaker sections have not been able to build up toilets in their houses, it is advisable that the Ministry of Drinking Water and Sanitation may consider providing a fixed capital to the banks in the form of security for financing construction of toilets for these weaker sections.

Communication Strategy

To make the programme successful, a National communication strategy should be in place laying emphasis on flexibility of approach including regional and sub-regional strategies. Training frontline workers and community leaders such as PRIs, religious leaders etc. to communicate effectively on sanitation and hygiene would certainly increase the knowledge and understanding among family members on the importance of sanitation and hygiene. Actual toilet construction and usage can also be promoted through effective use of existing social networks or interpersonal relationships such as family, friends, acquaintances, neighbours and colleagues that bind people together to enhance the communication process.

All Block Panchayats may be equipped with appropriate sets of gadgets for exhibiting films in villages of GPs under the Block as per a plan. At least every block should have a cultural team such as street theatre group, folk music group, puppet show group etc for media activities, social marketing and social mobilization drive in each village. Innovative communication strategies are also required to trigger behavior change and should be based on target oriented approach.

Decentralized Incentive based Approach

Gram Panchayats play a central role in achieving the sanitation outcome in the villages. They should incentivize on staggering basis to motivate them to achieve total sanitation and also sustain it through a community led approach. Besides, funds should also be provided to GPs which have attained higher level of coverage to ensure that ODF status is attained within a short time frame.

Rewarding Sustainability

With a view to encourage panchayats to perform effectively, financial incentives may also be considered for PRIs for effective management of sanitary and water systems and tariff recovery efficacy.

It is also necessary to provide assured supply of water to the toilets. As an incentive for attaining and sustaining sanitation for more than a year, a GP could be provided piped water supply system with higher level of supply.

Appointment of a dedicated grass-root level worker (Swachhta Doot) at the village level may be considered. They can be incentivized link to the effective demand generation and improvement in sanitation coverage.

Village Water, Health and Sanitation Committees (VWHSC) should mandatorily be made a Standing Committee of the Gram Panchayats by the states. They would be the

implementers of the programme at Gram Panchayat levels.

Community Toilets

In addition to Community toilets, which is limited to provisions for landless and floating population apart from provision at common places like bus stands and market places in the rural areas, tie-up should be made with NHAI to provide public toilets along highways. There should also be Government orders to make appropriate sanitation facilities essential at petrol pumps, restaurants and dhabas.

Sensitization

It is also necessary to sensitize the political leadership at national, state and district levels on the principles of demand driven approaches to total sanitation and to enable high level political support for sanitation. The political support is also essential for providing adequate funding to this sector.

State governments may be encouraged to introduce regulation making it obligatory to PRIs to ensure that all households in the GP have access to sanitation facilities.

The school children would work as crucial change agents in making this mission a success. They would not only apply the basic approaches to cleanliness in their own lives, but they would also carry the message all around in the society. With this perspective, focus has to be laid on ensuring mandatory provisions of toilet facilities in all the schools across the country. In a recently organized "My School-My Voice – Open Parliament for Children" in New Delhi, it was observed that negative effect on health due to poor sanitation and lack of toilets in the schools emerged as one of the main reasons for the drop out. In the said programme, it was pointed out that many children had school due to lack of cleanliness in their school. Some children had stopped going to schools so their parents did not send them to school fearing they would fall ill.

The concept of Bal Panchayat evolved in Sikkim needs to be replicated in other parts of the country too. These Bal Panchayats helped to have and persuade their friends to attend the school. Besides the sports meet and cultural programmes, they have also taken up cleanliness drive which earlier used to be directly undertaken by their teachers. This concept of providing the labour component in participatory mode along with teachers, community, panchayat and block officials for construction drive of the toilets by Sikkim children this needs to be followed in other parts of the country as well. To make Swachh Bharat Abhiyan campaign successful, inclusive approach needs to be emphasized.

The other important role is that of the women in both rural and urban areas. The household arrangement and its cleanliness is mainly under the controlled domain of the women household members. Hence, focus needs to be given on sensitizing the women force about the significance of their lead role in Swachh Bharat Abhiyan where not only they will apply various practices on their own, but would also ensure its strict adherence by their children as well as elder members in the family.

Though, it has been emphasized that toilets were more important than temples in a country where 70 per cent of rural households do not have a toilet (as per 2011 Census), it is ironic to note that a substantial portion of households with access to toilets are not using them. A survey conducted by Research Institute for Compassionate Economics (RICE) has indicated that 40 per cent of surveyed households in the States of Haryana, Rajasthan, Uttar Pradesh, Madhya Pradesh and Bihar that had a latrine, still at least 1 person in such household was still defecating in the open. This study confirms the notion that just building toilets without focusing on behavior change is not going to be enough. The people need to make the association between good health and use of toilets.

Monitoring

Monitoring is the backbone of such a vast programme. It is necessary to identify defunct/misuse sanitation facilities through effective monitoring. It would be appropriate to introduce real-time monitoring system maintained by the Ministry in convergence with identifications like BPL card number/Aadhar in addition to visual evidences.

Role of the Civil Society

In making this programme a success, civil society can play a key role by getting involved in monitoring the implementation of plans and checking the utilization of funds.

Capacity Building

Capacity building is essential for effective implementation of the programme. There should be a tie up with International institutions of repute for mandatory training of Centre/State officials engaged in the sanitation sector. It is desirable that a national level institute on water and sanitation on the lines of National Institute of Rural Development is to be set up by the Ministry for capacity

building at various levels. This suggestion has also been made by the Working Group on Rural Domestic Water and Sanitation for the 12th Plan 2012-17.

Government of India along-with the State Governments has been endeavouring for achievement of sanitation goals and also for promoting partnership with public, private and non-governmental agencies for improved provisions, maintenance and management of sanitation facilities. To achieve the target of total sanitation by the year 2019, government needs additional support from all sections of society. It is imperative that the Indian corporate sector takes this challenge within the ambit of Corporate Social Responsibility (CSR). If sufficient manpower/material support could be generated through the funds available under CSR in addition to governmental efforts, it may help in translating the goal of Swachh Bharat by 2019 into a reality.

Readings

Electronically retrieved from website www.healthissuesindia.com on 27.11.2014.

India's Sanitation for all: How to make it Happen (2009) Asian Development Bank.

National Family Health Survey (NFHS-3), Ministry of Health & Family Welfare, (2005-06).

National Urban Sanitation Policy; Ministry of Urban Development, Govt. of India.

NSSO 69th Round Report, Ministry of Statistics & Programme Implementation, (2012).

Progress of Drinking Water and Sanitation, (2014) update, WHO, UNICEF

Report of the Working Group on Rural Domestic Water & Sanitation, (2011) M/o Drinking Water & Sanitation, Govt. of India, September.

Report of the Working Group on Urban and Industrial Water Supply and Sanitation for the Twelfth Five Year Plan (2012-2017), November, (2011).

Water and Sanitation Programme – Working Paper on Scaling up Rural Sanitation - Policy and Sector Reform to Accelerate Access to Improved Rural Sanitation (2012) Fred Rosensweig Eddy Perez Andy Robinson June. □

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J&K WINDOW

RS 17.48 CR FOR RESTORATION OF BORDER FENCE IN JAMMU

A sum of Rs.17.48 crore has been allotted by the Government of India for the restoration of a 24-km long fence and defunct floodlights along the Indo-Pakistan border in Jammu that were recently damaged in the floods in the state. The Centre has approved 95 Long-Range Reconnaissance and Observation System for Border Security Force (BSF) with an expected cost of Rs.237 crore under its modernisation plan. To bolster the security along the Indo-China border, the government has also sanctioned 35 new border outposts, out of which 22 have already been set up. The remaining will become operational by 2016. Also, 27 Indo-Tibet Border Police priority roads will be constructed, to ensure better connectivity and accessibility to all the border outposts and patrolling points and 34 more roads have been approved.

To boost the vigil on the border, 123 mobile towers along the Indo-China border are also planned to be set up. The critical infrastructure in the border areas of Arunachal Pradesh is also being strengthened to upgrade troop's mobility and border security in those areas.

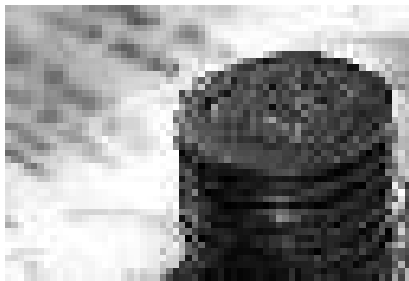
The government has also approved wet leasing of two light helicopters for operational air support to ITBP in Jammu and Kashmir and Uttarakhand through tendering process for which the total expenditure expected to be incurred for wet leasing of two helicopters is Rs 40 Crore per annum. □

Corrigendum

1. The title of the article by Manoj Pant in December 2014 issue of Yojana has been erroneously mentioned as 'Cleaning Rivers: A People Centric Approach'. It should read as 'Interest Rates, Inflation and the RBI: Time for A Change In Strategy?'
2. In the article by Shojin Shin titled 'FDI in India: Policy Change and State Variation' it has mentioned 'Montek Singh Ahluwalia who served as the Finance Minister from 1991 to 1996" in page 27 (middle paragraph, 15th line). It is informed that Manmohan Singh was the Finance Minister during that period and Montek Singh Ahluwalia was one of the Secretaries to the Government of India then.
3. In the article by Rajeshwari Raina in the December 2014 issue of Yojana, the detailed readings/references could not be carried. These would be available on the web version of the issue. The errors are regretted.

Determinants of FDI: Comparative Study on India and China

*Neha Saini
Monica Singhania*



...apart from the macroeconomic variables, there are other aspects which may attract capital flows in any country and we need to look beyond these variables for qualitative variables as well, which may influence the flow of capital in countries

FOREIGN DIRECT Investment (FDI) acts as a catalyst for growth of any economy. Now-a-days, FDI plays a pivotal role in development of the economy as indicated by several studies (Alfaro, Chandra, Kalemli-Ozcan, and Sayek (2004)). However, conversely there are empirical studies which indicate the FDI presence as inefficient (Abdurramane, 2014). Implicitly, the impact of FDI on a country depends upon the nature of economy of the country. Our paper examines two giant developing nations – India and China, which have a high FDI flow. In this way, we analyze the determinants of FDI in India and China through econometric analysis. The reason for selecting India and China is, that these economies are primarily the most attractive destinations for FDI inflows in the whole world (UNCTAD Report, 2008). And according to the latest report of FDI intelligence (2014), China and India are amongst the top five destinations of foreign capital investment. We aim at identifying the best-suited model of capital inflows with special reference to FDI, affecting the growth of Chinese and Indian economies. In order to reach the best suited model, various models with different variables need to be examined and tested so as to determine when and where these are

best suited in. FDI and FII are the two components of capital inflows in any country and these have become the drivers of international economic integration and stimulation. There are few fast growing economies like Singapore, China and Korea that have registered incredible growth due to the onset of FDI and FII. These capital inflows are not only accounted as sources of capital, but also assist in providing domestic countries with cutting edge technology, desired skills and serve as tools of innovation. Indian economy being equipped with demographic dividend¹, attracts the investors to invest in but policy drafts can make this place a far more attractive destination for foreign investors. There are numerous studies conducted which supports the impact of FDI and FIIs on economy. Borenszte De Gregorio and Lee (1998) argue that FDI has a positive impact on growth if the workforce of the country is highly educated. While Blomstrom, Lipsey and Zejan (1994) contradict this statement by evaluating the fact that education is not a critical factor, they, in fact, argue that positive effect of FDI is observed when the country is wealthy. In this paper, we analyze the variables that affect Foreign Direct Investment in India and China. The macroeconomic variables selected include GDP, trade openness, foreign exchange rate, real interest rates, inflation and scientific progress to

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carry out this empirical study.

Comparing Indian statistics relating to select variables with China, we find FDI inflows to be very high in China primarily due to inflation rate, real interest rate and foreign exchange rates being very low coupled with high scientific progress.

As per Figure-1, FDI inflows in China in year 1991 was reported at USD 7993.6 million and in the year 2013, it was USD 208253.01 million. And when we compare the Indian FDI inflow, which increased to 164.05 million USD USD15361.5 million, which is a high jump but in comparison

to China, we still have low inflow of capital.

Analysis and Findings

To begin with, the time series data for both the countries have been taken up and data has been checked whether it is stationary or not on the basis of Augmented Dicky Fuller Test. Series of both the countries are found to be stationary by taking the log difference.

The next step is to check the multicollinearity so as to determine whether the variables are highly correlated to other variables or not. The result of correlation analysis shows that

variables are not highly correlated to each other for both the countries.

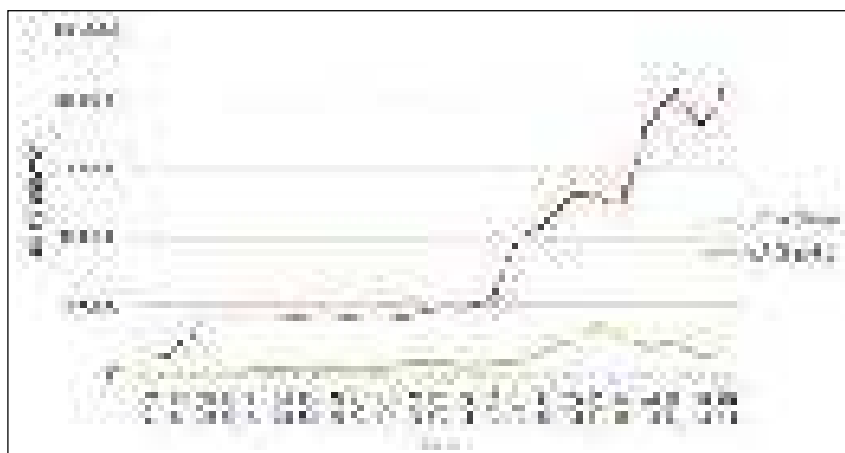
Thereafter, auto correlation is checked to find out the correlation between the error terms of the variables by checking Durbin-Watson Statistics of both the countries. We found it to be insignificant in both countries. Finally we checked heteroscedasticity of data using White test and found the data to be homoscedastic.

With this backdrop, the model can be applied to predict how the determinants are affecting the FDI inflows in India and China.

ARMA model applied on Indian data show cases all independent variables, namely adjusted GDP, openness, inflation, interest rate, scientific progress and exchange rate to have impact on dependent variable which is adjusted FDI. Surprisingly, scientific progress along with currency depreciation of the country do not show positive influence on FDI inflows in the country. But other variables are positively correlated with the FDI inflows in India. The best result that we found was when the same methodology of ARMA model was applied on Indian data taking into consideration the adjusted FDI as dependent variable and adjusted GDP, Foreign Exchange rate, trade openness, inflation as independent variable. By evaluating these variables, we report the highest R² as 0.722054 which implies that the model is explaining 72.20 per cent of FDI inflow influenced by selected determinants. However, when inflation is removed from the model, the solution comes out as adjusted R² =0.7123 which implies that model is explaining the 71.23 per cent of FDI inflows influence by the variables.

Similarly, when the same model is applied on Chinese economy, we find that independent variables namely adjusted GDP, trade openness, foreign exchange rate influenced dependent variable adjusted FDI by 51.12 per cent with adjusted R²=0.5112. However, as per this model, adjusted GDP, foreign exchange, inflation and real interest rates negatively affects the FDI inflow. But reality lies in the fact

Figure 1. Adjusted FDI inflow of China and India



Source: World Bank Databank, <http://data.worldbank.org/country/China and India>

Table1: Results of Augmented Dicky Fuller Test

Variable	China's ADF Test	India's ADF Test
Log (AFDI)	0.007	0.004
Log (AGDP)	0.050	0.007
Log (Inflation)	0.001	0.002
Log (Tradeopenness)	0.003	0.001
Log (Realintrate)	0.000	0.000
Log (foriegn exchange)	0.006	0.013
Log (Scientific Progress)	0.038	0.001

Table 2: Results of Multicollinearity of Chinese Data

	AFDI	AGDP	FOREX	INFLATION	PATENT	REALINTT	TRADE
AFDI	1	-0.45	0.048	0.35	0.23	-0.15	-0.03
AGDP	-0.45	1.00	-0.515	-0.55	0.13	0.30	-0.47
FOREX	0.05	-0.52	1.000	0.14	-0.39	-0.56	0.53
INFLATION	0.35	-0.55	0.139	1.00	0.35	-0.48	0.61
PATENT	0.23	0.13	-0.392	0.35	1.00	-0.19	0.05
REALINTT	-0.15	0.30	-0.558	-0.48	-0.19	1.00	-0.58
TRADE	-0.03	-0.47	0.529	0.61	0.05	-0.58	1.00

Table 3: Results of Multicollinearity of Indian Data

	AFDI	AGDP	FOREX	INFLATION	PATENT	REALINTT	TRADE
AFDI	1.00	-0.17	0.11	-0.03	-0.31	0.09	0.35
AGDP	-0.17	1.00	-0.16	0.06	0.54	-0.07	-0.03
FOREX	0.11	-0.16	1.00	-0.05	-0.46	0.19	-0.28
INFLATION	-0.03	0.06	-0.05	1.00	0.57	-0.07	-0.04
PATENT	-0.31	0.54	-0.46	0.57	1.00	0.01	-0.11
REALINTT	0.09	-0.07	0.19	-0.07	0.01	1.00	-0.20
TRADE	0.35	-0.03	-0.28	-0.04	-0.11	-0.20	1.00

that apart from the macro economic variables, the inflow of FDI depends upon some other variables which may be liberalized government policy, availability of skilled labour, fiscal policy and monetary policy as well, which are all matters of concern for India.

Policy Implications

FDI inflows influence the economy largely in generating employment, career opportunities, income, technological up gradations, high competition and better products but attracting FDI is not a simple task. It requires a lot of efforts in policy prospects and stability in economy. The main idea behind discussing all macroeconomic variables in this paper is to capture the attention of policy makers in this regard and fill the requisite gap by identifying factors that India lacks so that these may be

acquired over a period of time. We aim to bring out aspects related to FDI inflows and attracting more capital to support nation-building exercise in financial aspects.

Stable Economic Conditions: Economic conditions play a very important role in attracting foreign capital inflows in any country. As per the data provided by World Development Indicators, China is far ahead in terms of FDI inflows and the reason may be lower inflationary rate, low real rate of interest, home currency stability (which indicates economic stability), high exports and high openness in trade of goods and services. These macroeconomic variables have significant impact on FDI inflows in the country.

Liberalized Policy to Attract FDI : Liberalization, Privatization and Globalization (LPG) policy of

government significantly lead to increase in capital inflows. After 1991, there was a significant increase in the flow of foreign capital in to India and China. To attract more capital, policy should be framed in a liberalized manner for various sectors, which may lead to high efficiency and productivity. The policy liberalization may be in terms of technology transfer, capital goods and licensing of new acquisitions.

Heavy Investment on Infrastructure and Developmental Aspects: Most multinational corporations looking for investment in host country are based on infrastructural and development aspects present in host country. China’s spending on infrastructure and other development related aspects is very high as compared to India which manages to attract more foreign capital. Also the logistics performance index of China is high as compared to India (World Development Indicators, 2014).

Vocational Training at Secondary Level: Chinese economy is much wider than Indian economy but because demographic dividend opportunity is present in Indian economy, India may reap benefits of higher FDI inflows. However, while India enjoys the

Table 4: Results of White Test of Chinese and Indian data

Variable	China Prob.	India Prob.
AGDPLN ²	0.8541	0.0946
INFLAIONLN ²	0.6221	0.575
PATENTSLN ²	0.024	0.2904
REALINTTLN ²	0.9425	0.6676
TRADELN ²	0.4144	0.4986
FOREXLN ²	0.4149	0.1308

Table 5: Results of Model explaining FDI inflow in China and India

Model	Variables Understudy	China Adjusted R ²	India Adjusted R ²
ARMA(1,1)	AGDP, Trade Openness, Inflation, Patents, Real interest rate, Foreign Exchange	0.474429	0.250219
ARMA(1,1)	AGDP, Trade Openness, Inflation, Real interest rate, Foreign Exchange	0.503563	0.6569
ARMA(1,1)	AGDP, Trade Openness, Foreign Exchange	0.512149	0.712387
ARMA(1,1)	AGDP, Trade Openness, Foreign Exchange, Inflation	0.481311	0.722054

advantage of demographic dividend, the skilled workforce in India is low as compared to China (World Development Indicators, 2014). This problem may be resolved by providing vocational training at school level itself. With such kind of change, we may make the population under-17 a skilled workforce.

Recommendations

The study aims to find the factors determining the FDI inflows in India and China. Individually, the data related to GDP, scientific progress, real interest rate, foreign exchange rate, trade openness and inflation has been characterized as the determinants of FDI for both countries and ARMA model proposes the best fit model which explains 72 per cent variations in India taking adjusted GDP, foreign exchange rate, trade openness and inflation as significant variables. The best fit model of China explains 51 per cent variations in FDI flows taking GDP, trade openness and foreign exchange rate as determinants. This indicates that in Chinese economy, macroeconomic factors played a very important role in attracting FDI inflow, but there are some other variables present which are also being considered before, while investing capital into the country including, stability in economy, more liberalized policies, high infrastructural facilities, efficient and skilled workforce. India needs to focus on these aspects also to get more capital inflow.

Finally, we conclude that apart from the macroeconomic variables, there are other aspects which may attract capital flows in any country and we need to look beyond these variables for qualitative variables as well, which may influence the flow of capital in countries and the policies should be framed taking such variables into account while considering foreign capital inflows.

(The data is extracted from the websites of World Development Indicators (WDI), Ministry of Statistics and Programme Implementation (MOSPI), IMF and World Bank. In

this paper, we use regression analysis to find out the impact of select variables on FDI flows of India and China and the variables are tested positive or negative impact on FDI).

Readings

Abdurramane, N. (2014), How is sectoral FDI affecting firms performance?, Mater's These, Paper 94. Accessed at <<http://repository.usfca.edu/cgi/viewcontent.cgi?article=1101&context=thes>>

Agrawal, V. R. (2011). FDI Inflow Determinants in BRIC countries: A Panel Data Analysis. *International Business Research*, 4 (4), 255-263.

Alfaro, L., A. Chanda, S. Kalemli-Ozcan, and S. Sayek (2004), "FDI and Economic Growth: The Role of Local Financial Markets," *Journal of International Economics* 64, 113-134.

Balasubramanyam, V. M. (1999). Foreign Direct Investment as an Engine of Economic Growth. *Journal of International Trade and Economic Development*, 8 (1), 27-40.

Borensztein, E. Gregorio, D. & Lee. (1998). How does foreign investment affect growth?. *Journal of International Economics*, 45(1), 115-135.

Blomstrom, M., Lipsey, R.E. and Zejan, M. (1994). What Explains Growth in Developing countries?. *NBER Discussion Paper* 1924.

FDI Intelligence Report 2014, Accessed at <<http://www.fdiintelligence.com/Landing-Pages/fDi-report-2014/The-fDi-Report-2014>>

G, James & Gupta, P (2002). Portfolio Flows into India: Do Domestic Fundamentals Matters ?. *Presentation at NCAER*, October 22.

Kohli, R. (2001). Capital Flows And Their Macroeconomic Effects In India. Delhi: *Indian Council for Research On International Economic Relations*. Accessed at <www.icrier.org/pdf/renew64.pdf>

Kohli, R (2003). Capital Flows and Domestic Financial Sector in India. *Economic Political Weekly*, 22, 761-68

Levine, M. C. (June, 2002). Does Foreign Direct Investment Accelerate Economic Growth? *Working Series of SSRN Papers id 314924*, 1-14.

Lim, E. G. (2001). Determinants of, and the Relation Between, Foreign Direct Investment and Growth: A Summary of Recent Literature. *IMF Working Paper*, pp. 1-28.

Masca, E. D. (2008). Determinants Of Foreign Direct Investment Flows To Developing Countries: A Cross Sectional Analysis. *Prague Economic Papers*, 356-369.

Mazumdar, T. (2005). Capital Flows into India: Implications for its Economic Growth. *Economic Political Weekly*, May, (2005) Accessed at www.epw.in/authors/tanushree-mazumdar

Menani, S. (2013). FDI and FIIs as Drivers of Growth for Indian Economy: A Comparison. *International Journal of Innovative Research and Development*, 1(2), 209-216.

National Population Policy (2000) Accessed at countryoffice.unfpa.org/india/drive/NationalPopulation-Policy2000.pdf

Singhania, M., & Gupta, A. (2011). Determinants of Foreign Direct Investment in India. *Journal of International Trade Law and Policy*, 10 (1), 64-82.

Spatz, N. A. (December, 2004). FDI and economic growth in developing economies: How Relevant are host economy and industry characteristics. *UNCTAD/ITE/IIT/2004/9*, 13 (3).

Sultana., T.S., & Pardhasaradhi., S. (2012). Impact of Flow of FDI & FII on Indian Stock Market. *Finance Research*, 1(3), ISSN: 2165-8226.

Wang, M. (2009). Manufacturing FDI and Economic Growth: Evidence from Asian Economies. *Applied Economics*, 991-1002.

World Investment Report (2008), UNCTAD. Accessed at <http://unctad.org/en/Docs/wir2008_en.pdf>

World Development Indicators (2014), World Bank Databank Accessed at <<http://data.worldbank.org/country/China>>

World Development Indicators (2014), World Bank Databank Accessed at <<http://data.worldbank.org/country/India>>.

Endnotes

1 Demographic dividend means young population in country, which lasts for a long time - typically five decades or more. Eventually, the reduced birth rate reduces the labor force growth. China and India both are having high population but India is the only country in the world, which has the youngest workforce present. India will have 63% as working age population in 2016 (*National Population Policy 2000; BRICS report of Goldman Sachs; NSSO report*). □

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Biotoilet: State-of-the-Art Management of Human Waste

Huzaiifa Khorakiwala



While the septic tank merely waits for the waste matter to turn into sludge and manure slowly over a period of months during which, the seepage goes on unnoticed and uncontrolled, the biotoilet actively takes charge of dealing with the waste matter efficiently

TIME AND again, we keep reading news items on the problem of open defecation in our country. In fact, it has more or less come to be identified as a national trait or even a symbol much like the elephants and snake charmers of yore. India has the dubious distinction of being home to 60 per cent of all open defecators of the entire world. More than 62 crore people, or roughly half the population of the whole of India practice open defecation and this number does not appear to be going down anytime in the foreseeable future. Even urban India has to bear the brunt with 18 per cent defecating in the open, while in rural India, it is as high as 69 per cent.

The lack of toilet facility exerts a collateral damage on the education front too. Most of the schools in rural areas are co-ed with boys and girls attending classes together as they cannot afford to have separate schools and teachers for them. And in most secondary schools, the girl students simply drop out when they approach puberty mainly because there are no toilets in the premises where they can take care of personal hygiene.

Not Aesthetics Alone

Quite apart from the aesthetic angle, open defecation poses a major public health hazard. The free and

easy mixing of faecal waste with water sources such as streams, ponds and tanks especially during the wet season leads to heavy contamination of drinking water since modern water purification systems for domestic use are hard to come by in rural areas. No wonder, there is a never-ending malady of water borne diseases like typhoid, dysentery, hepatitis, intestinal worms and so on in the hinterland.

Septic Tank Not Safe

Building a toilet in each home is of course, a laudable exercise but there is more to the issue than meets the eye. The standard septic tank and the soak pit may appear to offer easy and low cost solutions but they are fraught with the danger of faecal matter leaking into the soil as they are not appropriately designed and constructed. The seepage goes on round the year and it is not easy to check or monitor it as it is not overtly visible for the locals to take action, thus lulling them into a false sense of safety which is detrimental to public health.

Bio-toilet

It is against this backdrop that the bio-toilet enters the scene with a positive impact. In contrast to the septic tank or soak pit, it deploys what is known as the bio-digester tank as it helps digest the fecal matter using a modern biological principle. While

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the septic tank merely waits for the waste matter to turn into sludge and manure slowly over a period of months during which, the seepage goes on unnoticed and uncontrolled, the bio-toilet actively takes charge of dealing with the waste matter efficiently. It does it with the help of anaerobic bacteria which, as the name indicates, grow and multiply in the total absence of atmospheric oxygen as it prevails inside the sealed tank. These bacteria fully digest the waste into water and bio-gas. In other words, the bio-toilet technology involves active digestion while the older methods rely on passive decomposition.

The bio-toilet offers other advantages as well. It is more compact as it occupies only one third of the space taken by the septic tank or soak pit. The latter need periodic emptying and cleaning out every few months, while the bio-toilet needs no emptying

Building a toilet in each home is of course, a laudable exercise but there is more to the issue than meets the eye. The standard septic tank and the soak pit may appear to offer easy and low cost solutions but they are fraught with the danger of faecal matter leaking into the soil as they are not appropriately designed and constructed. The seepage goes on round the year and it is not easy to check or monitor it as it is not overtly visible for the locals to take action, thus lulling them into a false sense of safety which is detrimental to public health.

as it ensures over ninety per cent decomposition of the waste matter. The bio-toilet thus, enjoys a maintenance-

free life of nearly 50 years while the septic tank needs annual repairs and needs to be replaced after five years.

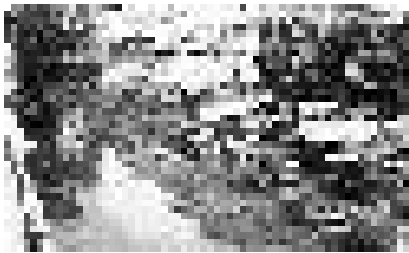
Water Scarcity

One of the major reasons why the practice of open defecation still continues in our country is the lack of water. We often see reasonably well-built toilets falling into disuse within weeks due to clogging because there is not enough water to flush them out. The villagers and even urban slum dwellers can only manage to carry a can of water with them for ablution purposes and not a bucket-full for flushing as it is either not available or too heavy and cumbersome to carry all the way to the public toilet. That brings us to the next requirement in public health, namely adequate water supply. It is not enough to build toilet blocks if they are just going to clog up within weeks. □

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Sanitation, Development and Social Change: Cleaning of Holy Minds

Bhasha Singh



We have to respect their struggle of dignity and self respect. Only then social change can be envisaged. To bring development in the real sense we have to break the casteist shackle of sanitation. We need to radically change the mindset. Cleaning of mind should be our priority

SANITATION HAS of late, become a very hot issue. We find everybody talking about it. It has brought a drastic change in the whole discourse around sanitation. Now it is linked with development agenda and it is being projected as the tool for social change. Not only this, it has also become an agenda for business. Many corporates, multinational companies are talking about it and investing in this. Much hype is generated around Swachh Bharat Abhiyan and around Rs. 2 lakh crores have been said to be earmarked for this. Is there any difference between these seen and much propagated datas and unseen and hidden realities?

I want to start with very simple straight questions.

Why at all are we talking all of a sudden about sanitation? Is there any national or international pressure or there is a real concern to bring much needed radical changes in sanitation? Have we seriously identified the heart burning problems of sanitation? Is this move is related with the agenda of World Bank and International fund lending agencies? If we look at the various

schemes whether it was Nirmal Bharat Abhiyan of the previous government or Swachh Bharat in the current one, one thing is very clear that it is not mere sanitation. For example, if we see some data, in absolute terms India receives almost twice as much development assistance for water, sanitation and water resources management as any other country, according to data from the Organisation for Economic Co-operation and Development. The World Bank finances a number of projects in urban and rural areas that are fully or partly dedicated to water supply and sanitation. The Government of India and the World Bank signed a \$500 million credit agreement in February this year to improve piped water supply and sanitation services through decentralised delivery systems in the states of Assam, Bihar, Jharkhand and Uttar Pradesh. As per the agreement, the sanitation component will support the Government of India's programme, which includes construction of household toilets, soak-pits, drain and lane improvements, community awareness programmes for improving sanitation and hygiene practices, along with incentives for achieving 'open defecation free' status.

The author is a senior journalist currently working as Chief of Bureau with Outlook Magazine. Her writing has been focused on most marginalized, dalits, women and wider issues of human rights. She has worked extensively on issue of agrarian crisis and farmer suicide in north India. She has done ground reporting across the country to highlight questions related to radiation and nuclear reactors. She is the author of *Adrishya Bharat* and *UNSEEN-Truth about India's Manual Scavenging*, published by Penguin. She has also been awarded with many fellowships and recognitions including Ramnath Goenka award for Best Journalist of the year.

It can't be just a co-incidence that Melinda Gates foundation and top Indian corporates like Adanis, Ambanis, Sterlites have also started singing with the government in the same tune on sanitation. Confederation of Indian Industries (CII) is constructing 10 thousand toilets in 2015-16; Larson & Toubro pledges to construct 5,000 toilets; Vendanta group's Hindustan Zinc announces to make 10 thousand toilets and this list is continuously increasing.

So that means India is entering into an era of toilet revolution. Anybody can ask that if it is happening then where is the problem. Lets juggle some facts. Today, only 31 per cent of the 167 million rural households in India have access to tap water and domestic toilets (Census 2011). About 67 per cent of the rural population continues to defecate in the open and India accounts for about 50 per cent of the world's open defecation. Studies suggest that the economic impact of inadequate sanitation in India is equivalent to 6.4 per cent of GDP in 2006. And surely the most marginalised is deprived of better sanitation. In India, more than 20 per cent of Dalits do not have access to safe drinking water. 48.4 per cent of Dalit villages are denied access to water source. Only 10 per cent of Dalit households have access to sanitation (as compared to 27 per cent for non-dalit households). Everyone should have free access to toilets, clean water and better sanitation. It is an issue of human rights. But in this whole toilet building euphoria, one of the biggest problem is that instead of providing free toilets to poor and the most marginalised class, we are asking them to use pay toilets or pay for putting the sewerlines.

Another problem in this approach is that the whole focus is users centric. We have not spent a single line, single rupee on the sanitation workers. What an irony that we are ready to spend million and millions on construction of toilets without giving a single thought

to the question that who is going to clean? We are still not ready to ask-What are we going to clean? What is our concept of cleanliness?

Is it not true that we as Indians are very much concerned about personal sanitation and least bothered about public sanitation. We have not developed a strong civic sense around sanitation. This weakness is directly reflected in weak civic bodies-be it municipal corporations or gram sabhas. These civic bodies have become implementing agencies instead of governance bodies. They are not at all in a position to defend the rights of their employees, i.e. sanitation workers.

No Abhiyan or campaign on sanitation talks about sanitation workers. Why? The reason is simple. We are still not ready to accept that cleanliness along with wider issue of sanitation is caste based. Because of our casteist mindsets, we are not willing to break this shackle. We are not ready to address the issue of cleaners of India. What an irony! India is not clean because we don't want cleaners to live with dignity and equality. Reality is that we have doomed a specific caste to clean our gutters, our garbage & our sewers. And we never felt ashamed of it. Why sanitation workers are not in focus in all this discourse, knowing the fact that in India sanitation is caste based. In 2014 while we are writing these words, more than 3 lakhs sanitation workers, all dalits, are manually cleaning the filth and human waste. Hundreds of them are waste fighting for life inside gutters. Hundreds of women manual scavengers are forced to clean dry toilets, thousands are cleaning railway tracks. We are talking so much about sanitation and not talking about modernisation of sewerage system. How can India be called a developed nation when sons of her soil have to enter in sewer lines to clean the blockages. Many of them are dying and others are also fully aware that they can die inside anytime.

While on the one side we are talking about cleaning of roads, cleaning of drains...but we are least bothered about how much we pay to the people on whom we have shouldered the whole responsibility to make India clean. They are the least paid workers. They are deprived of minimum wages. They are working under blood sucker contract system. The system has given contractors free hand to exploit them. Maximum numbers of our cleaners are working without any job security-be it at most modern Indira Gandhi International Airport or in Delhi Municipal Corporations or with Indian Railways or Sulabh International toilets. Everywhere we can find scavengers working for less than minimum wages.

Government has mercilessly given sanitation work to contract. When they are not getting even the minimum wages, where is the question of asking for safety gear. They work in horrible conditions. Every month around 200 sanitation workers in the country die at work, with Mumbai alone accounting for more than 20 of them. Lack of proper safeguards puts these people at risk of infections, which are occasionally fatal. Statistics show that 90 per cent of India's sanitation workers die before they turn 60 after contracting various infectious diseases. India has a total of 2.7 million sanitation workers, almost all of them belonging to lower caste families. Among these, about 1.3 million manual scavengers are involved in carrying human excreta in the country. The government employs less than a third of sanitation workers, and the rest are private contract workers. They are paid a salary of 3000-5000 rupees a month, much below the minimum wage requirement, too less than what even a construction worker is able to get as daily wages.

There is a vicious circle of untouchability around sanitation work. As they are born in scavenging caste, they are doomed to do stinking menial jobs. Because of this work, they are looked down and further marginalised.

In this process, they also just keep vying for the scavenging jobs or regularisation of their temporary or contractual jobs. So the vicious circle continues. With sanitation work, there is a stigma attached. If we don't understand the nitty-gritty of that stigma then all the efforts to make sanitation better is going to end in a dead end tunnel. United Nation Special Rapporteur on Human Rights to Safe Drinking Water and Sanitation, Catarina De Albuquerque has clearly mentioned in her very important report that in India and its sub-continent, stigma is attached with sanitation because it is linked with caste and whole notion that who cleans the dirt are dirty.

While talking to me sometime back she said unless we break these vicious links, we cant think of people coming out from the filth to a dignified livelihood. Scavengers facing stigmatisation experience ostracism, abandonment, shunning, rejection, isolation, exclusion, harassment and physical violence. Any policy intervention has to break this to change it. Are we breaking this? In year 2014, the existence of lakhs of manual scavengers across the country is a blot to all the claims.

Safai Karamchari Andolan (SKA), an organisation working from last three

decades for elimination of manual scavenging in its survey has found the existence of different forms of manual scavenging in all the states. SKA national convenor Bezwada Wilson's observation represents the community concerns that prevalence of manual scavenging and other degrading caste based occupation shows casteist mindset of our policy makers. He says that they want dignified livelihood and non-scavenging jobs, only then the country can be clean. Bezwadas observation on casteist mindset of policy makers get its ground when we find that crores of rupees allocated for rehabilitation of manual scavengers were unspent. In 2012-13, the Government of India allotted Rs. 100 crores for rehabilitation of manual scavengers but in that whole financial year, they had not bothered to spend even one rupee for rehabilitation. And nobody was held accountable for that.

Amidst all the present pomp show, brand new brooms photo-ops, manual scavengers are forced to clean human waste. This is the reality that we need to address.

These have been the most neglected aspects of our sanitation discourse. It is related to the most important and

basic question of modernisation of our sanitation system. Efforts which come in shape of campaigns don't establish its links with development and social change. We can see the contract when young generation from scavenging community is getting ready to come out of broom and human waste, brooms are imposed on the society as role models. In this respect, Swachh Bharat Abhiyan works against the aspirations of younger generation of sanitation community. When the community is getting prepared against practice of scavenging, we are imposing brooms on them. There is whole-hearted effort to make brooms more glamorous than cleaning. Why can't we hear the voice of the community if we are genuinely concerned about changing their plight? While working on the issue of manual scavenging I have not met a single women manual scavenger who wants their next generation to be in this in human hell. We have to respect their struggle of dignity and self respect. Only then social change can be envisaged. To bring development in the real sense we have to break the casteist shackle of sanitation. We need to radically change the mindset. Cleaning of mind should be our priority. □

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New Portal on FTAs

The Commerce Ministry has launched a trade portal providing exporters with information on preferential tariffs and rules of origin in such markets. The 'India Trade Portal', designed to ensure better utilisation of Free Trade Agreements (FTAs), will also have other information of importance to exporters such as technical barriers faced by trade in different markets. India has signed a number of FTAs with various countries and regional blocks over the last few years, but exporters have not been able to utilise them well because of lack of knowledge about what those agreements offered. The Indian Trade Portal will make available important data for use of exporters and importers at one place, in a user friendly manner and will contribute to ease of doing business for trade and industry.

The salient features of the portal are : • To assist Indian exporters and foreign buyers to opt for most preferred tariff route to source Indian products at the lowest available tariff • identify the SPS/TBT requirements of a product for entry into a country • Knowledge platform for MFN tariffs, preferential tariffs and rules of origin • MFN tariff and preferential tariff for Indian exports products to 42 countries - covering India's major export markets, ASEAN, SAARC and Eurasian Economic Commission countries • More than 3000 sanitary and phytosanitary (SPS) measures and technical barriers to trade (TBT) in India's major export markets • ITC(HS) code search, identification of corresponding ITC(HS) code of products in other countries • Database of suppliers from India for foreign buyers • Export procedures, knowhow and law • Frequently asked questions on trade agreements, export promotional schemes, banking customs and central excise • Alerts on changes in tariff and SPS/TBT measures for registered users and regular updation and addition of more countries.

DO YOU KNOW?

Recapitalization of Banks

Recapitalization is the process in which, the amount of assets and debt of a particular entity are restructured so as to meet a financial goal. This goal can be a step to limit the amount of tax that the company owes on its assets in hand, or as a part of a reorganization to steer clear of bankruptcy. The concept of recapitalization is usually associated with businesses but the same concept can also be applied to non-profit organizations, financial institutions such as banks or mortgage companies, and even to individuals in general. To put it in other words, the recapitalisation consists of a major change in the way in which, a bank is to be funded. This can be done by issuing new shares or taking a loan from the government of that nation. Primarily, the recapitalisation involves providing the bank with fresh new capital, like, for example, the government agreeing to buy new shares. This improves the bank balance of the bank and prevents their financial structure from collapsing.

Recently, the Public Sector Banks (PSBs) in India got the 'In principle' approval by the Centre for infusing fresh capital on the need basis from the year 2013-14 to 2018-19 for ensuring their compliance to Capital Adequacy norms under Basel- III guidelines. This will cater to the credit needs of the productive sectors of the economy and also help the banks tide over the effect of stress in the economy. It will also strengthen the national and international banking operations of PSBs and will heighten the confidence of investors and safeguard the market sentiments. The infusion of equity capital of PSBs would not only empower them to expand, but also further develop their credit growth. This supplementary availability of credit will serve the credit needs of our economy and would also benefit employment oriented sectors, like that of micro & small enterprises, agriculture, export, entrepreneurs etc. to promote their economic activities which would, in turn, contribute significantly to the economic growth of the country.

Recently, it was announced that for the public sector banks to be in line with Basel—III norms, Rs 2, 40,000 crore are required to be infused as equity by the year 2018 in our banks. To meet this huge capital requirement, the capital of these banks will be raised by increasing the public shareholdings in a phased manner through sale of shares largely through retail to common citizens of this country, while maintaining their public ownership suggesting that the government stake in the banks would remain over 51 per cent.

Turing Test

Turing Test or the test for Artificial Intelligence was a test invented by the English mathematician Alan M. Turing to check whether or not, a computer can think like a human brain. To determine how one can actually define 'thinking', he devised a subjective test to get an answer to the question "Can machines think?" and expressed that a computer can be called sentient if its actions, reactions and interactions are like that of a human being. This test is very simple in its nature. There are three terminals. Two of the terminals are operated by humans and the third terminal is operated by a computer. Each terminal is physically separated from the other two terminals. One human is designated as the interrogator. The other human and the computer are designated as the respondents. The questioner interrogates both the human respondent and the computer according to a specified format on a certain subject and context, and for a certain length of time, say, for 10 minutes or so. After the specified time, the questioner tries to determine as to which terminal is operated by the human respondent, and which terminal is operated by the computer. This test is repeated several times. The human interrogator is isolated and asked to distinguish between a human and a computer, on the basis of their replies to his questions. This test is used to quantify the thinking capacity of a computer by its probability of being misidentified as the human. If the interrogator makes the correct determination in half of the test runs or less, the computer is considered to have an artificial intelligence, because it is thought to be just as human as the human respondent to the questions posed.

This test has been under criticism as the nature of the questioning must have a defined limit in order for a computer to possess intelligence resembling that of a human's mind. In some cases, a computer may score high when the questioner frames the queries that can have a simple "Yes" or "No" such as mathematical number theory. But in the case of questions of conversational nature that are subjective and broad based, a computer cannot be expected to perform like a human being particularly, if the subject is emotionally charged or socially sensitive.

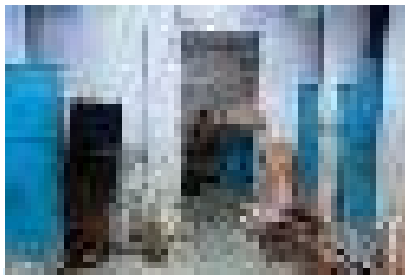
On the contrary, the computer can perform much faster and better than a human being that it can become quite easy for the questioner to comprehend which one is computer and which one is human. Computer applications such as Google, Yahoo, and AltaVista have the potential to outdo a human in a Turing Test on the basis of various information searches. □

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How Safe are the Toilets?

Understanding Issues Involved in Toilet Access for Women

*Aarushie Sharma
Asmita Aasaavari
Srishty Anand*



Basic infrastructural changes such as the toilets remaining open all night, toilets being provided with sufficient infrastructure, toilets being well lit and well maintained, their architecture being gender friendly and located in spaces which allow maximum access, along with supervisors stationed will make the toilets much safer in terms of lighting, access, provision of basic services, etc.

THE MOST crucial problem associated with toilet access for women is the problem of safety. Often women are eve-teased, mocked at, molested in or on their way to the public toilet and face harassment ranging from verbal, visual, physical, flashing, stalking, violent physical attack, sexual assault or even rape.

In the context of these issues, while 'safety' of women emerges a top concern in discourses on toilets, it often focuses on sexual safety of women, thus not accounting for the implications on the physical safety of women.

Familial emphasis on protecting women's safety for the honour of family makes women more wary of their toilet access. Adding to this, insufficient toilet infrastructure plays a critical role in limiting women's access to the toilets. Thus, restricted, women master the practice of control. They adopt practices to avoid going to the toilet, in the process not realizing the severe health implications their practices entail.

Dysfunctional toilets and the practices women adopt to cope with the former both have severe implications on their physical safety. This essay highlights the various infrastructural issues with public toilets and seeks

to argue that the need of the hour is to attend to the infrastructural shortcomings of public toilets and community toilet complexes (CTCs). Doing so would enable women to lay claim to toilets more confidently and would thus make these toilets 'safer' spaces for women.

This article is based on qualitative research conducted in resettlement colonies and lower income settlements of Delhi: Janta Mazdoor Colony (New Jaffrabad, near Seelampur); Bawana Resettlement Colony (Bawana); Jai Hind Camp (Kusumpur Pahadi), Masoodpur and Annanagar & Sanjay Amar Colony (behind WHO headquarters, near ITO) as part of the Krishnaraj Summer Research Fellowship 2013.

The first section discusses the implications of timings and condition of toilets on women's access and safety.

The second section builds on infrastructural need gaps in public toilets and its impact on making toilets unsafe spaces.

The third section critically examines the discourse on safety which rests on notions of family honour and shame and argues that in order to make toilets 'safer' spaces, there is a need to look within and beyond the oft cited discourses on safety of women.

Aarushie Sharma worked as Research Executive with TNS Global, a consumer research organization and is now a freelancer based in Delhi. Asmita Aasaavari is a Research Associate with Collaborative Research and Dissemination (CORD). CORD is an independent education research group that seeks to articulate the problems of the disadvantaged through field-based research, working in the domain of policy and public opinion. Srishty Anand is currently a Research Analyst with Kaarak. Kaarak is an advisory and professional services organization operating in the domain of social and economic development.

Adjusting the Biological Clock

The mere existence of toilets does not ensure their usage since public toilets ubiquitously have timed permissible usage¹. Most often CTCs are open from 5 AM to 11 PM. What do women do if there is a need to go to the toilets at night? Most women shared that they always keep a check on what they are eating at night while some confessed to having skipped dinner altogether to ensure that the need itself never arises.

Not only does the toilet have its particular time, women too have a particular time at which they prefer to go to the toilet. In all sites having public toilets with the exception of Masoodpur², majority of the women preferred to go in the morning. Due to limited cubicles, women start queuing up at four in the morning in order to avoid the rush. While many prefer to go in the morning, a large majority use the toilet during early evening when it is not dark and crowded. Frequent electricity cuts, cubicles devoid of bulbs and tube lights further discourage women from using the toilet in the dark³.

In addition to controlling the urge to visit the toilet, women also monitor the number of times they can frequent the toilet. Are they able to access the toilet whenever they need to? Many of them actually visit the toilet only once a day. Given the dirt, filth and the overall unsafe environment of the toilet, they do not want to visit it the second time.

As if visiting the toilet once a day seems unrealistic, the responses we got in Annanagar and Sanjay Colony were even more alarming. Here, the condition of CTCs and mobile toilets is so deplorable that a woman accounted not going to the toilet for three-four days at a stretch.

These instances establish that going to the toilet more than once to defecate is often not a simple choice for women. It is a calculated, contemplated

decision after weighing the costs and benefits. Women adjust their biological need of going to the toilet in accordance either with the timing of the public toilets or the feasibility of visit and safety concerns. Few are able to go to the public toilets whenever they need to. Most have taught themselves to go to the toilet early in the morning, never go in the night, and not go when the toilet condition is unbearable.

Adding to toilet timings and their conditions are factors of toilet infrastructure and architecture which challenge women's uncontested claim to the toilets.

Toilet Infrastructure

The low walls of the CTCs and the lack of sufficient distance and demarcation between men's and women's toilet cubicles are a source of perpetual security threat. Women in Janta Mazdoor Colony and Annanagar complained that in their inebriated state, men climb the walls of the cubicles, harass women and hurl abuses at them, making it difficult for the latter to visit the public toilet during afternoon and at night.

Further, the CTC at Janta Mazdoor Colony is located geographically behind the settlement, adjacent to the barren land, away from the houses; as a result, the cries of help seldom reach out. One of the respondents expressed, "*Gents baith jaate hain aur auraton ko daboch lete hain. Yahan se toh aawaaz bhi bahar nahi jayegi*" (*Often men hide in the ladies toilet and attack women. From here even the cries of help would not reach out*).

Apart from low roofs, absence of latching and lack of adequate lighting are other infrastructural shortcomings contributing to women feeling unsafe in the toilets. While lack of proper lighting discourages women from using the CTC after dusk, lack of latching doesn't allow them hassle free access during the day either. Often women hold the door from inside or station a friend outside the cubicle to guard their privacy.

The maximum threat to the physical safety of both men and women was realized at the small makeshift-like toilet at Sanjay Camp. This dilapidated structure without lighting, proper doors is even devoid of a concrete roof and this has led to women and men being on a constant guard while using the toilet because of the fear of the possibility of the wall and the weak structure of the cubicle collapsing anytime.

Adding to infrastructural problems, baseless intruding, inappropriate and discomforting questions of the toilet attendant further restricts women's unchallenged access to the toilets. Because there aren't any female attendants/ supervisors in the toilets, majority of the women feel very scared to use the CTCs in their own localities. Despite MCD's rule book delineating two supervisors – one male and one female at CTCs, the invisibility of female toilet supervisors is a stark reality.

Bathing & Urinating: Absent Concerns

What is often left out of discussions on toilet infrastructure in context of women is the concern with bathing and urinating.

We hardly came across women who used the public toilet for bathing. The situation is in stark contrast to men's toilets which boast of men using the CTCs for bathing as well. The supervisor at one of the CTCs explained the discrepancy by arguing that women don't need a bathing compartment as most choose to bathe at home. The choice argument cleverly legitimizes the dysfunctional bathing arrangements for women, camouflaging that this choice is indeed the effect of the absence of provisions in the first place.

One reason why women avoid bathing in the public toilet is due to lack of running water and absence of provisions to keep their clothes and insufficient space for them to change. To avoid the ordeal of carrying clothes

to change and wash, they prefer to bathe at home and thus bathing cubicles are seldom used.

Secondly, women are conscious of being attacked by men. With sexual safety being one of their top concerns, women often calculate the potential risks which bathing could pose to their safety given the broken latches, low roofs of the toilets and the supervisor's uncomfortable questions.

Another factor discouraging women to use CTCs for bathing are their financial constraints. The CTCs often charge a fee of Rs. 2, 3, 5 for toilet, bathing and washing purposes respectively. Women, especially those who are not working outside the home, depend on their husband's income for their daily toilet cost. Often their husbands lose calm when women approach them for money for daily toilet use.

Invariably, a large majority of the women in these areas have put together a makeshift structure in their homes to bathe. Those devoid of plots and with insufficient income to spend on CTCs, bathe just outside their camps with their clothes on. Disapproving of the state of things one of them retorted angrily, "Ye bhi koi nahana hai?" (Is this bathing at all?).

Along with bathing, the other absent concern in context of public toilets is urinating. While most women use their makeshift bathing compartments at home for urinating, the question arises that what do women do when they are out on the roads? The inadequate attention paid to urinals for women is reflected in the discrepancy between urinals and toilets for men and women, the former exceeding the latter majorly. Further, while toilets are always shut at night, urinals are usually accessible for men round the clock. This sends across the message that women don't need toilets at night, let alone urinals. It also suggests that women do their toilet function at their home or workplace, thus not accounting for the need to use toilets when women are traveling

or are out on roads. While some women relieve themselves by hiding behind parked cars or bushes; the most shocking insight was the realization that majority of the women interviewed hardly urinate, except when they defecate. They drink less water to avoid urinating, not realizing the severe health implications it may have.

The problem of scarce urinals and toilets becomes particularly aggravated for pregnant and menstruating women. Further, a fundamental shortcoming in the infrastructure of toilets is that it does not take account of the needs of differently abled citizens. At the sites studied where the CTCs had cubicles marked for persons with disability, they were usually in dilapidated conditions just like any other cubicle thus making it impossible for people to use the toilet on their own.

How 'safe' are the Toilets?

Women's access to toilets is often hindered as and when women's safety is threatened by factors such as poor/ faulty design of the cubicles (open roofs where men can peek in); poor maintenance (broken latches and doors); inadequate lighting (women find it difficult to get back home in the dark and fear it is easier for men to attack them in the CTC compound at night), men and boys loitering around the toilet complexes and absence of female attendants at the CTCs.

While all these factors hinder women's unrestricted toilet access, the predominant reason why the public toilet or the open field is seen as 'unsafe' is often associated with the rising number of cases of sexual harassment in public toilets and during open defecation. Dasra published an extensive study in 2012 which states that approximately 30 per cent of women from the underprivileged section of Indian society experience violent sexual assaults every year because of lack of sanitation facilities which compel them to travel in search

of secluded spots or public facilities to meet their bodily needs⁵.

More often than not, the risk of sexual assault gets tied with the questions of honour and shame of the woman and her family. Often the cases of sexual harassment against young girls do take place but are not reported for the fear of damaging the 'societal image' of the girl and her family.

During the fieldwork, the women of Janta Mazdoor Colony shared that the fear of their daughter(s) safety is always at the back of their mind i.e. fear that their daughter(s) might be harassed or molested in the public toilet and the resultant shame it would bring upon the family. 'Agar kal ko humari ladki ke saath toilet mein koi chherkhaani karta hai toh hum kahaan mooh dikhaane layak reh jaaenge, itni badnaami hogi'. (If tomorrow someone eve teases my daughter in the toilet, how will we face the world. We will be so ashamed).

The notions of honour and shame are so deeply internalized that while charting their way to the toilet, women are always careful to avoid any intrusion on their modesty which according to them would repudiate the respectability of their families. As many of them say, "izzat ka sawaal hai" (It's a question of honour).

Whether women choose to go to the toilet or to the field, whether they go in the morning or at night, whether they go nearer or farther; their safety and honour is of utmost concern. Women's preferred time, the place they choose to go to and the company they choose to take along all reflect how going to the toilet, a basic process, is laid with various issues and its consequences for women.

While sexual assault is a pertinent issue, what needs to be addressed is that the discourse on safety unfortunately is almost always exhausted by sexual safety. The examples above show that the concern with safety of mothers, wives and daughter has very little to

do with their physical safety and more with their sexual safety. Rape of a woman often becomes more an issue of reputation than of physical harm (as seen in the cases of families which choose not to file such cases due to fear of it damaging their societal image).

Women having internalized the value of sexual safety seem to pay less attention to other ways they may risk their physical safety. Choosing to monitor their fluid and food intake, avoiding the visit to the toilet after evening, restricting themselves to one visit a day, they prioritize their sexual safety over their physical safety while the latter may cause greater damage to their bodily systems.

Shilpa Phadke in the article '*Dangerous Liaisons: Risk and Reputation in Mumbai*' has eloquently put forth that from the perspective of the community, a family's attempts at preserving women's respectability and honour outweigh the value placed on actual safety. Women are compelled to produce respectability and protect the 'honour' of their families even at the cost of their own safety⁶. This emphasis on sexual safety restricts women's chances of taking risks and further restricts their access to public spaces. What women need to do in order to maximize access to public space as citizens is not the provision of safety but the right to engage risk which realms in the discourse of rights over protectionism.

What the above argument reflects is that the concern with making women's access safer may be misled if it is limited only to the sexual safety of women which may further restrict their limited access, make them more prudent of the routes they take what time they access the toilet.

What is more important is to understand that safety concerns, the level and extent of claim one feels for a space. The way the CTCs function at these sites, these levels of claims seemed to be absent. How can women staying in these areas feel more rightful

in their access to the CTCs? How can they confidently access the toilets? While years of socialization into manufacturing respectability, guarding sexuality cannot be easily challenged, what can be made available to these women to ensure they begin to take risks is basic infrastructure.

Conclusion

While recent concerns with sanitation seem to focus on the need for more toilets, there is an equally pressing need to identify the problems with the existing ones.

In the current scenario, lack of sufficient infrastructural provisions discourages women from using the public toilets. Further, in the process of using unclean toilets or getting adjusted to 'controlling' their urge to defecate and urinate, many do not realize the severe health implications such practices entail. The lack of access to clean toilets and personal hygiene results in serious health problems and increases the chances of contracting chronic constipation, severe white discharge, heavy menstrual bleeding i.e. dysmenorrhea, bladder inflammations, stomach aches, kidney stones, skin problems, urinary tract infection, jaundice, nausea, psychological stress, anxiety attacks and feelings of social shame. That apart, it creates irreparable complications during pregnancy and postnatal recovery.

To enable women's uncontested access to public and community toilets, there is a need to make the toilets friendlier as far as infrastructure is concerned.

Basic infrastructural changes such as the toilets remaining open all night, toilets being provided with sufficient infrastructure, toilets being well lit and well maintained, their architecture being gender friendly and located in spaces which allow maximum access, along with supervisors stationed will make the toilets much safer in terms of lighting, access, provision of basic services, etc. As Phadke argues, keeping toilets open all night for women would

send the significant message that women have every right to be in public spaces. These changes would not only make toilets safer spaces, but would enhance women's claim to public spaces in general. Once these toilets become safe, workable, accessible, clean, hygienic and healthy; the nation can truly celebrate a 'SWACHH' Bharat.

Readings

Dasra- Catalyst for Social Change. (2012). Squatting Rights- Access to toilets in Urban India.

URL: <http://www.dasra.org/pdf/SquattingRights_Report.pdf>

Phadke, Shilpa, Khan, Sameera, Ranade, Shilpa. (2011). Why Loiter? Women and Risk on Mumbai Streets, India : Penguin

Phadke, Shilpa. (2007). 'Dangerous liaisons: Risk and reputation in Mumbai' in Economic and Political Weekly.

Endnotes

- 1 The time of opening and closing the toilet varies from location to location and is often subject to the whims and fancies of the toilet attendant who is not always the person appointed by MCD but often the former's relative.
- 2 Masoodpur settlement neither has home/personal toilets nor public toilets with the adjoining stretch of open fields being used for open defecation.
- 3 Masoodpur shows an important contrast from the other sites in terms of the time women go for open defecation. Most prefer to go at night, a time they consider safe since the dark camouflages and renders their activity invisible
- 4 As per Municipal Corporation of Delhi, the CTCs are free of cost. However, at most CTCs, the toilet attendant charges a fee from users. Residents oblivious to this, continue to pay to the attendant.
- 5 Dasra Catalyst for Social Change. 2012. Squatting Rights- Access to toilets in Urban India.
- 6 Phadke, Shilpa. 2007. 'Dangerous liaisons: Risk and reputation in Mumbai' in Economic and Political Weekly. □

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Development Roadmap

e-Visa Facility for Tourists from 43 Countries

In a bid to boost tourism industry, the Government of India has launched electronic visa facility for tourists from 43 countries. The tourist visa-on arrival (TVoA) by electronic travel authorisation (ETA) will be available to visitors from Australia, Brazil, Finland, Germany, Indonesia, Israel, Japan, Mexico, Russia and the US among others. A tourist will now have to apply online at the website www.indianvisaonline.gov.in, upload a photo and passport copy and pay the fee online. Once approved, the applicant will receive an email within 72 hours, authorising him/her to travel to India and he/she can travel with a print-out of this authorisation. On arrival, the visitor will have to present the authorisation to immigration authorities, who will then stamp the entry permission. The 3 day permit will cover visits for sightseeing, visiting friends and family, recreation, short-duration medical treatment as also casual business visits. The facility can be used only twice in a calendar year. It is to be introduced in a phased manner at nine airports, namely, Delhi, Mumbai, Chennai, Kolkata, Hyderabad, Bengaluru, Kochi, Thiruvananthapuram and Goa. 76 counters have been created for this.

Deposit Scheme for Female Child

The Government of India has notified a small deposit scheme for the girl child to provide for her higher education and marriage. The 'Sukanya Samridhi' prescribes opening of a deposit account with post offices in the name of a girl child by her biological parents or legal guardian. The account can be opened in the name of a girl child at the time of her birth till she attains the age of 10. A girl child who attains the age of 10 years a year prior to the commencement of new scheme will also be allowed to open an account. The minimum deposit amount is Rs 1,000/- every year in multiples of Rs 100 every year. If the minimum amount is not deposited, there will be fine of Rs 50 for every year of default. A maximum of Rs 1.5 lakh can be deposited in one financial year. The deposit is to be made for 14 years from date of opening of account, which will be operated by the parents or legal guardian till the girl child attains the age of 10 years after which, she can operate the account while parents can deposit the money. The account will mature in 21 years from the date of opening of account. However, one can withdraw half of the balance (at the end of preceding financial year) for her higher education and marriage, but only after the girl attains the age of 18 years. The account will be closed if the girl marries before the maturity period. One girl is allowed only one account and parents can open such an account for a maximum of two girl children.

NORTH EAST DIARY

MEGHALAYA JOINS INDIAN RAILWAY NETWORK

The north eastern state of Meghalaya has been added to the country's railway map as the first passenger train between Meghalaya's Mendipathar and Guwahati covering a distance of 131 km was inaugurated. With this commissioning, Meghalaya, that was the only state among the seven sisters of the Northeast not having any railway line, has been brought into the railway map of India. The expected cost for this project is about Rs 275 cr. Out of the total length of this railway line, 19.75 km comes under Assam and 9.49 km in Meghalaya. The Dudhnoi-Mendipathar railway line will pass through the Goalpara district of Assam. The three stations on this route would be Dudhnoi, Nolbari and Mendipathar. This section will initially have a speed potential of 65kmph and later of 100kmph. □

CENTRE TO PROMOTE SCHEMES, DEVELOPMENT IN NORTH EAST

The two special scholarships were launched by the Centre for students of Northeast – Ishan Uday and Ishan Vikas. The Ishan Uday special scholarships would be given to 10,000 students from the Northeast. The second scheme, the Ishan Vikas scheme would be extended to 2000 students and 500 faculty members from colleges of the Northeast in which they can visit other parts of the country every year. Besides these two schemes, a modern apparel garment manufacturing centre would also come up in all north eastern states starting with Nagaland, Assam and Sikkim. The Centre has also earmarked a sum of Rs 53,000 crore in the Union Budget for development of Northeast in which, Rs 28,000 crore have been earmarked for construction of new railway lines to better the connectivity and boost the local infrastructure in the region. Rs. 5000 crore have been devoted for improving the intrastate power transmission systems and for boosting 2G mobile connectivity in the region.

A National Sports University will also be set up in Manipur and 6 new colleges of agriculture will be established in the region. The PM also mentioned four revolutions which he looked forward to, including the second green revolution for agriculture that will include a push for organic farming in Northeast India, 'White Revolution' for milk and animal husbandry, 'Saffron Revolution' for energy development, including renewable energy development, and Blue Revolution for fisheries and marine development. Besides this, an economic corridor is also planned come up in northeast India, Myanmar and the adjoining regions that will make Northeast India serve as a gateway of Southeast Asia in future. The government has also signed an agreement with Japan to open an economic corridor with Myanmar to boost employment in the region. □