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All India Institute of Local Self-Government (AIILSG), established in 1926 has been actively working in the field of urban development management and is a diligent partner in promoting the cause of local governance in India and overseas.

The Institute has been the steadfast friend, philosopher and guide to Urban Local Bodies (ULBs) across the Country. For more than eight decades it has contributed to the principles and practice of urban governance, education, research and capacity building. It has designed and developed a vast array of training literature and courses and trained more than 1.5 million stakeholders in diverse areas of urban governance and urban services delivery.

These activities of the AIILSG are practiced through 30 regional centres located in different regions of the Country. The Institute anchors the Regional Centre for Urban and Environmental Studies (RCUES) of the Ministry of Urban Development, Government of India for Western India region. This Centre is actively involved in building capabilities of municipal officials, staff and elected members from the States of Goa, Gujarat, Maharashtra, Rajasthan and the Union Territories of Diu, Daman, and Dadra & Nagar Haveli by upgrading their knowledge and skills required for effective administration and implementation of various urban development programmes.

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Editorial

Nutrition data calls for urgent action

The Ministry of Health and Family Welfare recently released the Phase 1 findings of the National Family Health Survey (NFHS-5), 2019-20. The previous rounds of the Survey (1 to 4) were in 1992-93, 1998-99, 2005-06 and in 2015-16. The NFHS is a multi- round survey at the household level in all States and UTs covers population, health and nutrition plus quality of health, family planning services, domestic violence, reproductive health, anaemia, and the nutrition of women. The exercise has special focus on women and children. The current Phase-1 findings of NFHS-5 cover 22 states and UTs; Phase 2 covering the balance being in progress. Majority of the indicators are available at the district level too.

These surveys provide valuable insights into the status and well-being of the population at the family level and thus enable informed decision making on the part of Governments and other stakeholders and to put in place appropriate programmes and interventions to address shortcomings; thereby enable progress towards the achievement of the SDGs.

The compendium is presented in the form of Factsheets for each State and UT arranged in alphabetical order.

States covered (17): Andhra Pradesh, Assam, Bihar, Goa, Gujarat, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Telangana, Tripura, and West Bengal.

Union Territories covered (5): Andaman & Nicobar Islands, Dadra & Nagar Haveli and Daman & Diu, Jammu & Kashmir, Ladakh, and Lakshadweep.

The Survey has used a total of 131 indicators grouped under 21 heads to measure the performance of States/UTs.

Child nutrition in NFHS-5

Child nutrition is an important metric covered in the survey and helps assess the well-being of the population and represents the quality of human capital available for future development. Here the findings are mixed, both in terms of actual numbers and progress compared to the last survey of 2015-16. Three key indicators have been picked for assessing child nutrition. They are 'Children under 5 who are stunted (height-for-age)', 'Children under 5 who are wasted (weight-for-height)' and 'Children under 5 who are underweight (weight-for-age)'. Here only 6 states have done better (on atleast two of these three indicators) compared to the figures of 2015-16 – Andhra Pradesh, Bihar, Karnataka, Manipur, Meghalaya, and Sikkim. The larger and considered more prosperous ones of Maharashtra and Gujarat have seen their numbers slip. In the case of Gujarat, stunted children has gone up from 38.5% in 2015-16 to 39% now. Wasted has reduced from 26.4 to 25.1. Underweight has gone from 39.3 to 39.7. One may note that the absolute percentages are also high - about a third of all children do not meet the standards of physical well-being. Similarly in Maharashtra, percentage of stunted children has gone up from 34.4 to 35.2; that of wasted children has remained stable at 25.6. Underweight has moved marginally from 36% to 36.1%. Here again about a third of the population do not meet the standards.

AIILSG's humble efforts

AIILSG has pioneered path breaking innovations through its International Center of EQUI-T to address the issue of malnutrition. These innovations are predominantly focussed on infants and children from disadvantaged populations. A salient feature is that these field actions are with all types of disadvantaged-indigenous forest dweller tribes, indigenous nomadic tribes, rural disadvantaged, urban slum dwellers, socially marginalised, etc. Gender dimension holds a special significance for AIILSG with a key focus is on ensuring nutrition of girl-child and addressing anemia among women. AIILSG's field actions have improved quality of life of more than seven hundred thousand (seven lakh) populations from 435 settlements, and has improved nutritional status of infants and children from these populations. Of special significance is MAMTA (Movement Against Malnutrition with Transformative Actions) innovation of AIILSG. The MAMTA innovation by AIILSG's ICEQUI-T has proved to be highly effective in addressing malnutrition for highly disadvantaged, even in places such as Palghar district which have been witnessing child malnutrition deaths. One important element of the "MAMTA-Tribal & Rural" is providing MAMTA seed-kit to the tribal and rural families, and training them to plant these. The combination of seeds is decided by the health,

nutrition and agriculture experts at AIILSG's ICEQUI-T taking into consideration the respective local agro-ecological conditions for technical feasibility and holistic nutrition provision. The seeds provided are not hybrid seeds (open pollinated seeds) and thus are replicable. This makes the initiative self-sustainable as the participants retain a part of vegetable produce to extract seeds for next plantation.

Other related AIILSG innovations include- promotion of nutritional recipes based on local affordable food inputs, strengthening knowledge resources of local Anganwadis and Gram Panchayats with related books & other knowledge resources, holding nutrition-fun-fairs, etc. AIILSG strives to enable increased outreach of the government services and it mobilizes the disadvantaged to proactively access the government services.

Another crucial innovation of AIILSG in this direction is channelizing vibrant youth energy constructively towards the cause through its MY SDG2 (Movement of Youth for Sustainable Development Goal 2: End Hunger & Malnutrition). Its objectives are sensitizing youth towards the importance of the SDG 2 and important role they can play for the attainment of SDG 2, Disseminate through them the innovations developed by AILSG, and Enable the youth to identify potential efforts they can undertake towards the attainment of the SDG2. The activities it undertakes include: Propagation of MAMTA seed-kits in many more tribal villages (for kitchen gardens to address malnutrition), Sessions with educational institutions (especially for youth in the vicinity of the poverty ridden tribal areas), Developing a customized portable exhibition, and capacity building of youth to use creative media such as Street theatre, Puppet shows, Campaigns.

Compliance with the Bio-medical Waste Management Rules & Effect of Training – A Systems Perspective of Health Care Facilities in Ramanagara District, Karnataka

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Abstract:

In India, the Bio-medical Waste Management Rules, 1998 were revised in 2016 and later amended in 2018 and 2019. Accordingly the scope of Health Care Facilities (HCF) coverage was enlarged. Training is an important requirement under these Rules. A survey of 105 HCFs in Ramanagara district, both government and private, spread across all four taluks and located in urban as well as rural areas was carried out. Nurses received training in higher proportion of HFCs in rural areas and in the government sector compared to those in urban areas and private sector, which is statistically significant. However, training of doctors, nurses, pharmacists and lab technicians was not found to be associated with the practice of segregation of bio-medical waste. Regression through origin, showed the quantity of BMW generated by a HCF is positively associated with number of outpatients, location and type and negatively with number of inpatients, with R2 0.51. Only about one third of the registered private clinics were using the services of the Common Bio-Medical Waste Treatment Facility (CBMWFT) operational in the district. Bar coding system is yet to be adopted. Liquid waste is being treated by about 82% of the HCFs before disposing. Both the vehicles of the CBMWFT are GPS enabled. In addition to training of staff, availability of funding and necessary items like bins, covers, needle cutters etc. will facilitate efficient management of BMW in the district.

Key Words Common Bio-Medical Waste Treatment Facility; Health Care Facility; Bio medical waste, training; regression analysis; Maridi, Ramanagara.

Introduction

Health care services are essential to reduce morbidity and also mortality and improve health status. However,

the process of delivery of health care generates bio-medical waste (BMW), as a bye-product. If not treated scientifically and disposed properly, BMW can cause injuries and also be a source of a number of infections, some of which could be deadly. In order to reduce the harmful effects of BMW, the Government of India has notified the Bio-Medical Waste (Management and Handling) Rules, 1998 published vide notification number S.O. 630 (E) dated the 20th July, 1998. These rules were superseded by 'the Bio-Medical Waste Management (BMW) Rules, 2016.' According to these Rules a Health Care Facility (HCF) means a place where diagnosis, treatment or immunisation of human beings or animals is provided irrespective of type and size of health treatment system, and research activity pertaining thereto. Important changes in 2016 Rules include a) coverage of HCFs is more pervasive; b) duties of occupiers listed; c) categories of BMW reduced to four from 10; d) treatment and disposal mandatory for all HCFs; e) on-site treatment is allowed by HCFs if there is no CBMWTF within a distance of 75 KMs; f) format for annual report prescribed; in terms of HCF covered. (Central Pollution Control Board and National Productivity Council 2017). The BMW Rules also stipulate use of bar coding to account and track the waste being sent out of the premises and disposed through common biomedical waste treatment facility. The vehicles transporting BMW should have GPS to monitor their movement. Due to the change in coverage under the ambit of BMW Rules, number of HCFs increased from 764 to 11460 in Himachal Pradesh (Sood 2016). The BMW Rules, 2016 were further amended in 2019 to include compliance with output discharge standards of liquid waste by 31st December 2019, by HCFs with less than 10 beds (Ministry of Environment Forest and Climate Change 2019). In 2017 India generated on an average about 559.1 tons of bio-medical waste per day, out of which, it is estimated that around 518.6 tons is treated. Thus about 14782.5 tons of BMW is not treated in a year. Karnataka, a state in the southern part of India, tops among the states in India producing with 67.3 tons per day (Central Pollution Control Board 2019). With a Cumulative Annual Growth Rate (CAGR) of 7%, India will produce an estimated 777.5 tons of BMW. This offers an attractive investment opportunity (ASSOCHAM 2018).

In this backdrop, this paper presents an assessment of compliance of HCFs with the BMW Rules in Ramanagara district of Karnataka state in India. Ramanagara district was carved out of the erstwhile Bengaluru (earlier Bangalore) Rural District on 23 August 2007. The district comprises four taluks (sub-district areas) namely

Channapatna, Kanakapura, Ramanagara and Magadi of the undivided district. Bengaluru is the capital of Karnataka state. The Ramanagara district lies between the north latitude of 120 14' to 130 and 11' and east longitude between 770 3' to 770 8'. The study district has a population of 1,082,636 (urban - 24.7%; rural – 75.3%) as per Census 2011. In terms of population it is ranked 28th and in terms of population density it is ranked 13th in the state. The district has 73 Government Health Care Facilities (HCF) comprising a) one district hospital; b) four sub district HCFs/Community Health Centres (CHC); c) 61 Primary Health Centres (PHC); d) four urban clinics. The private sector HCFs include 25 hospitals; 112 nursing homes/clinics and 30 diagnostic laboratories registered with the Directorate of Health.

Materials and methods

A total of 105 HCFs (hospitals, nursing homes, clinics) were surveyed with help of a structured questionnaire. The survey covered six Urban Local Bodies (ULB) and 106 villages, covering all four taluks namely Channapatna (13.3%); Kanakapura (36.3%); Magadi (31.4%) and Ramanagara (19.1%). Share of private HCFs is 71.4% and the remaining are government HCFs. While 60% are located in the urban areas, the remaining are in the rural areas of the district. Interviews were conducted with relevant officials of the District Pollution Control Board (DPCB); Common Bio-Medical Waste Treatment Facility (CBMWTF) and District Health Office (DHO) of Ramanagara district. The CBMWTF was also visited.

Profile of Sample Hospitals

Location: Out of the 30 Government hospitals 16.7% are in urban areas comprising one district hospital; two taluk hospitals and 2 Primary Health Centres (PHC). The remaining (83.3%) are in rural areas consisting of 20 PHCs and 5 sub centres. In case of the private HCFs 77.3% are in urban areas and the remaining in rural areas.

Number of Beds: While 17.1% of the sample HCFs have no beds (Government – 6.7%; private – 21.3%), about 57.1% of the HCFs have beds between 1 and 5. Another 19% have between 6 and 20 beds, while the reaming 6.7% have more than 20 beds. Two HCFs with 100 and one with 150 beds are in the urban areas and both are in the Government sector. Distribution of the HCFs by bed strength and taluk are presented in Table 1.

Table 1: Distribution of HCFs by Bed Strength in Ramanagara District – By Taluk

(Percentage)

S. NO.	NUMBER OF BEDS	TALUK				TOTAL
		Channapatna	Kanakapura	Magadi	Ramanagara	
1	NIL	0.0	18.4	33.3	0.0	17.1
2	1 to 5	57.1	55.3	48.5	75.0	38.1
3	6 to 10	42.9	15.8	12.1	15.0	18.1
4	21 to 30	0	7.9	3.0	5.0	4.8
5	100	0	2.6	3.0	0	1.9
6	150	0	0.0	0.0	5.0	1.0
	NO. OF HCFs	**14**	**38**	**33**	**20**	**105**

Outpatients per day: In case of 33.3% hospitals, number of outpatients was between 1 to 19 and 44.8% hospitals have out patients between 20 to 50. Of the remaining 19.1% have more between 51 to 200 and the 3.8% have more than 200 outpatients. All the four HCFs with more than 200 out patients are in the Government sector and in urban areas.

Inpatients per day: Majority (61.9%) of the sample hospitals don't admit inpatients. Proportion of zero patients HCFs is 69.8% in Government and 50% in private. While 17.1% have 1 to 5 another 13.3% have between 6 to 20 inpatients. Remaining 7.7% have an inpatient load of more than 20. HCFs with NIL inpatients is higher in the rural areas (74.7%), while it is only 30% in the urban areas.

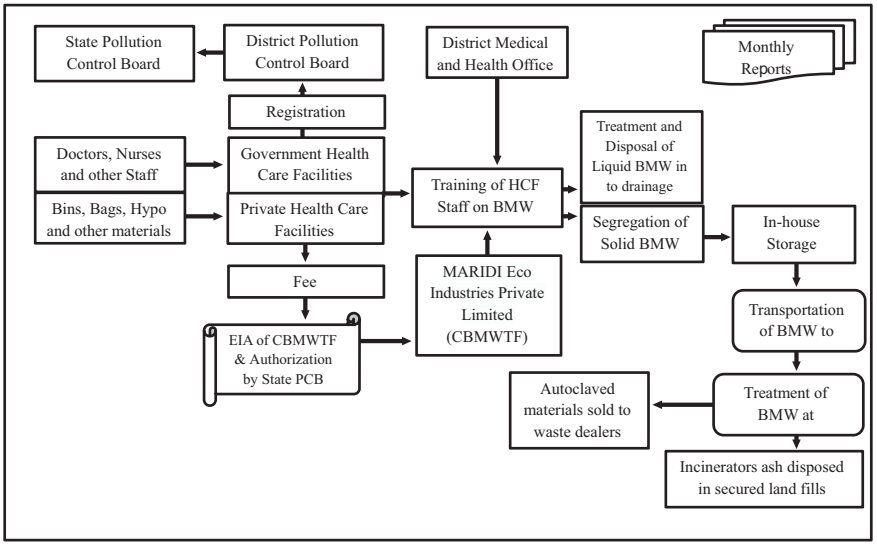
Deliveries/Surgeries: Deliveries/surgeries are conducted in only 14.3% of the sample HCFs. The proportion is the highest in Ramanagara taluk and the lowest in Magadi taluk. Proportion of HCFs conducting deliveries/surgeries is relatively higher in urban areas (15.9%) in comparison with rural areas (11.9%). While 33.3% of the government HCFs conduct deliveries/surgeries only 6.7% of the sample private HCFs do them.

Results and Discussion:

The present study adopts 'systems frame work' for assessment of compliance with the BMW Rules by the HCFs in Ramanagara district. The Bio-medical Waste Management System of Ramanagara district can be depicted as shown in Figure 1.

The findings are presented with respect to the key subsystems namely a) Health Care Facilities (HCFs); b) Common Bio-medical Waste Treatment Facility (CBMWTF); c) District Pollution Control Board (DPCB) and d) District Health Office (DHO).

Figure 1: The Bio-Medical Waste Management System of Ramanagara District



Note: *BMW · Bio Medical Waste; CBMWTF - Common Bio-Medical Waste Treatment Facility; EIA · Environment Impact Assessment; GPS · Global Position System; HCF · Health Care Facility*

Health Care Facilities

Salient findings with respect to a) training of staff; b) BMW management practices and c) quantity of bio-medical waste generated were analysed in the following part.

Training

Training is an important means of creating awareness, which in turn is necessary for correct BMW management practices. Pre and post assessments of training interventions of hospital staff in Bengaluru in Karnataka state (Ahmed et al 2016) and Hyderabad in Telangana state (Swathi et al 2018) report an increase of their knowledge about BMW management, which is was also statistically significant. Imchen et al (2017) observed that the healthcare workers who received training are 5 times more likely to show correct practices of waste segregation as compared to those who did not receive training, in a tertiary hospital in Lucknow city, in the India state Uttar Pradesh.

The BMW Rules 2016, stipulate that staff of health care establishments (HCFs) and common bio-medical waste treatment facilities (CBMWTF) be trained on segregation, collection, storage, transportation, treatment and disposal of bio-medical wastes. Among the 105 sample HCFs, doctors were trained in 81.9%; nurses in 42.9%; pharmacists in 18.1% and lab technicians in 14.3%. Status of training by category and location of the HCF are shown in Table 2.

Table 2: Number of HCFs Reported Training of Staff in Ramanagara District – By Location

S. NO.	STAFF CATEGORY	NUMBER OF HCFs REPORTED TRAINING			
		Urban		Rural	
		Yes	No	Yes	No
1	Doctors	53	10	33	9
2	Nurses	20	43	25	17
3	Pharmacists	11	52	8	34
4	Lab technicians	8	55	7	35
	TOTAL NO. OF HCFs	**63**		**42**	

Nurses were trained in higher proportion of rural HFCs (55.6%) compared to urban HCFs (44.5%).

Status of training by category and type of HCF are shown in Table 3

Table 3: Proportion of HCFs Reported Training of Staff in Ramanagara District – By Type

S. NO.	STAFF CATEGORY	NUMBER OF HCFs REPORTED TRAINING			
		Government		Private	
		Yes	No	Yes	No
1	Doctors	23	7	63	12
2	Nurses	23	7	22	53
3	Pharmacist	10	20	9	66
4	Lab technicians	10	20	5	70
	TOTAL NO. OF HCFs	**30**		**75**	

Similarly, nurses in higher proportion of government HCFs (76.7%) received training compared to the HCFs in private sector (29.3%).

The difference by location and also type of HCF was found to be statistically significant at 0.01 level. For location the Pearson Chi-square is 7.94 and DF=1. For type of HCF the Pearson Chi-square is 19.6 and DF=1. The difference in training, by location and type, of other categories of staff was found not statistically significant at 0.01 level.

BMW Rules is the most widely covered topic in the training (81.9%) followed by segregation of BMW (45.7%) and management of sharps (21.9%).

BMW Management Practices

Segregation of Solid Waste: Majority (82.9%) of the sample HCFs stated that they segregate bio-medical waste (BMW) from other solid waste. Segregation is relatively better among the HCFs in urban areas (85.7%) in comparison with the HCFs in rural areas (78.6%). A study of 121 HCFs in seven districts of three states viz. Andhra Pradesh, Maharashtra and Uttar Pradesh in India has also reported higher proportion (86%) of HCFs in urban areas segregating BMW compared to 61% of HCFs in rural areas (Rao 2018). Similarly segregation is marginally better in private HCFs (84%) in comparison with the Government HCFs (80%). Pearson Chi-square test shows that the difference is not statistically significant for location as well as type of HCF.

Practice of segregation of bio-medical waste by HCFs was analysed with respect to training of doctors, nurses, pharmacist and lab technician in the HCFs. Pearson Chi-square test shows that segregation practice is not associated with training of any of the four staff considered.

Use of Colour Coding: According to the BMW Rules 2016, yellow bins are to be used for (a) Human Anatomical Waste; b) (b) Animal (Laboratory) Anatomical Waste; c) Soiled Waste items contaminated with blood, body fluids; d) expired/ discarded medicines; e) chemical waste; f) chemical liquid waste; g) Microbiology, Biotechnology and other clinical laboratory waste, etc. Red bins are meant to store **Recyclable Contaminated Wastes** generated from disposable items such as tubing, bottles, intravenous tubes and sets, catheters, urine bags, syringes etc. White translucent and puncture proof containers should be used to store needles and sharps like scalpels. Black/Green bins are used for general waste.

Also almost all sample HCFs (97.7%) reported segregating BMW as per the colour coding. Use of different colour coding is shown in Table 4.

Table 4: Use of Colour Code for Segregation by Sample HCFs in Ramanagara District

(Percentage)

S. NO.	BIN COLOUR	USE OF COLOUR CODING FOR SEGREGATION			
		LOCATION		TYPE	
		Urban	Rural	Govt.	Pvt.
1	Yellow	52	30	22	61
2	Red	47	23	17	54
3	Black/Green	45	21	17	50
4	Others	2	2	1	2
	TOTAL NO. OF HCFs	**52**	**33**	**24**	**61**

Management of Sharps: Needle cutters are being used by 63.2% and needle destroyers by 26.4%. Contaminated Needles are disinfected using hypo solution before disposing by 87.4%. A post training evaluation of 116 HCFs in eight districts covering all four revenue divisions of Karnataka state in 2014 reported non-containment of sharps in 34.7%, 23.4%, 26.8% of small, medium and large HCFs, respectively (Gadicherla et al 2016).

Liquid Bio-medical Waste: Blood, mucous and other infectious waste is treated and neutralized by 81.9% of the sample HCFs, before disposing. In case of 33.3% of the sample HCFs the liquid waste flows in to sewerage, while from 40.0% of the HCFs it goes in to open drains and in the remaining it goes in to other places.

Use of CBMWTF Services: A common biomedical waste treatment facility (CBMWTF) collects BMW from 86.2% of the sample HCFs in Ramanagara district for treatment and disposal. The coverage of urban HCFs is 81.5%, while it is 93.9% in the rural HCFs. While almost all (95.9%) are covered among the Government HCFs, only 82.6% of private ones are serviced by the CBMWTF. As per the 2016 Rules, the BMW should not be stored more than 48 hrs at HCFs. Some of the sample hospitals maintained that the CBMWTF sometimes does not collect waste within 48 hrs. A review of the "Status of Implementation of the Biomedical Waste Management Rules, 2016, in the entire state on 20-03-2017 (Karnataka State Pollution Control

Board 2017) also pointed out such lapses on the part of CBMWTFs in the state.

Other Solid Waste: Other solid (municipal) waste is collected by the Municipality in case of 45.4% hospitals and 29.9% dump in municipal bins.

Quantity of Solid BMW

Among the 87 sample HCFs that segregate BMW, the average BMW produced is 4.82 kgs/day. The sample Government HCFs produce on an average 6.92 kgs/day, higher compared to 4.0 kgs/day generated by the sample private HCFs. On the other hand the HCFs in urban areas produce 5.44 kgs/day, which is higher compared to 3.76 kg/day produced by those in rural areas. However, the 't' value for difference in means show that the difference for location as well as type of HCF, is not statistically significant. Distribution of sample HCFs by quantity of waste generated is shown in Table 5.

Table 5: Distribution of Sample HCFs by Quantity of BMW Generated in Ramanagara District

(Percentage)

S. NO.	QUANTITY OF BMW (kg/day)	LOCATION		TYPE		TOTAL
		Urban	Rural	Govt.	Pvt.	
1	1 kg and below	18.5	18.2	12.5	20.6	18.4
2	2 to 5	55.6	75.8	62.5	63.5	63.3
3	6 to 10	14.8	3.0	12.5	9.5	10.3
4	10 to 20	9.3	0.0	4.2	6.3	5.7
5	21 to 50	1.9	3.0	8.3	0.0	2.3
	NO. OF HCFs	**54**	**33**	**24**	**63**	**87**

Number of inpatients and outpatients treated are significant determinants of the quantity of BMW generated by a HCF (Tesfahun et al 2015). Association between the type of HCF and production of BMW was found to be statistically significant in Taiwan (Cheng et al 2009) and in Uttarakhand state in India (Thakur and Ramesh 2018).

In this study, a multivariate analysis, using regression through origin, was carried out using quantity of BMW/day as the dependent variable. Four independent variables namely number of outpatients, number of inpatients, location of HCF and type of HCF were found to be significant. The R^2 was 0.515. While inpatients showed negative association,

remaining three variables showed positive association. The beta and 't' values of the four independent variables are shown below.

S. NO.	INDEPENDENT VARIABLE	BETA	't' value
1	No. of outpatients	0.451	4.347
2	No. of inpatients	-0.165	-1.671
3	Type of facility (Government =1)	0.245	2.555
4	Location of facility (Urban = 1)	0.358	4.329

CBMWTF

Maridi Eco Industries (MEI) Pvt. Ltd has set up a Common Hazardous Waste and Bio-Medical Waste Treatment Facility (CBMWTF) at KIADB Harohalli Industrial Area, Phase – II, Harohalli Village, Kanakapura Taluk, Ramanagara District. The CBMWFT of MEI provides scientific disposal of bio-medical waste treatment and disposal services, not only to the HCFs in Ramangara but also, those located in Bengaluru Urban, Bengaluru Rural, Mandya districts, catering to approximately 25,000 beds. The total waste handling capacity of the facility is 25 TPD, of which 20 TPD is accounted by BMW. The facility has (a) 1 x 500 kg/hr rotary kiln incinerator for treatment of hazardous waste and biomedical waste and 2 x 250 kg/hr static incinerators for treatment of biomedical waste, (b) Autoclave – 5 TPD, and (c) Shredder – 1000 kg/hr. up to 20 TPD of Bio-Medical Waste. (Maridi Eco Industries 2018). MEI has an Effluent Treatment Plant also and the treated water is used for circulation in incinerators for control of air pollution.

As per the records of MEI, their CBMWTF caters to 70 Government and 100 private HCFs in Ramanagara district. Two vehicles fitted with GPS, which is mandatory as per the latest BMW Rules, collect BMW from HCFs and transport it to CBMWTF for treatment.

MEI has conducted one district level training in 2017-18 for both Govt. and private hospital staff. One person from each hospital had attended the training programme. It has also organised three training programmes during the last year for their own staff.

MEI charges Rs. 5.50 to 6.00 per bed for private HCFs. For private clinics a fixed amount of Rs. 2500 per month is charged. In case of government hospital the charges are fixed depending on the level. They are as follows:

- District Hospital: Rs 8000/ month.

- CHC: Rs 3500/ month.
- PHC: Rs 2500.00/ month.

Out of a total 112 registered private clinics in Ramanagara only 31.3% clinics are using the services of MEI. Remaining 77 private clinics and 30 odd diagnostic centres are yet to be enrolled with MEI. Non-usage of services of MEI is similar to other districts. In Uttara Kannada district of Karnataka state about 28.8% of the 805 HCFs did not register with a CBMWTF (Ismail 2018).

Pollution Control Board

The State Pollution Control Board gives authorization to the HCFs to handle BMW and the CBMWTF to collect, transport, treat and dispose the waste collected. The district PCB has coordinated with the District Health Office (DHO) to conduct a training programme on BMW for the HCFs in the district during 2017-18. In collaboration with MEI, PCB organised a one-day training in 2017-18.

According to the Form IV-A, a mandatory submission by the district PCB to State/Central PCB, while 1071Kgs of BMW is generated per day, about 89.5% is collected by MRI. The HCFs with bed generate 2.3 times more Bio-medical waste compared to HFCs with no-beds. Further details are summarised in Table 6.

Table 6: Summary of Bio-medical Waste Management in Ramanagara District (2018-19)

S. NO.	ITEM	VALUE
1	Total number of HCFs	475
2	HCFs (Hospitals and Nursing Homes) with beds	152
3	Total number of beds	1869
4	Number of HCFs/occupiers authorised by PCB	114
5	BMW generated by bedded HCFs per day	748 kgs
6	BMW generated by non-bedded HCFs per day	323 kgs
7	Total BMW generated per day	1071 kgs
8	BMW collected, treated and disposed by CBMWTF (Maridi)	958 kgs
9	Number of occupiers submitted annual reports for the previous calendar year	104
10	Veterinary institutions using captive facilities (deep burial pits)	113

Some of the bedded HCFs and most of the non-bedded HCFs are yet to be authorised by PCB.

District Health Office

The QCM section of the DHO office of Ramanagara district has organized over 55 to 60 trainings for all government hospitals during their facilitation visits since 2016. The DHO also submits the monthly/annual reports of various government HCFs to the PCB. As per the 4th quarter Kayakalpa Report, out of the total 73 government HCFs, annual reports were submitted for 47 HCFs.

Conclusion

This is one of the very few studies which looked at the entire district level system of biomedical waste in India. 'The quantity of waste generated by the HCF is dependent on four variables namely i) number of outpatients; ii) number of inpatients; iii) location of HCF and iv) type of HCF. The association is statistically significant. This study found that training of nurses to be positively associated with the practice of waste segregation. Training of other staff, however, did not show association with segregation practices. It implies that training alone will not be able to bring in change in the segregation behaviour of HCF staff. Other enabling factors such as adequate funding, supervisor and availability of basic items such as bins, plastic covers, needle cutters/ destroyers and hard plastic containers with hypo to disinfect sharps will facilitate the transition. Liquid waste is being treated by about 82% of the HCFs before disposing. The vehicles of the CBMWFT in the district are GPS enabled to ensure tracing of their movement. Bar coding by the HCF of their waste, another mandate of the BMW Rules 2016, is yet to catch up in the district. There is also an urgent need to ensure that the HCFs, not yet using the services of the CBMWFT available in the district, to enrol and dispose of their BMW scientifically.

Acknowledgements:

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Enrolment, Parentlessness and Living Arrangement among Rural Children: Nallur Panchayat Union Middle School, Nagar Village, Tamil Nadu

M. V. Vaithilingam, K. G. Ravichandran

Abstract

Human resource and its quality are considered pivotal in the development of a nation. Providing basic education to all the children is the prominent prerequisite to bring about human development. The provision of free and compulsory education by the Government of India has enhanced public awareness and improvement in literacy levels in the rural and slum areas to a greater extent. The Constitution Act 2002 and subsequently the Right of Children to Free and Compulsory Education (RTE) Act 2009 advocate free and compulsory education to all children in the age group of 6-14 years as a fundamental right. This Act explains the modalities of the provision of free and obligatory education for children between the ages of 6 and 14 years in India under Article 21A of the Indian Constitution. India became one of the hundred and thirty five countries to make education a fundamental right of every child when the Act came into implementation on 1 April 2010. The mid-day meal scheme for school children was introduced in Tamil Nadu in 1956 for the first time in India in order to curb the dropout-out rate and improve the nutritional status, which also subsequently influenced reducing child mortality significantly. Keeping these facts in mind, this paper attempts to study the enrolment by gender and class, trends and change of enrolment, parentlessness and living arrangement among children of class 1-8 during past 10 academic years in the Nallur Panchayat Union Middle School, Nagar Village, Veppur Taluk, Cuddalore District, Tamil Nadu. The results reveal that there were a total of 362 students covering Class-I to Class-VIII during the academic year 2018-2019 which has increased from 223 during 2007-2008, a percentage change of 62.3%. The girls outweigh boys in enrolment, which may be the impact of efforts of the government in improving girls' education and the increasing aspirations of parents in educating their

daughters. The enrolment of children in Class-VII was more and less in Class-II. About five percent of children were parentless, and most of them were with neither father nor mother. The parentless or single-parented children were taken care of either by their fathers and step-mothers or their paternal or maternal grandparents. Providing additional school buidlings and teachers will enable more enrolment and comfortable learning-teaching activities among the students and teachers in the school.

Keywords: Free education, Middle school, Nagar village, Universal education, etc.

Introduction

The importance of education for the wellbeing of the society and development of the nation has been well realised and disseminated by various authorities and organizations. Wellstone (2016) observes that education and democracy have the same goal; the fullest possible development of human capabilities. Education is the primary right of every individual. It is the most important foundation or building block, which paves the future road-map for a person. Education can truly make or break an individual, because it builds and develops a person's beliefs, ideologies and values. Education gives the ability to think with reason, pursue dreams and aspirations in life and live a respectable life in the society. Education gives us a definite path to follow, to lead our lives by principles and gives us the freedom of expression. It frees our minds from prejudices and motivates us to think with logic and reason. It is essential for the overall development of the human mind and brain. The literacy rate of a country determines its prosperity and economic health. The benefits of education are numerous. Education helps in human development from different aspects – personal, social, economic and spiritual. The care of the middle school children and attention of the teachers are more emphasised as there is a transition in their behavuiour from childhood to adulthood. Most of the studies are based on the enrolment of the students in schools, problems of the students, infrastructural facilities in secondary and higher secondary schools and colleges/universities in urban areas; there are very few studies on the enrolment of primary/upper primary school children and their problems in rural areas.

Keeping these facts in view, this paper tries to study the enrolment of middle school children, existence of parentless children and their living arrangements in Nagar Village, Nallur Panchayat Union, Cuddalore District, Tamil Nadu.

Literature Review

The enrolment of children in school is a prerequisite for increasing the literacy of a family, community and the nation as a whole, and subsequently it helps for development in economic, health, environment and overall development of an individual and the society.

A middle school is an educational stage which provides education between primary school and secondary school. It is also known as intermediate school or junior high school. The concept, regulation and classification of middle schools, as well as the ages covered, vary between, and sometimes within, countries. The Central Board of Secondary Education (CBSE) classifies the levels of education into Pre-Primary – Nursery to KG; Primary – Classes I to IV; Middle School or Upper Primary – Classes V to VIII.; High school – Classes IX to X; and Inter college – Classes XI to XII (Amaid, 2012). A survey conducted by the Industry body Assocham ranks Tamil Nadu top among Indian states with about 100% Gross Enrollment Ratio (GER) in primary and upper primary education. The results of the Annual Survey of Education Report (ASER) 2011 conducted with the help of over 26,000 students across 29 districts with different learning levels, reveals that only about 32 per cent of the students in class V could read a simple story in Tamil. Among the class IV students covered in the study, only 40.6 per cent could perform subtraction of two-digit numbers, while the current curriculum expects them to be able to perform multiplication and division as well (Hindu, 2012).

The enrolment in primary education has influenced the increase in the literacy rate in Tamil Nadu. Among the 15 major States, Tamil Nadu ranked third in respect of literacy rate, Kerala (93.91%) and Maharashtra (82.91%) occupied the first and second places respectively. Among the districts, the literacy rate was the highest in Kanniyakumari (91.7%) and the lowest in Dharmapuri (68.5%). During the past five decades, the literacy rate in Tamil Nadu had more than doubled. The literacy rate for the State increased from 36.4 percent in 1961 to 80.1 percent during 2011. With respect to gender, the literacy rate of males was higher than thatof females in Tamil Nadu as well as at all India level. The literacy rate of males and females in Tamil Nadu was higher than that of all-India. The literacy gap between males and females and rural and urban was lower in Tamil Nadu as compared to all-India. The gender literacy gap was higher at 19.5 percent in Ariyalur district and lower at 3.7 percent in Kanniyakumari district. The literacy gaps in rural and urban areas among the districts were the highest in Kanniyakumari district and the lowest in Erode district. The literacy

gap in rural and urban areas ranged between 1.8 percent in Kanniyakumari district and 18.2 percent in Krishnagiri district (RGI & CC, 2011).

The rise in the literacy rate over the years could be attributed to better inputs in primary education. When the school attendance level of the students is good, subsequently, their learning capability is expected to be good. Otherwise, the shortcoming would be with the teachers but not with the students. ASER reports that if students with 90 per cent attendance cannot score even 35 marks and pass, it is the teacher's failure, not the students. The quality has not just suffered, but is appalling (Hindu, 2012). The parents whose children are studying in the school with poor quality education will claim for their rights, and thereby they need to be accountable. Balaji Sampath of Aid India said the study and its findings were not just about quality, but also about social injustice and inequality. Quality cannot work with just a top-down approach, he said. "What we really need to do is to instigate parents of poor families. They have a right to audit quality in learning in schools their children go to. Schools must be made accountable to them," he said (Hindu, 2012). The increase in the primary and upper primary schools and subsequently the enrolment of the children have influenced the increase in the literacy levels of all segments of the population irrespective of their gender, age and other socio-econoimc characteristics at village/town, block/municipality, district, state and national levels. The literacy rate in Tamil Nadu is better than the national average in terms of not only its increase over a period of time, but also reduced gender and residential differentials.

There are many studies on school enrolment and the factors responsible for the increase or decrease of school enrolment at macro level. This study focusses on enrolment of middle school children with gender and class compositions, trends of school enrolment and existence of parentless children and their living arrangement at village level.

Objectives

This paper has the specific objectives namely, (1) to study the enrolment of middle school children by gender and class; (2) to examine the trends and changes in enrolment; (3) to find out the parentless children and their living arrangement; and (4) to suggest some measures for sustaining and improving enrolment of children and quality education in the Nallur Panchayat Union Middle School, Nagar Villlage, Veppur Taluk, Cuddalore District, Tamil Nadu.

Data and Method

This paper uses the secondary data collected from from the students' attendance musters of Class-I to Class-

VIII in the Nallur Panchayat Union Middle School, Nagar Villlage, Veppur Taluk, Cuddalore District, Tamil Nadu. The bi-variate analysis is carried out to realize the objectives of the study.

Results and Discussion

The results are discussed under sub-heads such as the pofile of Nagar Village, Veppur Taluk, Cuddalore District; profile of Nallur Panchyat Union Middle School, Nagar Village; enrolment of school children by gender and trends; enrolment of school children by class and gender; and enrolment of parentless children.

Profile of Nagar Village, Veppur Taluk, Cuddalore District

Nagar is a large village located in Nallur Panchayat Union, Veppur Taluk, Cuddalore District, Tamil Nadu with total 739 families residing. The village has population of 3,296 comprising 1696 males and 1600 females. There are 392 (11.9%) in the age-group 0-6 in the total population of village. The average sex ratio and child sex ratio of the village are 943 and 840 respectively, which are lower than that of the state (996 and 943 respectively). Nagar village has higher literacy rate (81%, male 89.5% and female 72.3) as compared to that of the state (80.1%) as per the Census of India 2011 (RGI & CC, 2011). As far as the educational facilities around the village are concerned, one Government Upper Primary School, one Government Higher Secondary School and a few private English medium schools are available in Nallur, a small town which is one Km. from Nagar village. There are one Government Upper Primary School, two Government Higher Secondary School, one for boys and one for girls in Seppakkam village, which is 3 km. from Nagar village.

Profile of Nallur Panchyat Union Middle School, Nagar Village

The Nallur Panchayat Union Middle School, Nagar Village was upgraded from the Nallur Panchayat Union Primary School, Nagar Village during the academic year 2007-2008. Presently, the school has three buildings which are not sufficient to accommodate the children of Class-I to Class-VIII. The school is in need of five more buildings to conduct the full-time classes for the children of all the classes with sufficient space. As far as the number of the teachers in the school is concerned, presently there are three Graduate Grade Teachers who teach English, Science, and Mathematics for the children of Calss-VI to Class-VIII, and 3 Secondary Grade Teachers who teach all the subjects to the children of Class-I to Class-V. There is a shortage of 3 teachers to fulfil the students-teacher ratio as per the recommendations of NCERT.

Enrolment of school children by gender and trends

The percentage of children in middle school of Nagar village increased from 9% in 2007-08 to 14.6% in 2018-19. However, it increased to 10.9% in 2009-10, but decreased gradually to 7.4% in 2017-18 (Figure 1a).

The percentage distribution of school children by gender and trends shows that the percentage of female school children is more as compared to that of male children in general during the academic years from 2007-08 to 2018-19. There is no difference in the percentage of school children among males and females during the same period as the percentage for male children ranges from 45.6% to 47.2%, and for female children from 54.4% to 52.8%, from high to low (Figure 1b). It clearly shows that girl children are overwhelmingly attending school, which may be due to the effect of government's various awareness programmes related to educating girl children.

Enrolment of school children by class and gender

As far as the enrolment of school children by class during the academic year 2018-19 is concerned, more percentage of school children is noticed in Class-VII (16.6%) followed by Class-V (14.1%), Class-VI (13.3%), Class-I (13%), Class-III (12.7%), Class-VIII (11.3%), Class-IV (10.8%) and Class-II (8.3%) (Figure 2a). Class-II and Class-VIII have less percentage of children attending school as compared to other classes.

The percentage of female children is less in Class-I (46.8%) and high in Class-VII (61.7%), whereas that of male children is less in Class-VII (38.3%) and high in Class-I (53.2%) (Figure 2b). This shows somewhat an irregular pattern of positive relationship among male children and negative relationship among female children with class. It is important to note that though there is an increase in the desire of the parents in schooling their daughters in the beginning years of schooling, the percentage of school enrolment among female children is decreasing when the class level increases. This is an indication of giving less importance to educating female children and preparing them for early marriage or utilising them more for household work. Class-III children's enrolment increased from 12% in 2007-2008 to 14.9% in 2018-19. However, upto the academic year 2012-13, it decreased and after that it increased. There is an increase in the percentage of school children's enrolment. However, the increase seems to be intermittent but not constant. It evidences the impact of investment on girls' education in the middle school (Table A1).

Enrolment of parentless children

Among the total 362 children of Nallur panchayat Union Midddle School, Nagar Village 17 children (4.6%) were parentless during the academic year 2018-19. Among the parentless children, most (58%) of them were with neither father nor mother followed by with no father but with mother (23.5%), and with no mother but with father (17.6%) (Figure 3a). Among the total parentless children, most children were girls (64.7%), again with no mother (66.7%) as against male children (35.7%) and with no father (30%) and with no mother (33.3%) (Figure 3b) (Table A2).

Conclusions

The enrolment of children in the primary and upper primary schools is the prerequisite for increasing the literacy level of people in general and enrolment in higher education. Studying the school enrolment and its related problems at village level is important, as improving the educational level of the villages is the base for the national development. This study reveals that there was a total of two-hundered and twenty-three students covering Class-I to Class-VIII. The girls outweigh boys in enrolment, which may be the impact of efforts of the government in improving girls' education and the increasing parents' aspirations in educating their daughters. The enrolment of children in Class-V was more and less Class-I. About five percent of children were parentless, and most of them were with neither father nor mother. The parentless or single parented children were taken care either by their fathers and step-mothers or their paternal or maternal grandparents. Providing additional school buidlings and teachers will enhance enrolment and comfortable learning-teaching activities among students and teachers in the school. The parental aspirations on children's level and type of education by gender and factors influencing school enrolment may be the important and interested areas for further research.

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Table A1: Number of students by class and gender and academic year, Nallur Panchayat Union Middle School, Nallur, Nagar village, Cuddalore District, Tamil Nadu

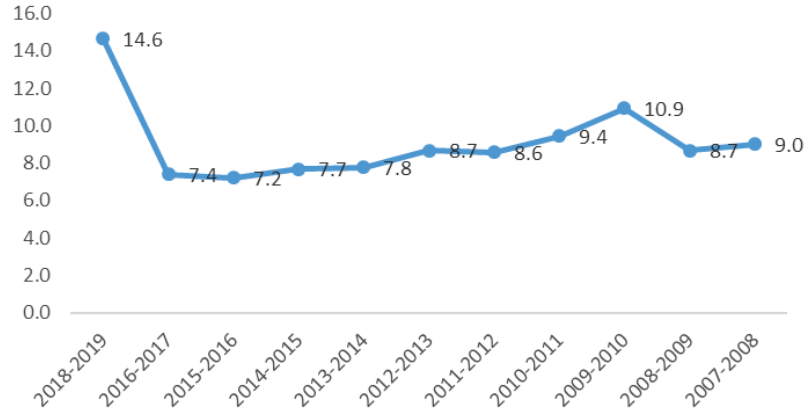
Class	I	II	III	IV	V	VI	VII	VIII	Total
Academic Year	TOTAL								
2018-2019	47	30	46	39	51	48	41	41	362
2016-2017	20	27	27	23	27	18	19	19	183
2015-2016	20	27	22	23	27	18	19	19	178
2014-2015	22	25	21	26	21	21	31	31	190
2013-2014	15	19	25	20	25	21	35	35	192
2012-2013	17	22	20	23	26	35	36	36	214
2011-2012	28	15	18	24	35	38	35	35	212
2010-2011	11	16	30	35	40	38	26	26	233
2009-2010	28	36	41	39	39	28	28	28	270
2008-2009	5	34	42	37	36	29	-	-	214
2007-2008	34	42	37	36	36	38	-	-	223
	BOYS								
Class	I	II	III	IV	V	VI	VII	VIII	Total
2018-2019	25	15	21	20	26	22	23	19	171
2016-2017	9	13	11	12	9	10	10	10	84
2015-2016	9	13	11	12	9	10	10	10	84
2014-2015	10	11	11	9	10	9	10	15	85
2013-2014	3	10	8	9	12	9	15	14	80
2012-2013	8	7	7	11	12	21	13	13	92
2011-2012	8	5	8	11	14	14	13	15	88
2010-2011	4	8	15	16	15	14	17	15	104
2009-2010	13	17	16	14	18	17	17	17	129
2008-2009	4	15	17	13	17	17	17	-	100
2007-2008	15	17	13	19	22	23	-	-	109
	GIRLS								
Class	I	II	III	IV	V	VI	VII	VIII	Total
2018-2019	22	15	25	19	25	26	37	22	191
2016-2017	11	14	16	11	18	8	12	9	99
2015-2016	11	14	11	11	18	8	12	9	94
2014-2015	12	14	10	17	11	12	13	16	105
2013-2014	12	9	17	11	13	12	17	21	112
2012-2013	9	15	11	12	14	14	24	23	122
2011-2012	13	10	10	13	21	24	13	20	124
2010-2011	7	8	15	19	25	24	20	11	129
2009-2010	15	19	25	25	21	11	14	11	141
2008-2009	1	19	25	24	19	12	14	-	114
2007-2008	19	25	24	17	14	15	-	-	114

Table A2: Number distribution of children enrolled by standard, gender and caste, Nallur Panchayat Union Middle School, Nagar, 2018-2019

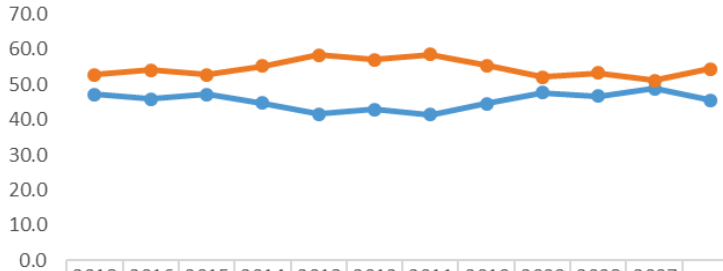
Std.	Gender		Caste			Total
	Male	Female	SC	BC	MBC	
	Childrenwith no father					
I	0	1	1	0	0	1
II	1	2	1	0	2	3
V	0	1	0	0	1	1
VI	1	1	2	0	0	2
VII	0	2	1	1	0	2
VIII	1	0	1	0	0	1
	Childrenwith no mother					
I	1	0	1	0	0	1
III	0	1	1	0	0	1
VII	0	1	1	0	0	1
	Childrenwith no father and mother					
I	0	1	1	0	0	1
V	1	0	1	0	0	1
VI	1	0	1	0	0	1
VIII	0	1	1	0	0	1
Total	6	11	13	1	3	17

FIGURES

Fg. 1a Percentage distribution of middle school children by academic Year, 2007-2008 to 2018-2019



Fg. 1a Percentage distribution of middle school children by academic Year, and gender, 2007-2008 to 2018-2019



	2018-2019	2016-2017	2015-2016	2014-2015	2013-2014	2012-2013	2011-2012	2010-2011	2009-2010	2008-2009	2007-2008	Total
Male	47.2	45.9	47.2	44.7	41.7	43.0	41.5	44.6	47.8	46.7	48.9	45.6
Female	52.8	54.1	52.8	55.3	58.3	57.0	58.5	55.4	52.2	53.3	51.1	54.4

Fig. 2a Percentage distribution of middle school children by standard, 2018-2019

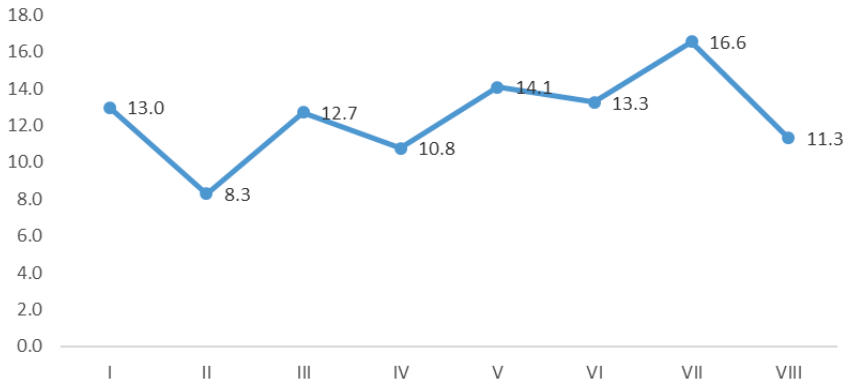
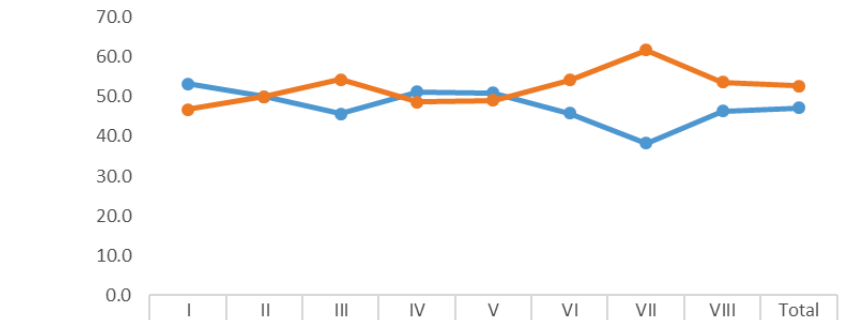
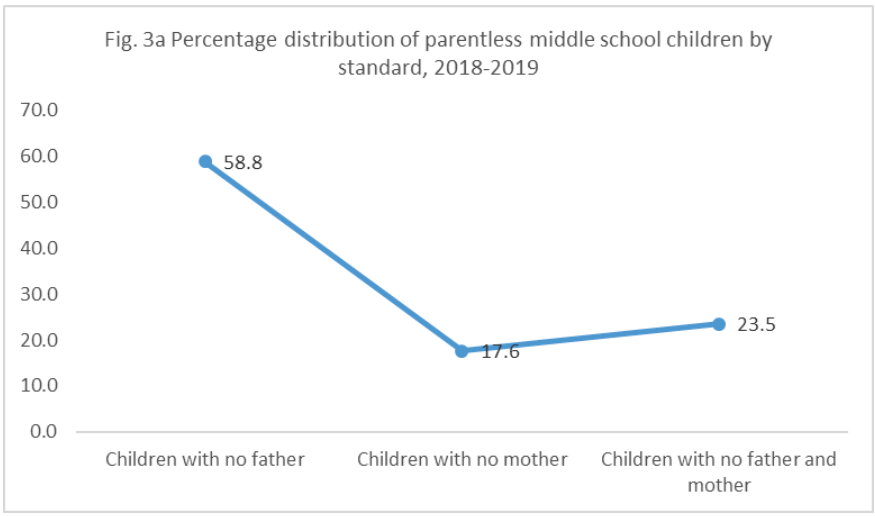
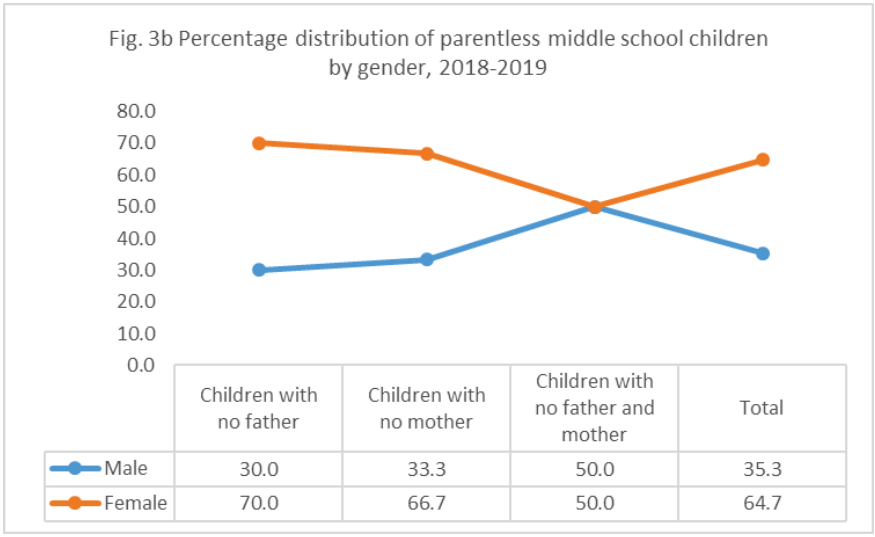


Fig. 2b Percentage distribution of middle school children by gender and standard, 2018-2019



	I	II	III	IV	V	VI	VII	VIII	Total
Male	53.2	50.0	45.7	51.3	51.0	45.8	38.3	46.3	47.2
Female	46.8	50.0	54.3	48.7	49.0	54.2	61.7	53.7	52.8





	Children with no father	Children with no mother	Children with no father and mother	Total
Male	30.0	33.3	50.0	35.3
Female	70.0	66.7	50.0	64.7

Destruction of Forests in Northern India: An Ecological Assessment

Pawan Kumar Banta

Forest is a peculiar organism of unlimited kindness and benevolence that makes no demand for its sustenance and extends protection to all beings, offering shade even to the axe man who destroys it ÿ ÿ ÿ ÿ ÿ GAUTAM BUDDHA

Introduction:

The Himalaya is the most important life supporting system of the Indian subcontinent. Answering a question on the Himalaya put to him by King Milinda, the sage Nagasena said: "The Himalaya, the King of mountains, five and three thousands leagues in extended at the circumstance, with its ranges of eight and forty thousand peaks, the sources of five hundred rivers, the dwelling place of multitudes of mighty creators, the producers of manifold perfumes, enriched with hundreds of magical drugs, are seen to rise aloft, like a cloud, the centre of the earth." (Lall-1981). This greatest physical feature of earth, which is covered all through its length and breadth by diverse types of forests, has been praised by all and sundry since bygone ages. It is also true that climatic, edaphic conditions, flora, fauna, vegetation, historical, socio-economic, cultural, ethnic and political characteristics of the entire region are controlled largely by it. Unfortunately, however, this precious gift of 'Mother Nature' is at present the most threatened system of the world. Further, the alarmingly high rate of population growth, the existing geo-political scenario and the economic imbalances in the ecosystem during the last two-three decades have had an impact. Although these changes have been going on for the last one hundred years, the pace of destruction during the last thirty years has been rather frightening and it is not difficult to visualize its consequences in the immediate future. It is, however, not yet too late to realize the truth that "there is only one Himalaya to lose" (Reiger- 1981) and to plan to save the great heritage from any further destruction and to act most

sincerely on its implementation. A strategy has to be developed after an analysis of the existing socio-cultural, ecological, economic status of the Himalayan complex belonging to the Indian Republic. The major source of degradation has been the loss of vegetational cover, wrong plant introduction policies, migration of working hands to far off places, thoughtless increase in cultivation area to wastelands, sedimentation of rivers, scarcity of potable water and fuel, poor quality of domestic animals, pseudo-urbanization, roads, building, mining, horticulture on agricultural lands, no real survey of local land quantum, increased evapotranspiration, increase in weeds in secondary successional stages, thoughtless change of old cropping pattern, tourism, trekking, socio-cultural and economic problems with increased number of tourists, etc. Unfortunately, the destruction of habitat, flora, fauna and the vegetational cover has been throughout the length (2500 km.) and breadth (250-300 km) of the Himalaya. Lately, however, the probable consequences of an impending ecological disaster have been realized, but only by the bureaucrats and the upper stratum of the society and many people have been voicing concern regarding sustainable development and the proper utilization and management of resources. However, these have been only thought of and, as a result, the degradation continues unabated.

Salient Ecology Characteristics Of The Region

The Himalayan mountain system, which is approximately 2500 km in length and 250- 300 km in width, is made up three strikingly distinct longitudinal ranges separated by faults. Theoutermost is the Shiwalik belt with an average height of 100 m, the middle belt, 65-70 km in width and average height of 300 m and the inner belt, the great Himalaya with an average height of 5200 m. Ninty-two great peaks, some of them 8000m or more in height, are situated in this belt (Dewan-1988). These three can further be grouped into three transverse zones:

1. Western Himalayas (Comprising Jammu and Kashmir, and Himachal Pradesh)

2. Central Himalayas (Uttar Pradesh Hill Districts and nowadays Uttarakhand)

3. Eastern Himalayas (from Singalia Range up to and including the Bramhaputra Watershed) (Dewan-1988)

Each of these zones is characterized by distinct climate, topography and vegetation.

Geology And Soils

The Shiwaliks are geologically the longest of the three belts and are made

of fresh water, deposits of clays, sandstone, grits and conglomerates. These rocks, due to different degrees of consolidation, yield considerable amounts of sediments during heavy rains. The Middle Himalayas are composed of mainly igneous, sedimentary and metamorphic rock types with inclusions of granites and with complex folds and faults. The major topographical features of this range are rivers, terraces and flat basins. The Great Himalayas is characterized by granite, gneiss and a belt of basic and ultrabasic rocks. (Dewan-1988)

Climate

The region is characterized by the monsoon. In general the Shiwalik and the Middle Himalayas have a mean annual rainfall varying from 1000 mm to 2100 mm and the Great Himalayas between 500 and 1100 mm or less; The Western Himalayan zone are arid to semi-arid. The mean temperatures vary; in July, the mean temperatures in the Shiwalik Ranges are from 26.5 degree centigrade to 29.5 degree centigrade, from 21 degree centigrade to 26 degree centigrade in Middle Himalayas and less than 21 degree centigrade in the Great Himalayan belt. In January, however, the entire region registers a mean temperature of less than 4-5 degree centigrade (Mani-1981).

Because of such diversity in climatic, elevational, geological and topographical factors no characteristics relationship of community structure to environment can be established. (Singh & Singh-1985), however, suggested the following major environmental gradient in the region:

1. That of decreasing temperature from low to high elevation;

2. That of decreasing moisture from east to west;

The major consequences of the first gradient are:

1. Continuous overlap between different formation types, e.g. region in the submontane zone (up to 1000 m elevation) with mean 21-26 degree centigrade annual temperature; the annual rainfall can support both ombrophilous forest and seasonal leaved forest.

2. Adaptation of different growth from non convergent within a given climate belt.

3. The role of climate determining the formation type is secondary, e.g. development of the chir pine forest in lower montane belt Central Himalaya which otherwise should have oak forest.

4. The overlapping of the ranges of the mean annual temperature and

the average total rainfall leads to the co-occurrence of different forest type within a single zone, e.g. the occurrence of oak and chir pine forests in Kashmir valley.

The second gradient is inversely related to the effects of Pleistocene glaciations but directly to the diversity in number of species and speciation in general. (Singh & Singh-1987).

Phytogeography

In the Himalayan region, the different floral elements represented are Austro-Polynesian, Malayo-Burman, Sino-Tibetan, Euro-Mediterranean and African. It has not only acted as a bridge facilitating the flux of many taxa, but as a barrier for some, thus promoting endemism. 29% of endemic Indian dicot taxa are found in the Himalayas. The Western Zone shows a pronounced Euro-Mediterranean affinity, the Eastern Zone a Chinese and Malesian affinity, and the Central Zone a mixture of the two (Meher, Homji & Mishra-1973).

Following the categories recognized by Champion and Seth (1968), Puri, Meher, Homji, Coupa and Puri (1983), as well as by Singh & Singh (1987), eleven forest formation types are found in the Himalayan region.

The submontane forests below 1,000 m altitude are moist and evergreen in the Eastern Himalayas. Towards the Central Himalayas they are replaced by deciduous sal forests. Between 1.000 and 1,800 m follow the lower montane conifer forests with pines kesiya in the east and Pinus roxburgii in the western part. In 1,500-3,800 m attitude mid mountain forests are found, which are very Mesick in East towards the West, they are replaced by dry oak and conifer forests. Above 3,000 m follow the high montane stunted forests and scrublands.

Human Population

The population of the Himalayas has almost doubled during the last thirty years and at present, stands at around 43 million. It is composed of different ethnic groups. The overall density of the region is 110 person /sq.km as compared with 221 of the entire country. The Shiwalik region is the highest in density (234 persons/sq km), followed by the mid Himalayas (25 person/sq km), and only 18 person/sq km in the inner or higher Himalayas. He mid Himalayas has the highest number of urban centers (59%) followed by the Shiwalik (38%), but only 25%in the higher Himalayas.

Three distinct cultural belts are found in general: outermost Hindu –Muslim, mid–zone a mixture of Hindu-Muslim and Buddhist, and innermost Buddhist.

The distribution (percent) of different religious groups is as followed: Hindus 64, Buddhists 7, Sikhs 1 and Christians 0.6. Other ethnic groups constitute 9 percent of the population whereas in the extreme West Muslims dominate; Christians dominate in the extreme East. The average literacy rate is 32 percent as compared to thirty six percent of the entire nation. It is the highest in the Shiwalik (40%).The Central Himalayas with 33% and 21% respectively.

Past And Present Ecological Change

The Himalayan system is geologically very young and still active and maturing. Changes in orography and vegetational cover have been occurring continuously since its origins. A glance through the fossil history of the region tells us the chronological sequences in its developmental history and thus helps us to know the pattern of changes that have taken place in its geology, climate and vegetational cover. A detailed knowledge of the pattern of change is a must in order to assess, the present day destruction of the forest cover of the Himalayas. Vishnu- Mitre (1984) suggested that during mid- Miocene, 'incipient latitudinal zonation' occurred in the Himalayas and the tropical forests were located in the lower slope, temperate forests on the higher slopes and subtropical in between. This Miocene orogeny coupled with 'planetary dynamics' led to securing phi vial cycles during the Pleistocene and these cycles brought about drastic changes in the ecology of the area as well as in the vegetational cover. This was followed by incursions of different phytogeographical elements in the region both from the west and the east. Such changes were very distinct during the early Pleistocene. The period between 8,000 to 4,500 years ago was characterized by a warm phase which affected largely the invasion of the pine forests by the oaks. In the geological past the entire Himalayas were covered by tropical wet evergreen forests, the type of which is now the entire Miocene flora was replaced by the modern floral elements. The uplifts of these mountains occurred in five stages, the last being during early Pleistocene. These uplifts brought about the following environmental changes:

1. Increase in the breadth of the climatic gradient from a relatively uniform warm and humid stage to that which now ranges from warm to extremely cold conditions with permanent snow cover at higher altitudes.

2. Conditional but spasmodic and explosive surface modification owing to tectonic stress and

3. Creation of mountains barriers which influenced the distribution

pattern of rainfall (Singh & Singh-1987)

These changes culminated in the present status of the vegetational cum orographic profile of the Himalayas. The climatic reshuffling and local readjustments brought about relection of taxa and evaluation of paleo-ecotype of modern species (Vishnu-Mitre-1984). These changes helped the incursion of newer elements in addition to the evolution of the local forms.

Several natural and recurring destructive forces have thus been operating all through the historical past of the Himalayas and will go on in the future as well. These will always have to be given due importance while evaluating destruction of the forests in the Himalayas. The steepness of the terrain, its tectonic instability, the relatively young age of the mountain system and the present characteristic pattern of the monsoon in the region, also contribute to the continuous erodibility of these slopes and the occurrence of natural weathering processes. The perpetual snow and ice and the glaciers etc. transport rocks and boulders, keeping the system always in flux of change, which brings about different types of vegetational adjustment and modification of some taxa and disappearance of others. Often, the processes lead to degradation of habitat as well.

These natural disturbances become more complex when man interfaces, knowingly. The outcome of the destructive processes becomes more severe especially when both density and diversity of the population become involved in such a process. The degree of disturbance also varies with the terrain. Thus, the lesser Himalayas are affected the most and Greater Himalayas the least, because not only the terrain becomes more open but also due to the high density of population. For similar reasons, the central belt of the Himalayas has been more destroyed than the western and eastern belts. The minimum damage so far has been done to the eastern belt.

Unlike natural disturbance, mandate disturbances bring about changes which are by and large irreversible, very rapid and affect both the disturbed area as well as the depended area. The disturbances can be of the following types;

1. Natural and mandate weathering leading to severe erosion and transportation of fertile sediments by the opening up of forest area cultivation and felling of tree for building and fuel purposes.

2. Population pressure on existing forests, soil and water resources.

3. The destruction of forest, especially in the catchment area of

downstream effects such as rivers and river valley causes an increase in floods and droughts and poor recharging of the aquifers

4. Indirectly through migration of working hands to other regions as it leads to the exploitation of timber in the immediate vicinity of the inhabited area by women and infirm persons. This causes excessive damage to the forest regeneration.

Pattern of the Destruction of Forest

A review of literature by Rawat (1981, 1985), Singh, Pandey and Tiwari (1984), Stebbing (1926), Tucker (1983) and earlier forest records, working plans and personal observations reveal the following pattern of destruction of the forest cover in the Himalayas:

Starting from the pre-railway period, to the present day, the denudation of the area can be divided into four phases: pre-British period, British period, post-independence and the present period from 1960 onwards. In the pre-British period all economic activities such as agriculture, fuel, construction, mining, and cottage industry were strictly subsistence based. This was so because of the low density of population, restricted movement and poverty. Since the needs were limited, the forest resources were not damaged and the forest cover maintained its primeval look.

With the arrival of the British rulers, because of political and economic exploitation and administrative necessity, expansion in agriculture, irrigation, means of communication, mining, smelting industry, tea cultivation, horticulture, and fruit cultivation was started and encouraged. Along with this, urban development in the plains was taken up as well. All these activities resulted in an increased demand on forest cover and resources. In the same way, more forest areas were used for construction of roads, for building, mining, etc. With the introduction of a railway system the demand for wood for sleepers, wagons, fuel and coal increased. For the sleepers initially, sal trees were felled and later, with the shortage of this wood, deodar was preferred. Since sal occurred in the Shiwalik zone and deodar in the mid-Himalayas, the destruction of forest cover followed the same way. Further, since sal and deodar belonged to the late successional stage and their generation in disturbed habitat conditions was the survival of an early successional stage component, the chir pine. Similarly, the oak forests, which initially were preferred for coal and fuel, could not regenerate rapidly enough and these areas were also taken up by chir pine. Thus, a general

damage encompassing an opening up of the area and the erosion of the system was introduced. Furthermore, since the demands from forests were of specific type, the then rulers organized the Forest Service and introduced the concept of 'reserved forest' which, due to a lack of knowledge of ecology of the area and the forest cover, could not materialize. Instead, this unscientific ecological approach reduced the naturally occurring stratified forest to a one layered forest which could not sustain itself in the existing climatic conditions. Also due to heavy felling of tree the habitat degraded very fast and the forest cover gave way to grassland or even to a shrubby stand. In addition, there was total neglect of the subsistence economy, and preference was given to the pine plantations over the broad leaved oak type forest. This resulted in a further mass scale habitat degradation due to the changed type of litter and organic matter, and, consequently, rapid weathering. Furthermore, with the development in the plains and improvement of the means of communication, the hill people, especially the working hands moved out to the plains for work to improve their economic conditions, which increased the flow of money from the plains to the hills for the local development in terms of larger cultivated areas, construction of roads, houses, small-scale industry, power projects, rope ways, etc.

Unfortunately, all this economic improvement was at the cost of the forest cover. Such a phenomenon was more common to the Western and Central Himalayas. It was at this developmental phase of society, with the seeds of habitat degradation well inquired in the system, that India became independent. Now, an all-round and rapid development and expansion was inevitable. Even so, the pattern of demand and supply remained almost similar. This led to more development and higher revenue requirements and further but zealous over exploitation of the forest cover in the Himalayas. The rate of erosion increased multifold and consequently the regeneration of vegetation became almost zero. The various forest working plans, characterized by rotational felling, introduced homogeneous age even for selected taxa. The result was mass-scale degradation of the habitat with poor herbaceous and nutrients cycling and loss of valuable soil cover and nutrient due to extensive run off. The land degradation resulted in very fragile pastures with poor herbaceous and grass cover, which, owing to overgrazing by local and migrating livestock, further augmented the rate of decay of the habitat. The herdsmen moved with their cattle to still inner regions of the Himalayas. Thus the denudation of the forest cover, which started with the Shiwalik (Outer

Himalayas) belt with the clearing of forests spread to other parts of Himalayas, where the climatic conditions make the habitat process and the repair mechanisms very slow. The increase in population density and the heterogeneity of its cultural make-up due to migration had led to diverse patterns of land utilization resulting in further large scale destruction of forests. The building of roads has also been at the cost of forest cover, its density, diversity, age structure, productivity of forest land resulting in silting of reservoirs and streams.

In the Eastern Himalayas, where shifting cultivation culture has been in vogue for many centuries, the interferences with the forests have added a new dimension to the degradation of forest land. Earlier, when larger forested areas were available, the jhumming cycle was a minimum of twenty to thirty years duration. Now, with the shrinkage of forested area and increase in population, the cycle lasts only about five years (Toky and Ramakrishna-1981).

The resulting loss in the regenerative capacity of the land is such that when the land is finally abandoned because of poor returns, the substratum becomes barren paradoxically in a belt with the highest rainfall of the region. The forests of the Great Himalayas and the mid Himalayas are further damaged by the increase in mountaineering activity and the growing flux of tourists round the year (Singh-1989).

During the past forty years or so, all the destructive processes outlined above, which stared during the British period and magnified during the post-independence period, have further compounded. This has been so because of the complete loss of the buffering effect of the vegetational cover, the un-balanced nutrient budget, absence of regeneration of local plants, shrinkage of the forested area and the increase of population pressure.

The destruction of the forest habitat is also being brought about by changing the age-old pattern of growing crops such as species of Elencine, Amaranthus, Sectaria, Fagopyrum, to maize, soyabean and other legumes (Singh and Singh-1987). Because of their habit and life cycle, the crops damage the soil system more than the earlier rain fed crops. Also, the preference for fruit tree cultivation not only opens up the area, but upsets the nutritional balance of the habitat; an additional indirect loss of forest cover is by using the wood for packing cases, etc. Furthermore, due to faulty demarcation of reserved forests area, village or panchayat forests have become inadequate for subsistence economy. This has led to a perpetual struggle among people of different statuses and between people and forests. The resulting politicization of

the entire issue has been at the cost of total neglect of its ecological and economic aspects. The major consequences of the activities in the Himalayas during the period under consideration are:

1. Reduction in the total forested area, the good, medium and poor quality forest areas are approximately 4.4%, 25% and 10% of the geographical area. The Himalayan forests have become net source of carbon for the atmosphere releasing 21x1012 g of carbon annually (Singh and Singh-1987).

2. Increase in the weed density in the forested area, species of lantana, imperata and eupatorium often forming pure stands and bulk of ground flora.

3. Original forest being replaced by exotic species in order to meet the commercial demands, hasty action in the management of forests has led to replacement of the soil by teak.

4. Replacement of shade tolerant species by light demanders resulting in poor regeneration of broad leaved species.

5. Loss of heterogeneity of forest covers leading to instability.

6. Poor seed production and loss of regeneration capacity of native trees.

7. Several wild animals have become locally extinct or are on the verge of extinction, e.g. red giant flying squirrel of oak forest, the caracal, leopard, smooth Indian otter, Himalayan black bear, sambhar, barking deer, musk deer, etc. (Sharma-1988).

8. More degradation and erosion of the area due to distribution of marginal lands, sloppy, terrain, etc.

9. Increase in the migration of local people to the plains and thus decrease in the number of working hands required to rejuvenate and replant the area.

10. Sedimentation of rivers.

11. Drying of natural springs because of vegetational loss.

12. Removal of cover and litter layer, increased convection, decreased evapotranspiration and water retention.

13. Paradoxically, the process of development has increased poverty more in hills than in the plains due to payment for the purchase of goods from outside as yields are poor locally. It has led to more economic imbalance and other related social problems.

14. The carrying capacity of the Himalayas, especially outer and

mid- Himalayas, is going down rapidly due to ecological imbalance

Plan of Action

The foregoing accounts have summarized the past and present state of ecology of the Himalayas. Moddie rightly says that the earth has got a cancer and the cancer is man. "The cancer has been steadily creeping over the Himalaya, unspectacularly but relentlessly." Once, densely forested areas are becoming ugly and barren. The biota is getting lost very fast and both man and Himalayan forests are becoming poorer day by day. Whereas, it is true that there is an awakening regarding the state of affairs of the Himalayan forests and the impending consequences, unfortunately, these have remained restricted to the urban syndrome of seminars, symposia, workshops, television programmes, and not an iota of it has even percolated to the rural or ecologically critical areas. Even where it has been perceived, it has been more due to political rather than practical or ecological bias. The destruction of the Himalayan forests has continued unabated.

In the view of the above analysis, the following suggestions are being made to check further destruction of Himalayan forests:

1. Specific forest units, based on geographic, geologic, physiographic, microclimatic and edaphic characteristics should be demarcated.

2. Identification of appropriate technology for afforestation and conservation and the active involvement and participation of local users for fulfilling the objectives.

3. Agriculture as currently practiced should not be treated separately but in an integrated manner with forestry, animal husbandry, and human resources. Selection of crops should be area specific and local people should be educated about faulty traditional agriculture.

4. National planning for forestry should take into account the interrelations between social functions and local values of the forests and their products in addition to animal husbandry, agriculture and human resources in the rural Himalayas. It should aim at balancing the productive and protective aspects. Therefore, conservation, resource renewability and expansion must be the guidelines.

5. Legal status and ownership of land should be alienated for other land use, particularly agriculture and horticulture.

6. The degraded forest be enriched by local species.

7. In tourism planning, the carrying capacity of the region must be taken into account. Also, steps must be taken to develop trading facilities, employment opportunities and economy of the rural poor, rather than helping stronger groups.

8. Biotic regulation of biochemical flux should be done so as to manage the nutrient budget of the forest area.

9. Steps have to be taken not only to stop any further felling but to develop heterogeneity in the forest stand as well.

10. Planning for afforestation should be done only after sincere analysis of the quantum of the need of the area.

11. Since the mid Himalayas in general, especially of the eastern zone are more vulnerable and fragile, "immediate steps must be taken to slow down the process of degradation."

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Children Friendly Cities - Planning Strategies and Issues in India

Sanjay Mishra, Simranjot Singh

Abstract:

In the chaotic urban environment, the independence and development of children often struggles as the urban environment is not friendly to the children and the infrastructure is only accessible by mature and healthy individuals making children dependent on others. Hence it is the responsibility of urban planners to make cities friendly for children to enable their accessibility, enhance the safety and overall development of children by planning the cities by considering the needs of the children. In India, the vulnerability of children is much higher as the urban environments are more challenging. In this paper, various problems regarding children vulnerability in urban India and various planning guidelines given by UNICEF are discussed.

Keywords: Children friendly cities, children safety, children development.

1 Introduction

„...in serving the best interests of children, we serve the best interests of all humanity.‰

- Carol Bellamy, Former Executive Director, UNICEF

A child-friendly city is a city where children can grow up in an enjoyable, responsible, healthy and dynamic way through improvements in the physical and social environment in which the children grow up . In a child-friendly city, a key goal is that children of different ages and backgrounds are out and about playing, exploring and living in their neighbourhoods, with or without their parents or caregivers . By contrast, the Child-Friendly Cities initiative supported by United Nations Children's Fund (UNICEF) focuses on the process: on involving children and young people in the governance and decision-making of the city . The Child-friendly Cities Project initiated

by UNICEF and the United Nations Human Settlements Programme (UN-Habitat) in 1996 is the first multi-stakeholder collaboration to place children at the forefront of the urban agenda.

2 Need

Children face a lot of challenges in Indian cities which are, rapid and chaotic growth concentrated on informal, slum settlements with inadequate infrastructure; open defecation; parks not being accessible; lack of footpaths, streetlights, and safe places to cross roads; and children in some neighbourhoods needing to use public transport, which is not child-friendly, to get to the nearest school. India's rapid urbanisation presents an enormous opportunity for all sections of society to achieve a higher quality of life.

Children are among the most deserving sections of the urban population that will benefit from this growth if policies are planned and adopted taking into account the factors that shape childhood and can promote healthier development of their childhood. India has the world's highest infant population. Children (0-18 years of age) make up 472 million of Indian community members (39%). Of these, 128 million children (27%) live in urban areas. Children account, in total, for one third of India's current urban population.

3 Approach

In order to provide a child friendly environment in urban areas, the approach is divided into two main categories by global initiative, based on children's rights and the environment.

3.1 Rights Based Approach

Rights Based Approach focuses on child rights (e.g. UNICEF and its Child-friendly Cities Initiative, or the Out of School Children Initiative) to enable local bodies to make decisions for the betterment of children and to foster the rights of children to a safe, secure, instructional, empowering, equitable and enriching atmosphere.

3.2 Environment Based Approach

Environment Based Approach relies on the physical and social environment of children. This strategy was adopted at country level (Netherlands, Canada, etc.) along with global efforts initiated by organizations such as UNICEF.

4 Urban Planning Strategies and Indian Scenario

UNICEF has formulated various urban planning strategies and guidelines focusing on children and families having children, to benefit children life and their role in decision making in planning processes. These guidelines are classified under various

principles, where each principle covers cardinal needs and requirements of children for their overall development in the urban surroundings. The principles studied are discussed in table 1.

4.1 Discussion

In the table 1, the principles and planning strategies at building level, neighbourhood level, city level and multi levels are discussed; along with the issues faced by the children in India in terms of each principle. The first principle is housing which includes providing affordable and adequate housing and secure land tenure for children and the community, where they feel safe and secure to live . About 7.6 million children live in slums in India, making up 13.1 per cent of the metropolitan areas overall child population; country faces a huge housing crisis for children. The second principle is Public Amenities, covering infrastructure for health, education and social services for children and the community. The major problem in India regarding public amenities is that 33 percent of children in the age group of 5–18 years in cities do not have access to schools which affects the development and future of children directly.

The third principle studied is Public Spaces, which includes providing safe and inclusive public and green spaces for children and the community . In India, nearly 40% of schools have no playground. This affects the health of the children and decreases the interest of children in studies affecting the overall performance of children in schools as play is key to physical, mental, intellectual and social wellbeing of children. (Sharif, 2014)

The fourth principle studied is Transportation, covering active transportation and public transit systems and ensure independent mobility for children and the community . According to Ministry of Road Transport and Highways, 9,977 children died in road accident in the year 2018 . This can be translated to death of 27 children under age of 18 daily in road crashes. These are big numbers making this issue one of great concern.

The fifth and the last principle studied is Integrated Urban Water and Sanitation Management Systems, including safely managed water and sanitation services and ensuring an Integrated Urban Water Management system for children and the community.

5 Conclusion

Children have an intense relationship to their surroundings. This means that the planning and land-use policies of a society impact profoundly on their physical, social, and mental

Table 1 : Planning Guidelines for Child Friendly Cities and Indian Issues

Principle	UNICEF Guidelines						Problems in India
	What to plan	How to plan					
		Building scale	Neighbourhood scale	City scale		Multi-level scale	
				Land use planning	*City development planning*		
1. Housing	• Acknowledge informal settlements[i] and slums, as they may not have municipal services/ safe space for children to play. • Plan for affordable housing. • Providing security to tenures comprising of legal protection against forced evictions, and other threats.	• Formulating norms and standards for housing, ensuring accessibility to housing and safety amenities for children. • Enhancing the use by children by formulating design guidelines for housing. • Impact assessments in planning and design phase of housing development, for optimal benefits and minimal ill-effects on children.	• A neighbourhood housing plan for essential services and facilities for residential areas. • Workshops led by children on upgradation of multi-unit housing, to enhance security, accessibility, safety, comfort, mixed use and physical activity.	• Land use standards for appropriate density of housing units and land use plans increasing affordable housing distribution and supply • Building permit regulations that ensure optimal supply and distribution of affordable housing.	• Formulating housing strategies to provide housing based on demographic growth estimates and adequate housing principles at city level. • Supporting local public housing development agencies. • Supporting cooperative housing associations in technical and legal procedure.	• Legislation supporting slum upgrading and affordable housing. • Refine/ enforce land use regulations ensuring affordable land prices such as Transfer of Development Rights. • Support inclusive housing policies for specific groups such as migrants. • Housing observatories with disaggregated data and Geographic Information System (GIS).	• About 7.6 million children live in slums in India, which make up 13.1 percent of the total urban child population. • In the 0–6 age range, 18.7 percent of urban children live in slums. • High population density varying between 700 to 4,210 per acre in slums and squatter settlements contributing to disease-prone areas especially for children.
2. Public Amenities	• Provide early child care[ii]. • Plan safe spaces for children. • Support social urbanism[iii]. • Promote the cradle-to-career approach[iv].	• Norms and standards ensuring child-focused accessibility and safety to amenities for children. • Design guidelines for public amenities and enhancing the use by children. • Stimulation and physical activity: defined space for physical activity and play.	• A neighbourhood social infrastructure plan. • Public amenities workshops led by children for co-directing programmes; guiding design and management; enhancing accessibility, safety, security and comfort pertaining to amenities.	• Land use standards quantifying public amenities based on global standards. • Land use plans protecting and ensuring effective supply, equal distribution of public amenities. • Building permit regulations ensuring optimal supply and distribution of public amenities.	• Formulating strategies to provide public amenities according to current needs and demographic growths at city level. • Taking support by local public facilities agency for land acquisition, construction and management of public amenities.	• Legislation supporting slum upgrading and public amenities programmes such as child-care, schools, health care. • Refine/ enforce land use regulations ensuring affordable land prices for public amenities. • Public amenities observatories with GIS-maps on quantity, quality, density and gap between offer and demand for public amenities.	• 33% of children in the age group of 5–18 years in cities do not have access to schools. • 23% (22.72 million) of urban children in the age group of 5–18 years are out of school • 90% migrant children do not have access to ICDS and *Anganwadi* services; also, survey of 85 cities across India revealed that 40% of children do not have a healthy Body Mass Index (BMI)[v].

Principle	UNICEF Guidelines						Problems in India
	What to plan	How to plan					
		Building scale	Neighbourhood scale	City scale		Multi-level scale	
				Land use planning	*City development planning*		
3. Public Spaces	• Planning for mobility to public spaces, leisure and recreation activities and public buildings with access for all. • Plan open and green spaces for children. • Developing green corridors. • Supporting place making[vi].	• Formulating norms and standards for public and green spaces ensuring child-focused security, access and safety. • Enhancing the use of public and green spaces by designing guidelines. • Impact assessment in planning and design phases of public and green spaces, for optimal benefits and minimal ill-effects.	• Neighbourhood public and green space plan. • Children-led Place-making workshops. • Recommendations for built spaces and environments around public and green spaces, enhancing economic activities and safety of neighbourhood.	• Land use plans to protect and ensure effective supply, equal distribution in typologies and primary uses. • Building permit regulations increasing supply and equal distribution in typologies.	• Public spaces and green network plans for city. • Greening strategies for improving open spaces. • Local public agency for public spaces management.	• Legislation enabling acquisition and creation of land for public and green space. • Coordination mechanisms for different public spaces. • Integration of Green Space Policy with other relevant policies.	• Nearly 40% of India's schools have no playground. • 12% of the children between 4 to 16 years suffer from psychiatric disorder • As per World Health Organisation, nearly 50% of child deaths by ARIs is because of indoor air pollution[vii].
4. Transportation	• Plan for NMT and public transport. • Promote children's independent accessibility and mobility. • Improve street connectivity, walkability and road safety for children.	• Formulating norms and standards for road infrastructure promising child-focused accessibility, comfort, safety and multi-functionality. • Transportation system design guidelines to enhance connectivity for children. • Impact assessments in planning and design phase of transportation infrastructure for optimal benefits for and minimal ill-effects.	• Neighbourhood mobility plan ensuring children's self-dependent mobility accessibility and road safety. • Ensuring walkability for schools, bus stops, workplace and residential areas, within 5 km catchment area. • Strategies for active transport routes and enhancing public transport coverage. • Promote safe school environments, safe street crossings, space for active transportation, signage and other protection measurements, and promoting active transportation to drop off children.	• Land use standards ensuring minimum of land availability for promoting children's self-dependent mobility. • Land use plans promoting compact city development to reduce motorized trips and trip lengths; ensure effective supply, equal distribution of streets and infrastructure for public transport.	• Integrated plan for transportation following principles of active and public transport; healthy and safe passage and equitable distribution for all, focusing on diversifying transport options. • A public transportation plan with a grid of accessible stops and modes of inter-modality on walking distances following TOD and clean energy principles. • Planning safe passages providing adequate pedestrian and biking trajectories. • Planning for low traffic areas; progressive parking regulations and parking locations.	• Coordinate policies on urban mobility at national, regional and local level prioritizing NMT and public transportation. • Coordinate plans on road safety at national and local action level for children.	• 15,700 children die of road accidents every year in India. This can be translated to death of 20 children under age of 14 daily in road crashes. • In 2005 road injuries led to approximately 82,000 deaths for children under 5 years of age. • 1.7% of total population in age group 0–19 is specially-abled requiring special alterations in the transport infrastructure.

Principle	UNICEF Guidelines						Problems in India
	What to plan	How to plan					
		Building scale	Neighbourhood scale	City scale		Multi-level scale	
				Land use planning	*City development planning*		
5. Integrated urban Water and Sanitation Management	• Providing universal access to safe and affordable water – in schools and other public amenities for children. • Plan spaces for water, sanitation and hygiene appropriate for children. • Planning for regenerative water services[viii]. • Promote Integrated Urban Water Management. • Develop and upgrade decentralized water and sanitation systems. • Planning for green storm water infrastructure.	• Formulating norms and standards promising availability, accessibility and safety to water and sanitation infrastructure. • Enhancing the use of water and sanitation infrastructure by children by formulating special design guidelines. • Impact assessments of integrated urban water and sanitation infrastructure within planning and design phase of the project.	• Neighbourhood water and sanitation plan localizing public access to water and sanitation within reasonable distances. • Organize child-sensitive participatory workshops with all stakeholders in urban planning and urban water and sanitation management. • Urban design recommendations relating to integrated water and sanitation infrastructure, with potable water supply, sanitation and using green storm water infrastructure	• Formulating land use standards quantifying the amount of land required for Integrated Urban Water Management. • Implementing land use plans protecting and ensuring effective supply and equal distribution. • Building permit regulations increasing the supply and equal distribution of water and sanitation infrastructure.	• Implementing water and sanitation plan, taking into account future demographic growth, higher water and sanitation demand, future risks and other factors; at city level. • Local coordination for integrated water resource management for land acquisition, planning and management of infrastructure.	• Coordination instruments for cost effective financing for the upgradation; maintenance and daily management and supervision of water and sanitation infrastructure. • Legislation that allow easy land acquisition for water and sanitation management. • Integration mechanisms for water and sanitation management coordinated with other relevant policies.	• 32% of urban households live in single room shelters. • 20% of households in urban areas do not have a toilet at the household level and depend on shared facilities. • 71% of urban households have access to drinking water within their premise. • 77% of urban households have bathroom within the premises. • 37% of Households have open drainage and 18% have no drainage. • 2.27 million houses, which constitute 2.9% of total occupied houses in urban areas, are dilapidated. Such houses are unsafe, particularly for children.

[i] Informal settlements are urban areas showing one or more following characteristics: 1) inadequate structural quality of housing; 2) overcrowding; 3) inappropriate access to water, sanitation and other infrastructure; 4) insecure residential status (UN-Habitat, 2015).

[ii] Early child care providers are children's first teachers, and play an integral role in early childhood education.

[iii] Also termed as 'urban acupuncture', is a type of participatory urban planning.

[iv] To break cycles of intergenerational poverty, the educational programmes are administered in collaboration with non-profit organizations and government.

[v] Status of Children in Urban India Baseline Study - 2018 Second Edition

[vi] Place making is a collaborative process where public spaces are shaped to maximize shared value.

[vii] Data sourced from study done by World Health Organisation

[viii] Taking into account .the following principles: 1) Replenish water bodies and surrounding ecosystems; 2) Reduce usage/ demand of water and energy; 3) Using systemic approach, integrated with other services such as waste or energy; 5) Increase usability of systems (UNICEF, 2018).

Sources: (UNICEF, 2018), (Census, 2011)

health. The five principles discussed: home, public amenities, playgrounds and parks, street and public transit as well as water and sanitation to create healthy, child friendly cities should be at the top of every planner's list.

In India, the situation of urban children is not satisfying, as various issues have been discussed regarding each principle, hence child friendly practices in Indian cities are an urgent need as a Child Friendly City has numerous health benefits. The obvious benefits of physical health are derived from having safe places to play and walkable neighbourhoods. Less obvious benefits to health include lower stress and improved cognitive functioning. Integrating children into society and giving them access to amenities, through empowerment enables increased self-confidence, improves social and mental health. The healthiest option for children is a secure, green, accessible, inclusive society.

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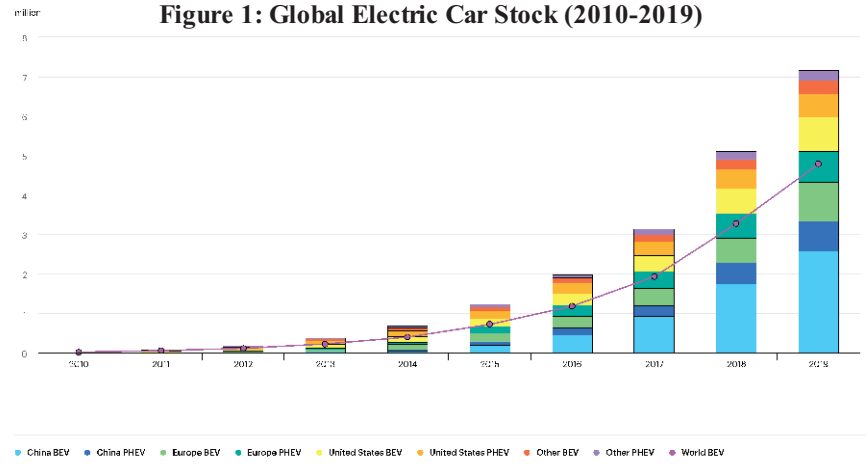
Significance of Public Charging Infrastructure for wider reach and adoption of Electric Vehicles in India

Pooja Sanghani-Patel

The global auto industry is undergoing disruption with the growing trend to shift towards zero emission vehicles, giving an edge to Electric Vehicle (EV) and Full Cell Electric Vehicle (FCEV) value chain players like design developers, manufacturers, charging infrastructure/ service providers, hydrogen fuel provider, lightweight material providers (such as aluminium, carbon fibre, lightweight steel), battery manufacturers, and battery manufacturing material providers (including metal and mineral mining companies). In the backdrop of Paris Agreement, EU, USA, Japan and China are setting ambitious targets for lowering historical emission levels (gCO2/km). This has direct implications on the auto industry such as many countries prioritizing shared mobility as an alternate to private car ownership and mass adoption of self-driving car technologies. Till date, 17 countries have announced 100% zero-emission vehicle targets or the phase-out of internal combustion engine vehicles through 2050 (France mandated to achieve this by 2040). The EV30@30 Campaign launched at the Eighth Clean Energy Ministerial in 2017 aims to collectively reach a 30% market share for electric vehicles in all modes except two-wheelers by 2030. The participating countries of EV30@30 Campaign are Canada, China, Finland, France, India, Japan, Mexico, Netherlands, Norway, Sweden and United Kingdom.

The global electric vehicle fleet expanded significantly over the last decade, underpinned by supportive policies and technology advances. Electric cars, which accounted for 2.6% of global car sales and about 1% of global car stock in 2019, registered a 40% year-on-year increase. Sales of electric cars topped 2.1 million globally in 2019, surpassing 2018 – already a record year – to boost the stock to 7.2 million electric cars.

Figure 1: Global Electric Car Stock (2010-2019)



[Source: Global EV Outlook 2020, published by International Energy Agency (IEA)]
Note: BEV: Battery Electric Vehicle, HEV: Hybrid Electric Vehicle, PHEV: Plug-in Hybrid Electric Vehicle

India's EV Policy Framework

India has a supporting policy framework to help reach the ambitious transition from fuel-dependant vehicles to more environmentally responsible alternates. Some of the major initiatives and/or policies are listed below:

Automotive Mission Plan 2016-26 (AMP 2026)

AMP 2026 outlines the trajectory of growth of the automotive ecosystem in India; entailing definite regulations and policies that govern research, design, technology, testing, manufacturing, import/ export, sale, use, repair, and recycling of automotive vehicles, components and services. Automobile industry is projected to be 3rd largest globally, contributing 12% to India's GDP with a scope to increase exports of vehicles by five times. Auto Industry in India has the potential to generate USD 300 billion revenue and 65 million additional jobs by 2026. The AMP 2026 foresees India to be in 1st in world in production/ sale of small cars, 2-wheelers, 3-wheelers, tractors and buses; and 3rd in heavy trucks & passenger vehicles.

Draft National Automotive Policy 2018

The draft National Automotive Policy 2018 recommends adoption of a long-term roadmap for emission standards beyond BSVI and

complement the same with the global standards by 2028. The policy mentions rolling out Corporate Average Fuel Efficiency (CAFE) norms till 2025 that will help address the emissions footprint by large private corporations and corporate houses. Another recommendation in this policy is adoption of a differential taxation method based on a composite criterion, including parameters such as CO2 emissions and length. Next, the policy suggests associating Automotive Industry Standards (AIS) with the Bureau of Indian Standards (BIS) on critical aspects related to safety (over a period of three years). Lastly, the policy emphasizes on fast track adoption of Bharat New Vehicle Safety Assessment Program.

National Electric Mobility Mission Plan 2020 (NEMMP)

NEMMP encourages consistent, affordable and competent xEVs (Hybrid and Electric Vehicles) that meet consumer performance and price expectations through government-industry collaboration. The aim is to have six million Electric and Hybrid Vehicles per year on Indian streets by 2020 at a cumulative cost of USD 2.15 billion, which also includes industry collaboration. The key objectives include promotion and development of indigenous manufacturing capabilities, creation of required infrastructure, generating consumer awareness and adoption/ development of pertinent technologies. The policy envisions enabling the Indian automobile industry to achieve global xEV manufacturing leadership and thus, contribute towards national fuel security.

Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles or FAME-II

Department of Heavy Industries (DHI) proposed Fame India Scheme II is to be implemented over a period of three years, starting 1 April 2019. DHI is the nodal Department and responsible for planning, implementation and review of the Scheme. FAME-II is targeted towards faster adoption of electric mobility and growth of electric and hybrid technology to improve the ecosystem in the country. The Government of India approved the FAME-II scheme in February 2019 with a fund requirement of USD 1.39 billion for the duration FY20 to Fy22.

Green Urban Transport Scheme (GUTS) 2017

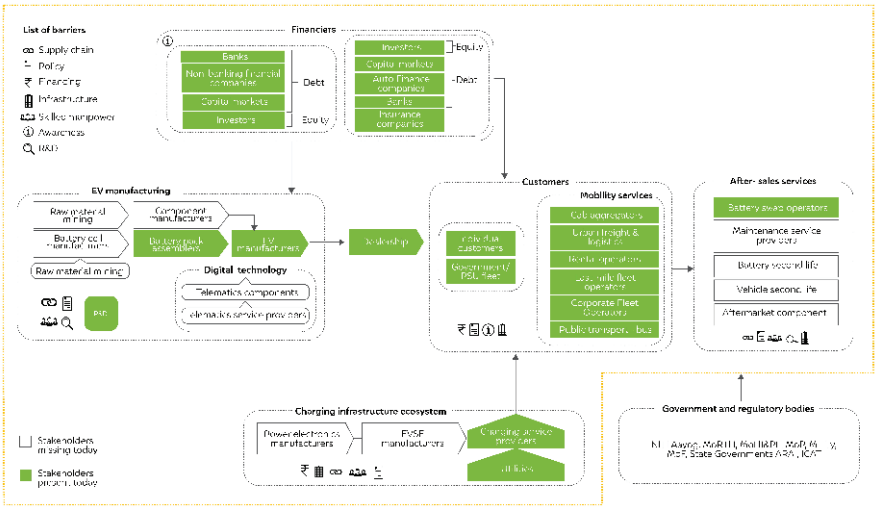
GUTS has been executed with the help of the private sector including assistance from the central and state governments under a seven-year mission with a total cost of USD 10.76 billion. The Scheme promotes low carbon sustainable public transport system in urban areas including Non-

Motorized Transport (NMT), Public Cycle Sharing, Bus Rapid Transit (BRT) systems, Intelligent Transport Systems (ITS), Urban Freight Management etc. For the first phase, 103 cities have been identified (either capital cities or cities having a population of 0.5 million and above). This is an important step towards replacing conventional public vehicle fleet with more sustainable alternates.

India's EV Landscape

The existing EV landscape in India can be categorized into six buckets viz., Financiers (such as banks, non-banking financial companies, investors, auto finance companies, capital markets and insurance companies); EV Manufactures (that includes raw materials mining entities, battery cell manufacturers, component manufacturers, battery pack assemblers, EV manufacturers and digital technology service providers); Customers (i.e., individual customers,

Figure 2: Opportunities for new stakeholders in India's EV value chain



[Source: India's Electric Vehicle Transition: Impact on Auto Industry and Building the EV Ecosystem]
Note: MoRTH - Ministry of Road Transport and Highways; MoHI&PE · Ministry of Heavy Industries & Public Enterprises; MoP - Ministry of Power; MEITy - Ministry of Electronics and Information Technology; MoF - Ministry of Finance; ARAI - Automotive Research Association of India; ICAT - International Centre for Automotive Technology

government or PSU fleet, and mobility services such as cab aggregators, urban freight & logistics providers, rental operators, last-mile fleet operators, corporate fleet operators, and municipal/ state bus services); After Sales Service Providers (battery swap operators, maintenance service providers, battery/ vehicle second life vendors and aftermarket vendors); Charging Infrastructure Ecosystem (including power electronics manufacturers, EVSE manufacturers, charging service providers and utilities); and lastly Government and Regulatory bodies (such as NITI Aayog, MoRTH, MoHI&PE, MoP, MEITy, MoF, State Governments, ARAI and ICAT).

Opportunities in EV Space in India

Given the growing tilt towards EV coupled with the fact that by 2025, the value chain of EV in India is expected to reach a whopping USD 4.8 billion, the various avenues in which opportunities emerge.

EV manufacturers can focus on auto components suited for Indian driving and climatic conditions across the supply chain i.e. motors, controllers, power electronics, and batteries. India also presents a huge opportunity in the space of semiconductor and power electronics manufacturing (currently imported from China). Another area is development of advanced technologies for motors and controllers. Lastly, there's a need for capacity building and training, especially on the safety aspects associated with manufacturing EVs.

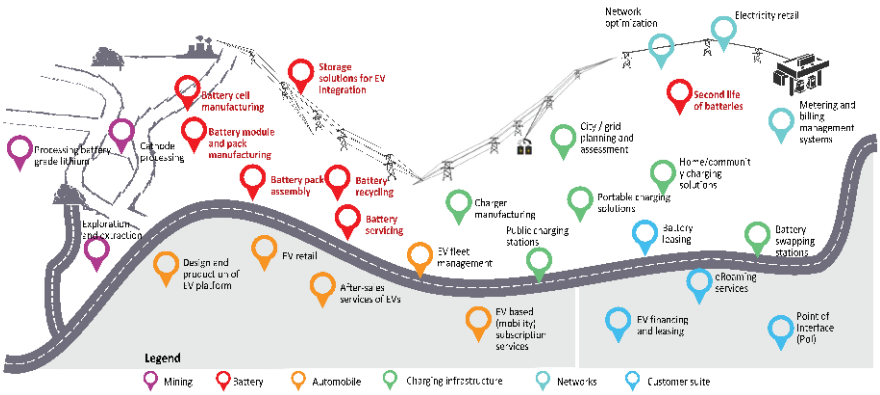
In terms of Electric Vehicle Supply Equipment (EVSE) Ecosystem, there's a great potential for developing a countrywide supply chain, laced with fast chargers (imported EVSE chargers are not suited for Indian weather conditions). One way to boost investments is classifying deployment of EV charging infrastructure under Corporate Social Responsibility. There's a market opportunity for indigenously developed low cost and compact EV slow chargers for private use/ individual customers, along with possibilities for battery swapping infrastructure and service providers. Simultaneously, small commercial entities can be encouraged to invest as EV charging service providers (given that there's a business case for the same).

On the Financiers front, the respective entities can develop various loan products for EV purchase, standardize valuation method for assessing life of asset, end-of-life value and resale value, and easy access to EV insurance. Government entities may introduce higher subsidies for EV purchase and use, which may be diverted from savings from oil imports.

In the long run, these savings may be diverted towards creation of EVSE infrastructure.

Urban freight and logistics companies can transit to EV fleet with suitable payload capacity and speed as advances in the field occur. Such fleet shall most likely be high voltage with fast charging capability and better quality. Corporate fleet services with higher seating capacities shall have a good potential, further boosting private bus procurement by extending FAME II subsidies.

Figure 3: EV Ecosystem Value Pools



[Source: A Power & Utilities (P&U) perspective, June 2019, EY]

Charging Infrastructure Ecosystem

The major players in the charging infrastructure ecosystem include four main industry players. The first one is Power Electronic Component Manufacturers, i.e., wires, capacitors, transformers and others. There are very few power electronics manufacturers in the Indian market today, such as Delta Electronics, Infineon, and ABB. Resultantly, most of the components required for constructing an EV charging station are being imported. Next comes the EVSE manufacturers responsible for provision of charge controllers and network controllers (which are then integrated to manufacture an EV charger). Again, only a handful of EVSE manufacturers exist in the Indian EV ecosystem today. Third comes the Charging Service Providers through a gamut of business models such as (i) Turnkey EVSE solution providers provide a complete end-to-end EV charging solution that includes manufacturing of EVSE charger, and its installation and

operation; (ii) EVSE operators install and operate the EVSE charger, they generally own the asset and provide charging services to consumers (for example, Magenta Power; and (iii) Charge network operators that aggregate different EVSE outlets on a common platform for the consumers to charge their EVs (for example, Fortum's Charge & Drive).

Globally, prevalent charging technologies. In the Alternate Current (AC) charging also known as Level 1 or Level 2, an in-car inverter converts AC to Direct Current (DC), which then charges the battery at either Level 1 (equivalent to a US household outlet) or Level 2 (240 volts). It operates at powers up to roughly 20 kilowatts. In DC charging, also known as Level 3 or Direct Current Fast Charging (DCFC), the charging system converts AC from the grid to DC before it enters the car and charges the battery without the need for an inverter. Usually DCFC or Level 3 chargers operate at power range from 25 kilowatts to over 350 kilowatts. The third type, getting prevalence lately, is the Wireless charging where the system uses electromagnetic waves to charge batteries. In this case, usually a charging pad is connected to a wall socket and a plate attached to the vehicle. Most existing charging technologies align with Level 2 chargers and can provide power up to 11 kilowatts. A mix of Slow, Fast and Superfast charging, depending on the use (public/ corporate/ private use etc), holds the key to cater all EV needs in future.

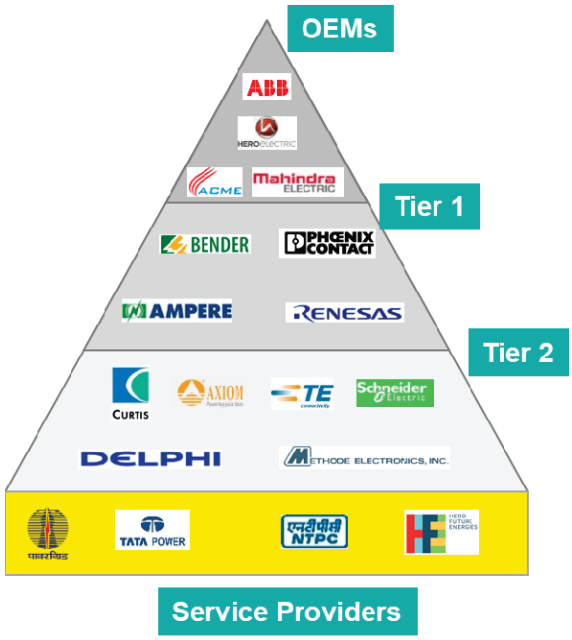
Developments around Public Charging Infrastructure (PCI)

PCI is the underlying element for success of EVs in India. Globally, many countries have rolled out specific policies and/ or programs for full-fledged PCI infrastructure and use. For instance, Germany subsidizes up to 60% of costs for all eligible businesses under a program with an impressive USD 285 million; with an overall target of reaching 10,000 Level-2 and 5,000 DC fast charging stations. Japan, on the other hand, has set aside a whopping USD 1 billion as grants to local governments and highway operators on public-private partnership as part of next generation vehicle charging infrastructure deployment promotion project in partnership with Nippon. The USA has introduced matching grants for local governments to the tune of USD 15 million for funding public charging stations under the American Recovery & Reinvestment Act. The United Kingdom has earmarked USD 2 million for municipalities to reimburse installers of curb side stations intended for residential use. The Highways England Company Limited is building DC fast charging stations along major roads/ highways in England through a budget of USD 15 million.

In India, Public Charging Infrastructure and allied components supply is expected to witness a significant thrust as OEMs plan for additional projects backed by service providers' and Government initiatives. For Installation of Charging system, all mega cities with a population of over four million as per Census 2011, all existing expressways connected to these mega cities and important highways connected with each of these mega cities may be taken up for coverage. While the guidelines for charging infrastructure are set by Ministry of Power, states like Delhi, Kerala, Karnataka and Gujarat have adopted dedicated Electric Vehicle Policies.

At the private sector front, players like Reliance Industries have formed a joint venture with British multinational oil and gas company BP, with focus largely on components like chargers and controllers. Companies such as Ampere have ventured into EV charger business to offer chargers featuring µC-based intelligent battery charger system. Charging cables are primarily supplied by TE and Delphi with current capacity in the range of 16-32 amperes.

Figure 4: Public Charging Infrastructure Stakeholders (supply-side)

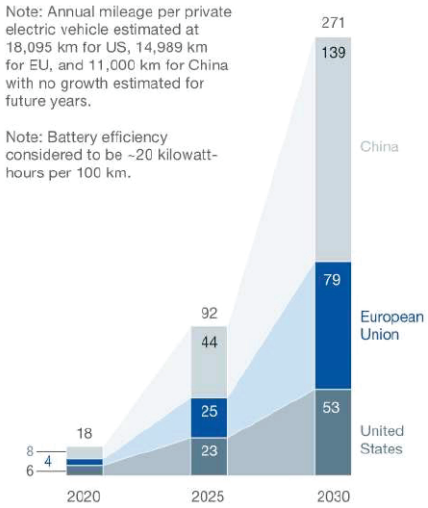


[Source: Author's compilation]

Recommendations for Public Charging Infrastructure

The issues plaguing public charging infrastructure provision in the country today are poor range and accessibility of charging infrastructure, a huge charging-capacity gap and limited attractiveness for private players. If consumers purchase EVs at the expected rates in the next five to ten years, a lack of charging infrastructure shall pose an obstacle to mass and successful EV adoption.

Figure 5: Energy demand across the globe



[Source: McKinsey & Company]

To bridge the supply gap in India, it may help to study the best practices adopted to encourage and support creation of public charging infrastructure internationally. For instance, China plans to reach 20% share of EV in national vehicle production, or about 7 million EV per year by 2025. To support this, Chinese cities plan to provide one charge point for every eight EV and charging stations within 1 km from any point in the centre of the city. Even the municipal governments in China have started funding development of local charging stations. On the other hand, Netherlands has introduced public charging points which are accessible 24x7 and semi-public charging points which are accessible to all based on parking or operating hours. Netherlands has also installed fast charging points for addressing long distance charging needs, where

charging while parked is not available. Lastly, they have installed private charging points on private sites/ premises which are connected to a private electricity supply to cater to private use.

In France, government extends 30% subsidy to all the charging stations in exchange of recipients' commitment to build at least 20 charge points and offer free parking for charging vehicles. In Germany, businesses may apply for funding to cover up to 60% of the hardware and network connection costs of the stations (grant recipients must conform to the Open Charge Point Protocol).

Keeping these in mind, it is suggested that India roll out a national grid plan to cater to the projected EV consumption till 2030 on public private partnership basis in a phase manner such that publicly accessible charging stations may be available within 5 km radius by 2023, 3 km radius by 2026 and 1 km radius by 2030. India can focus on both Fast (Level 2 and 3) & Regular Points keeping the current consumption trend in mind. It is also recommended that a country-wide interoperable charging stations be mandated, ensuring hardware and software compatibility for the prevalent and future EV variants.

Additionally, India can allow Private EV Service Providers (EVSP) that match the prescribed requirements. Subsidies on installation costs by type (can be a mix of national/ state/ local outlays) can be: (i) 50% for public charging points, (ii) 40% for semi-public charging points, and (iii) 30% for private charging points.

Most individual passenger cars remain parked for eight to 12 hours at night, making home charging the preferred and cheaper alternate to charging elsewhere (residential electricity unit rates are lesser than commercial/ industrial unit rates). It is estimated that if approximately 75 to 80 percent of EV owners in the United States and European Union were to have access to home charging, it would cater to about 75 percent of their energy needs in 2020. Similarly, as India experiences higher EV penetration, private or community charging points shall be a workable solution. For a community PCI, local governments can consider extending installation subsidies (to the tune of 50% of hardware and network connection costs) in lieu of a minimum of 50 assured users in addition to allotting at least 25% of total daytime empty parking slots for outsiders/ visitors at no extra cost. This would also help in addressing spillover and illegal on-street parking in and around large community living spaces.

Another recommendation is to develop charging infrastructure at central business districts (CBDs)/ business hubs in large cities (cities over

7 million population) by retrofitting existing multi-level public parking structures (wherever possible) to cater to charging needs of local CBD users, visitors, shoppers, customers, and cab service providers such as Ola, and Uber and in the future, urban freight and logistics service providers. Although such a model shall need subsidies to allow for discounted rates to make it affordable vis-à-vis home charging. In the same way, privately owned and operated and publicly accessible wireless charging stations can be developed at airports, railway stations, bus terminals, convention centres, government buildings, etc on a PPP basis.

To gauge the effectiveness of these recommendations, it is important to take stock of the current industry landscape in terms of public charging infrastructure ecosystem and its market readiness. EV seeding has already begun in the Indian auto component industry. Motherson group supplies electric wiring for trucks and buses, apart from supplying parts to Mahindra Reva & Mirrors to Tesla. An array of domestic suppliers in the Indian market comprise companies such as Greaves Cotton Limited, Meritor, Bharat Forge (Kalyani), Samvdardhana Motherson, Varroc Excellence and TATA Hendrickson; and international suppliers such as Bosch, Denso, Samsung, Infineon, Magna and Hitachi. Subsequently, many large players are foraying in the Indian EV space lately including Reliance, Adani, ISRO, BHEL, BAK, LG Chem, Samsung; and even Start-ups like Future hi-tech batteries, Li, EV Motors India Private Limited and Ion Energy.

Case in point and key learnings

India's first multimodal electric mobility pilot by Ola at Nagpur helped bring to light various crucial operational issues with respect to running an EV fleet. This pilot brought to notice the concerns around economics of charging infrastructure. It was realized that the high electricity tariffs for EV charging coupled with the limited fleet size of EVs led to underutilisation of the existing EV charging stations; thus, failing to achieve economic viability. The average utilisation rate was just 40 per cent for fast chargers and a miniscule 5 per cent for slow chargers, indicating that drivers preferred shorter charging times for battery top-ups. The land lease rental (at INR 23–28 per sq feet) accounted for over 31 per cent of the overall operational expenses, while the commercial electricity tariff (at INR 17.7 per unit) was the second-largest contributor.

Although the implementation of special EV tariff under Maharashtra's Electric Vehicle Policy 2018 reduced the electricity tariff considerably; the

land lease rent continued to be the highest contributor (43 per cent) to incrementally increasing operational expenses. This triggered a vicious cycle, wherein the limited availability of EV charging infrastructure led to longer waiting times for drivers, such that a considerable share of their login hours was spent off-road for charging, leading to lower overall returns to the service provider (Ola) and drivers alike. To address this, more charging stations were installed eventually reduced the waiting time from 3–4 hours to a mere 15–20 minutes, it resulted into a steep increase in the land lease rent and jeopardized the overall economic viability of the project.

From this case, it cannot be stressed more that government funding (beyond what prevails today) is critical to establish market competitiveness and attractiveness of public charging infrastructure, at least for the next decade in India. Eventually, as the market matures, and EV penetration reaches targeted milestones, the scale of economics shall come into play, making it a viable business model for private service providers. But till then, concerted government willingness and effort in form of substantial financial outlays will be important to ease use of EVs vis-à-vis the fuel-dependent alternatives.

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An Invitation

The Local Government Quarterly invites contributions in the form of articles and research papers from its readers and well-wishers.

Contributions may be e-mailed to us in digital form as a Word file.

Articles could normally be between 3000 and 4000 words, though we do not wish to limit the size. As we print in black and white, tables, charts, graphs, images, etc. need to be compatible. We reserve the right to edit for sense, style, space, etc.

Contributors may e-mail their articles to:
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Report Review

Sustainable Development Report 2020

Read the full report at: http:// sustainabledevelopment.report

The manuscript of the report to be published by Cambridge University Press is authored by the Lead writers Jeffrey D. Sachs, Guido Schmidt-Traub, Christian Kroll, Guillaume Lafortune, Grayson Fuller and Finn Woelm.

The Executive Summary starts on a grim note stating 'The world is facing the worst public health and economic crisis in a century.' The report notes that the crisis is affecting all, including the high income countries of Europe and America. The measures taken to respond to the threat notably the prolonged lockdowns in various countries have impacted the economies of entire nations leading to massive job losses and major impacts on vulnerable sections. The crisis is therefore a significant setback to the achievement of the SDGs. The Executive Summary goes on to note that though some countries have done better at containing the spread of the virus, all countries remain at risk and need to strengthen surveillance, preparedness and building resilience.

The report advises that the SDGs be kept at the heart of policymaking in the post-COVID recovery planning seeing that the pandemic has gravely amplified income and other inequalities, while highlighting the need to strengthen health systems in all countries.

Encouragingly, the commentary states that 'Asian countries have made the most progress towards the SDGs since the adoption of the goals in 2015. Asian countries have also responded most effectively to the COVID-19 outbreak.' And therefore, the 'the shift of the geopolitical and economic global center of gravity from the North Atlantic region to the Asia-Pacific region is likely to be accelerated by the crisis.'

In a later section of the Executive Summary, the report argues for making globalisation more fair and sustainable and resilient to external shocks even as we reap benefits of the phenomenon in terms poverty reduction, technological advance, economics, and enjoying each other's cultures. More international cooperation and partnerships can enable sharing of best practices and therefore support mitigation and

prevention strategies, and help the more vulnerable countries.

Finally there is a call to strengthen statistical and data gathering abilities of governments including through partnerships with private sector to prevent lags in data availability and analysis which could hinder efforts to effectively manage such crises.

Part 1 of the document is titled Covid-19, the SDGs, and the Recovery. It points out to the rising inequalities and the soaring poverty and hunger while saying that the poorest share a disproportionate amount of the suffering. In this section there are two parts – the first reviews early responses and identifies short term priorities for action; and how the SDGs can help. Among short term priorities, it lists 'Control the disease'. Here there is a visually appealing description of the pandemic on each of the 17 SDGs; and calls to mitigate negative impacts on the SDGs as a short term priority. Among the medium and long term priorities, it advises to 'Guide the recovery with the six SDG Transformations' namely, Education, gender inequality; Health, well-being and demography; Energy decarbonisation and sustainable industry: Sustainable food, land, water and oceans: Sustainable cities and communities: Digital revolution for sustainable development

In the second part, it assesses 'how governments have responded to the immediate health crisis and describe emerging lessons for public health authorities, governments at large, and the public.'

Part 2 of the Report is titled The SDG Index and Dashboards. Here the country wise index is given for 166 countries. India on rank 117 has and index of 61.9 meaning it is at 61.9 percent achievement of SDGs with equal weight to all 17 goals. Sweden, Denmark and Finland in that order are at the top ranks. There are also graphs which depict the global progress on SDGs during 2010-2019 by region, income groups and on 14 of the SDGs. However all these do not take into account the impact of COVID-19.

The SDG dashboards section presents using coloured markers, the strengths and weaknesses of each country on each of the SDGs. The methodology notes that the 'dashboard ratings are based on data for the two indicators under each goal for which the country performs worst.' In other words, good performance on say 5 out of 7 indicators will not compensate for poor performance on two indicators, it explains. The dashboard is available for each country as well as UN sub-region as well as income groups (low, lower-middle, upper-middle and high). The data for India is a mixed bag with 'on track' status for 4 of the 17 goals. Further there is a chart showing the absolute gaps for each country on each

goal. India has gaps of over 20% (marked in red) on 9 of the 17 goals.

Part 3 of the report is titled Policy and Monitoring Frameworks for the SDGs. This section assesses policy interventions by governments to implement. While noting that the SDGs have become a widely used framework for many national data providers, the reports cautions that effort is still required to address data gaps and time lags in relation to SDG indicators. It further argues for more effort on sharing best practices and lessons learnt for the benefit of other counties to enable them make rapid progress towards the achievement of the SDGs.

The report makes an important observation stating that Performance and outcome data (e.g., poverty rate, life expectancy, CO2 emissions) have limitations, because there is a substantial time lag in reporting. It says '….tracking SDGs using outcome data alone means adopting a "rear-mirror view." Such a view tracks historic trends, which may be a poor guide to the future.' Government reforms could take a long time to reflect in outcome data, as also the impact of Covid-19. Therefore it emphasizes on the need for 'real time' data and 'forward looking' assessments of policies.

It goes on to present, for the first time, findings from two public opinion surveys conducted by the SDSN in March and April 2020, on "SDG Progress and Challenges" and "Covid-19 and the SDGs. The survey covers 30 countries, including most of the G20 and OECD nations and countries having population greater than 100 million people. Importantly, the reports states, "We find a discrepancy between expressed political support for the SDGs and the integration of the SDGs in strategic public policy processes, including national budgets."

Tables, charts, figures and other depictions in this section pertaining to the survey present very useful (and revealing) data which warrant close scrutiny and analysis.

Part 4 is titled Methods Summary and Data Tables

These will enable understand the underlying tools and methods used in the report and analyzing the data.

Finally in part 5 are the detailed Country Profiles. For each country are given Index score, global rank, average performance by SDG, Dashboard, SDG trends, etc. These are well depicted by colour-coded charts which enable easy assimilation.

Overall the SDR2020 is a useful document to evaluate performance on SDGs by country, region, etc. However, the 2020 SDG Index and Dashboard in the report do not

incorporate the impacts of COVID-19 due to paucity of data at the time of writing given the fact that the report was compiled in June 2020. The report points to the vital importance of timely data saying 'This illustrates how crucial timely and disaggregated data are across the SDGs. Major efforts should focus on increasing data availability and reducing time lags in official statistics, and on leveraging the wealth of real-time data available from non-traditional sources, including the research community and the private sector.' However further editions of the report will enable better understanding of the full impact of the pandemic on achievement of SDGs.

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OBJECTIVES

The main emphasis of the Institute's work is to see that the local bodies can contribute more effectively to the development process and provide the citizens with better living conditions by meeting their aspirations in terms of required amenities, infrastructure and better environmental conditions, thus contributing to social and economic development of the society as a whole by better management of the human settlements. While these are the long-term objectives, the immediate ones are:

- To advance knowledge of the principles and practices of Local Government by conducting research and by organising training courses and programmes at various centres in India for officials and elected representatives in the local bodies.
- To strengthen and improve Local Government Institutions by improving their performance through education, orientation and bringing them together for common endeavor by organising specialised conferences, conventions and seminars.
- To make available a platform for members of local bodies and officials for exchange of views and ideas related to urban development and administration.
- To represent the views of local authorities supported by research work to the concerned higher authorities from time to time.
- To publish bibliographies, articles, books and other literature on matters of interest to local bodies.
- To publish journals, bulletins and other literature on different aspects of Local Government and on the working of Local bodies in different states.
- To undertake research studies in public administration, problems of local bodies and also in related topics of urban and environmental factors and arrange for their publication etc.
- To establish and maintain an information-cum-documentation service for local bodies.
- To undertake consultancy assignments in various areas of urban development and problems of local bodies with a view to improve and develop organisational, managerial and operational efficiency.

In view of the above, the Institute has been collaborating with the relevant government departments, Central and State, Universities, Organisations and Research Institutions. The work of the Institute covers several aspects involving a multi-disciplinary teamwork.

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