Environmental Sustainability Index: Haryana

Increasing importance has been given to the integration of environment and economic development in policy-planning process. However, particularly in case of India, data deficiency clearly affects the policy making process. Lack of focused information about various sustainability issues, at state and national level, is not available to various stakeholders like policy makers, private sector, Non Governmental Organizations (NGOs), preventing any further sustainability analysis. Environmental Sustainability Index (ESI), developed by Centre for Development Finance attempts to address these issues of environmental sustainability. ESI, formulated primarily as a diagnostic tool for informing and empowering policy makers, citizens, researchers and activists, seeks to fulfil three main objectives. First, to provide information to ensure evidence-based policy making; second, to facilitate prioritisation of budget allocation between various resource sectors and lastly, to measure and monitor sustainable development at the state level over time.

This research project is an effort to map the current sustainability levels of the Indian states, while simultaneously projecting their ability to protect the environment in the future. Dimensions of sustainability are captured through forty-one indicators, culled from a wide range of themes such as air, water, land, forests, and impacts of pollution on ecosystem and human health and policy responses by various stakeholders. Based on the aggregate score, states are categorised into five groups: 'most' sustainable (top 20 percentile), 'more' sustainable (60-80 percentile), 'moderately' sustainable (40-60 percentile), 'less' sustainable (20-40 percentile) and 'least' sustainable (bottom 20 percentile).

Each state's environmental resources, capabilities and hence challenges differ from others. Hence the tool compares the states across six peer groups; created on the basis of GDP per capita and contribution to India s GDP. Sub index analysis of peer groups reveals a pattern; similar environmental issues are being faced by states with comparable growth trajectories. Consequently, a deeper analysis of successful sectoral policies is initiated to enhance knowledge about policy initiatives and outcomes at state level. In this context, this case let series aims to highlight initiatives (in terms of policy and implementation measures) taken by various state governments to tackle a plaguing environmental issue in their peer group.

This case let focuses on ***Haryana***, categorized under "*Red"* category which signifies that it scores in the 0-20 percentile category. Haryana has been in the fore front in terms of waste management policies and appropriate fund allocation. Even though the state is focusing on up gradation of civic infrastructure required for waste management, a growing need is felt to encourage Waste-to-Energy conversion projects, treatment of hazardous wastes and reasserting need for private participation in Waste Management mechanism.

ESI Snapshot

ESI Group	Red
Other states in same ESI group	Bihar, Gujarat, Punjab, Jharkhand, Uttar Pradesh
% Contribution to overall India's GDP	3.77
SGDP per capita / annum	53203
% population living below poverty line	2
Population density per square km area	573

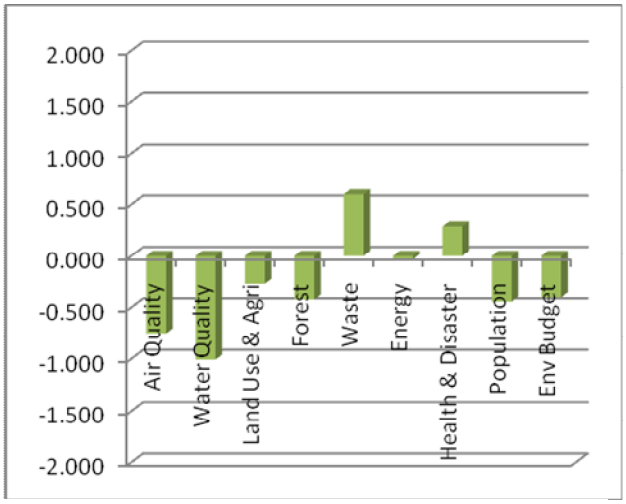

Figure 1: ESI of Haryana in 9 Sub-indices

Columns that lie above the X axis depict a better than average performance (as compared to all 28 states). Columns that lie below the X axis depict a less than average performance (as compared to all 28 states). The height of a column indicates the degree to which a state has performed better or worse than others in that particular sub index. All values are in standardized scores. All sub indices are adjusted to ensure that higher values indicate better performance in that aspect of sustainability.

The spider chart shows the sustainability of states in terms of Driving Force-Pressure-State-Impact-Response. All values are standardized scores. Values farther from the centre indicate better performance. A state's higher positive score in 5 different components add up; and higher green area indicates better performance by the state in all components.

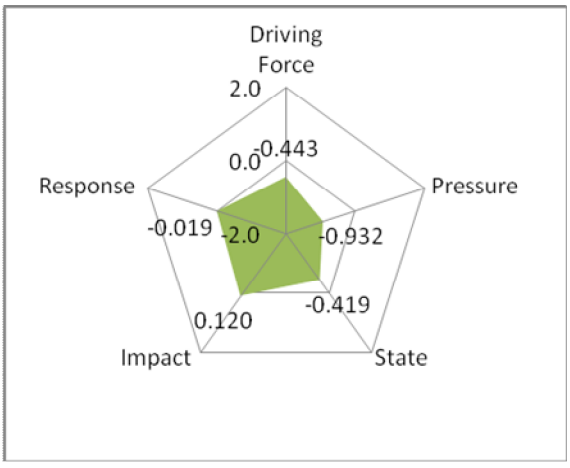

Figure 2: ESI scores as per DPSIR Framework

Introduction

The state of Haryana has a population of over 25 million with a geographical area of 4.42 m ha, which is 1.4% of the geographical area of the country. It has a population density of 573 persons per sq km. The cultivable area is 3.8 m ha, which is 86 % of the geographical area of the state. Out of the total cultivable area, 3.62 m ha, that is 96.2 % is under cultivation. (Government of Haryana) Evidently, the population is heavily dependent upon agriculture as their main source of livelihood. Such widespread cultivation of diverse crops creates the issue of waste management since agricultural production leaves considerable amounts of agricultural waste. Some of it is recycled into the agricultural production as fertilizer, while large amounts remain unused creating the need for developing effective waste management strategies. Agricultural waste is further supplemented by the waste genereated from households. Out of the 82 mteric tonnes waste generated per day, only 25 percent goes for composting daily while 10 percent is incinerated (CPCB, 2000) At the same time, the organic proportion of waste in village households is much higher than that in the cities. This is mainly because of different life styles, consumption patterns, food habits, etc. (Kansal, Mori, Kaul, & Solanky, 2011)

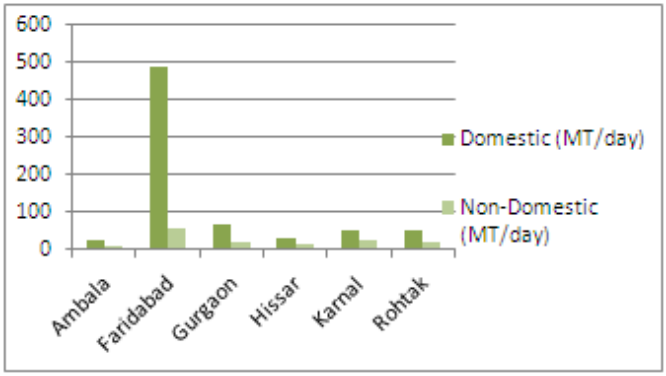

Figure 3: Solid Waste generated by source (Metric Tonnes per day) (NIUA, 1999)

An important percentage of agricultural waste generated in the state is utilized as fuels for various purposes, including cooking, heating. Therefore, no effort is required for collection or disposal of such agricultural waste, since it gets consumed on a daily basis, as reflected by figure 4. The per capita consumption on dung cakes and agricultural residue is the highest, followed by other fuels like fuel wood, kerosene and LPG. (Kansal, Mori, Kaul, & Solanky, 2011)

	Cooking	Heating	Other	Total Fuel	Total Kcal
Cow dung (kg/day)	0.40	0.32	0.15	0.87	2772
Agricultural Residue (kg/day)	0.34	0.26	0.06	0.66	2552

Figure 4: Per Capita Consumption of household waste in HCFP study area (Kansal, Mori, Kaul, & Solanky, 2011)

Solid Waste Management (SWM)

In case of non-biodegradable waste, while the emphasis has been laid by the state government on disposal or recycling, biodegradable waste is seen more of a resource. The first stage of waste management is its collection. Most of the biodegradable waste from households are collected within the household, and then composted to be used as manure. The state government has provided an active mechanism resulting in the collection of waste near its source, as indicated by Fig 5. In order to encourage inter-departmental

coordination, Department of Environment, Government of Haryana released an amount of Rs. 1 lakh in 2007-08 to the Urban Development dept for door to door garbage collection. (Dept of Envt, Haryana) Waste management schemes costing Rs. 119.59 crore, have been implemented in the cities of Faridabad, Rohtak, Karnal and Indiri. (Financial Express, 2007) Such schemes have been implemented effectively over a number of years by ensuring adequate staff personnel for waste management. Haryana has one of the highest staff per 1000 population ratio in comparison to other states of the same category.

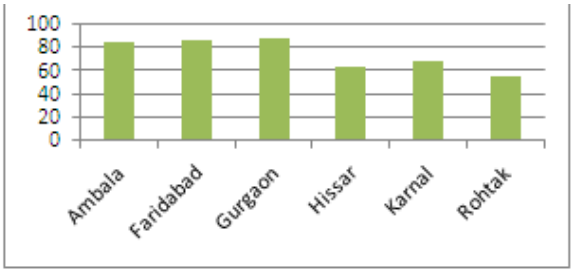

Figure 5: Waste collected to generated (%) (NIUA, 1999)

Policies and Programmes

At the stage of disposal, the practice of composting has received continuous assistance from the state government. The Gram Panchayat overlooks the allotment of land for the specific purpose of composting in every village. In 2009, the Haryana government had sanctioned a grant of Rs 1.32 crore under the *Rashtriya Krishi Yojana* for the expansion of mushroom spawn and composting units of the Haryana Agro Industries Corporation Agro Research & Development Centre. (Bureau, The Financial Express, 2009) The manure so produced is purchased by the Haryana Forest Department at a pre-fixed rate to ensure economic sustainability of the activity. While doubts have been raised regarding the efficiency of composting leading to a loss of nutrients, the quality of this manure can be significantly improved through vermi-composting process. The process involves stabilisation of organic solid wastes through earthworm consumption, which converts the material into worm casting. Vermi-composting has been implemented in various villages with aid from the Haryana Forest Department. The Haryana Community Forest Project (HCFP) has promoted vermin-composting in all project villages to reduce soil toxicity from use of chemical fertilizers and pesticides. As a result of this activity, organic farming has gained momentum in many project villages. HCFP, co-funded by the Government of Haryana and the European Commission, was implemented in 338 villages in 11 districts of Haryana with the objective of conserving and rejuvenating natural resources, mainly through forestry development, with the active participation of communities, especially women. (HCFP) The practice, over the years, has been effective. In 2003, 409 women working across 59 villages became financially independent by practising vermin-composting as an income generation activity. (Tandon, 2003)

Various other initiatives for SWM have also been undertaken by the state government. A scheme for Modernization of Solid Waste Management and Repair of Roads in 16 towns falling under National Capital Region (NCR) costing Rs. 5656.00 lakhs had been sanctioned by the National Capital Region Planning Board (NCRPB) in 2002. (Haryana Slum Clearance Board) The Department has also introduced three new schemes, that is, Sewerage Treatment Plant in Haryana State, Ghaggar and Markanda Action Plan and Setting-up of Environment Training Institute at Gurgaon in the 11th Five Year Plan (2007-12).The Finance and Planning Department has given its approval regarding the same and sanctioned a token amount during the year 2007-08. (Dept of Envt, Haryana)

Bio-methanation

Among the various techniques employed for cost effective and efficient utilization of organic waste – solid and liquid, bio-methanation stands out not only as a novel method, but also an efficient, value-added and eco-friendly one. It is the generation of biogas through anaerobic digestion of the solid-liquid organic biomass waste employing ethnogeny micro flora.

In its bid to tap the potential of the renewable and eco-friendly fuel, the Government of Haryana has planned to set up large size biogas plants in different parts of the state.. Haryana is going to set up Biogas Plants along with bottling of biogas in cylinders for commercial use, as well as generating fertilizers. (Singh, 2010) In a first of its kind, the Ministry of New and Renewable Energy has approved the setting up of 1000 cu. m Biogas Fertilizer Plant in Sonipat at a cost of Rs. 145 lakhs. Central financial assistance to the extent of Rs. 72.5 lakhs has already been provided. This is to be followed by the setting up of another 1000 cu m Biogas Fertilizer Plant at Hissar, in collaboration with Option Energy India at an estimated cost of Rs. 183.43 lakhs. (FE Bureaus, 2010)

Waste-To-Energy (WTE)

Urban and industrial wastes are extremely useful as potential energy resources with an estimated power generation potential of up to 3000 MW. The industrial sectors identified, in a study conducted by Ministry of New and Renewable Energy (MNRE), can contribute to 1000 MW and the share of the urban sector will be 1500-2000 MW depending upon the relative proportion of biological (bio-methanation) and thermal (gasification) processes to be adopted as WTE technologies. (MNRE) The state of Haryana intends to create conditions conducive for the involvement of private sector or public – private partnerships in renewable energy generation. The State has the potential to generate 14MW of power through biomass. The state Government aims to achieve a minimum of 10% (i.e. 500 MW) of the total capacity addition of 5000 MW of conventional power to be generated through Renewable Energy Power Project by 2012 as per Renewable Energy Cetrification policy of MNRE, GoI. Haryana Renewable Energy Development Agency (HAREDA) is the nodal agency for co-ordinating all associated activities, and shall function as a single window clearing Agency for all Renewable Energy Power Projects for facilitating necessary clearances and approvals on behalf of the Government of Haryana. (Government of Haryana, 2005)

The State Government shall also be acquiring land for setting up various plants, if necessary, at the cost of Independent Power Producers (IPP) if a request to the same is made. The private parties involved in the WTE process shall be exempted by the government, to varying extents, from royalties on non-consumptive use of water, local area development tax, electricity duty (Government of Haryana, 2005)

Biogas based Power plant projects for generation of electricity through waste have been executed in *Sirsa, Panchkula* and *Bhiwani* district of the state that are nearing completion. (Department of Renewable Energy). HAREDA is planning to set up biogas plants with capacity of 25 cubic metres to 85 cubic metres in various Universities across the state, including various educational institutions in the state to produce biogas from the hostel and canteen wastes of these Universities. Biogas plants with one to four cubic metres capacity were also being set up in the households in the State. (Haryana News, 2010) (The Times of India, 2010)

Hazardous Waste Management

In India, there are 36,165 number of hazardous waste generating industries, generating over 62lakh Metric Tonnes of hazardous wastes every year. (CPCB, 2009) The contribution made by Haryana to the total national waste generated is 0.59 %, which is minimal in comparison to most of the remaining states (Figure 6). Consequentially, the Waste Management Policies of Haryana are primarily focussed on management of non-hazardous waste. Accordingly, Common Treatment, Storage and Disposal Facilities (TSDF) are developed for the disposal of land disposable hazardous waste at 22 different places in only 10 states; waste incinerators in only 14 states and Union Territories, neither of which includes Haryana. However, Chandigarh Pollution Control Committee has tied up with Punjab Pollution Control Board and the hazardous waste generated in U.T., Chandigarh will be disposed of to Treatment Storage & Disposal Facility (TSDF) at Derabassi (Punjab) (CPCB, 2009)

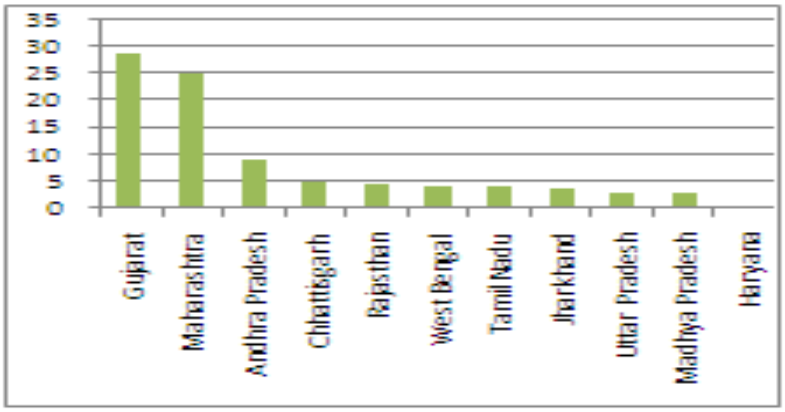

Figure 6: State wise contribution to Total HW generated (%) (CPCB, 2009)

Policy Implementation

Moreover, Government of India had notified the Hazardous Waste (Management & Handling) Rules (HWM Rules) on July 28, 1989 under the provisions of the Environment (Protection) Act, 1986 and was further amended in the year 2000 & 2003. The objective for introduction of such Rules is to ensure safe management of hazardous waste, generated from different industrial sources. Waste disposal in all the States is carried out in accordance with the guidelines laid down by the Supreme Court of India (SC).[1] States were also mandated to facilitate and encourage public awareness and participation by making information widely available. As per the guidelines of Hon'ble Supreme Court of India, a Hazardous Waste Disposal site is being developed at village Pali, District Faridabad for safe disposal of hazardous waste generated by the industries. (Figure 7) (Dept of Envt, Haryana)

No. of Districts	No. of Units generating waste	Quantity of Waste Generate (Metric Tonnes per Annum)			
		Landfill able	Incinerable	Recyclable	Total
17	1419	30452	1429	4919	36800

Figure 7: Number of units in Haryana for Hazardous Waste Management (CPCB, 2009)

[1] SC had issued notices to all the State Governments, Central Pollution Control Board and State Pollution Control Boards, Pollution Control Committees in the Union Territory, so as to identify the problem, and the extent of such waste, availability of the disposal sites and various other aspects relevant to minimizing the generation, its proper handling and disposal with a view to safeguard the environment.

Conclusion

The efficiency of Haryana's Waste Management policies is based upon the identification of focus areas, and allocating appropriate funds for implementation. Accordingly, much emphasis was laid on policies pertaining to collection and disposal of biodegradable agricultural waste. The 11th Finance Commission had provided Rs. 50 crore to the Haryana State Government for up gradation of civic infrastructure including, SWM, and drainage/sewerage. (Finance Commission of India, 2000) While the same still remain the focus areas, there is also a growing need to encourage WTE conversion projects as well as treatment of hazardous wastes. The following decade will also witness the implementation of various biogas based power plant projects that have received the approval of the concerned authorities. Such large scale projects reassert the growing need for private participation in Waste Management mechanism.

The Twelfth Finance Commission (TFC) has also stressed the importance of public-private partnerships to enhance service delivery of solid waste management services in the urban areas. TFC has urged that states may require municipalities or towns of over 100,000 population as per 2001 census to prepare comprehensive scheme including composting and waste to energy programmes to be undertaken in the private sector for appropriate funding from the grants recommended by the TFC. It has suggested earmarking of at least 50% of grants for this purpose. (Development and Panchayat Department, Governmet of Haryana)

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