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Environmental Management Systems in Higher Education Institutions in India: A Workplace Management Approach

–Meena Bhandari*, Seema Raj*

Abstract

Environmental Management System (EMS) is the need of hour to attain sustainable environment. The stabilization or execution of EMS in an organization approaches towards the environmental concern. EMS provides the data regarding utilization of natural resources and reduction or reuse of generated wastes. ISO 14001 of EMS is for the prevention of environmental pollution, compliance of environmental regulations and improvement in environmental performance. Under this objective; plan, do, check and act are the four basic principles for the execution of EMS in an organization. This paper discusses the importance of EMS in higher education institutions and its relevance with youth awareness regarding objective of environmental education and its protection. Several case studies are available in Indian context, which always inspire the utility and application of EMS in education system. If higher educational institutions and other organizations/industries in India attain complete EMS practices, we can fill the gaps to approach the perfect environment safety practices.

Keywords: *Environment, Sustainable, Regulation, Compliance, Education*

INTRODUCTION

Environment may be defined as the surroundings in which an organization operates, including air, water, land, natural resources, flora fauna, humans and their interrelation (ISO, 1996).

* Assistant Professor, K. R. Mangalam University, Gurugram, Haryana, India.
Email: seema.raj@krmangalam.edu.in

Environmental Management (EM) is defined as the management of an organization's or company's impact on the environment. An Environmental Management System (EMS) is a planned way of handling an organization's significant environmental influences. The environmental influences include waste, emissions, energy use, transport and depletion of resources. The disparaging and damaging influence of man's economic and industrial accomplishments on the environment is not of recent origin. During recent years, growing population, developmental activities and industrialization have produced negative impacts on the environment. Economic expansion without environmental concerns produces environmental disasters. It is important to control both environmental and natural resources in the country. Global awareness regarding environmental issues has resulted in the development of Environmental management system. Remediation of environmental degradation can only be done by adopting a suitable environmental management system.

It is important to highlight that as per Indian constitution, it is fundamental duty of every citizen to protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion and empathy for all living creatures (Pradip Kumar Das, 2016).

EMS affords an outline for organizations that intend to improve their environmental performance. It is a method and prospect to methodically establish and accomplish pollution prevention objectives for the organization for superior environmental performance. The enactment and creation of EMS was first introduced following Rio de Janeiro Environment and Development Conference. Environmental stewardship becomes the responsibility of all employees of the organization through commitment towards identification and execution of environmental aspect, impact and legal compliance (Chavan and Naik, 2012).

International Standard Organization (ISO) developed the environmental management standard series (ISO 14000), which is accepted all over the world (ISO, 1996). The ISO 14001 standard defines EMS as that part of the overall management system which includes the organizational structure, planning activities, accountabilities, practices, measures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy (ISO, 1996). In early 1990s, national and international EMS certification schemes emerged and since then they have evolved to become standardized and structured so they are attuned and paired with other mainstream standards (e.g. ISO 9001 Quality Standard).

ISO 14001 is an international standard for environment management systems, based upon three main doctrines:

- To prevent environmental pollution.
- To comply environmental regulations.
- To improve environmental performance.

The ISO 14001 is established as a standard having specification for an environmental management system and this can be judged by external agencies. The use of ISO 14001 is voluntary, but is often cited as an obligation of commercial tendering processes.

EMS has four components. It is a cycle that includes plan, do, check and act. If this cycle is followed constantly, it leads to continuous improvement and up-gradation of the system. Fig. 1 shows the EMS cycle which is an abstract description of the different components.

- **Plan:** To establish the objectives, priorities and processes in accordance with the organization's environmental policy.
- **Do:** To implement the adopted processes.
- **Check:** To monitor and measure processes as per environmental policy, objectives, targets, legal and other requirements, and report the results.
- **Act:** To continually act so as to improve performance of the environmental management system.

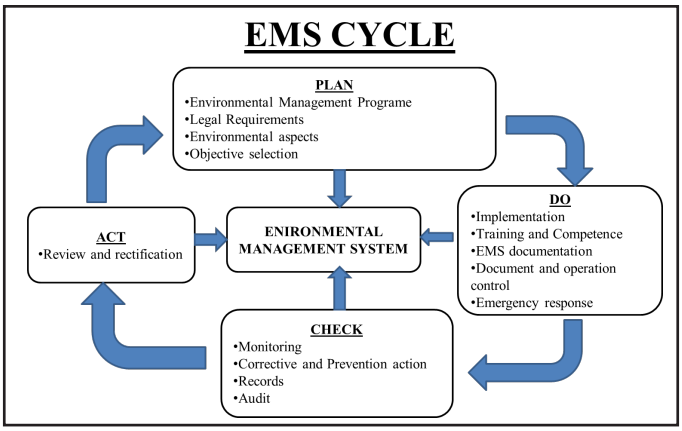

Fig. 1: Environment Management System

The design, planning and execution of an EMS involve significant effort and time as well as commitment on the part of management of the organization. Management must provide complete support to the system and accentuate on the fact that they wish to upsurge their environmental performance (Chavan and Naik, 2012).

Recently, there has been a significant improvement in both awareness and response to the concept of conserving the environment. This can be accredited to the statutory and regulatory requirements of government and from consumer's pressure and the deteriorating ecosystem. Therefore, organizations are constantly under pressure to develop and implement the EMS.

Indian organizations are putting up some sincere efforts to implement EMS and their performance has increased; still, countrywide efforts are not sufficient and adequate. Adoption of EMS, the extent to which EMS elements are used and their status of implementation by the Indian industries help them to reduce pollution and embrace cleaner production activities. Those industries become ISO 14001 certified companies or in the advance stage of ISO 14001 implementation (ISO 14001, 2004). It is observed that Indian organizations are more motivated for ISO 14001 certification rather than taking full benefit of EMS. However, statistical analysis reveals that the overall adoption of cleaner production activities is at the low level. The majority of the Indian organizations seem to be fulfilling EMS out of pressure from competition, customer, government, domestic and export market. Though the compliance levels in Indian industries are far higher than before, India still lags behind in the implementation and has to go a long way (Khanna, 2010).

By adopting EMS, organizations can not only increase their environmental performance and compliance, but will also prevent pollution and conserve resources. By following EMS, they will mitigate risks, enhance their efficiency and reduce the costs. They will also enhance their employee's morale and their awareness of environmental issues and responsibilities. The organization will be able to qualify for recognition/ incentive programmes and its image with public, regulators, lenders, investors will automatically improve.

HIGHER EDUCATION INSTITUTIONS

Higher education institutions (HEIs) can be considered as small cities since they imitate city characteristics, and their activities can produce similar environmental influences (Alshuwaikhat and Abubakar, 2008). HEIs, thus, present an excellent case to showcase and arouse the local neighbourhood for embracing the ecological sustainable practices as successfully implemented by HEIs (Trencher *et al.*, 2013). The apex bodies in higher education system, i.e. universities can deliver

environmental education through its innovative curriculum, research, interaction and collaboration with NGO working in those areas. They can offer proficient and knowledgeable expertise to solve critical local and global environmental issues.

The concept of environmental sustainability is increasing in HEIs, leading to the concept of "sustainable campus" which incorporates environmental sustainability in research, teaching and on-campus other activities (James and Card 2012; Muller Christ *et al.*, 2014). There are several advantages of sustainable campus as it sensitizes campus community, provides clean environment, increases job satisfaction and performance of staff/faculty by providing healthy and safe dwelling, and inspires the local community who witnesses the difference in degree of cleanliness between sustainable campus and the environment in which they are living. Overall, everyone staying in the campus and in neighbourhood gets benefitted because of this concept.

Several EMS frames have been developed for universities including environmental management model (Peter Viebahn, 2002), for example, EMS implementation model for U.S. colleges and universities (Savely *et al.*, 2007), sustainable university model (Velazquez, 2006), ISO 14001 models, EMS self-assessment checklist, higher education 21 programme, the auditing instrument for sustainability in higher education (AISHE) and European EMAS model (Eco-Management and Audit Scheme) (Clarke and Kouri, 2009). The ISO 14001 and EMAS (Eco-Management and Audit Scheme), developed by the European Union, are the two best known formal environmental frameworks. Basically, universities do business in five areas including education, research, operations, outreach, and assessment and reporting (Lukman *et al.*, 2009).

Promotion of environmental education and installation of EMS in the universities is necessary. It can both educate and demonstrate environmental principles by taking an initiative to understand and reduce the influence of its activities on the environment. The process in which the university handles the problems of heating, cooling, waste disposal, waste recycling, efficient use of energy, waste water management, e-waste management, food waste management, transportation, material procurement, disposal of chemical & hazardous waste from labs, noise pollution, use of pesticides in the university farms and other is directly related to the environmental concerns. In addition to maintenance, construction and renovations give great opportunities to advance the environmental conditions of the universities. Role of all departments and

population, policy, planning, implementation, checking and corrective action and review and improvement processes is necessary. Moreover, education of labour class is crucial regarding awareness of environmental literacy and sustainability. So, multidisciplinary course of action for the promotion of environmental education and EMS installation in Universities is required (Salequzzaman and Davis, 2003).

LITERATURE SURVEY

Sekhon (2014) suggested that the main function of education is to create intelligent human beings who work for some common objective. University educated faculty, research scholars and students are central to the embellishment of global environmental literacy and sustainability. Thus, installation of EMS in the universities has been proposed so as to incorporate sustainable practices into planning and operations of the campus (Fig. 2).

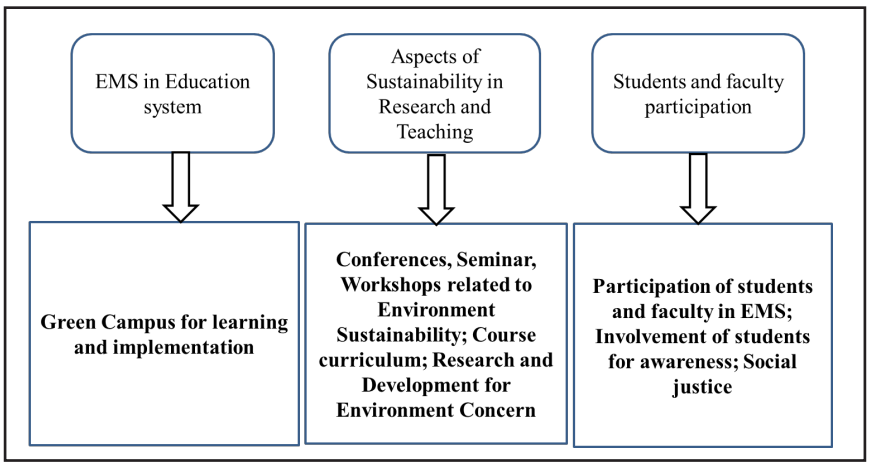

Fig. 2: Environmental Management and Sustainability in Educational Organization

Similar studies and suggestions are also expressed on the potential of students as well. For example, National Assessment and Accreditation Council, India, on the issues of empowerment of students and quality sustenance in education, feels that empowerment of students regarding environmental educational perspective is essential. It is revealed that universities can both teach and demonstrate environmental principles by taking action to understand and reduce the environmental impacts that result from their own activities (Trivedi *et al.*, 2008).

HEIs present in their daily routine provide some indicators, which induce the preservation of the environment, endangering a day-by-day commitment with the cause of environmental conservation and Environmental Management (EM) helps to understand the dynamics of project processes that benefit the environment and alters the ways of relating to the environment (Rauen *et al.*, 2015).

Waqara *et al.* (2016) proposed the environmental management framework for HEIs. They proposed that Initial environmental review (IER) can be shepherded through interviews, questionnaire and observations; followed by strength, weaknesses, opportunities and threats (SWOT) analysis to recognize crucial environmental distresses of the selected university (Fig. 3). Finally, environmental management system execution plan can be established for the university in the light of ISO 14001 guidelines.

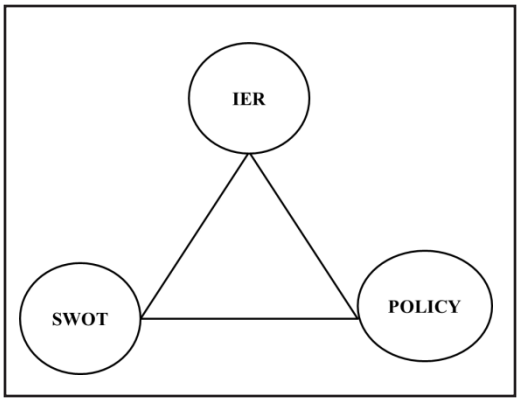

Fig. 3: Environment Management Planning for University

Responsible use of technology helps in identifying and leveraging the inter-connectedness of various technology platforms, provides emergent ways to design for disassembly, recyclability and upgrading which ultimately results in to prototype shift from wasteful linear processes to "closed loop" design and production (Fig. 4). A lot can be learned from natural ecosystems which produce no waste. Educational institutes produce a lot of "waste" such as reams of papers, plastic utilities like computers and other parts, etc. This waste can be managed better or avoided in first place. Educational institutions can be the forerunners by fetching such changes and based on new technology and adopting EMSs (Kumar et al, 2014).

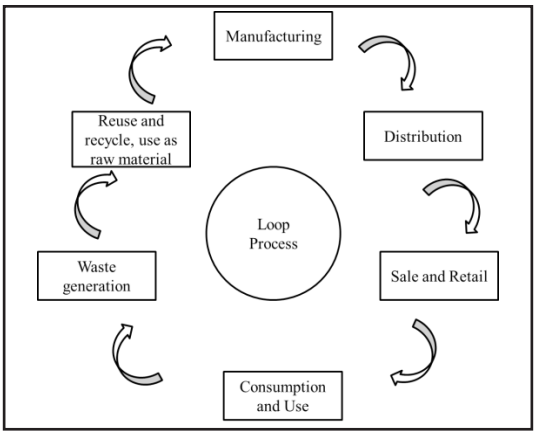

Fig 4: Loop Process for Waste Management

Universities should generate awareness, knowledge and take a lead on environmental preservation and adapt sustainability practices for a better quality of living as well as assimilate sustainability in their educational and research programmes. They may decrease the direct and indirect effects of different activities on the environment by following of EMS guidelines (Jaafar *et al.*, 2017).

Rajamanikam and Poyyamoli (2014) carried out the waste stream analysis in HEIs through a study conducted at Staff Quarters of Pondicherry Engineering College (PEC), an undergraduate institution of Puducherry. They segregated the Solid Waste (SW) into compostable (organic), dry and special wastes. The average household SW generation rate has been found to be 1.760 ± 0.712 kg/day and a high amount of waste generation rate was found in middle income group as compared to low and high income groups. It was observed that kitchen waste constitute the major fraction with 53% of overall solid waste followed by yard waste (12%), plastics (10%), paper (8%), miscellaneous (4%), silt, soil & mud (3%), glasses (2%), textile/leather (2%), metals (2%), wood (1%), household hazardous products (1%), e-wastes (1%) and sanitary waste (below 1%). Kitchen and yard wastes can be recovered as good quality compost as they together accounted for 65% of total SW with Carbon/Nitrogen ratio of 29:1 and calorific value of 1342 kcal/kg having 62% of moisture level. Metal and glass wastes are 100% recyclable while paper and plastic have the reclamation capacity of 98 and 94%, respectively. 95% of staff quarter SW could be mended through source segregation and collection, composting and reprocessing practices.

A healthy tree stores about 13 pounds of carbon annually. By captivating CO_2 at the rate of 48 lbs/year, a single tree can discharge enough oxygen back in to the atmosphere to support two human beings. A single tree produces nearly 260 pounds of O_2 each year. Experimental studies conducted by Thapak and Changani (2011) suggested that seventeen trees can be saved by reduction of one ton of paper usage. So, online technology in educational institutions must be adopted to save paper.

Jose (2016) studied sustainability education, their impact and urgency, in academic HEIs, particularly business school education in India. It was observed students by and large remain unexposed to sustainability and disaster management concepts in their curriculum due to lack of institutional capacity, faculty stimulus and enticements, lack of recruiter interest and limited accessibility to high quality resource material.

Jadav *et al.*, (2014) examined the efforts taken by higher education Shivaji University, Maharashtra, in environmental development in the areas of creating healthy environment and conservation of resources.

Partha Sarathi *et al.* (2017) pointed out that environmental legislation, perhaps, is sufficient and it is necessary to motivate the companies for meaningful environmental reporting as well as to reward them for good quality of environmental reporting similar to the rewards given for good environmental performance.

Dangi and Agarwal (2017) proposed their recommendations for waste management practices for MITS Campus, Gwalior, and suggested that it is feasible to dispose of the waste properly. Waste management can be improved by segregating the waste at the source and then applying the sustainable waste management practices which include composting, vermicomposting, biomass briquettes, charcoal briquettes, Refuse Derived Fuel, etc., and recyclable material can be sold.

A model for implementation of an EMS in the TERI University was studied. The initial environmental review and SWOT analysis were analyzed, followed by preparation of environmental policy and plan according to ISO 14001. As per results of SWOT, the university has been doing satisfactory and is energy efficient and is also doing well in water conservation, waste management, transportation and landscaping. Adoption of EMS also has led to developed environmental consciousness in the minds of young professionals who graduate from the university (Jain and Pant, 2010).

Each evolving university utilizes about eight lakh litres of water and utilizes about 5,333, KWH of electricity per day for their manoeuvres and there are seven lakh universities in India. Ecomap, which is applicable for industries, can also be employed in educational institutions for resource

mapping and optimization. Thus, educational institutions should also be compared with industries and their environmental performance is to be analyzed properly by conducting studies at least once in a year and measures must be adopted so as to make them sustainable (Gobinath, 2010).

A detailed investigation regarding the methods of practices associated with sources, quantity generated, collection, transportation, storage, treatment and disposal of solid waste was made in MNIT Campus, Jaipur, which revealed that solid waste management (SWM) was not adequate in the campus (Upadhyay *et al.*, 2012). Based on the findings, the authors have suggested programmes and policies for improving source segregation, storage of recyclables, collection, transportation and safe disposal methods to facilitate increased recovery rate towards framing an inclusive sustainable waste management system. Sustainable management of municipal solid waste involves life cycle assessment, categorization, reprocessing and reduction in all types of wastes and their proper land filing (Jha *et al.*, 2011).

Through training and communication, the EMS can be properly executed (Sammalisto *et al.*, 2008). The environmental management plan to control environmental distresses for educational institutions in Pakistan has been proposed on the basis of gaps experimented through Initial Environmental Review (IER) and SWOT *(strength, weaknesses, opportunities and threats)* analysis (Waqar *et al.*, 2016).

Table 1 illustrates the EMS related projects undertaken by different educational Institutions of India.

Table 1: EMS Related Projects Undertaken by Different educational Institutions of India

S. No	***Name of Higher Educational Institutions in India***	***Parameter Studied***	***Inference Drawn***	***Reference***
1.	Staff Quarters of Pondicherry Engineering College (PEC), an undergraduate institution of Puducherry.	Solid Waste (SW)	95% of solid waste could be recovered through source segregation, collection of segregated waste , composting and recycling practices.	Rajamanikam and Poyyamoli, (2014)

S. No	***Name of Higher Educational Institutions in India***	***Parameter Studied***	***Inference Drawn***	***Reference***
2.	Academic Institutes	Use of paper	Provides understanding about consumer behaviour regarding paper use, substitution of online technology	Thapak and Changini (2011)
3.	Business school education in India.	Sustainability education, their impact and urgency, in academic higher education institutions particularly business school education in India.	Students remain unexposed to sustainability and disaster management concepts in their curriculum due to lack of institutional capacity, faculty stimulus and enticements, lack of recruiter interest and limited accessibility to high quality resource material.	Jose (2016)
4.	Shiva ji University, Maharashtra	Examined the efforts taken by Shiva ji University, in environmental development in the areas of creating healthy environment and conservation of resources. University has done a green audit to monitor the use of different environmental factors like water consumption, electricity consumption and solid waste management in its campus.	Water conservation in two water tanks in the campus, Creation of international level state energy park, Effective street light, University canteen is attached to the vermicomposting site. The university practices No Vehicle Day once in a month to save the fossil fuels and to reduce the Carbon footprint. Students participation in the plastic ban, river pollution rally, anti-idol immersion, bird watching events.	Jadhav *et al.* (2014)

S. No	***Name of Higher Educational Institutions in India***	***Parameter Studied***	***Inference Drawn***	***Reference***
5.	MITS Campus, Gwalior	waste management practices	Waste management can be improved by segregating the waste at the source and then applying the sustainable waste management practices which include composting, vermicomposting, biomass briquettes, Charcoal briquettes, RDF etc. and recyclable material can be sold.	Dangi, and Agarwal, (*2017)*
6	TERI University, New Delhi	Carried out IER and SWOT Analysis	As per results of SWOT the University was doing satisfactory energy efficient and water conservation, waste management, transportation and landscaping. It also lead to developed environmental consciousness in the minds of young professionals who graduate from the University.	Jain and Pant (2010)

S. No	***Name of Higher Educational Institutions in India***	***Parameter Studied***	***Inference Drawn***	***Reference***
7.	Higher educational institutes.	Initial environmental review (IER) through interviews, questionnaire and observations; followed by strength, weaknesses, opportunities and threats (SWOT) analysis to recognize crucial environmental distresses of the selected university.	Suggested programmes and policies for improving source segregation, storage of recyclables, collection, transportation and safe disposal methods to facilitate increased recovery rate towards framing an inclusive sustainable waste management system. Plan can be established for university in the light of ISO 14001 guidelines.	Waqara *et al.*, (2016)
8.	MNIT Campus, Jaipur	A detailed investigation of practices associated with sources, quantity generated, collection, transportation, storage, treatment and disposal of solid waste	Solid waste management (SWM) was not adequate in the campus	Upadhyay *et al.*, (2012)
9.	Educational Institutes	Educational institutes produce a lot of 'waste' such as reams of papers, plastic utilities like computers and other parts etc.	This waste can be managed better or avoided in first place. Educational institutions can fore-runners by fetching such changes and based on new technology and by adopting environmental Management Systems	Parveen Kumar *et al.*

S. No	***Name of Higher Educational Institutions in India***	***Parameter Studied***	***Inference Drawn***	***Reference***
10	Shivaji University, Kolhapur,	Watershed Management	Landscape identified for watershed management and the maps including the drainage pattern, contour map, elevation map and land use/ land cover map were prepared.	Ingavale *et al.* (2013)

CONCLUSION

- Promotion of environmental education and installation of the EMS in the universities is indispensable.
- It can teach and validate environmental principles to understand and decrease the impact of its actions on the environment.
- It provides the understanding in which university handles the problems of heating, cooling, waste disposal, waste recycling, efficient use of energy, waste water management, e-waste management, food waste management, transportation, material procurement, disposal of chemical & hazardous waste from labs, noise pollution, use of pesticides in the university gardens, etc.
- Maintenance, construction and renovations in the university may give great prospects to enhance the environmental conditions of the universities.
- Role of all departments and stakeholders, environmental policy, planning, implementation, checking, and corrective action, and review and improvement processes are absolutely essential.
- Education and training of labour class is crucial for environmental literacy and sustainability.

So, a multidisciplinary course of action and planning for elevation of environmental education and EMS installation in universities is mandatory.

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