

MANAGING NATURAL RESOURCES A SPECIAL ALLUSION WITH WASTE MANAGEMENT FOR SUSTAINABLE LIVELIHOODS

T. Kumuthavalli^a

^a Department of Lifelong Learning,
Bharathidasan University, Khajamalai Campus, Tiruchirappalli, India.

^a Corresponding author: kumdllbdu@gmail.com

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Abstract: This introductory note sets the tone for what follows in the subsequent pages on natural resource management linked sustainable development of human and other resources, with special reference to waste management. India is endowed with a rich and vast diversity of natural resources. Its development and management plays a vital role in production and development. Integrated Natural Resource Management is vital for fulfilling our millennium development goal of poverty reduction, environmental sustenance and sustainable economic development. National and International Policies on Management of Natural Resources envisages that the Natural resources of the country should be developed and managed in an integrated manner by applying effective waste treatment. The basic framework for applying a socio-ecological system approach to natural resource management has been set, which forms the basis for what follows in the subsequent pages.

Keywords: Natural Resources Management, MGDs, Waste Management

INTRODUCTION

India is the second most populous country, which has about 16% of the world population and 25% of the land area. Rapid industrialization last few decades have led to the depletion of pollution of precious natural resources in India depletes and pollutes resources continuously. Further the rapid

industrial developments have, also, led to the generation of huge quantities of hazardous wastes, which have further aggravated the environmental problems in the country by depleting and polluting natural resources. Therefore, rational and sustainable utilization of natural resources and its protection from toxic releases is vital for sustainable socio-economic development. Natural Resource Management (NRM), conservation and restoration are applications of ecological principles by humans. In practice, successful management of natural resources, conservation and restoration must coordinate complex time-dependent ecosystem processes with human dynamics. We need a clear understanding of our self and how we either facilitate or hinder the progress toward healthy ecosystem functions. Successful management implies continuous learning.

*Assistant Professor, Department of Lifelong Learning, Bharthidasan University, Tiruchirappalli, email: kumdllbdu@gmail.com

NATURAL RESOURCE MANAGEMENT

'Natural Resource Management' refers to the management of natural resources such as land, water, soil, plants and animals, with a particular focus on how management affects the quality of life for both present and future generations (stewardship). Natural resource management deals with managing the way in which people and natural landscapes interact. It brings

together land use planning, water management, biodiversity conservation, and the future sustainability of industries like agriculture, mining, tourism, fisheries and forestry. It recognizes that people and their livelihoods rely on the health and productivity of our landscapes, and their actions as stewards of the land play a critical role in maintaining this health and productivity.

THE NEED TO MANAGE OUR RESOURCES

Everything that we use or consume - food, clothes, vehicles, tools, petrol, furniture, medicines, books, toys, and the infrastructure of electricity, roads bridges, and buildings are obtained from resources on this earth. The only thing one gets from outside is the sun's energy and even this is converted by the biotic components of the environment and by physical and chemical based processes on the earth before one makes use of it. The recent concerns about the environment and Natural Resources (NR) have arisen because of the increasing awareness of the finite nature. What appeared as to be plentiful earlier, clean water and air, fuel energy, land for food, forests and trees are becoming increasingly scarce. If one depletes them too fast, without the possibility of their regeneration, one will be creating untold misery for oneself and for the future generations.

Both the governments and citizens not managed the environmental resources properly over the last 50 - 100 years. The reason is one has not anticipated some of the impacts of industrial and technological advancement. When the industrial revolution started some 250 years ago, the world population was at 600 million - that seems like a lot of people but now the world population is now more than ten times at 7.01 billion and will grow to 8 billion by 2025! Better health and increased age limits have resulted in a net gain of over 200,000 people every day. Side by side, the global economy increased remarkably between 1960 and 2011. One has experienced the fastest pace of development and modern lifestyle requirements ever achieved by humans.

The resource that our modern cities demanding are to meet this demand worldwide, food production increased by roughly two-and-a-half times, water use doubled, wood harvests for pulp and paper production tripled, installed hydropower capacity doubled, and timber production increased by more than a half. For example, more land was converted to cropland in the thirty years since 1950 than had been converted in the whole of the period 1700 to 1850 (The Biodiversity Synthesis Report in the UN Millennium Ecosystem Assessment project). Forty percent of the earth's land surface is now used to grow crops and graze animals.

While we exploit these natural resources the amount of damages caused to the environment is staggering. Major rivers like the Ganga and Yamuna, the life line for the northern Gangetic plain food belt have become gravely polluted. The reason lies in industrial pollution and urban municipal waste. Agricultural runoff from over use of chemical fertilizers and pesticides add to soil contamination. The pressure to have more food crops, commercial crops and animal husbandry with the help of modern agricultural practices has led to the stripping of large areas of forests and using great amounts of water and energy. As a result large scale soil erosion and local climate change have occurred. Air pollution due to automobile exhausts and industrial emission levels has caused green house gases to rise and cause global warming. All these have combined to deplete and endanger some of our most valuable natural resources.

MILLENNIUM DEVELOPMENT GOALS (MDGS)

In the historic year of 2000, 189 nations pledged to form the eight 'Millennium Development Goals (MDGs) to help people to overcome extreme poverty and multiple deprivations. MDGs are set to be achieved by 2015 and are most strategically designed, broadly supported, comprehensive and specific development goals the world has ever agreed upon. These eight time-bound goals i.e. Eradicate extreme poverty and hunger, Achieve universal primary education, Promote gender equality and empower women, Reduce child mortality rates, Improve maternal health, Combat HIV/AIDS, malaria, and other diseases, Ensure **Environmental sustainability** and Develop a global partnership for development provides concrete framework tailored to suit specific development needs

Goal 1

To achieve the goal of eradicating extreme poverty and hunger, India must reduce the proportion of people below poverty line from nearly 37.5% (in 1990) to about 18.75% by 2015.

Goal 2

To achieve universal primary education, India should increase the primary school enrolment rate to 100 % with decreasing number of students and completely wipe out the drop-outs by 2015 against 41.96% in 1991-92.

Goal 3

To ensure gender parity in education, India will have to promote female participation at all levels to reach a female male proportion of equal level by 2015.



Figure 1: Indian Scenario

Goal 4

It aims at reducing 'under five mortality rate (U5MR)' from 125 deaths per thousand live births in 1988-92 to 42 in 2015.

Goal-5

India should reduce maternal mortality (MMR) from 437 deaths per 100,000 live births in 1991 to 109 by 2015.

Goal-6

Under this goal, though India has a low prevalence of HIV among pregnant women as compared to other developing countries, yet the prevalence rate has increased from 0.74 per thousand pregnant women in 2002 to 0.86 in 2003. This increasing trend needs to be reversed to achieve MDG 6.

Goal-7

The proportion of population without sustainable access to safe drinking water and sanitation is to be halved by 2015 and India is on track to achieve this target.

Goal-8

Develop global partnership for development. (It includes financial support from developed countries. For example Official Development Assistance – ODA, etc).

These Millennium Development Goals also stressed the importance of managing the natural resources and treating the wastes.

WASTE MANAGEMENT

Merriam-Webster defines *waste* as "refuse from places of human or animal habitation." The World Book Dictionary defines waste as "useless or worthless material; stuff to be thrown away.". **Zero Waste America** defines waste as "a resource that is not safely recycled back into the environment or the marketplace."

Degradation of NR by wastes

Waste is Wealth in the sense that in India's villages, and other rural economies, raw food waste is worked into the soil around plants or coconut trees, or added into a backyard pit with the straw bedding from cattle-sheds, to decompose naturally into compost that is fully used in the fields every monsoon. But there are dangerous impacts through improper treatment of wastes which almost spoils the livelihood. There are number of categories in waste are as follows: "**hazardous waste**" means a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may - (A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed. "**medical waste**" means any solid waste which is generated in the diagnosis, treatment, or immunization of human beings or animals, in research pertaining thereto, or in the production or testing of biologicals. **mixed waste**" means waste that contains both hazardous waste and source, special nuclear, or by-product material. "**solid waste**" means any garbage, refuse,

sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities. **"transuranic waste"** means material contaminated with elements that have an atomic number greater than 92, including neptunium, plutonium, americium, and curium, and that are in concentrations greater than 10 nanocuries per gram, or in such other concentrations as the Nuclear Regulatory Commission may prescribe to protect the public health and safety. **"high-level radioactive waste"** means - the highly radioactive material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations. **Low-level radioactive waste** means radioactive material that is not high-level radioactive waste, spent nuclear fuel, transuranic waste, or by-product material is classified as low-level radioactive waste. They have been causing serious negative effects on our natural resources. There is a need to treat these wastes effectively for leading trouble free environment which is almost essential for sustainable livelihood and its development.

BEST PRACTICES OF WM FOR NRM

Container Management

(a) Wastes should be identified prior to arriving at the Waste Storage area. (b) Waste containers storing unknown or uncharacterized waste should be stored separately until they are characterized and labeled. (c) Maintain separate waste containers for compatible waste streams (d) Log chemicals and quantities added to waste containers as chemicals are added. (e) Train personnel on safe procedures to transfer chemicals to waste containers. (f) Do not store waste containers where they have the potential to freeze or are exposed to high heat. (g) Waste containers should be in good condition. (h) Clearly mark the area as a hazardous waste storage area. (i) Make sure waste containers are compatible with the waste type they are expected to contain. (j) Keep an adequate spill control kit nearby (k) When handling waste containers use mechanical aids such as drum lifts, drum hand trucks, and drum dollies. (l) Make sure container caps are secure. (m) Train personnel on spill clean up procedures. (n) Maintain good general housekeeping. Keep aisles and walkways clear. (o) Equip waste transport vehicles with spill containment equipment. Etc.,

Drains

(a) Maintain good housekeeping. Keep aisles clean and free from litter and debris. (b) Store containers in secondary containment to prevent uncontrolled spills. (c) Prevent and respond to spills quickly. Do not let material enter the floor drains, the sanitary or stormwater collection systems. Keep adequate spill response kits and equipment available to respond to spills of oil, fuel, grease and train responders in proper response procedures. (d) Clean up any spill promptly.

Emergency Planning

(a) Identification of potential emergencies. (b) Roles and responsibilities of management, employees and coordination of roles with potential off-site responders such as police and fire departments or local hazardous materials response teams. Identify facility emergency coordinators and means of contact. (c) Description of how emergencies might be recognized and communicated within the facility. (d) Identify evacuation routes, safe rally areas and procedures for accounting for personnel, including visitors. (e) Describe procedures for activating facility alarms and notifying local emergency response services. (f) Describe procedures for personnel to obtain emergency medical treatment and first aid. (g) Describe amount and types of training in-house personnel receive to be able to respond to emergencies consistent with the roles and responsibilities identified. (h) Provide an inventory of Personal Protective Equipment and other equipment and tools for use in emergency situations.

Inspections

Inspections should examine the waste storage area for: (a) Spills (b) Leaks (c) Container damage (d) Rust and corrosion (e) Overflows (f) Condition of secondary containment (g) Operation of monitoring equipment (h) Readiness of emergency response PPE and equipment (i) Container or tank levels (j) Container caps in place and sealed when material in not being added or transferred (k) Incompatible materials stored near on another (l) Signage is present and legible

Inspections should be documented with specific findings, recommended corrective actions and assigned responsibilities and time frames for completion of corrective actions. Follow-up inspections should include determination of implementation of corrective actions.

Manifests

(a) Hazardous waste manifests are legal documents and it is recommended that a limited number of personnel be authorized to sign manifests. (b) Personnel authorized to sign manifests must be

trained in the school's hazardous waste management, administrative and recordkeeping procedures. (c) Prior to signing the manifest, the authorized individual should verify that: Containers are properly labeled. Correct types and quantities of wastes are listed on the manifest. Containers are in good condition and appropriate for the type of waste. (d) Only direct full-time employees should be authorized to sign hazardous waste manifests. Students, contractors and part-time employees should not sign manifests.

Waste Reduction

Toxic use reduction and waste minimization activities apply not only to wastes but include the management of releases to air, water, and generation of solid and non-hazardous waste. Even when not required by environmental regulations, the following best practices are recommended.

Air Quality

(a) Implement microscale chemistry techniques where possible. (b) Make sure the caps and container lids on volatile chemicals are secure. (c) Do not store chemicals in laboratory fume hoods. (d) Substitute less toxic or less volatile chemicals in processes where possible.

Wastewater

(a) Review processes and procedures for opportunities to minimize wastewater generation. (b) Use organic dishwashing solutions instead of chromic-sulfuric acid mixtures when washing glassware if possible.

Hazardous Waste

(a) Minimize the amount of chemicals stored in the lab to the minimum quantities needed to avoid having to dispose of chemicals that expire or deteriorate during storage. (b) Develop an inventory of chemicals no longer needed in lab that could possibly be used by another. (c) Evaluate ways to reduce the amount of toxic chemicals used in lab procedures. (d) Explore methods to re-use or recycle spent solvents, unused paints, cleaners, and other chemicals. (e) Avoid contaminating non-hazardous waste streams with hazardous, radioactive or biohazardous material.

Non-Hazardous and Special Waste

(a) Use two sided copying (b) Make procedures, manuals and other documents available electronically (c) Use e-mail instead of hard copies (d) Share trade periodicals (e) Use reusable containers (f) Use rechargeable batteries

CONCLUSION

Clearly, a good case exists to manage our natural resources, conserve the environment and have proper waste disposal in a more scientific and sustainable manner, with a long-term perspective rather than for short term gains. The sustainable livelihoods of the Human beings and other beings are resting on the conservation, restoration, regeneration of the natural resources. Governments both central and state should also ensure that the proper waste management procedures and rules and strictly avoid the hazardous materials in common usage practices. Whereas conservation and utilization of natural resources in a sustainable manner are depends on how the citizens and governments are accountable to the social responsibilities. At the same as students, youth and responsible professions can also contribute immediately to conserve our natural resource at our own level. To ensure sustainable use of resources in our environment utilize the principle of 'The Three R's.' - Reduce, Reuse, and Recycle.

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