THE PLACE OF ENVIRONMENTAL CHEMISTRY IN ECONOMIC REHABILITATION

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Abstract

Attempt has been made in this paper to explain the discipline, environmental chemistry. Activities of man that resulted to the disruption of equilibrium in the ecosystem were also mentioned. Different wastes produced as a result of these activities were outlined. Then, how these wastes can be turned into new products was discussed. Finally, some recommendations were offered to the Federal Government to help in boosting these recycling industries. This will help in increasing our national financial state.

Introduction

The issue of environment has been a source of concern to all. Our environment can be said to be made up of land, water, air and living things. These three components were created pure for our use. They are indispensable to us. There are interactions among the three components of environment i.e. there are land-water, land-air, and water- air interactions. For this reason, we find water (as moisture) in air, in soils, suspended solids in air and water and dissolved air, particularly oxygen (as dissolved oxygen) in water, dust particles and water vapour in air. Man stands in the midst of all these interactions, taking interest as part of the system and studying the effect they all have on him.

Environmental Chemistry, therefore, is the study of all systems of land, water, air, life forms., technologies of the materials processing, energy conversions, etc. that surround man (Ademoroti, 1996). It can also be defined as a discipline that involves the study of the sources, actions/ reactions, impacts/ effects and the fate of chemical species on air, water and soil. It also involves the study of effects of technological ideas. It is encouraging to note that in recent years, many chemists have become deeply involved in the investigation of environmental problems. Environmental Chemistry is an exciting area that combines the application of chemical principles with the maintenance and enhancement of environmental quality which is the biggest challenge facing human- kind today.

In the past, pressures on the environment have typically been localised, leading only to local or regional poverty (Greene, 1991). For example, communities responsible for overgrazing their land or polluting their water supply would often move to new areas. But, even if they did not move, local hunger and disease did not necessarily affect the continued well-being of societies in neighbouring regions.

However, in recent times, the situation is different. Growth in world population and economy, increased and widespread industrialization and the development of international trade and society have occurred on such a scale that severe environmental damage and unsustainable exploitation of the earth's resources are taking place on a global scale.

Despite all human efforts to influence its environment, the tendency to exploit it as if it were an inexhaustible resource has repeatedly led to one disaster or the other. Examples of such damage and unsustainable exploitation are as follows:

Oil and mineral resources are being consumed rapidly by the industrialized states, thereby depleting global reserves at the cost of developing states and future generations. Many of the earth's seas and oceans are being overfished. Also, the dumping of waste products into the air, sea and land has reached a level at which pollution has become a severe international or global problem. Huge quantities of waste are being dumped into the sea, leading to potentially dangerous concentrations of hazardous chemicals, heavy metals and radioactive materials. Before looking at the economic value of these wastes, let’s see how they are formed.

Types of Wastes

Any untreated or discarded solid material from residential, commercial, industrial, mining and agricultural activities that cause environmental problem may be termed solid waste. It is those wastes which have been rejected for further use and which can neither be transported by water into the streams, nor can readily escape into the atmosphere. There are many ways of categorizing solid waste but in this paper, the classification would be on the source of the waste.

(a) **Domestic and Municipal Wastes:** The domestic waste include waste generated from household preparations like cooking and serving of food; wastes from handling, storage and sale of produce and meat. This is generally called garbage and there is the rubbish waste which is made of combustible substances (primarily organic); leaves, paper, woods, rags, grass, flower trimmings, etc. Ashes which is the residue from fires used for cooking is also inclusive.

Municipal waste could be summarized under three headings which are:

i) Bulky wastes; which include abandoned motor vehicles or their parts, trees, palm fronds, stumps, etc.

ii) Street refuse which include street sweeping, leaves, litters, glass, etc. and iii) Dead animals, these are small animals; like fowl, cats, dogs, goats, sheep or large animals like donkeys, cows, horses or even sometimes unclaimed dead human bodies.

In fact, it is almost impossible to enumerate all the materials encountered in a typical municipal waste dump. They are many and include materials in various stages of decay. These dumps form a haven not only for worms, flies, insects, vermin, rats and rodents, but also for snakes. The dump is the resting-place for garbage and rubbish from different sources.

(b) **Industrial and Commercial Wastes:** Many commercial houses and industries do not have an organized method of disposing their wastes. They are dumped indiscriminately thus constituting a menace and if they are toxic or in any way harmful, they become hazardous to the health of the public. The industrial waste here could be from factories, power plants, treatment plants etc. The variety and volume of this depends on the type of industry and level of industrialization of the district. The solid wastes resulting from industrial and manufacturing operations are from tanneries, breweries, textiles, dyeing, food processing, metal scraps, plastics, rubber and many others.

Commercial wastes are from markets, stores, shops and abattoirs. The type of waste here is rubbish and it includes combustible (mainly organic substances): cloth, cartons, cardboard, leather, rubber, etc. Then non- combustible (primarily inorganic): metal, tins, cans, metal foil, bricks, ceramics, glass, bottles etc.

(c) **Agricultural Wastes:** These wastes are made up of unwanted parts of crops during harvesting season. Examples are maize sheaves and cobs, maize stalks, stalks of guinea - com or different kinds of chaff from grains, yam vines, cassava stems, yam and cassava peelings etc. They run into hundreds.

Apart from these are fall -outs from fertilizers, pesticides and herbicides which farmers use on their farm to increase farm yields, fight pests and weeds.

(c) **Others:** These may include hazardous waste from a variety of sources. In this group we find radioactive wastes from nuclear power plants, laboratories, hospitals, etc. Toxic wastes such as heavy metals, pathogenic and pathological wastes.

Suggested Role of Environmental Chemistry in Economic Rehabilitation

The role of Environmental Chemistry in economic rehabilitation can be seen in the careful management of the waste produced. Most refuse contains a wealth of valuable raw materials that can easily be reused or recycled, to produce new products. In general, recycling conserves not only material resources but fuel reserves as well and in so doing will help to boost our economy and provide jobs for the unemployed. Environmental Chemistry can help us to achieve the following economic boosts and reliance:

Here, re-used waste donates multiple use of a given material or product. This is typified by the returnable beverage bottles or washed polythene and used again. In doing this, work would be provided for some people to earn a living and the person that gathers these bottles will also gain by selling same to the companies that need them.

Also, some wastes can be recycled to produce new products. Examples of such activities are recycling of used papers. Papers thrown into waste-paper baskets are mechanically ground and made into news print

paper, tissue paper, writing and packing papers. Recycled paper and plastics have turned out to be competitive at end of the day. Also, conversion of cullet back into glass bottles is a common example of recycling. Most glass factories operate at some 15- 25% cullet content.

When an item cannot be used in its present condition, it must be destroyed and treated somehow to extract its useful raw materials. For example, used tyres can be shredded and converted to raw rubber which could be used again.. The use of pyrolysis has been found useful in this area. Old vulcanized rubber could be recycled by destroying the crosslinkages (i.e. Vulcanization sites) by means of chemical reagents. Rubber and tyres can also be burnt directly as fuel and this aspect will also help in local fuel consumption and thereby increasing our foreign reserve for other economic purposes.

Furthermore, spoilt meat can be rendered and converted to tallow and animal feed which can also help in the area of our animal poultry. Tallow could be used in the production of candles, soap, lubricants etc. (Turk, Wittes, Turk and Wiltes, 1978). This tallow can help people to be self -employed by establishing small and medium scale industries. Also, some waste products can be reclaimed, this is simply recovery of a component of waste for use in a manner different from its initial function. For instance, carcasses of motor vehicles which are abandoned are collected, washed and melted to remove the dross and recast. In this way, such abandoned vehicles have been converted to fan blades, cutlasses, hoes and many other utensils.

In traditional methods, the garbage after the removal of metals, plastics and glass is first ground and innoculated with nutrient source such as cow, goat, or dog dung or chicken droppings or night soil, and a filler such as wood chippings or ground com -cob and related materials. The mixture is usually turned over twice a week. At the end of the operation, the humus - like materials that remain contain less than 12 of each of the tree primary fertilizer nutrients. The humus may be enriched by adding inorganic fertilizer if necessary. The final step is then ground and bagged for ultimate sale as soil conditioner and as partial replacement for fertilizer (Ademoroti, 1996).

Finally, recycling conserves not only material resources but fuel reserves as well. For example, nearly twenty times as much fuel is needed to produce aluminum from virgin ore as from scrap aluminum, and over twice as much is needed to manufacture steel and paper from virgin material as from scrap.

Conclusion

In conclusion, this paper has tried to look al Environmental Chemistry as a discipline and what it has tried to do or is trying to achieve in our society.

It has also looked at different wastes and how they can be resourced to increase our depressed economy and produce jobs for the unemployed. Recycling of materials has been an old technique in chemistry and chemical technology where it has served in concentration, purification and conservation of available resources.

These days, environmental considerations as well as the dwindling fossil resources make recycling the technique of the future. The problem however is that at present, in most cases, economic considerations have not made it a very attractive venture in our society. Often, it is cheaper to go for new material than to recycle a disused one. The paper has tried to proffer some recommendations to our Federal Government.

Recommendations

i) Industries respond to a variety of pressures, not only economic but also social, political and legal. Therefore, Federal Government should give federal grants to industries to encourage waste recycling, ii) Another way to accelerate recycling rates is to pass laws that encourage re-use. This could be done by imposing a mandatory tax on all non-returnable bottles, so that the companies that produce them will begin to make use of the bottles again, iii) The environmental groups like FEPA should mount advertising campaign to educate people about the problems of beverage containers; and numerous recycling centres should be established.

iv) People should be educated not to be disposing their wastes anyhow, v) Dumping centres should be established and people should be encouraged to dump their refuse there, vi) Finally, government should put more tax on disposing new cars and then use that

income to
reclaim old cars.

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