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Solid wastes management - aspects and practices

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It is the intention of this paper to create a possibility to transfer knowledge to and exchange opinions between the participants in this 10th W.E.D.C. Conference in the far much neglected field of solid wastes management. The rapid emergence and multiplication of complex scientific technological and social problems outpaces the ability of any nation, however rich and determined to seek all the prerequisite solutions to these problems and to explore all the alternative options open to it. A global cooperative effort is the only logical response to the issue challenging humanity. It is for this season that nations seek to share knowledge and experience pertaining to their common problems and for the attainment of common goals.

It is a fact that directly or indirectly, all human activity produces effects that produce an environmental impact on the receiving media. The contamination that inundates the world does not end in the air, in the waters and in the soil. Nor does it appear in the form of waste but goes so far as to deeply influence our daily lives. It even manages to enter our bodies. It is present within us and can modify and change not only our surroundings but even our very behavior, reducing possibly even our degree of freedom.

Among all the environmental problems faced by mankind, management of the ever increasing quantities of wastes produced by society is certainly one of the most urgent one. The problems of waste management differ, of course from country to country and solutions in certain area cannot be simply applied elsewhere.

Man has always produced solid wastes! Today, however, waste production is greater due to the freightenings estimates of population explosion. Hence more wastes are produced and more discarded products accumulate from our way of life. The "No deposit, No return" practice is convenient for a moment but "throw away" objects and convenience packing materials finally become a large part of our solid wastes problem. They accumulate because they are not easily broken down or degraded. It seems that man as the supreme being of creation has not adapted to what we call living together, as one with other beings of the creation, his immense technological creativity having led him to violate the laws of nature to extents that may even be irreversible.

Therefore, it is imperative that the proper management of waste is an essential prerequesite of a safe and pleasant environment. The progress of the waste management practice must be derived from specific technical developments and by the establishment of appropriate institutions. Before changing an existing system, the local situation must be carefully studied and, preferably the proposed system should in the first instance be tested on a pilot project.

Solid wastes management development activity entails a variety of socio-economic consequences and only very thorough and rational planning can lead to an actual improvements in the solid wastes collection, transport, treatment and disposal. Changes are necessary in the use of the considerable scientific and technological knowledge which has been used in ways now recognised to be harmful. It must be kept in mind that while designing solid wastes management systems it must provide direct or indirect environmental benefits.

Wastes management facilities may be publicly or privately owned. Conflict may arise in wastes management system from the fact that there is divergence between "private costs" and "social costs". Wastes management problems must for these reasons be viewed on the wider context of their economic and environmental implications. It is very important to rather plan at an early stage, than to consider and allow for the making of changes in the existing infrastructure.

Now there is a new trend that most of the countries feel that they need to pay more

attention than in the past to deal with the environmental factors in order to improve the quality of life of their population and to economically and wisely use their resources in order to develop an environmentally sound solid wastes management programme, as the existing models of development have been misappropriate and unsatisfactory to cope up with the new problems. Hence a satisfactory solution must be found to the problems related to wastes managemnet aspects and practices in order to control the environmental related diseases. To achieve this the quality, role and the establishment of an information system to improve the flow of knowledge on all matters related to solid wasts management is a must.

The necessity to establish new institutions or the inclusion of this knowledge by way of syllabuses in the existing technical and professional institutions will be an asset in reducing the environmental and health risks, as a result of the application of bad solid wastes management practices.It is clear that in most countries financial constraints are the limiting factor in arriving at a proper waste management. To overcome this aid could be obtained by the respective government from the World bank, WHO, UNEP, US AID, etc., as these international organisations are deeply concerned with the development of good practices of the solid wastes management.

Essential to any wastes management practice is the knowledge of the composition of wastes and draw up a successful programme. Waste sampling and refuse analysis programme must be initially carried out. Wastes management may be described as a system incorporating all the measures necessary to ensure the safe and most economic methods of disposing wastes. Everybody knows that wastes cannot be wholly destroyed,they can only be converted to substances which eventually reach the air, soil or water with minimum environmental effects.

Solid wastes is a general term used to define waste material other than liquids, produced as a result of domestic,commercial industrial or agricultural activities. By definition, liquid and gaseous wastes are excluded but no hard and fast line can be drawn in the case of sludges from some industrial premises, which are partly liquid and partly solid. As an extension of solid wastes, the expression "Solid Waste management" is now used to embrace all activities involved in the storage, collection, transports, treatment and disposal of solid wastes.

The wastes management practice requires a multidiamensional approch. It doest not stop with the financial approch alone, but institutional legal, social and technological considerations also must be taken into account in planning, execution and control of wastes mangement. It may be useful that we skip through in brief, some of the aspects and practices in solid wastes management in a few countries to get an idea of good and bad practices.

Srilanka

So far no serious studies on refuse in any urban areas have been carried out. Most of the present practices in solid wastes managment are developed on the basis of past experiences.The wastes collection gets preferential treatment over the disposal systems, and due care is not given to the improvement of the techniques of disposal menthods.The entire Colombo area is not covered with sewerage system and as a result the cleansing division is shouldered with the responsinility of managing the collection and disposal of night soil,catch-pit and septic tank contents. The contents are tipped into the sewerage treatment works,which have more or less outlived the period of usefulness.The effluents which are untreated are discharged into the neighbouring rivers which cause pollution of water.

The wastes collected are disposed dumping in the name of sanitary landfill due to severe financial constraints. As a result of poor environmental sanitation practices nearly 60% of the total number of patients who come for treatment in hospitals are found to be suffering from preventible diseases.

The quality of labour engaged in solid wastes mangement deserves commendation and the very same manpower from Srilanka who are engaged in the public cleaning services in Middle East have earned a good reputation in this field. inspite of possessing good labour, the achievements of solid wastes management services in Srilanka as a whole can be counted on fingers and the situation is not good as it should be. This example is very clear to illustrate that quality of man-power alone is not the sole criteria in deciding the success of wastes management.

India.

A vast land with an urban population of 110 million (1971) census generates approximately 15 x 10^6 tonnes of solid wastes every year and an estimated US.$70-100 million was being spent annually in urban areas alone during the period 1971-73 Inspite of incuring a considerable amount, this activity pose a large number of persistant problems.The collection and

disposal is labour intensive. The man-power provision for collection, transport and disposal of wastes per million inhabitants served is about 1000-3000 persons. To obtain best possible performances at the least possible expenditure, the workers should be properly organised. The performance in turn can be judged, by the efficiency of collection as evidenced by absence of nuisance, and by proper disposal of the wastes.The disposal of solid wastes did not receive as much attention as it should. The collection and transport has to be properly organised,so that the same job can be done more effectively with reduced cost. Uncontrolled dumping was a common practice. In many cities proper dust-bins are not provided with the result city refuse get mixed with dust and earthy matter.

Saudi Arabia

Saudi arabia's solid wastes management is remarkably at a high level and it depends largely on imported technology and man-power. Manufacturers ,suppliers, and consultants in industrialised nations have perfected machinery, systems and services which are used for the special needs of the country's solid wastes management programmes. The operations of services are given on contracts and its supervision is done by the respective municipalities and industrial organisations. In this context special mention must be made on the solid wastes management of the Arabian American Oil Company, who operate a model service through its contractors. The author himself is engaged by a well known Establishment "Hassan Mansoor Sihati" who operates from Dhahran.

In the industrial areas of "ARAMCO" the cleansing of public toilets are usually done by cleansing crew, who travel in mobile vans to remote points alongwith their cleansing materials and equipments. The collection of wastes is done in covered compact vehicles and disposal is strictly done in properly maintained sanitary landfills. The Saudi Arabian government has set-forth environmental standards and is strictly enforcing them.

Singapore

Singapore's 2.4 million citizens transform their 238 square miles tropical island nation from a slum ridden former British colony into a bright modern land. It will be of great significance to review the solid wastes managment services in the emerging Singapore,the hardworking republic with communial harmony, that enjoys prosperity, while honouring ancient ways. The Singapore city with nearly a million inhabitants has a separate cleansing department, within the memory of even the employees with the longest record of service. A salient feature of the cleansing department is the extensive use of its legal powers in the enforcement of the laws.

A clause of para 903 section (4) of the local governement ordiance helps to put teeth into the bye-laws, to presume that refuse in front of a dwelling or commercial building is the responsibility of the occupier of the premises.Singapore charges for permits to distribute hand Bills, as these eventually add to the work load of the cleansing department. It is not surprising that the department is able to maintain an efficient service to keep Singapore " the cleanest city in the East". The delegates of the conference can themselves find out the secret of success of Singapore's wastes management services, while being here and during technical visits which is scheduled in the conference programme.

usually the management of solid wastes programmes create problems, which in many areas have become critical. The treamendous development of technology and change in life styles have given rise to an extremely wide range of materials discarded as wastes, ranging from innocous inert material to complex chemical substances requiring special measures in handling and disposal because of their toxic or potentially hazardous nature.

Ideally, solid wastes, should bot contain any faecal matter or urine, and the mixture of the latter wastes with houshold wastes should, as in the case in some countries, be prohibited by law.The handling of pathological wastes, slaughter house wastes, and similar wastes, and similar materials in association with household wastes should be also prohibited. There are also some longterm problems of man's food chain that have to looked into when a good wastes management practice is to be introduced. When good standards of operation are not maintained at disposal sites and improper discharge of wastes in open drains, rivers etc. may result in serious health problems. Rain water passes through a deposit, of fermenting solid wastes emerges as a leachate, which contains a very high proportion of fermenting organic matter. Leachates from industrial solid wastes may contain dissolved chemicals,particularly heavy metals, which are poisonous. It has been demonstrated that such materials may be concentrated in nature by some organisms in man's food chain, specially when highly toxic wastes are dumped at sea or deposited in landfills.

Toxic substances like heavy metals, like mercury, and Cadmium from batteries and lamps are commonly present even in remote places of the world. In the elimination

process , we should be aware that the end products may not be dangerous to environment including the employees handling such wastes.

The main source of air pollution is the old or inefficient incineration plant. Combustion causes a large amount of dust to be supended in flue gases and if dust eliminators are not installed it may be very unpleasant to live in the immediate environment of the plant. Hence it is essential that plants are equiped with electrostatic precipitators.Uncontrolled and incomplete combustion of wastes materials can result in the release into the atmosphere of a number of undesirable pollutants including particulate matter, sulphur dioxide nitrogen oxide, various hydrocarbons and other noxious gases that may have deleterious effects on the health of those who inhale them.

Wastes collection

some authorities who are responsible for collection of community wastes have an attitude that the wastes should be disposed of as quickly and cheaply as possible. In many cases, invariably the reasons given for the breakdown of wastes collections has been the non-availability of vehicles due to frequent breakdowns and it is common to see the refuse uncollected for days.

When the collection services fails the refuse itself forms a danger by harbouring cockroaches, flies, rodents etc. The battle against these pests is difficult and an year round active pest control campaign may have to be launched. The expenditure incurred in pest control could be minimised by upholding good practices of solid wastes management right throughout the year without any ups and downs. Further many cities in developing countries do not have an adequate system of wastes collection,which itself requires considerable capital investments and operating funds. Authorities responsible for wastes management fail to understand the simple theory that collection and disposal services are inter-related .It is essential that hospital wastes must be handled with utmost care, as the substances used for irradiation of tumours, and such (radium Cobalt) should not be discarded in the environment. They are part of one of the many major health hazards to the society.

Wastes disposal

The establishment of disposal facilities requires, careful site selection, knowledgeable engineering and good management. Very often the last named is the key factor. The landfill method involves depositing the wastes in layers and covering exposed wastes,with soil daily as work proceeds to prevent breeding of flies or other vermin.

Incineration

Countries where there is financial constraints do not accept incineration method as solution to waste disposal problems. In some countries like Spain, a service of local scope of collection and disposal of dead animals is growing inspite of the limitations and problems imposed by the urban living. The collected carcasses and the offal from public markets are finally disposed by incineration in special furnace. The WHO recommends, that the hospital wastes must be disposed by incineration. It is desirable if this service could be extended to the wastes from Zoos,Dairies,Stables,Laboratories and research centres too.

Composting

The wastes which contains more than 60% of organic material is very suitable for composting. The United Nations Industrial Development Organisation give assistance to countries for the production of composting from urban wastes. A regular supply of wastes is an essential pre-requisite for composting. Unless carefully planned to reduce capital and operating expenditures and to overcome the many problems of infrastructure,organisation and marketting,compost plant will not become vioble ventures in developing countries.

Energy From Wastes.

With increasing industrialization in developing countries, the demand for and cost of raw materials will continue to grow, while their longterm availability can no longer be taken for granted. Commercial and industrial solid wates represents potential sources of re-usable material and energy, and much research is being carried out in Europe and USA to determine the most practicable and economic methods of materials and energy recovery from solid wastes.

Solid wastes management control has become a specialized discipline to ensure that the environment is adequately safeguarded at all times and pollution risks avoided. In this vital area of public service, the oldest professional authority is the British "Institute of Solid Wastes Management" and its monthly publication "Solid Wastes" keep its readers abreast of the latest developments in the wastes management aspects and practices.In this field WHO plays a leading role, in the development of good practice in all its aspects.The activities include literature on the subject, seminars, training programmes, and country projects.

I conclude this paper, with the fervent hope that the international Community can play an important role in this sphere by declaring technologies as common

heritage of mankind and be made freely available to all those who need them.

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