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From:
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To,
Coordinator,
International Conference (ICNMS),
Bangalore,
INDIA.

Sub: Submission of modified full paper – Reg.

Dear Sir,

Please find the enclosed **modified**article on **"Challenges and Problems of Urban Waste in Andhra Pradesh"** for its presentation in the Two- Day **International Conference on Innovative Management Strategies(ICNMS)** to be held on March 7-8, 2014, at Bangalore. Please include the article in the conference volume to be published.

Please send soon acceptance letter and thus enable me to attend the conference.

Yours Sincerely

(Y KESAVA REDDY)

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CHALLENGES AND PROBLEMS OF URBAN WASTE IN ANDHRA PRADESH

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Introduction:

Urban waste is the collection, transport, processing, recycling or disposal of waste in urban areas. The term usually relates to materials produced by human activity, and is generally undertaken to reduce their effect on health, the environment or aesthetics. Urban waste is also carried out to recover resources from it. Urban waste can involve solid, liquid, gaseous or radioactive substances, with different methods and fields or expertise for each.

Waste management practices are differing for developed and developing nations, for urban and rural areas, and for residential and industrial producers. Management for non-hazardous residential and institutional waste in metropolitan areas is usually the responsibility of local government authorities, while management for non-hazardous commercial and industrial waste is usually the responsibility of the generator.

This paper made an attempt on relative trends in urban and rural population, solid waste disposals, hazardous wastes, measures taken by the Government, integrated low cost sanitation programs and recycling of urban waste in India.

Relative trends in Rural and Urban Population in India and Andhra Pradesh:

Trends in Urban and Rural Population in India

Year	Population in Millions			Percentage of total Population		Percentage increase in urban population during the decade
	Total	Rural	Urban	Rural	Urban	
1991	844.3	627.1	217.2	74.3	25.7	
2001	1,027	742.0	285.0	72.2	27.8	2.1
2011	1,210.2	833.1	377.1	68.8	31.2	3.4

Source: office of Registrar General of India.

The total population in India in 2011 is 1,210.2 millions, of which the rural population is 68.8 per cent and urban population is only 31.2 of the total population, where as in 2001 it was the total population of 1,027 millionof which the rural population is 72.2 and the urban population was 27.08 per cent of the total population. The rural population is decreasing from 74.3 per cent in 1991 to 68.8 per cent in 2011, whereas on the other hand the urban population is increasing from 25.7 in 1991 to 31.2 per cent in 2011.

Trends in Urban and Rural population in Andhra Pradesh

Year	Population in Millions			Percentage of total Population		Percentage increase in urban population from 1991 to 2011
	Total	Rural	Urban	Rural	Urban	
1991	6,65,08,008	4,86,20,882	1,78,87,126	73.10	26.90	
2001	7,57,27,541	5,52,23,744	2,05,03,597	72.92	27.08	0.18
2011	8,45,80,777	5,63,64,630	2,52,62,708	66.64	66.64	6.28

Source: office of Registrar General of India.

Andhra Pradesh, extending over an area of 2,75,045 sq.km., has a population of 8,45,80,777 with 308persons per sq.km as per 2011 census. Its population was 7,57,27,541 as per 2001 census. The urban population in the state in 2011 census is 2,52,62,708, which is 33.36 per cent of the state's total population, where as in 2001 census it was 2,05,03,597 which is 27.08 per cent of the state's total population. On the other hand the rural population in the state in 2011 censes is 563,64,630 which is 66.64 per cent of the state's population, where as in 2001 census it was 5,52,23,744 which is 72.92 per cent of the state's population. The census 2011 reveal that the urban population percentage is increased by 6.28 percent, where as rural population percentage is decreased by the same percent. The growth rate of population in the state was an increasing trend since first census in 1951, after the Independence of India.However, for the first time afterIndependence, decrease in the growth rate was observed in the state.

Solid Waste Disposal in India:

Solid waste is generated in almost all parts of the urban areas and solid waste management becomes complicated in bigger cities. Collection, transportation and disposal of solid waste are the major operations involved in solid waste management. In most cities, the refuse is dumped in an unsatisfactory and haphazard manner without sanitary land fill.

Industrial and hazardous waste in India:

Sources of hazardous waste include those from industrial processes, mining extraction, tailings from pesticide based agricultural practices, etc. Industrial operations lead to considerable generation of hazardous waste and in a rapidly industrializing country such as India the contribution to hazardous waste from industries is largest. Hazardous waste generation from industries is also critical due to their large geographical spread in the country, leading to region

wide impacts. The annual growth in hazardous wise generation can be directly linked to industrial growth in the country. States such as Gujarat, Maharashtra, Tamil Nadu, and Andhra Pradesh, which are relatively more industrialized face problems of toxic and hazardous waste disposal far more acutely than less developed states. The major hazardous waste-generating industries in India include petrochemicals, pharmaceuticals,Pesticides, paint and dye, petroleum,fertilizers, asbestos, caustic soda, inorganic chemicals and General engineering industries.

During the last 30 years, the industrial sector in India has quadrupled in size. The main source of hazardous waste and cause of an adverse impact on the environment has been the Indian chemical industry.

Municipal solid wastes in India:

There has been a significant increase in the generations of MSW (Municipal solid wastes) in India over the last few decades. This is largely a result of rapid population growth in the country. The daily per capita generation of municipal solid waste in India ranges from about 100 g in small towns to 500 g in large towns. Although national level data do not exist for municipal solid waste generation, collection and disposal, for the lack of a nationwide inventory, the growth of solid - waste generation over the years can be studied for a few selected urban centers. The municipal waste generation however grew from 30,058tonnes per day in 1999-2000 to 38,031 tonnes in 2004-05 and in 2010-11 it was grow to 50,592 tonnesper day. This clearly indicates that the growth in municipal waste generation in our urban centers has outpaced the growth in population in recent years. The reasons for this trend could be our changing lifestyles, food habits and changes in the standard of living. MSW in cities is collected by the municipalities and transported to designated disposal sites normally a low lying area on the outskirts of the city for disposal. The choice of a disposal site is more a matter of what is available than what is suitable.

Industrial and hazardous waste in Andhara Pradesh:

Out of the 66 cities/towns, 14 cities are generating wastes above 50 tonnes a day. They are Hyderabad, Guntur, Kurnool, Nellore, Nizambad, Rajahundry, Vijayawada, Vishakhapatnam, Warangal, Anantapuramu, Eluru, Kakinada, Khammam, and Tirupathi. The other 52 cities generate less than 50 tonnes a day. They are Adoni, Bhimavaram,Chirala, Chittoor,kadapa, Gudivada,Guntakal, Hindupur,Puttaparthy,Karimnagar, Kothagudem and Machilipatnam etc. In

any case, this shows how increase in garbage generated is putting pressure on land for landfills and affecting waterways.

Inadequate Sewerage in A.P:

With the exception of major towns of Hyderabad, Secunderabad, Vijayawada, Visakhapatnam.andTirupathi, most of the towns are not sewered and pollution of thewater bodies and the ground because untreated sewage is a common problem. Even, major towns like Hyderabad and Secunderabad do not have total coverage of sewer and only 1/3 of sewage is treated while the remaining water flows into Musiriver causing heavy pollution. The total length of the sewerage in Hyderabad is 1629 kms. The present sewage system covers about 70% of the jurisdiction of the MCH and a small portion of the LB. Nagar Municipality. The remaining eight municipalities do not have any sewerage system. The main sewage treatment plant for Hyderabad is at Amberpet, which is designed for an average flow of 115 mid (25-Mgd peak flow). Another STP is installed beside the Hussainsagar Lake with a maximum capacity of 30 mid. The STP at Amberpet is also being upgraded. These conditions show the increase in pressure on land and water bodies.

Biomedical Waste A.P:

Today there is an increased awareness about health among people. Correspondingly, medical facilities in terms of the number of hospitals, their bed strength etc. have also gone up. On the flip side, the hospitals are generating wastes too. These need special attention and care in their disposal. Use of disposable plastics against the of sterilized glass syringes, bottles and other material have increased the quantity of medical wastes largely. This waste could be infectious in nature and is capable of causing severe damage to the human health and environment.

Municipal Solid waste in A.P:

It is a primary function and the responsibility of the Urban Local Bodies (ULBs) to clean refuse & garbage from the towns and dispose it properly. At present there are 110 municipalities and six municipal corporations, including Municipal Corporation of Hyderabad in the State. The total garbage generated in the State is 5790 million tonnes /day estimated @ 0.5 kg per day per head as per norms fixed. The total garbage lifted and transported to dumping yards is 4890 m.tns/day i.e., 84.5%. There are only 43 Municipalities having compost yards for dumping of

garbage. At present 73 Municipalities are having land for dumping garbage. The status of availability of land for compost Yards in the Municipalities is as follows:

1. Sufficient land available in	:	27
2. 75% & above land available in	:	16
3. 50% to 75% land available in	:	10
4. 25% to 50% land available in	:	15
5. Below 25% land available in	:	05
6. Land not available (no compost yard)	:	37
TOTAL	**:**	**110**

Efforts are being made in the remaining 37 municipalities to acquire lands, for composting under Solid Waste Management Projects. Further, out of six municipal corporations, all the corporations, except Warangal are having sufficient dumping yards. The Vijayawada Municipal Corporation has implemented the Solid Waste Management Project through M/s Excel Company. Similar projects are yet to be implemented in the Municipal Corporations of Visakhapatnam, Kurnool and Warangal. In Rajahmundry and Guntur, necessary orders have been issued for establishment of the MSWM Projects. In the selection grade Municipalities of Kakinada, Eluru, Nellore, AnantapuramuNizamabad and Tirupati, the scheme is yet to be implemented.

Measures taken by the State Government:

With a view to discouraging indiscriminate use of plastic carry-bags and containers in the urban areas in particular, and at public places in the State, the Government issued a notification through GO Ms. No.25, dated 30thMarch 2001 of EFS&T, in accordance with the 'Phasing Out Plastic Carry-Bags Recycled Plastic Manufacture and Usage Rules 1999, under Environment (Protection) Act 1986.

A State-Level Committee has been formed to take necessary actions on Municipal Solid Waste (MSW) and the first meeting was held on 25th April 2003, which decided the following:

- The Environment Protection Training and Research Institute (EPTRI) will be the nodal agency to coordinate all legal, technical, economic and physical aspects of the MSW Management system through a three-year action plan.

- EPTRI has to prepare a proposal in consideration with the action plan of Andhra Pradesh Industrial Technical Consultancy Limited (APITCO) and all on-going projects, and in consultation with experts of the committee and other agencies with past experience.
- EPTRI can chalk out activities among the agencies involved to commence the site selection processes or where sites are already located their environmental assessment. DPRs etc.
- The APPCB and the Director of Municipal Administration (DMA) would make initial contributions to a rolling fund with the EPTRI to meet the costs of running the monitoring cell and paying for initial studies.

(Source: Municipal Administration & Urban Development Department, Govt. AP)

Disposal of Urban waste in AP:

Clean and Green Programme

The Government has issued instructions vide G.O.Rt.No885, Finance and Planning (Plg.XX) Department, dt.30.11.1998, to implement the Clean and Green Programme in all the Urban Local Bodies in the State. Every third Saturday in a month has been declared as Clean and Green Day. The activities taken up by the ULBs under Clean and Green Programme are as follows:

- Motivating people. particularly women groups and private industrial / business groups to make contribution to the Clean and Green Programme
- Special drive for desolation of drains, mobilizing additional manpower wherever required
- Special drive for garbage removal with suitable deployment of civic staff and private persons wherever necessary.
- Mobilizingcleaning operations of market places and slaughterhouses.
- Cleaning of all the municipal parks including removal of weeds and bushes
- Cleaning of burial grounds
- Deseeding and cleaning of water bodies along with proper chlorination and beautification.
- Identification of low-lying areas and action for draining Out of water from these areas.
- Plantation of trees by procuring suitable species of saplings in every household. road margins, community lands, public offices, schools buildings, college buildings,

compounds of industries, parks, water works institutional premises, filed bunds and canal bunds etc.

- ❖ Provision of soak pits and platforms near public bore wells
- ❖ Construction of individual sanitary latrines etc
- ❖ Construction of Neeru-Meeru structures
- ❖ Motivating school / college students by conducting rallies etc.

Integrated Low Cost Sanitation (ILCS) Programme:

Integrated Low Cost Sanitation Programme for construction of individual toilets has been taken up in 113 urban towns. Among the urban towns where this programme was launched, it had been completed in 16 towns. Individual toilets under Integrated Low cost sanitation (ILCS) had been constructed a target of 571,000.

Urban Waste Recycling

Recycling is the physical reprocessing of old materials into new products, with the aim of preventing the waste of potentially useful materials. In addition, it generates a host of environmental, financial, and social benefits, for example the recycling of saves 95% of the CO2 emissions an environmentally harmful greenhouse gas compared to refining new metal.

Recycling facts:

Aluminum	Recycling one Kilogram of Aluminum saves up to 8 kilograms of bauxite, four kilograms of chemical products and 14 kilowatt hours of electricity.	It takes 20 times more energy to make aluminum from bauxite ore than using recycled aluminum.
Glass	For every ton of recycled glass used, approx.315 kilos of Carbon dioxide and 1.2 tons of raw materials are spared.	20% reduction in emissions from glass furnaces and upto 32% reduction in energy usage.
Paper	A ton of paper from recycled material conserves about 7000 gallons of water, 1731 trees, 60lb of air polluntants and 4000 KWh of electricity.	Milling paper from recycled paper uses 20% less energy

Fuel from Plastic Waste:

The center for Microporous Materials in Manchester (UK) has developed a process for distillation of fuel from dirty, mixed plastics recovered from urban wastes. The center has developed zealots, the crystalline aluminum silicates, for producing the fuel from plastic wastes. The zeoloites act as catalysts in the distillation of fuel. Since the fuel obtained from waste plastic contains no lead and has a high octane rating, it is known as "green fuel". This fuel will not only help in reducing the use of petrol, but it will also help solve the environmental problem of disposing of the non-biodegradable plastic waste.

The process of distillation involves heating of plastic waste in an oxygen free environment in order to present the burning of plastics. The hydrocarbons in the plastics are distilled of as vapors, which are cooled and collected. A significant portion of the plastic consists of PVC (polyvinylchloride), broken down into a harmless compound by adding an appropriate zealot catalyst during distillation.

The waste recycling plant in Germany has developed a technology for converting assorted plastic wastes into oil. The plastic wastes such as polythene bags, milk pouches, plastic cartons, computer casings, etc. are mixed with heavier oil residues and then water is added. As a result, chemical compounds in the waste plastic break up to produce synthetic oil, which is piped to a refinery to yield high-quality oil-based products. In some plants, instead of adding water to it, the plastic waste is heated after mixing it with heavier oil residues. By this process, one kg of waste plastic yields about 0.9 kg of reusable materials.

Recycled Plastic Clothes:

Clothes from recycled plastic waste will soon be available in the global textile market. Going by the recent developments in the chemical and textile industries, it may not be long before a sweater or a jacket make from recycled plastic bottles becomes an essential fashion accessory.

The Brasher Boot Company a small British concern, launched Europe's first fleece jacket in London, which was made from recycled polyethylene terephthalate (PET) a plastic used in making soft drink bottles. Except for the zipper and the thread, the rest of the jacket was made from recycled PET. This company turned to recycled plastic fleece on commercial as well as environmental grounds, and recycled materials are forming an increasing part of the Company's output. Garments made from recycled PET meet all the basic demands of a clothing material, viz., lightness, comfort, warmth and durability, in addition to being environment friendly.

Rhovyl, a company in France, has started making yarn comprising 70 per cent polyvinylchloride (PVC) derived from the recycling of mineral water bottles. The yarn is as soft and supple as the natural wool.

Power Generation from Garbage:

Our cities and towns are cursed with piles of rotting garbage and endless hours of power cut. Western Union India is now offering a solution to both the problems simultaneously. The multi-national company has developed a technology to produce electricity from city garbage. A, Rs. 100 crore, plant can process 1,000 tonnes of city garbage per day and generate 8 MW (megawatts) of electricity, making a profit of Rs25 - Rs.30 crores per year. In India, the company has entered into an agreement with several municipal corporations, Kolkata. Aurangabad andThiruvanthapuram. Earlier, it has signed agreements with the Governments of Vietnam, Turkey and Thailand.

In the technology developed by the Western Union India, city garbage is used to produce methane and latter can be used to generate electricity. The technology is ideal for the Indian garbage, which has a high concentration of biodegradable matter and a high moisture content, unlike the garbage produced in Western countries, which has a high concentration of biodegradable matter and a high moisture content, unlike the garbage produced in Western countries, which has a high concentration of combustible materials like paper. The company has already set up a pilot plant at Pune, which can generate 5 k.w of electricity. At this plant, ferrous metals are removed from the garbage by using a powerful magnet. Paper, sand, plastics, glass, etc. are removed by using a pneumatic separator. The garbage is then mixed with water and bacterial species,specifically cultured for producing methane. These bacteria thrive on the waste and produce methane by digesting the refuse. This process is known as biomethanation.

The bacteria take about a day for the conversion of garbage into methane. The reactor used for this conversion is a double reinforced cement concrete structure, which is usually maintained at a temperature of about 150 C. As a result, about 65 per cent of the garbage get converted into methane and the remaining product is used as manure. The methane so produced is then fed into a gas-fueled internal combustion engine, which runs a generator to produce electricity. It is claimed that 500 Mw of power can be generated in India from our urban solid wastes alone and about 2,000 MW of power can be generated by using both municipal solid wastes and industrial effluents.

The Indian Scenario of Recycling of Urban Waste:

The Indian scenario is totally different in terms of reducing waste at source. Due to diverse culture and tradition, source reduction of waste lies far apart as the last option in the waste hierarchy. Resides, there is no segregation of waste in India, since there is no efficient collection system, non-enforcement of law and huge cluster of population with paucity of living space particularly in the urban areas. This is a major issue in slums and low-income communities. Ultimately the waste goes to the open dumping yards. However reusable material; such as plastic and glass bottles, toys, electronic items, etc are reused in the form of refilling and reselling the item. The recycling business in India has a huge network but is highly informal and performed in un-organised manner such as the e-waste recycling process which is extremely harmful to workers and environment.

In addition, the pollution trends as indicated in the table makes one afraid that the every increased vehicles contribute more than 70 % to the total pollution in India. It is a chief cause of concern as it significantly harms human health and has a telling impact in reduction of their productivity levels.

Sources of pollution in India (in percentage)

Sources	1970-71	1980-81	1990-91	2000-01	2010-11
Industrial	56	40	28	20	18
Vehicles	23	42	64	72	75
Domestic	21	18	8	8	7

Sources: CPCB, 20011

From the, it is clear that the vehicles emission is a major contribution to the total pollution. The study rise in vehicles pollution is from 23 per cent in 1970-71 to 75 per cent in 2010-11 because of population growth and even increasing automobiles. Reduction in domestic source of pollution is due to replacement and traditional source of energy by LPG supply. The contribution of industrial polluting has come down from 56% in 1970-71 to move 18% in 2010-11. In spite of the expansion of industrial sector, the decline trend in industrial emission is attributed to technology transfer which enables better management of pollution in the Indian industries.

CONCLUSION:

It is true that Urban Solid Waste is a serious problem that has been challenging the urban administration. But it is not an insurmountable problem eluding an appropriate solution. Applying scientific knowledge and technology the urban solid waste can be economically

handled in such a way as to get energy generation from the waste and can also aid the agriculture sector by providing organic manure in a large scale, after systematically eliminating, the non-bio degradable things like plastics, synthetic-fibres etc.

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