

Indian scientific research and Indian research journals

This is with reference to the Guest Editorial by Lakhotia in *Current Science*¹. He raises concern about the apathies of Indian researchers in publishing their scientific research results in Indian journals. It was astonishing to read that the same concern was raised about 86 years ago in the same journal². And the situation is woeful till today.

It was pleasing to read that there were foresighted, venerated people whose devoted outlook established in the country, academies and scientific bodies, and also launched journals to satisfy the publishing needs of Indian researchers. Those scientific bodies and academies still assume high regard in Indian scientific and academic communities. The Indian scientists and academicians feel proud of having being conferred with the memberships and fellowships of these scientific bodies and academies. Unfortunately however, the journals published by such institutions do not find deserving regard in the eyes of elite scientific and academic minds. Who should be held responsible for this pitiable state of affairs? To me the answer appears simple. The seeds have to be sown by such elite minds into the well-prepared fertile soil, to see them sprouting.

The other odd raised by Lakhotia was that 'the scientific establishment in the country does not seem to have strong faith in the quality of research output from majority of laboratories in India'. If that is the case, then how are the research outputs published in any of the foreign journals by such laboratories of high quality. And, had the publication of those research results not brought prestige to the journals published by Indian scientific academies/bodies/institutions? Any journal, whether foreign or Indian, gets high impact factor, citations, and admiration among the scientific community due to the quality of research it publishes, and not the country in which it is published. We have to come out of the unconvincing labelling of national and international publications, for knowledge and science have no boundaries. This fact has become clear with the revolution in the era of information technology.

It is noteworthy to mention that majority of our research grants come from funding bodies under the Government of India. Research is carried out in Indian laboratories by Indian scholars. But alas, the research outcome becomes worthy only when it finds the stamp of some foreign journal. We purchase our own

published research papers from foreign journals paying money in their currency, and often pay to be published. In fact, there appears to be the problem of personality and the mindset. There is a personality that has the power of influencing others and, the one that gets influenced. The Anglicized-cultural mind set of ours (the Indians) has pushed us into a sieged mentality of 'dis-ease' within ourselves. One has to come out of this mindset and feel proud about Indianness. Otherwise, our science and Indian scientific journals will continue to remain in national and regional domains. It is simple; why should anyone believe and respect us, if we do not believe and respect ourselves.

1. Lakhotia, S. C., *Curr. Sci.*, 2018, **115**, 2187–2188.
2. *Curr. Sci.*, 1933, **1**, 335–337

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Urban waste recycling in developing countries should be improved

Currently, the major ecological concern in developing countries (e.g. Mexico, India, China) is the poor control of urban waste (highlighted by epidemics of rubbish dumps). This is leading to unsustainable use/depleting of the Earth's limited natural resources and the global pollution of life-supporting hydrosphere, atmosphere, lithosphere and biosphere (particularly by phosphorus and nitrogen from food waste and hazardous chemicals from electronic and plastic waste) due to water/air streams and interrelated biogeochemical cycles. At present, the major part of all urban solid waste (USW) in developing countries goes to landfills, incineration and illegal dumps that is unsustainable and risky for both human health^{1,2} and the global natural environ-

ment (e.g. climate change through methane (CH₄) and carbon dioxide (CO₂) emissions³). Only a small part of USW in developing countries is recycled.

Waste generation in developing countries is increasing quickly because of interrelated social and economic roots (urbanization, population and prosperity growth) and therefore, the adverse impact of waste on the global total environment (climate change, water, air and land pollution) and public health (e.g. respiratory diseases) is also increasing under inefficient system of waste management.

Both theory and practice prove that recycling (reusing) is the most efficient (including greenhouse gases emissions⁴) and sustainable way of waste processing

(after waste minimization), because it is based on material recovery. However, the recycling rate of USW in developing countries (e.g. China 8%, Mexico 5%) is much lower than in the most of European countries. For instance, the recycling rate of USW in 2015 was 65% in Germany, 55% in Belgium, 48% in Sweden, 44% in the UK and 39% in France⁵.

The recycling rate of USW in many Eastern European countries (e.g. Poland, Hungary, Czech Republic) has increased much during the 20 years period from 1995 to 2015 (Table 1)⁵ as a result of reforms in USW management (related to development of recycling industry and greater responsibility for separate waste collection among the local population). However, in Russia, China, Mexico and

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Table 1. Urban solid waste recycling rate (%)

Country	1995	2015
Poland	1.8	42.5
Hungary	1.6	32.2
Czech Republic	0	29.7
Slovakia	2.8	27.9
Bulgaria	0	29.4
Estonia	0.6	28.3
Latvia	0	28.7
Lithuania	0	33.1
Slovenia	2	54.1
Croatia	0	25.2
Russia	0	7
Turkey	1	1
Mexico	2	5
China	9	8

other developing countries, the system of waste recycling is stagnant due to ecological irresponsibility (particularly among the rulers) and weak recycling infrastructure. The positive experience of

the European leaders in USW recycling may be useful for development of an effective waste management system in developing countries.

Therefore, the following reforms for USW recycling in developing countries are proposed.

(A) Educational and administrative reforms: The ecological responsibility for waste minimization and recycling culture (manual waste sorting and separate waste collection in different containers (e.g. for paper, glass, plastics, food, metal, textile, electronic waste/chemicals, etc.)) should be cultivated in developing countries by educational reforms (raising public awareness – causes and effects of waste accumulation, and personal liability for domestic waste management) and administrative reforms (e.g. high penalties for generation of illegal waste dumps and mixed waste collection, and incentives for waste separation).

(B) Technological reforms: The recycling infrastructure (recycling plants and

widespread grid of separate waste collection sites) should be constructed in all municipalities (at high priority) by appropriate economic and technological reforms (e.g. sufficient funding for development of advanced recycling technologies).

1. Grizzetti, B. *et al.*, *Environ. Sci. Policy*, 2013, **33**, 186–195.
2. WHO, World Health Organization, Geneva, Switzerland, 2018.
3. IPCC, International Panel for Climate Change. Geneva, Switzerland, 2018.
4. Turner, D. A. *et al.*, *Resour. Conserv. Recycling*, 2015, **105**, 186–197.
5. OECD, Organisation for Economic Cooperation and Development, Paris, France, 2017.

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