distance from the state capital, rural mass migration and 'ideal' location in Orissa. Bhawanipatna and Koraput need equal development to bring about the overall growth of Koraput–Bolangir–Kalahandi (KBK) and Western Orissa. Kalahandi is the central place among KBK districts; and Bhawanipatna is a central town within 200 km radius of KBK and other tribal and backward regions in Orissa, including Boudh, Kandhamal, Bargarh and Gajapati districts.

The Ministry of Human Resource Development has recently suggested the formation of Innovation University through private public partnership (PPP) mode. It may be possible to collaborate with the Agarwal Foundation for an Innovation University in Kalahandi – the Vedanta group would have a moral duty to establish an university in the region directly affected by its mining activities, prior to launching a Rs 15,000 crore invested world class university near Bhubaneswar for philanthropy purposes.

Among the proposed 14 Innovation universities, seven could very well be built in smaller rural towns facilitating future generations to evaluate the quality of these institutions. The present policy makers need to re-think before increasing the gap between rich cities and poor semi-urban regions in their access to quality higher education and Innovation universities.

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Short-term courses on radioactivity for technical personnel

Recent happenings regarding the improper disposal of radioactive material and equipment call for urgent measures to educate the personnel handling such material and the public in general. This is not merely for the personal safety of a few individuals, but also to prevent radioactive material from falling into the hands of extremists who would not, then, really have to raid state-controlled nuclear establishments to get material for making 'dirty' bombs. Agonizing death, not damage, caused by dispersing even small amounts of radioactive material as a fine mist can match what may be caused by a 'real' nuclear weapon.

Particularly appalling were reports that have appeared in the print and visual media that compromise the reputation of many institutions of higher learning and advanced research, and expose the depths of ignorance among personnel who, one would expect, would know better. Some examples: (i) Regarding ^{60}Co irradiation equipment: 'It was procured many years ago by a professor who has retired. We don't know why he procured it. It was brought to disposal by normal auction procedures because no one here now knows how to operate it'. (ii) 'We have our own procedure for disposal of radioactive materials. We burn it when we have done with it'. (iii) 'We really don't have to worry about it. They become harmless when their half-life is over'. These examples clearly show that there is an urgent need for conducting elementary courses on radioactivity/radiochemistry. Even personnel who are qualified enough to be appointed in universities and research institutions and who, one would fully expect to know better, seem to be ignorant about the fundamentals of radioactivity and the dangers on being exposed to active material when handled by uninformed and untrained people.

Specifically in relation to the examples given above, knowledge needs to imparted that manufacturers of equipment employing radioactive sources are usually required by law in the manufacturers' own countries to include instructions on the method of disposal once the equipment has reached obsolescence. 'Burning' of radioactive material can release active volatiles, e.g. $^{3}H_2O$, into the atmosphere, releasing the 'ashes' (a fog of nanoparticles) of still active metals, etc. 'Half-life' is NOT some measure of radioactivity that ceases at some point of time but is a rate measure, the time it takes for a given amount of material to lose half of its active content. Theoretically, such first-order decay will never end, just like the tortoise in Zeno's paradox will never reach his destination!

It is not surprising that no records are maintained in many institutions, of what happens to the radioactive material distributed for various purposes. One may even wonder if the most elementary of precautions, of exhibiting the internationally agreed radioactivity sign, is recognized for what it is and is appropriately exhibited in research institutions, not to mention hospitals that provide radiation therapy.

There is a need to institute urgent measures to educate and train all personnel concerned with these matters and this is best done by an arrangement with the Department of Atomic Energy. The education/training programmes must be oriented towards practical handling of active materials. Teaching faculty and, most importantly, technical staff that may need training would be from such institutions as universities and research institutions, hospitals, etc. Not to be left out are shipyards and factories where welded joints are inspected by X-rays, most usually generated from a radioactive source, metallurgical works, etc. One should also not forget to include personnel manning ship-breaking yards and areas where waste from industrialized countries is dumped. I hope that the knowledge will filter down to personnel manning scrap yards in all major cities.

The manner of education may consist of about a week's course of lectures on the fundamentals of radioactivity, employing video clips or movies showing what may happen on exposure and on modes of handling and disposal of radioactive materials. At least one faculty member/supervisor and one or two technical-level personnel must be *compelled* to attend the course which may be repeated every three or four academic years in order to cover newly recruited personnel. Attendance may be certified after a due test.

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