



The growing impetus of the Environmental Era

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The Industrial Radiation Age

Air currents also distribute more sinister pollution around the world.

When reactor number 4 of the Chernobyl Nuclear Power Station exploded in a blazing fireball on April 26, 1986, blowing off the reactor's heavy steel and concrete lid, it sent a deadly plume of radioactive debris across Europe, Scandinavia and other parts of the Soviet Union. This carcinogenic cloud of uranium dioxide fuel and fission products eventually passed over 20 different counties, dropping its lethal particles onto millions of people in these northern lands in the form of contaminated rain.

This radioactivity, released during peacetime, was a hundred times more intense than that released by the combined Hiroshima and Nagasaki atomic bombs detonated during World War II.

Alpha particles travel short distances and are not able to penetrate human skin. Beta particles are able to penetrate skin but no deeper into the body. Gamma rays are capable of penetrating sheets of steel.

In this way a cloud of radioactive particles that drifts with the wind over a wide area to eventually settle unseen, unsmelled and untasted, poses a considerable health threat, adding to the problems already caused to humanity in the Industrial Radiation Age by daily exposure to some 200 000 chemicals in the water that we drink, in the food that we eat and in the air that we breathe.

The official death toll of the Chernobyl disaster, the world's worst nuclear accident, was 31 people. The actual number of people who succumbed or will still succumb to cancers, leukaemia and other terrible diseases caused as a result of exposure to Chernobyl's radiation, will never be known.

In the aftermath of the release of Chernobyl's rebellious atoms, more than 135 000 people had to be evacuated from the radioactive hot zone and resettled elsewhere. And rich farmland, more than 1 000 square kilometres of some of the most productive soil in the Ukraine, was contaminated to the point that it may never again yield crops.

Chernobyl is an example of a safety exercise gone horribly wrong through human negligence, bad judgement and gross mismanagement.

Another example of a lethal cloud being unleashed on an innocent and unsuspecting community through complacency, poor training, safety violations and technical failure was the industrial accident that occurred in the Indian city of Bhopal in the early hours of the morning of December 3, 1984.

In the Bhopal disaster, 40 tons of methyl isocyanate (MIC), described as being five times more toxic than the mustard gas used during World War I, escaped from a pesticide plant on the outskirts of the city. Brisk winds then blew the dense cloud of deadly gas towards a nearby shanty town.

According to official figures, 3 928 people from the surrounding community were certified dead from exposure to the deadly gas, although independent organisations recorded a much higher figure of 8 000 people dead in the first few weeks after the accident.

In the aftermath of the Bhopal disaster, one of the world's worst industrial accidents, 170 000 people were treated at hospitals and temporary dispensaries for coughing, vomiting, severe eye irritation and feelings of suffocation.

A population of more than half a million people was exposed to a host of serious health risks such as eye problems, respiratory difficulties, immune and neurological disorders, female reproductive difficulties and cardiac failure. Carcasses of buffaloes, goats and other animals had to be collected and buried. Fishing was prohibited. Supplies, including food, became scarce due to safety fears by suppliers. And, within a few days of the accident, leaves on trees went yellow and fell off.

As with Chernobyl, pollution from preventable causes such as repeated safety violations, faulty valves and a lack of training of plant personnel, had exacted a terrible price.

Freshwater quality around the world

Freshwater pollution has long been one of the most visible and persistent signs of humanity's impact on the natural world. And, although surface water quality has improved in most developed countries over the past 20 years, degradation of the world's freshwater sources continues to be a serious global problem.

In January 2002, an aquatic version of Chernobyl and Bhopal occurred when a storage pond at a gold mine near the city of Baia Mare in northern Romania burst its banks, causing some 100 000 cubic metres of water containing an estimated 100 tons of cyanide, to spill into small local rivers which then found their way into the River Tisza in nearby Hungary.

Considered one of the worst river pollution accidents in Europe, this spill wiped out fish and plant life for several hundred kilometres in river systems in Romania, Hungary and Yugoslavia.

An accident such as happened in Romania brings the problems of freshwater pollution to the awareness of people around the world in a very vivid and affecting way. However, as the spread of industrial development continues, contamination of freshwater sources is occurring from many less dramatic, but no less insidious, sources.

Freshwater pollution spans a wide range of chemical, physical and microbial factors, with the balance of major



DECLINING QUALITY: Agriculture and sewage are sources of freshwater pollution in both developed and developing countries.

pollutants having shifted in most developed countries from predominantly faecal and organic pollution a century ago, to a new suite of contaminants today related to modern industrialisation.

This assortment of pollutants includes nutrients such as nitrogenous and phosphate compounds; heavy metals such as copper, lead, aluminium, iron and cadmium; industrial poisons; toxic organic compounds such as oil; acidic emissions; sedimentation and dissolved salts.

Development activities such as the paving and tarring of large surfaces in urban catchment areas means that stormwater run-off contributes significantly to freshwater pollution, particularly after the first rains of a season when oil, litter and decaying matter that have accumulated over dry months, are washed into rivers.

However, in developed countries where there is intensive livestock and crop production, agriculture is the single greatest source of pollution, degrading the quality of river and lake surface waters, with croplands, rangelands, forests and pastures accounting for significant nitrate loadings and phosphorous concentrations.

Although progress has been made in some areas to clean up polluted waterways and groundwater sources, intensive agriculture and development activities in watersheds have kept the clean-up attempts from being complete. The result is that water quality in almost all regions of the developed world is degraded to some degree.

In developing countries the problems of traditional pollution sources such as sewage have combined with new pollutants such as pesticides to heavily degrade water quality, particularly in agricultural areas and areas near urban industrial centres.

The most polluted rivers in the world are in Asia with

Sustainability is a simple idea. Taking a long-term perspective that recognises that the planet has ecological limits to growth and that resource depletion occurs when resources are consumed faster than nature can produce or renew them; sustainability is a dynamic process whereby a balance is sought between society's demand on nature and nature's capacity to meet that demand, taking into account the ability of future generations to meet their needs.

Asian rivers having three times as many bacteria from human waste as the global average. Asian rivers have also been found to contain 20 times more lead than found in

the rivers of some industrialised nations.

In Africa, where in many countries there is a backlog of services such as the provision of housing and sanitation, only 18% of households on average are connected to sewers. Many informal settlements have too few toilets and sometimes no toilets at all, with the result that inhabitants have no option but to make use of nearby open ground. The run-off from such areas is highly contaminated.

Also, a lack of adequate and timely removal of waste such as plastic bags filled with night soil causes seepage from bins and bulk rubbish containers, which adds to the toxic flow reaching streams, rivers and, ultimately, the sea.

In developing countries, where half the population is exposed to polluted water sources, diseases carried in water are responsible for 80% of illnesses and deaths, killing a child every eight seconds.

In South Africa typhoid is endemic, which means it is constantly present. And although occurs at a low level of frequency, the potential for outbreaks exists.

Sustainability and the big 'Rs'

In response to the unsustainable consumption patterns and technology choices of the Economic Era, the emergence of sustainable development in the 1980s as an ideological shift away from resource depletion towards resource safeguarding, conservation and thriftiness marked the beginning of what has been termed the Environmental Era.

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whereby a balance is sought between society's demand on nature and nature's capacity to meet that demand, taking into account the ability of future generations to meet their needs.

In a nutshell, sustainability means caring for natural resources so that they can be used indefinitely, thereby averting an ecologically insolvent future. It means living within the means of our one planet in a way that is responsible and accountable, looking after people, protecting the environment and ensuring economic growth.

The defining ideology of the Environmental Era is about a new global imperative – that of ecological security as guaranteed by international, national, corporate, inter-group and individual collaboration. It is about extending the earth's carrying capacity long enough for humankind to come up with sustainable and equitable solutions to the massive challenges we face.

From an individual perspective, the new paradigm of the Environmental Era is about a redefinition of personal growth. In direct contrast to the rampant consumerism of the Economic Era with its emphasis on "me-ism" and unconstrained consumption, the Environmental Era has swung toward a personal ethos of "us-ism" in relation to being and thinking and doing and giving, with many people trying to do the right thing, by themselves, by others, and by the world at large.

Consequently, by taking a broader and more holistic view of life that stresses health, safety, altruism, co-operation and preservation of the environment, together with concern for other living beings, many people have begun to rethink, reduce, recycle, recover, remove and reuse in a race against essential resource impoverishment.

For many of us, this swing in values has been rewarded with a greater sense of significance as we do work and live lives that we feel make a difference, albeit in a small way, to the greater scheme of things.

Environmental Era business

In a world where an accelerating pace of change has been the impetus behind major sociological thrusts such as globalisation and urbanisation, rapid commoditisation has meant the shifting of power from producers of goods and services to consumers.

Thus, driven by the demands of green consumers who want cleaner, less ecologically harmful products, the changing cultural values of the Environmental Era have filtered down to the worlds of business and industry.

Indeed, environmental responsibility has become big business and instead of being a benchmark for operational excellence, environmental best practice is now almost mandatory for organisations wishing to attain or retain a position of "best in class" or "best in the world".

One positive aspect to emerge from Environmental Era business and related industry competitiveness is eco-efficiency, which has arisen from the need to develop creative technologies that focus on greater efficiency in the use of resources, making high-quality products that require less energy and fewer materials in the manufacturing process, while simultaneously generating as little waste as possible.

In fact, cleaner technologies and cleaner production processes have become global trends, with many companies engaging in life-cycle analyses as a method of evaluating a product's environmental footprint from the production or sourcing of raw materials that serve to create it, right up through its scrapping or recycling phase.

A life cycle analysis provides an intensive self-monitoring process for charting the environmental impact or imprint of activities within the supply chain, whereby after compiling an inventory of all emissions to air, water and land associated with its operations, together with resources used, an organisation can monitor the life cycle of its products and activities as part of its operating procedure.

This process could incorporate the obtaining of raw materials needed to manufacture products as a first step, through modification processes of the raw materials into finished goods, up to and including distribution and point of sale, and finally product use and disposal of packaging by the consumer, classifying each process into impact categories such as global warming potential, acidification potential, nutrification potential, ozone depletion potential, energy consumption and solid waste production. As a final step, all impacts within a category are then aggregated, resulting in a total impact per category.

Distribution cycles, for example, could evaluate elements such as the weight and density of products to be transported, likely traffic congestion, exhaust emissions, fuel consumption, journey time and even noise levels in order to reduce the effects that road transport has on the environment.

Keeping to the theme of environmental accountability, other initiatives that have become part of worldwide Environmental Era business are environmental risk assessment studies, supplier certification programmes, environmental standards specifications, environmental improvement targets, employee environmental awareness training programmes and manufacturing site audits, to name a few.

Apart from satisfying a strongly emergent eco-science, these policies and practices make good business sense, as non-compliance in terms of environmental regulations could mean stiff penalties in some countries for companies that do not meet stringent manufacturing environmental performance standards.

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