

ANNUAL CONFERENCE OF ARAB FORUM FOR ENVIRONMENT & DEVELOPMENT
Phoenicia Intercontinental Hotel, Beirut, Lebanon
16-17 November 2015

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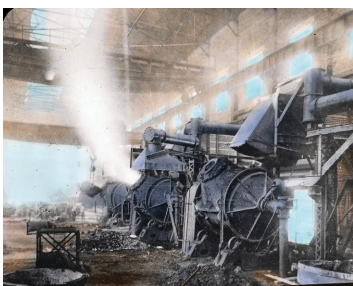
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Sudbury's Environmental Revival

Boghos Ghougassian
12/01/2012

The Greater Sudbury area in Ontario Province, Canada, 400 km north of Toronto city, was one of the earliest regions of the world to feel the harmful impact of unsustainable industrial development. It was also one of the first to recognize the mistakes and determined to correct them.



For nearly a century, mining and logging activities had converted the Greater Sudbury area into an inhospitable land. It had been dubbed as moonscape, its blackened scar visible from outer space. Even the Apollo 16 astronauts have done their exercises in here in 1971, before landing on the moon surface. Greater Sudbury encompasses one of the largest known nickel ore bodies on Earth, with an area of more than 60 km². This has earned Sudbury international recognition as "the Nickel Capital of the World".

Sudbury was found in 1883 as a railway station town. So dominant were the trees, the Jesuits called their parish "Ste. Anne of the pines". The trees also caught the attention of wood logging companies who clear cut the area leading to loss of biologic diversity, erosion of soils and other environmental impacts. Records indicate that Sudbury's forests have been swarmed with some 11,000 loggers during the late 1880s.

With the discovery of nickel, early mining and smelting processes in 1886 to 1929 delivered another devastating blow to the environment. The metal rich rock was ignited in open "roast beds" cloaking the area in dense clouds of sulfur dioxide's acidic smoke, which devastated the remaining green vegetation and acidified the freshwater of many lakes of the region, killing fishes and many other aquatic species.

Over the 40 year of roast yards history, 100 million tons of sulfur dioxide gas was emitted from the ores, which severely impacted the health of Sudburians and had catastrophic impact on the natural environment. These past activities combined with ongoing metal production facility emissions at three sites (Copper Cliff, Falconbridge and Coniston), prevented the natural regeneration of the forests, until early 1970s. By that time about 200 km² of land around Sudbury city were completely devoid of vegetation.

But today, Sudbury with its 200,000 population is a modern and environmentally friendly city. Its surrounding ecosystem is in a state of change, for the better, as a result of over 30 years of re-greening and restoration efforts, as well as significant emissions reduction. How this Environmental revival took place?

In the early 1970s the environmental awareness of the world rose tremendously and Sudbury played an active role in that revival. The first significant measure for air pollution control was the construction of the "super-stack" at Inco Company's smelting plant in 1972, at Copper Cliff, one of the three smelting facilities in Sudbury. The world's highest (381m) smoke-stack in those years solved the problem of local level impact of hazardous emissions of sulfur dioxide, heavy metals, and particulates from the smelting operations. The second important measure had been the Re-greening of the forests through community participation, which has become possible with the discovery that a few soil amendments could re-establish plant life. The third major environmental measure had been the protection of source water from contamination.

Today, the results of these measures have beautified the landscape, restored the water quality of Sudbury's 219 lakes and increased biological diversity and ecosystem health.

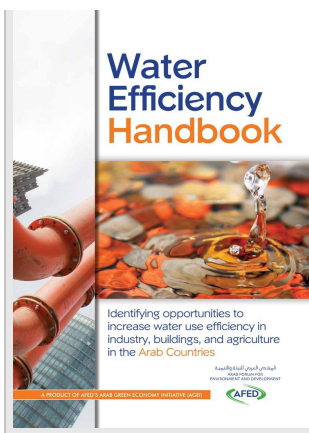
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Implementation of Specific Actions

The main measures that were undertaken, for the revival of Sudbury's environmental chaos included the following sectors:

1. Air pollution control

In 1967 the Ontario government passed the Air Pollution Act and enforced its emissions standards. The response of the 3 companies has become positive. They improved their smelting processes. Inco Company in 1972 has built its "super-stack" and in 1991 its oxygen flash furnace, which has contained 90 % of Inco's sulfur emissions. These measures have reduced by a whopping two thirds the amount of pollution falling on Sudbury, and Sudbury had began to register lower pollution rates than other industrial cities of Canada, like Hamilton and Toronto.

2. Forests re-generation

The loss of vegetation and continued exposure to fumigations from the ore roasting beds and the smelters exacerbated soil conditions and prevented natural growth up to the late 1970s.

In 1978 one of the largest community-based re-greening efforts on industrially disturbed lands was launched. 174 students have spent the summer of 1978 in reclamation work and by summer's end they had planted grass on 115 hectares of barren lands, planted 6,000 trees, gathered 365kg of native seed and established 122 new test plots. This has become a very encouraging start for afforestation efforts.

Year after year the community has rallied around tree planting. Students, scouts and other volunteer groups, encouraged by Sudbury's new, greener look, planted thousands of additional seedlings each year. The one millionth tree was planted in 1990.

In 1992, at the prestigious Earth Summit in Rio de Janeiro, Sudbury was honored with the 1992 UN Local Government Honorius Award for their land reclamation programs. By the end of 2008, over 3,400 hectares of lands have been grassed and over 11 million trees have been planted and the recovery area of barren lands around the 3 smelting centers has become 18,175 ha. The Re-greening Program continues until now (2012). It is anticipated that by 2015 additional 5 million trees will be planted. In the meanwhile, through natural regeneration, additional millions of new trees and plants have grown in the area.

Sudbury's rapidly developing ecosystem testified that environmental degradation can be reversed. And its success stories in the restoration of nature has become a positive example in healing the horrendous industrial zones of China, India, Russia and other regions of the world.

3. Source water protection

Healing the 219 lakes of Greater Sudbury and other water sources was another challenge for the community and the authorities. They have realized that the protection of their water at the source is an important way to ensure the health of communities, ecosystems

In order to protect water quality and quantity, local authorities of Sudbury have designed and adopted source water protection plans. They have also worked with volunteers, local communities, schools, municipalities, industries and others, to protect and rehabilitate the waters and lands within their watersheds, which include all of the following measures:

- Landfill sites to be well designed in order to avoid leaching of contaminants.
- At home level proper management of solid waste and hazardous waste.
- In outdoors practicing non-chemical pesticide use, minimizing rain run-off from pavements, car-washing only at stations, harvesting rainwater, reusing greywater, regular maintenance of septic systems, and other eco-practices.
- Agricultural activities to be well managed in order to avoid contamination of water sources. Grazing, fertilizer application, pesticide spraying and other potential sources of pollution, should be under control.
- Industries and businesses of all sizes are advised to rethink their operations to reduce the volume and toxicity of pollutants they produce by applying cleaner production principles that include modifying processes, reformulating products and developing new technologies.

The cumulative effect of these measures over a period of more than 30 years has been highly positive. The surface water bodies have returned to their natural state and the fish and aquatic life has returned to the water bodies of Sudbury.

Testing the environmental achievements: Sudbury Soils Study

After 30 years of rehabilitation of Sudbury a detailed soil study has been undertaken by a group of independent scientists, to determine whether the levels of metals in the study area environment pose a risk to humans, plants and animals.

The study was conducted during 2002-2008 and encompassed 40,000 km² study area. After intensive data analysis of more than 14,000 samples of soil, dust, water, air, vegetables, drinking water and food that were collected from the study area, and each soil sample was analyzed for 20 different chemicals. The study report "Human Health Risk Assessment" was produced in 2008. Its main conclusion, related to metal exposure in the environment, revealed that: there is little risk of health effects on Greater Sudbury area residents associated with the 6 chemicals of concern in the environment, specifically related to arsenic, copper, cobalt, lead, nickel and selenium. In 2009 the study report on "Ecological Risk Assessment" was produced. Its main conclusion being: Metal exposure originating from smelter emissions are not currently exerting a direct effect on the wildlife populations in the Greater Sudbury area, nor are they predicted to in the future. A final word:

The environmental revival in Greater Sudbury has been achieved successfully. Complementing these efforts is an ever expanding array of environmental and community initiatives that is making Greater Sudbury a sustainable and healthy community.