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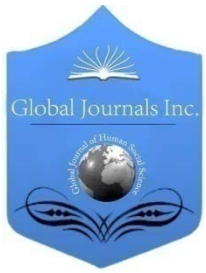

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Punjab in the Grip of an Ecological Disaster: Is there a Solution?

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Introduction- Punjab, the land of five rivers, is facing one of the worst crisis in its history. Its youth is trapped in drugs, marginal farmers are trapped in bank loans and are forced to commit suicides, the financial situation is so dismal that the State is in a debt trap, and the moral fabric of vibrant Punjabi society is under attack by internal and external contradictions.

However, I am not going to focus on the obvious but will like to investigate the long term effects of Ecological Disaster hovering over Punjab. During 1990s, when our research group in Guru Nanak Dev University was sanctioned a research project by Bhabha Atomic Research Centre (BARC) of Department of Atomic Energy (DAE) to undertake a survey for Environmental Radiation Health Hazards to population of Punjab, we could never imagine the consequences would be so alarming? Our aim was to assess the environmental radiation dose to inhabitants due to Radon gas emanating from the soil; the source of this gas being radioactive Uranium in soil and groundwater. We reported that in Malwa belt, the radiation dose is 20% higher compared with other districts of Punjab. However, there was no imminent danger to public health due to presence of indoor Radon in homes.

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Hardev Singh Virk

I. Introduction

Punjab, the land of five rivers, is facing one of the worst crisis in its history. Its youth is trapped in drugs, marginal farmers are trapped in bank loans and are forced to commit suicides, the financial situation is so dismal that the State is in a debt trap, and the moral fabric of vibrant Punjabi society is under attack by internal and external contradictions.

However, I am not going to focus on the obvious but will like to investigate the long term effects of Ecological Disaster hovering over Punjab. During 1990s, when our research group in Guru Nanak Dev University was sanctioned a research project by Bhabha Atomic Research Centre (BARC) of Department of Atomic Energy (DAE) to undertake a survey for Environmental Radiation Health Hazards to population of Punjab, we could never imagine the consequences would be so alarming? Our aim was to assess the environmental radiation dose to inhabitants due to Radon gas emanating from the soil; the source of this gas being radioactive Uranium in soil and groundwater. We reported that in Malwa belt, the radiation dose is 20% higher compared with other districts of Punjab. However, there was no imminent danger to public health due to presence of indoor Radon in homes.

We did not bother to evaluate the risk due to presence of Uranium (U) in soil and groundwater of Punjab. Uranium poisoning in Punjab first made news in March 2009, when a South African Clinical Metal Toxicologist, Carin Smit, visiting Faridkot city in Punjab found surprisingly high levels of uranium in 88% of the blood samples collected from amongst mentally retarded children in the Malwa region of Punjab. The results revealed that 87% of children below 12 years and 82% beyond that age having uranium levels high enough to cause diseases, and in the case of one child, the levels were more than 60 times the maximum safe limit.

This report opened the Pandora's Box and the echo of this report reverberated in the Parliament House. BARC teams under the direction of DAE were alerted to visit Punjab and an MOU was signed with GND University for undertaking a comprehensive survey of all districts for assessment of health risk due to Uranium concentration in ground waters. A large number of reports have been published in research journals. Most of the team members involved in this Project have been my old students and collaborators. My recent survey of four districts (SAS Nagar, Fatehgarh Sahib, Sangrur and Bathinda) have shown that Uranium content in water is within safe limits in SAS Nagar and Fatehgarh Sahib but it is higher than the safe limit fixed by Atomic Energy Regulatory Board (AERB) of India for Malwa belt (Sangrur, Bathinda, Mansa and Ferozpur). Punjab State department of Sanitation and Water Supply based in Mohali has reported the highest value of Uranium content of 2200 microgram per litre (ppb) in ground water collected from a deep borewell (700 feet) in Badla village of Dasuya Block of Hoshiarpur district. Some scientists propose that Uranium can be mined from underground waters of Punjab. What is the source of high U content in water? The Scientists of PU Chandigarh group report that high U content in water can be attributed to high salinity of water and Phosphatic fertilizers being used in Malwa region of Punjab. Calcium bicarbonate acts as a leaching agent for U in soil and it gets concentrated in groundwater by geochemical processes. It seems to be a plausible explanation but not the ultimate solution of the problem.

High U content in soil and groundwater is harmful for human beings as well as flora and fauna of Punjab due to its radiological and chemical toxicity. The survey conducted by BARC and GNDU teams have confirmed that 50% samples are unfit for human consumption due to excess amount of U and heavy metals like Arsenic, Cadmium, Nickel, Manganese and Barium. It is recommended that canal water may be used as potable water in water supply schemes of Punjab, as its U content is much lower than U content of the ground water. The second alternative is installation of RO (reverse osmosis) system to remove toxic elements (U and heavy metals) from water supply lines using underground water. Punjab has opted for both these alternatives in Malwa belt.

During 1950s, prior to Green Revolution in Punjab, the landscape was looking like a desert dotted with sand dunes right up to the foot hills of Siwalik range. But the water table of this sandy desert was quite shallow with depth of aquifer varying from 5 to 10 meters in most of the districts. During Monsoon months, it rose up to 1 meter within the top surface layer. Green

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revolution brought prosperity to Punjab but at what cost? As reported in The Tribune of 1st June, the ground water table has been depleted to 50-60 meters in most of the districts, except some blocks of Muktsar, Faridkot and Ferozepur districts where water-logging has created another havoc. Punjab has the highest density of Tube-wells in India reaching a figure of12.7 lakh, with nearly 50% of submersible variety capable of depleting water table up to 100meters depth and beyond. Manohar Singh Gill (Ex-MP Rajya Sabha) has highlighted this problem and its impact on marginal farmers in his article published in Indian Express (also reported in The Sikh Review, May 2016). It is in the air that Punjab Govt. has already approved the sanction of 1.25 lakh new Tubewell connections keeping in view the vote-bank politics of Punjab.

The Ministry of Drinking Water and Sanitation under National Rural Drinking Water Programme has provided online data for whole of Punjab (www.-indiawater.gov.in/imiswebReports) where water quality of each village is reported. There is another online facility provided by Central Ground Water Board, Ministry of Water Resources, and Govt. of India, which provides the nature of geomorphology and geohydrology data of Punjab at Block level (*cgwb.gov.in/gw_profiles/-st_Punjab.htm).* A clear WARNING has been issued to Punjab Govt. for restricting the number of Tubewells and shifting to Canal irrigation, to avoid further depletion of Water Table in Punjab.

A simple solution to the problem is also suggested: (i) promote Organic farming in Punjab, (ii) stop free supply of power to Tubewells, and (iii) adopta cropping pattern which breaks the wheat-paddy cycle. By our actions, we shall bring back desert conditions in Punjab in next 50 years; with hardly any hope of survival for future generations in Punjab. Clock is ticking fast for Punjab to act, otherwise the backbone of Punjab, its peasantry, will be destroyed!

I am reminded of a couplet of Oliver Goldsmith in his celebrated poem "The Deserted Village":

> Ill fares the land, to hastening ills a prey,
> Where wealth accumulates, and men decay:
> Princes and lords may flourish, or may fade—
> A breath can make them, as a breath has made:
> But a bold peasantry, their country's pride,
> When once destroyed, can never be supplied.

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