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## Preface

World's water systems are under formidable threat. Presently more than a billion people are living in areas where adequate amount of drinking water is not available. The problem is worsening day by day and it is estimated that by 2025, as many as 3.5 billion people could experience water scarcity.

The reasons for the water scarcity are well known. Firstly, there has been widespread decline in groundwater levels. Secondly, rising concentrations of greenhouse gases resulting from human activities are causing large-scale changes to Earth's climate and these climate changes are going to affect water cycle and water availability. All the major international forums agree that fresh water systems are the most vulnerable and are a risk for the whole humanity. Thirdly, increasing pollution is degrading freshwater and coastal aquatic ecosystems.

Coming closer to home, depleting water table of Punjab, is a well-known fact and very little has been done to counter this. The Central Ground Water Board, Punjab Irrigation Department and Agriculture Department have been emphasizing for the past many years "beneath the earth surface level, water has been disappearing in the Northern part of India, especially states like Punjab and Haryana and if the phenomenon persisted, it could lead to the collapse of agriculture in that region."

When the state government announced free power for farm sector in 1997, the number of tube wells shot up from about 2 lacs to 12.50 in 2001-02. Do we really need so many tube wells when 27% of our land is irrigated by the canals ? *At the national level we are annually drawing up more water than China and America combined. China, with a larger population, uses 28% less fresh water than India.*

Energy and water are closely related, Punjab Government has provided free electricity worth more than Rs. 45,000 crores to the Punjab farmers in the past 10 years. We need to start thinking about our pricing policy and also about less water-guzzling crops such as maize and sun flower. As 67% of our ground water is used for irrigation.

Water conservation needs a serious thought. All the policies, strategies and activities need to be revised to meet the present demands of water. Keeping in view our growth we need to plan for the future requirements also.

22% of ground water is used for domestic purposes. As noted by the United Nations, there are adequate water resources to meet our needs, but water "is distributed unevenly and too much of it is wasted, polluted and unsustainably managed".

Water education needs to be planned at all the levels. Water scientists, engineers, managers and decision makers need to get together to formulate policies. Education and training of water technicians, water education in schools and community forms an equal part of the planning. Mass media needs to be used to keep the communities informed of the present situation and that of the policies.

Presently, we are not adequately aware of the dangers of water scarcity. The communities need to understand the cost of water. Water conservation has become an essential practice in all regions, even in areas where water seems abundant. You cannot live without water. In the past, civilizations have disappeared from the face of the earth, not because the governments were not aware of the impending disasters. The disasters occurred because no action was taken in time and of course history repeats itself.

**R.P Singh**

## Why Water is Main Source of Life ?

Dr. K.C. Kanwar

Man does not live by food alone. Water is vital to human health and fitness. Although it is not a nutrient as are carbohydrates, fats, proteins, vitamins and minerals. It, in fact, is a key factor as no life is possible without it. We can survive for weeks without food, we cannot live without water longer than a couple of days.

Water constitutes approximately 60 per cent of the body weight of human adults. The total amount of water in a man weighing 70 kilograms is approximately a little over 40 litres. In a new born human infant, the water content could be as high as over 75 per cent of the body weight whereafter it progressively decreases till the end; the maximum loss of body water occurs in first 10 years of life. The percentage of water in human tissues ranges from as low as 20 per cent in bones and adipose (fatty) tissue to as high as over 80 per cent in grey matter (brain), bone-marrow and blood.

The molecular structure of water is unique which endows it with a number of extraordinary characteristics essential to its life-sustaining functions. It is an excellent solvent—more substances are soluble in water than in any other liquid known so far. This makes it an ideal constituent of the body fluids which sustains life-supporting chemical reactions. It dissolves varied products of digestion and transports them to the rest of the body. Likewise, it dissolves diverse metabolic wastes and helps to drain them out of the body. Besides, it performs a variety of functions—some well-known and well-understood, while others not so well appreciated, yet vital. The no-less important role of water is to distribute/dissipate the body-heat efficiently, thereby regulating body's temperature. Water accomplishes this role

ideally because it has high thermal conductivity ensuring rapid heat transfer from one part to the other.

Above all, water has a high-specific heat, implying that it takes a lot of heat to raise its temperature and likewise much heat must be lost to lower its temperature. Water molecules are attached to one another so strongly that it takes a lot of energy (or absorbs a great deal of heat) to vapourize a water molecule, thus making it a good coolant in summer. A football player weighing 100 kg. loses an enormous amount of water in perspiration /evaporation during a one-hour scrimmage. If this does not happen, the total heat produced would have raised the body temperature by over 100° C- a fatal state for human beings. Even other-wise, we produce large amount of (metabolic) heat from a variety of chemical reactions continuously going on in our body. Were it not for the high capacity of water to absorb this metabolic heat, the body temperature would have risen to the point where life could not be sustained.

Drinking a lot of water is an inexpensive way to stay healthy. Even excess of water is harmless. Water therapy—drinking water in the morning immediately upon waking up have amazing therapeutic affects for a multitude of health condition ranging from pain to asthma or cancer. Even the antagonists concede that water therapy is effective in many ailments caused by improper waste drainage as a result of clogged kidneys. One needs a healthy level of water to maintain healthy kidneys.

*The daily intake:* Even before we start feeling thirsty, our body is somewhat dehydrated. Researchers feel that most of us are not drinking enough water and are in a permanent state of partial dehydration. To sip water as and when available without waiting for being thirsty is not a bad idea. Normally, the water balance remains fairly constant, no matter how much water one takes in excess but it (the water balance)

suffers if the body is dehydrated. The water regulation in the body is affected by hypothalamus in two ways i.e. (i) by creating the sensation of thirst which makes us drink water and (ii) by controlling the excretion of water as urine. If water regulation fails, medical emergency ensues.

The water loss must be replenished promptly lest it should become a serious life-threatening hazard. If the body is dehydrated, the kidneys compensate by returning more water to the blood stream while filtering blood and as a result, there is less but concentrated urine. At the same time, the brain reacts to dehydration by producing the sensation of thirst leading to the intake of more water. If water is in excess, the kidneys return less fluid to the blood and the subject passes more but less concentrated urine. This way, the total amount of water in the body is kept fairly constant with the help of selectivity exercised by the kidneys which act dually both as filters as well as absorption units.

It is a common experience that two individuals in the same environment show significantly different water intake. Perhaps, to a certain extent, it is habitual. Ordinarily, one requires to drink a minimum of three to four pints. (1.5-2 litres) everyday. In a hot and dry climate an average individual daily water intake could go as high as even five pints. To this may be added about half a pint (300-400 ml) of metabolic water produced daily by the body. At a temperature of about 20° C, out of 2300 ml of water intake, approximately 1400 ml is lost in urine, 100 ml in sweat and another 100 ml in faeces. The remaining 700 ml is lost by evaporation from the respiratory tract and by diffusion through the skin. In a healthy individual, the water intake and water output are evenly balanced to maintain the total water content constant.

On an average, a human adult requires a minimum of 1.5 litres of water in addition to the amount of urine passed

to compensate for losses through other routes. To counteract the overall water loss, one preferably should drink water and avoid caffeinated beverages (coffee, tea or colas) which paradoxically are diuretic and dehydrate the system further. Similarly alcohol too dehydrates the system. “Nimbu Pani”, Lassi and Soups are good substitutes for replenishing water in the body.

If we consume less water than is needed or medically recommended, we expose ourselves to toxic overload. The liver and kidneys all need plenty of water to help them process and excrete everyday metabolic wastes and other toxins. Dehydration causes the thickening of the blood which makes its pumping difficult. The digestive system too cannot function properly without enough water. The scarcity of the water in the system could produce ailments like headaches, constipation, arthritis, the irritable bowel Syndrome, etc.

*(Prof. K.C. Kanwar is a former Chairman of the Department of Biophysics at Punjab University.)*

## Wonderful Water !

Jeremy Seabrook

*The passing over of supplies of the precious fluid to corporate interests is only another logical step in the industrialization of the planet and everything on it.*

Water is a sacred substance. Without it, life is impossible. Where it is insufficient, life is in danger, where it is contaminated, life is precarious.

Water is a symbol of purity as well as cleanliness, although water is not the only element that serves in purification rituals—fire, blood and magical incantations may also be used.

Ivan Illich, in his essay, "*Water and the Waters of Forgetfulness*", describes the history of water—from the stuff that radiates purity, bearer of dreams, memory and which saturates the inner and outer spaces of the imagination, to Water, “a social resource of modern times, a resource that is scarce and that calls for technical management. It is an observed fluid that had lost the ability to mirror the water of dreams.”

In one ceremony, says Illich, water can both purify and clean. “This action is most evident in the washing of the dead. . . . It has remained an act performed primarily by old women, widows and semi-witches not infrequently the same women who also wash the newborn. Washing the newborn or the dead is fraught with dangers that women face better than men. Before starting her cleansing, the Jewish woman places a kerchief on the face of the corpse; the Russian woman bows deeply and asks the dead to forgive her for stripping his remains. . . . only bodies so washed will not stay glued to their environment, will not remain prisoners of this world and haunt those who are

still alive. What for the dead man or woman is ‘ablution’, ‘absolution’, delivery from burdensome soil and dirt is, for the living, a purification of their dwelling space corrupted by death”.

Those who depart this life set out on a journey and the borders to the next world are, in a majority of cultures, bounded by a stretch of water. The waters of river, ocean or stream are slow flowing and symbolize the process of forgetting, washing away the memories that tied the individual to life.

It might have been thought that one of the *panch mahabhutas*, the very source of life, might be regarded with awe and reverence. For even in secular experience, the sheer power of water strikes terror. Two-thirds of the landmass of Bangladesh was flooded this August, while the small community of Boscastle in the South-West of England was virtually washed away by rain. The water that gives life, also takes it away: death by drowning has been the fate of mariners through the ages; as it is of hundreds of migrants who try to cross the seas each year in their efforts to reach the shores of privilege. Perhaps that is why the drowning of towns and cities when dams are constructed provokes so much opposition and anger—the element that sustains life is being diverted to sink into invisibility what life has created.

For millennia, water was, at the same time, a source of sustenance, but also a mysterious substance of wonder. Its purifying capacity was always easily subverted, so that it readily became a source of infection. Indeed, water-borne diseases kill 6,000 children each day in the world.

It was the industrial era in Britain which concentrated populations and contaminated water on a grand scale. In Victorian England, the banks of the

Thames were thick with foul-smelling mud which was exposed at low tide. In 1849 and again in 1855, Cholera killed some 20,000 people. Sir Edwin Chadwick, who presented a report on the sanitary conditions of the labouring people in 1842, imagined the city as a place through which water must incessantly circulate, clean water arriving and carrying away filth and sewage.

This was the time when water underwent its most significant change: it became a commodity. But there was little scope for private enterprise to make profits out of the dearing of waste, and for the most part, it was governments, local and national, which took charge of providing water to clean and wash away the filth of industrial society. Water ceased to be the object of worship: as long as it remained sacred, it stood a greater chance of being conserved and remaining free from pollution; but once it was desacralized, it began its journey towards becoming a formula, functional necessity water. Lakes, streams and rivers, which replenished themselves, inspired whole cultures and civilizations (and also caused them to fall when it dried up, as the beautiful ruin of Fatehpur Sikri attests), have ceased to inspire worship and a sense of the divine and have been transformed into water resources, another industrial raw material.

Today, the world stands on the threshold of a water crisis. More than one quarter of the world's people lack access to safe drinking water. Almost half are without even the most rudimentary sanitation. Twelve per cent of the world's population consumes 85 per cent of the available fresh water. Indeed, water consumption varies from a minimum of 5 litres a day per person in the poorest countries to 425 litres among the richest. Fifty litres a day is the recommended basic domestic water requirement for

a family of four people.

It is certainly true that governments of the world have proved themselves incapable of providing this indispensable amenity for their citizens: debt, corruption and inefficiency left many governments incapable of financing water and sewerage. The latest "answer" to this is the privatization of water.

The passing over of supplies of the precious fluid to corporate interests is only another logical step in the industrialization of the planet and everything on it. Privatization will certainly not bring water to the poorest people, neither of sufficient purity to quench their thirst, nor in sufficient quantity to carry away the ordure and filth of the growing cities of the world. We now hear of a global "water industry" in which 10 or a dozen corporate entities are in the market for control of water. Two French companies—Suez Lyonnaise des Eaux and Vivendi currently have more than half the world market. We hear of "water management options", "cost-recovery" plans, where by the poorest are encouraged, often by the intervention of NGOs, to provide the labour, money and efforts to build the infrastructure for water connections in the slums facilities which the rich take for granted. The poorest, who still buy their drinking water from vendors, pay far more for their water than the well-to-do. To render water into a marketed commodity is to transform the stuff of life, which pours down in abundance from the heavens, feeds the great rivers of the world, melts from the Himalayan glacier and the Arctic snows and sparkles through the streams and cascades of the planet.

Unless we are able to restore to water its quasi magical properties, and to see it as the irreplaceable and precious element it is, we shall see the world continue

to descend into ever more brutal “resource-wars”. Of course, water has been largely replaced in the rich Western societies and among the privileged of the South: when it has not been privatized in the form of value-added bottles of Evian or Perrier, it has been substituted by Coca-Cola, Fanta, Pepsi or any of the other denatured products of a billion of dollar “soft drinks industry”.

There is something deeply repugnant idea of the basic requirements of human life being within the gift of others to buy and sell as they choose. The most vital needs of the people of the earth have become business opportunities providing food, supplying drinking water, making cloth, creating shelter, have become items of consumption rather than the actions of autonomous and independent people.

Water, sustenance, shelter and protection against heat, cold and rain—all these things have a sacramental simplicity. They are essential and without them, the celebration of what it means to be human is impossible. Water has been reduced to the most despised and utilitarian commodity. Can it be rescued from its sites of stagnant and inert commodification in industrial reservoirs and be re-instated as the mythic and sacred liquid that not only sustains life, but also inspires the most fundamental stories we tell ourselves about the meaning of our existence?

*(The author lives in Britain. He has written plays for the stage, TV and radio made TV documentaries, published more than 30 books and contributed to leading journals around the world.)*

## Decreased Water Supply

**Richard B. Gregg**

Take the matter of water, which is essential for life. The information in the following two paragraphs is from *Water or Your Life* by *Arthur H. Carhart*.

Every gallon of gasoline (petrol) takes 7 to 10 gallons of water for its manufacture. One ton of viscose rayon demands from 200,000 to 300,000 gallons of water in its process of making. To produce a ton of synthetic rubber three times that amount of water is required. Each ton of paper made in modern paper pulp mills requires 50,000 to 60,000 gallons of water in the making. At the beginning of World War II, there were about 200 paper-mills in the United States, making about 10,000,000 tons or more of finished paper. That means 500,000,000,000 gallons of water. When it comes to the mills, a ton of cotton cloth requires 60,000 gallons of water in the bleaching and 80,000 gallons in the dying process. The manufacture of one pound of refined white sugar calls for 7 gallons of water. 160 gallons of water are needed to make a pound of Aluminium. A ton of soap needs 500 gallons of water to make it. When an airplane engine is tested, the cooling of it requires from 50,000 to 125,000 gallons of water.

Steel, of course is a necessary ingredient of all machinery, tools, large bridges and railroads. It can be made without much water in the process. But by modern methods, 65,000 gallons of fairly pure water is required to process a single ton of steel in its highly finished form. One of the major uses of water in a modern steel smelter is to cool the big retorts and their doors in order that they may endure the enormous heat of the molten steel and fuel and so that the employees can work near the furnaces. For such cooling a 150-ton furnace requires nearly 2,800,000 gallons of water

a day. Sheet steel mills also use much water for cleaning the sheets. Recently the Bethlehem Steel Corporation at Sparrows Point, Maryland, was pumping 15,000 gallons of ground water per minute for its manufacturing purposes. Of course not all this water is too polluted by these processes to make it a total loss, but most of it becomes unfit for human drinking or washing purposes or indeed for agriculture. In 1950, there were about 700 steam-electric plants in the United States with a total capacity of 40,250,000 kilowatt hours. These plants all together required 44,883,000 gallons of water *per minute*. That is a lot of water. It is not all consumed, for much of it is used over and over. Yet the figures make one pause for thought. Water supply is now a serious industrial problem in the United States and was mentioned in several paragraphs of President Eisenhower's first address to Congress in 1957. A headline on page 104 of the *New York Times* of March 3, 1957 said, "Water Shortage Threatens Nation's Dream of Unlimited Expansion, Survey Finds," and "Seven States Endure Severe Scarcity." In England, the water supply of London is becoming inadequate.

Streams are polluted and poisoned by city sewage, coal mining, oil-fields, food processing, paper pulp mills, steel plants, and all textile industries & chemical industries. This pollution kills all fish in the streams and makes the water unfit and dangerous for any domestic or agricultural use.

Industrialism makes big cities. Every person requires 6 to 8 pints of water per day to keep alive. The bigger the city, the more industries it contains, the greater is its daily per capita use of water. In the United States, a big industrial city uses from 125 to 300 gallons of water per capita per day. Over 5,000 tons of water is used to produce the food and drink of one person in the U.S.A. per year.

Agriculture also needs tremendous quantities of

water, as shown by agricultural research. The Annual Year-book of Department of Agriculture for 1955 of the United States says at the 358, "Growing plants transpire enormous quantities of water which they take from the soil. One corn field in Iowa transpires enough water during a season to cover the field to a depth of 12 or 16 inches. The production of one ton of dry alfalfa hay on the Great Plains may involve the transpiration of 700 tons of water more or less, depending on the evaporating power of the atmosphere." Again at page 396, "A single corn plant in full leaf may transpire 32 quarts of water in a week". John Stewart Collis whom we have already quoted, wrote, "In a single summer day a full-grown willow can evaporate up to 5,280 gallons of water . . . . . An acre of corn will normally evaporate during the vegetating period about 3,500 tons of water." For the production of every pound of dry matter of certain plants, F.H. King found by experiment that barley required 310 pounds of water, summer Rye needed 353 pounds of water, oats 376 pounds, summer wheat 338 pounds, horse-beans 286 pounds, peas 273 pounds, buckwheat 363 pounds. This is a mean rate of 325 tons of water for each ton of dry matter produced. As much as 1,000 pounds of water may be transpired for every pound of dry wood produced by a tree.

The total amount of available water has to be shared chiefly between industry and agriculture. In the United States it has been reliably estimated that of the total available water, 48 per cent was used in irrigation, 43 percent directly by industry and 9 per cent by household, etc.

In a country like India whose rainfall is irregular in amount from year to year and is crowded into only three to four months per year, whose population is pressing so desperately on the land for food, it would seem to be a dangerous thing to go in very heavily for industrialism. Food is more important than industrial products. The government

will have to allocate both surface and ground water very carefully between agriculture and industry.

Nor would it do to rely on tube wells for an indefinite additional supply of water. Whether the sub-surface water on the Indian plains is fed by subterranean streams from the mountains or only by local rainfall that soaked into the neighboring ground during the monsoon, that sub-surface water is limited in amount.

The city of Los Angeles, in California, U.S.A, has pumped up so much ground water for its uses that the land surface thereabouts has sunk as much as eight feet in some spots. At Long Beach, California, pumping up ground water has pulled down its sub-surface level of water 75 feet below sea level and well-water has begun to get salty all along that part of the sea-coast. In the Santa Clara Valley in California, in 1910, there were a thousand flowing artesian wells used mostly for agriculture, in addition to more shallow pumping wells. Pumping water expanded from 25,000 acre-feet in 1915 to 134,000 in 1933. The level of below ground water fell about five feet per year until 1933 when it dropped 21 feet ! The Valley ground itself sank five feet in 20 years, causing millions of dollars of damage to buildings, streets, pipelines and orchards. At Texas City, Texas, so much water was needed for industrial uses that many tube wells were sunk, some going down as far as 1,100 feet. In 1939, these wells were supplying about 10,000,000 gallons of water per day, by pumping. World War II increased the demands of industry so much that in 1945, these wells were supplying 22,500,000 gallons per day. As a consequence, the water level in one tube well there dropped 102 feet below sea level; another well sucked out so much ground water that its water level was 165 feet below sea level. As a result, the ground water became salty from infiltration of sea-water. Also in that area the level of the surface of the ground itself dropped

on an average as much as 2.4 inches per year; in some spots the total drop amounted to 1.5 feet. At other places, such as Louisville, Kentucky, far away from the sea and where the war made great demands on industry, the tube wells began to go dry. Water was being sucked out of the ground faster than it came into the ground. In California, water pumped out of the ground for irrigation purposes has in many places lowered the level of ground water several hundred feet and the cost of pumping has begun to get prohibitive so that orchards and fields had to be abandoned.

First edition June 1952, as everyone knows, modern science and technology, wrapped up in industrialism and large-scale commerce, are now intruding rapidly and in a big way into the continents of Asia and Africa. In the cultures and nations of those continents there are, as a result, great confusions and conflicts of values, beliefs, assumptions, customs and institutions as between the old and new ways. Everywhere changes of all kinds are very swift. There is a great urge to create a better world. Often old ways crumble before new good ways can be built up to take their place.

## **Rivers for Sale**

**Manohar Malgonkar**

Two statistics. Each is alarming in itself. Seen together, they're a danger signal.

One: India's population, grown threefold in 50 years, has reached the billion mark; it grows at the rate of 13 million every year.

Two: India has a fifth of the planet's population but only 4 per cent of its water resources.

It was thus self-evident that we were heading inescapably towards the point of not having enough water for the basic needs of the people for growing crops and fodder, for cattle and people to drink. But then no one had expected it to happen so soon and certainly not this year because the previous monsoon, that of 1999, was better than normal and also well-distributed.

Well, it has happened. Shortages began as early as February. In March, many of our towns and cities were subsisting on once-in-two-days rationing. But very soon it was once-in-three days and then once-in-four-days. At the end of March, President K. R. Narayanan warned the people of Rajasthan that they must treat water as their most precious resource and that it was their duty to conserve it by all means. A week later, there were water-riots in parts of Gujarat. And finally, on April 23, with the monsoon still six weeks away, the Prime Minister made an appeal for donations to help the drought-hit areas of Gujarat and Rajasthan.

From once-in-four-days in places like Belgaum, Bijapur and water-riots in Gujarat, it is but a short step to the horrors of Abyssinia which we see on our TV sets: whole villages on the move, looking for water, the sand littered with dead cattle and mother, themselves crazed

with thirst scooping black liquids from sandpits to wet the lips of dying babies which resembles bottled embryos.

President Narayanan's appeal was addressed to the drought-affected people of Rajasthan. But surely, the politicians in power in the various states who actually reside over the fates of our lakes and rivers were equally its targets. It was as though the President was shaking a head masterly finger and saying: Remember, water is life itself. The Bible mentions it precisely in those terms: "A pure river is water of life." Why, even our own scriptures tell us of what heroic troubles Bhagirathi had to go through to bring down the Ganga from the heavens to the earth.

What we have done to Bhagirathi's Ganga is a sad and shameful story but we have done the same to our other rivers too-transformed them into drainage systems for municipal wastes, industrial acids and other chemical sludge.

This year's drought is but a forecast of things to come. The ever rising demand for more water will make the shortage increasingly serious, unless our decision-makers at the highest levels put a halt to the vandalism of such of our water resources that have still remained unpolluted instead of lamenting their loss after they're gone.

As to how our rivers are put of business by those who control their fates, I offer a case study. It is a river I know well because I live near it. A small river, barely a hundred kilometers long, yet swift and strong and alive with Mahseer which only thrives in clean fast-flowing waters. It rises in the hills, South of Belgaum and flows southward to join the sea at Karwar.

It is called the Kali and it is— it was-the life-support system of a region known for its evergreen forests

and abundant wildlife.

Barely thirty kilometers from its source, the Kali has been virtually strangled to death by the infusion of a stream of the foulest industrial effluvium, so that, for most of its remaining length, the Kali's water is unfit, indeed dangerous for domestic use, and fish don't live in it.

But that still left a third of the Kali's length capable of serving as the lifeline of the villages and jungles through which it flowed and it is in this section that they have put up a dam across the river at a place called Supa to create a vast lake for generating electricity. This lake itself is now a scenic wonder: crystal clean water mirroring the evergreen hills that tower on all sides.

But what are beauty spots to administrators? Because this lake, too, is now to be a receptacle for industrial chemicals and as though this were not sufficient punishment for it, its intake of water is to be drastically reduced to serve the needs of a gigantic plant of horrendous pollution capacity.

The logic put forward for these measures has a truly Alice-in-Wonderland air-of having no relationship with ground level realities.

The Supa reservoir was constructed for the specific purpose of ensuring a plentiful store of water for generating electric power. But since the dam was completed, some 20 years ago, the reservoir has seldom, if ever been filled to its capacity. Low water-levels at Supa are often put forward as the reasons for load shedding.

So one would think that those responsible for generating power would not willingly permit the shutting off of the flow of one of the rivers that feed the reservoir, Right?

Sorry —wrong. Oh, yes, they keep complaining

about their lake never really filling up. But not so much as a token yelp of protest at the government itself having given away one of the lake's main feeder rivers, the Pandri, to the exclusive use of a coke oven plant.

Given away—that's right. The wording of the government's operative announcement is "all the water from the Pandri." Every drop.

So what about the villages and jungles that the Pandri supports? How will they find drinking water and cultivate their fields ?

Easy. We'll dig a couple of wells, see-stop screaming. And as to the land holdings which will have become uncultivable, we'll acquire them and hand them over to the coke plant. After all they were not cultivable, were they?

That, in essence, is the argument put forward. We take away all their fresh water and make the fact of their inability to farm their land an excuse for transferring those holdings to the coke plant. Neat-see?

But wait. There are more indignities planned for the Kali river in its course below the Supa dam, where it forms a large pool. From this pool, eight million gallons will be siphoned off every day and piped right back to the concerned person. That's right. Eight million gallons per day.

Does the Kali have enough water to sustain a daily loss of eight million gallons? Records suggest that it doesn't. But even if it does, will not such excessive withdrawals run the river dry altogether? What happens to the farming communities, their cattle, the wildlife, the jungle downriver, if you not only choke off their life-support system, but fill the riverbed with an unending stream of acids and chemical wastes?

And all this, in the face of the President's fervent appeal and Vajpayee's anxieties. Surely, now, with the drought already a presence, what was thought feasible five years ago by some ad-hoc committee, needs to be re-examined by personages of responsibility at the highest levels in both the state and the centre?

Are the needs of an industry famed for the highest levels of pollution more important than the needs of the people?

And here is irony! A newspaper report of "a high-power committee to prepare an action plan for solving the drinking water problem" in several districts of Karnataka.

So, what to make of it? The President telling the people to use less water, the PM, asking for money, for providing water, while a state which itself is short of 'drinking water', gifting rivers for industrial use.

*The Tribune, June 4, 2000*

## **Down the Drain**

Drought, water scarcity, power black-outs—all symptoms of a complete breakdown of public utilities. Individuals are left with no choice but to fend for themselves with generators and inverters for power. Rainwater harvesting and private storage tanks cater to the daily needs of those who can afford them. The less fortunate have no option but to put up with unpredictable services. It is little comfort that we are not alone—across the world. The future holds no hope of adequate potable water. In fact, the United Nations estimates that the biggest single cause of death among children is lack of safe drinking water—some 6,000 to 10,000 children die every year because of this. But India's water problems have more to do with faulty planning and management of existing supplies than lack of water resources. How else can we explain the fact that despite a decade of plentiful rains, our groundwater levels have fallen steadily? Many areas in Rajasthan, Punjab and even the Capital are facing acute water shortage already, compounded in part by power failures. Rural Madhya Pradesh's landscape, for instance, is dotted with tubewells and handpump sets which have fallen into disuse because there is no groundwater left. We've allowed 10 years' rainwater to go down the drain—rain water harvesting on a large scale could have saved our groundwater sources from plummeting.

Good water management can help to create sufficient reservoirs to be used in times of crisis. Rashtrapati Bhavan has set a good example on this score by going in for rainwater harvesting to meet its water requirements. Spread over 133 hectares, the presidential estate has 7,000 residents and gets up to 3,000 visitors daily. The RB consumes two million litres of water daily. Groundwater

levels here have plunged from two to seven meters in the last 10 years, as it indeed has in many other parts of Delhi and neighbouring areas. Now, with a rainwater harvesting system in place, the RB's annual water requirement totaling 730m litres is easily met. Organizations like the Centre for Science and Environment hold regular workshops and training sessions to educate and apprise people how to harvest rainwater and there are similar centres in other states like Tamil Nadu, engaged in water conservation. An official campaign to create awareness and provide practical information on rainwater harvesting should reach out to cooperative group housing societies and residential colonies in the metros. This way, we will have enough water the year round and not just on a rainy day.

The Times of India, August, 2002

## Severe Water Crisis in 15 States

Ground water levels are rapidly declining in the country, resulting in a severe water crisis in about 54,310 villages spread over 15 States.

The ground water crisis has led to lowering of water tables and drying up of wells in many States, including Uttar Pradesh, Rajasthan, Gujarat, Maharashtra, Madhya Pradesh, Karnataka, Tamil Nadu and Andhra Pradesh, a PTI survey has found.

At least 16,000 villages in Madhya Pradesh are facing a severe water crisis, followed by Karnataka (8,000), Rajasthan (6,570) and Tamil Nadu (6,554), the survey found.

The steep fall in water levels has been attributed to two major factors—poor recharge of ground water reservoirs due to failure of monsoon and increased withdrawal of the water for irrigation and drinking purposes.

Permanent recession of ground water levels has been observed in Karnataka in Devanhally and Hoskote taluks of Bangalore district, Gouribidanur and Mulbagal taluks of Kolar district and Malakalmuru taluk of Chitradurga district.

An analysis of water levels in these areas over a period of 10 years has indicated a recession of three to five meters. Wells have dried up in most of the areas.

Recurring failure of the monsoon has led to a significant fall in the water-table in Tamil Nadu, the decline ranging on an average between two and five meters. Most of the 20 districts in the State have below normal rainfall in the last few years.

In Coimbatore district, the water-table has gone down to 25 meters in some pockets, while it was only 10 meters below the surface 10 years ago.

Severe depletion of water has been recorded in eight districts of Andhra Pradesh : Mahaboob nagar, Nalgonga, Chittoor, Anantpur, Cuddapah, Kurnool, Prakasam and Rangareddy. In many of the places, the water table has receded below six meters below ground level.

Recurring drought has led to a decrease in the water levels in many parts of Maharashtra, particularly in the alluvial areas. At present, the ground water level is six to eight meters below ground level compared to four to five meters 10 years ago.

The water table has gone down considerably in the Saurashtra Kutch region of Gujarat during the past five years. While water was available at depths of seven to nine meters in wells in 1973-74, it is now available at depths of 24 to 30 meters.

Failure of monsoon and winter rains has adversely affected the water tables in Punjab, Haryana and the Union Territory of Chandigarh also. The decline rising from 0.5 to 8.61 meters.

The effects are more severe in south-western districts of Haryana, especially Mahendragarh, Gurgaon and Bhiwani, besides Ambala in the North.

The sprawling Sukhna Lake in Chandigarh has shrunk to one-third of its area and is heavily silted because of failure of rains in the catchment area the survey found.

A fall in the water-table has also been observed in Hooghly and Burdwan districts in West Bengal, Nalagarh and Paonta valleys in Himachal Pradesh, Trichur, Ernakulam, Wynad in Kerala and Goa and its surrounding areas in the Western Ghats.

## **Punjab Heading Towards Water Crisis**

**G.S. Aujla**

*In case the monsoon fails to break out over Punjab in the near future, it is apprehended that the Punjabis are sure to face acute scarcity of drinking water*

There are no two opinions about the fact that the traditional paddy wheat rotation stood the test of time and the Punjab farmer did a yeoman's service to the country by substantially contributing towards the central pool of food grains. To take maximum advantage from the minimum support price, the Punjab farmers spared no efforts to bring more and more area under this cropping pattern and even the sandy/marginal lands earlier used for cultivation of oilseeds (ground-nut), pulses, fodder and maize were abruptly shifted to paddy.

This monoculture was allowed to sustain unhindered for a pretty long time exposing the natural resource potential of land, underground water, environment and ecology to heavy strain. The position acquired alarming dimensions in the central plain districts of Ludhiana, Jalandhar, Patiala, Sangrur, Fatehgarh Sahib, Kapurthala, Amritsar, Gurdaspur and Ropar where the dependence was largely on the exploitation of sub-surface water.

In the just for making more and more money from the assured market of wheat and paddy, the Punjab farmers turned a blind eye towards the Johl Committee report on diversification submitted during 1985-86 and did not care to shift even an inch of the area from the high return crop system towards water-saving commercial crops of oilseeds, pulses, fruits, vegetables, maize and fodder.

The situation in Punjab has now reached to such a pass that the aquifers of underground water in the entire central zone of Punjab are on the verge of exhaustion and

the centrifugal pumps are showing signs of becoming in operational as the rains in the state are usually scanty & erratic while submersible pumps are not within the access of an ordinary farmer.

This year, the problem has been aggravated by the delay in the arrival of the monsoon and reduction in the power generation due to lowering of the water level in the Ranjit Sagar Dam, Pong and Gobind Sagar reservoirs.

Due to the precarious situation on the water/power front, the farmers who had just finished the task of paddy transplantation in their fields have now started ploughing their withered crop. The level of tubewell bores, which earlier used to be around 30-40 feet, is fast touching 60-80 feet, which is a matter of serious concern both for the state government and agricultural planners. In case the monsoon fails to break out over Punjab in the near future, it is apprehended that the people of Punjab are sure to face an acute scarcity of drinking water, leaving aside water for irrigation purposes and Punjab, the Land of Five Rivers, is likely to turn into a desert.

No doubt, we are too late now to prevail upon the insurmountable problem of depletion of the water-table, yet there is no question of losing heart and both the government and farmers must joint hands to improve the position on the water front with determination and sincere efforts.

It is the time for the Punjab farmer to bid a good-bye to its pet water guzzling money spinning paddy crop and bring a lion's share of his holding under the value-added cash crops of maize, fodder, oilseeds, pulses, fruits and vegetables, medicinal & aromatic plants, spices etc. which are quite economical water-wise. Even if no incentives come from the state government for shifting area from wheat & paddy, the Punjab farmer must make it a point to drastically shrink the area under paddy to save Punjab

from the likely hazards of drought/desert-like conditions, which are hovering over the heads of Punjabis.

The state government must make sincere endeavour to immediately formulate an action plan backed by adequate funds for soil conservation and water harvesting. Management works both in the sub-mountane kandi zone and also down in the plains so that the state can be relieved of the menace of demanding water-table through maximization of recharging during the rainy season.

Since the quantum of rainfall in the region basically depends upon the area under afforestation and vegetation/tree cover, which is on the very low side i.e. 5.7 per cent. This needs to be extended to at least 10 per cent by undertaking plantation work as a campaign by involving people from all sections of society.

To grapple with the complicated issues of replenishing the underground water reserves, an immediate integrated effort is the need of hour and this is not the time to miss the train, otherwise the people of Punjab would have to repent a lot and the posterity will not forgive us all.

Moreover, the cultivation of major cereal crops of wheat and paddy is no longer sustainable on the commercial scale due to radical changes on the global scene as part of the WTO provisions, when both these crops are neither competitive quality wise not cost wise. At the most, the Punjab farmer can retain a part of the area under basmati and durum wheat, provided he is able to produce as per global norms at the competitive cost.

*(The Tribune, July 25, 2002)*

## **Living on a Spoonful of Water !**

**Juhi Bakhshi**

Studies indicate that by 2050, more than 50 per cent of the Indian population will have shifted to cities, making water scarcity an acute problem. The water conflicts between states as well as between nations are expected to intensify on this account. The states that figure high on the list of potential water scarcity are Punjab, Haryana, Bihar, Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh, Maharashtra and Orissa.

The wars of the next century will be about water.

The rate of water withdrawal by existing tubewells in Delhi exceeds the amount replenished by rain to the extent of a good 13 per cent. The annual rains add approximately 7 per cent to the reserves every year. The rate of withdrawal by existing tubewells, however, amounts to nearly 20 per cent. This kind of over-pumping of ground water, experts warn, can magnify the concentration of pollutants in the water that remains.

We call ours a blue planet. It seems pretty blue when astronomers view it from outer space. The reason, of course, for this is that nearly 71 per cent of the earth's surface is covered with water—a fact that might easily mislead us into believing that we have at our disposal just too much of water to ever feel its scarcity. But this assumption has, in recent times, proved to be tragically false. Plenty of water there might be, but the quantity of water that is fit for human consumption is very, very limited.

Of all the water on earth, almost 97.5 per cent is salt water and of the remaining 2.5 per cent fresh water, some 70 per cent is frozen in the polar icecaps. The other 30 per cent is mostly present as soil moisture or lies in

underground aquifers. In the end, less than 1 per cent of the world's total fresh water (or about 0.007 per cent of all the water on earth) is readily accessible for direct human usage. This is the water that is found in lakes, rivers, reservoirs and in underground sources, shallow enough to be tapped at affordable cost. To understand the situation better, visualize this—if all the earth's water fits in a gallon jug, available fresh water would be equal to just over a tablespoon.

And it is from this spoonful of water that the entire world has been trying to quench its thirst. And a spoonful just does not seem enough. It can easily spill into that jug of non-usable water and leave us with precious little to quench our thirst. Does the idea of a thirsty, drought-stricken mankind seem too far-fetched? It really would not appear so if we were to take look at some of the facts and figures that environmental agencies have presented before us in recent times.

Here are some facts that should shake us out of our complacency.

The fresh water available amounts to less than one-half of the 1 per cent of all the water on the earth. Fresh water is renewable only by rainfall, at the rate of 40,000 to 50,000 cubic kilometers per year. Due to intensive urbanization, deforestation, water diversion and industrial farming, however, even this small finite source of fresh water is disappearing fast. If the present trends persist, the water in all river basins on every continent could steadily get depleted.

Global consumption of water is doubling every 20 years. According to a United Nations study, more than one billion people on the earth already lack access to fresh drinking water. Forty per cent people live in countries where water is scarce: by 2025, this is expected to rise to

66 per cent.

The greatest environmental disaster afflicting the planet is the scourge of dirty drinking water. Dirty water kills 2.2 million a year in developing countries. Most of the victims are children.

In fact, the water crises the world over, has reached such immense proportions that the inter-national community took it up as one of the main issues at the Earth Summit held at Johannesburg a couple of months ago. The summit focused on “Water—Its Rapid Depletion and Deterioration”. The Earth Summit had itself been held in a land threatened by famine, estimated to affect nearly 10 million people across Southern Africa. In Malawi, Mozambique, Zambia, Swaziland and Lesotho, the main cause of famine is drought. On the other hand, floods have in recent times been the cause of widespread misery in much of central Europe.

In India also, when the summer season is at its peak, dismal reports of acute water shortage begin to hit newspaper pages. India—which has 16 per cent of the world’s population, 2.45 per cent of world’s land area and 4 per cent of the world’s water resources is already heading towards a state of water crisis. A late monsoon last year had resulted in drought in 13 of the 29 states in the country. But drought apart, otherwise too there is a huge gap between the quantity of water that is made available to us by Mother Nature and the quantity that we are utilizing.

Check out the following to measure the water poverty that we in India face. And the situation, the experts warn, is only going to get worse. The reservoir of underground water, estimated at 432 billion cubic meters (BCMs), has been declining at a rapid rate of 20 cm annually in as many as 15 states. As a result, it

is feared that major metropolitan centres may go dry as early as 2015 on account of over-exploitation and misuse of water resources. Studies conducted by the UN indicate that the rate at which the underground reservoirs are being emptied all over the world, including India, is at least 10 times faster than it can be naturally recharged.

In Tamil Nadu, the water-table has dropped by 30m in 30 years and many aquifers have run dry. According to a study done by the New Delhi-based Central Ground Water Board, it will take just 2,600 additional large tubewells, those of the kind being installed by large housing societies, industries, educational institutions and hotels, running at an average of 10 hours per day, to exhaust the entire reserve of underground water in Delhi. The rate of water withdrawal by existing tubewells in Delhi as it exceeds the amount replenished by rain to the extent of a good 13 per cent. The annual rains add approximately 7 per cent to the reserves every year. The rate of withdrawal by existing tubewells, however, amounts to nearly 20 per cent. This kind of over-pumping of ground water, experts warn, can magnify the concentration of pollutants in the water that remains and in many cases polluted surface water or salty sea water pours into the aquifer to replace the ground water, making it impossible to farm.

The ecological consequences of drawing heavily on ground water too are grave. Deep aquifers, experts say, are a vital link in the hydrological cycle because they release water slowly into rivers, lakes and wetlands in the dry seasons and soak up water to prevent flooding in the wet times. The only reason that many of the world’s great rivers such as the Niger and the Nile flow all year round is because of ground water release. Take too much and the result is dried-up wetlands and river bed, environmentalists warn.

The problem of urban water scarcity is further expected to intensify in the near future. Water disputes between states and nations are not uncommon as is apparent from long-standing issues like sharing of Cauvery waters and Narmada-Sabarmati dispute. Considering India's bleak water scenario, trouble could also arise over water issues with neighbours like Pakistan and Bangladesh. India controls major water courses that supply water to these countries. India's Farakka barrage diverts the Ganga water away from Bangladesh. Currently, India is proposing the construction of another barrage on the Brahmaputra in Assam, effectively controlling all of Bangladesh's water supply.

The recent release of waters from the Narmada into the Sabarmati must have given rise to much salutation of the river as a life-giver, but we have as a nation never done enough to take care of rivers, our lifelines. Several perennial flows like the Ganga-Brahmaputra-Barak are becoming seasonal. Rivers are drying up or declining in volume. The Yamuna supplying water to Delhi and Agra is highly polluted, mainly because waste water that is discharged from Delhi, Mathura, Agra and Etawah into the river is untreated and the river does not flow fast enough to dilute the load of pollutants. The marauding of the Ganga's now an oft-discussed issue. There are vast stretches of Indian rivers that are unable to support fish on account of the levels of pollution caused by discharge of untreated effluents. Of the total water that we pollute, only one-tenth of the waste water from cities is treated. As a result, 85 per cent of the country's urban population that has access to drinking water, only 20 per cent receives drinking water that meets the health and safety standards.

The calamity is staring us right in the face. If we don't wake up to the facts now, it might just be too late.

What can you do ?

- \* You need not be an environmental activist to contribute your bit to guard the blue gold. Here are a few small tips that can help:
- \* You waste up to 7 litres of water when you leave the tap open to brush your teeth. Use a mug or a tumbler to shave, brush or wash your face.
- \* You use up to 50-100 litres of water every time you wash your car. Avoid doing so every day. Give your car a sponge bath and if possible use a bucket instead of a hose pipe to wash the vehicle.
- \* Use a watering-can to water the plants. Reuse the water you use to wash the vegetables in.
- \* Toilets require 7 to 10 liters of water for flushing every time. Use flushing systems that allow you to control the amount of water you flush.
- \* Take a bucket bath instead of a shower bath. As much as 25 litres of water, the amount equivalent to letting a shower run for only 2.5 minutes, assuming a flow rate of 10 litres a minute, might be all the water that a whole family may need in a day.
- \* Fix all the leaking taps at once and close any tap you find open, even though it might be a roadside one.
- \* Plant a tree. Trees help to conserve water.
- \* Use recycled stationery. Consume less paper. Paper is made from felled trees.
- \* *Be aware and care for the environment. The problem is ours and not somebody else's*

**Will this be said  
A Hundred Years Hence?  
Pawan Prinja**

“India was a populous land until the end of the 20th century with an ancient and stirring history. It was ranked among the industrial countries of the world. But the people multiplied recklessly, destroyed their land and its greenery and then in millions starved to death.

Today, the subcontinent of India ranks with the Sahara and the Gobi as one of the great deserts of the world and the first one that is entirely man-made. A few scattered nomadic tribes are to be found in the vast barren land eking a wretched existence on desert plants and animals, only so many as the desert can feed.”

Having noted this, it becomes evident that there is an urgent need to stop further degradation of our land. Otherwise, India will become a desert by 2010 A.D. with the increasing demand for food, fuel, fodder and our ever-growing population, every inch of the wasteland has to be brought back to productivity and maximum utility either by way of afforestation, social forestry or farm-forestry.

The major task is to afforest the wastelands, conserve the remaining good forests and afforest the protected forests areas which have been degraded.

*(The Hindustan Times, June 11, 1986)*

**Groundwater Sinking to New Depths  
Water Disaster  
Chandrika Mago**

Is the ground slipping from under our feet? With India mining its groundwater reserves, red spots are beginning to show on the radar. In fact, warn experts, it could soon be time to ring the alarm bell.

Nobody knows the full scale of the problem; it just hasn't been studied systematically. But thirsty Indians are guzzling groundwater reserves—85 per cent of rural supply and more than 50 per cent of India's urban and industrial supply is mined. In some areas, too much water has been pumped out.

In others, contamination is reaching serious proportions.

In Alipur, 470 of 5,711 administrative blocks have already taken out huge reserves from the ground. Not bad, you might argue.

Look more closely. Eighty per cent of Delhi's groundwater is in the extremely worrying categories of over-exploited and dark: withdrawal is well beyond, what is recharged.

All of Daman and Diu is inked red. Nearly three fifths of Punjab is on shaky ground; so, too, two-fifths of Haryana and Rajasthan. More than a quarter of Tamil Nadu has sucked out most of the water. In Mehsana, even Ahmedabad, says an official, the water-table has been falling by as much as 1.5 m a year.

Land subsidence has, in the past, been reported from Uttar Pradesh, Karnataka and Gujarat.

Cities are in particularly bad shape, says Central Groundwater Authority (CGWA) officials.

In large parts of Delhi, saline water has crept

close to the surface. Chennai and Mumbai are both facing seawater intrusion.

Chennai has a cocktail of troubles: over-extraction, salinity, heavy metals. But it's only now that the Central Pollution Control Board is planning a study of 35 metropolitan cities.

In 286 districts across 18 States, water levels have fallen more than four meters in the 20 years from 1982. Eleven areas first notified by CGWA, on grounds of quantity and quality, included chunks of Delhi, Gurgaon, Faridabad, Ballabgarh, Ghaziabad, Ludhiana, Diu, parts of Jaipur district, Haldia industrial complex and Gandhinagar.

Last year, another 32 areas across A.P, Haryana, M.P, Punjab and Rajasthan were asked to get ground water structures registered. Indore is on this list.

From overuse to contamination is a short distance. Arsenic in West Bengal is not new. But its new in Bihar's Bhojpur district. Fluoride is a problem in 16 states, led by Rajasthan. Salinity is making inroads along the eastern coast. In Tamil Nadu, A.P and Pondicherry, as groundwater sucked out leaves empty spaces for seawater to seep in. Parts of coastal Gujarat have been devastated. In the plains, salinity is spoiling the water in the heavily-irrigated areas of Punjab and Haryana. Maharashtra's sugar belt has witnessed "Indiscriminate" withdrawal.

Solid waste is working on it's black magic. Delhi's landfill sites, for instance, are in vulnerable areas-sites must be lined and maintain a minimum distance from the water table. They don't. In addition, since most urban areas don't have adequate transportation systems for sewage, this accumulates and eventually pollutes groundwater.

Industrial belts are showing poisonous heavy metals. Agriculture scientists have reported the chromium

trail from the carpet industry in Bhadohi, U.P. In Jalandhar, leather industry effluents mixed with sewage water. Around Hyderabad, there was "appreciable" build-up of heavy metals in red soils treated with urban wastes for 10 years. In parts of West Bengal, soil and crops have shown arsenic build-up after being irrigated with arsenic-rich water.

Coke's plant in Plachimada, Kerala, releases between 1.5-3 lakh litres of wastewater a day, says the report of a joint parliamentary committee (JPC). It has depleted groundwater, polluted it, reduced crop yields and led to skin disorders. Pepsi's plant in the same state uses 300 million gallons of water in a year; just 10 per cent is recharged.

A range of pesticides—Dieldrin, Lindane, Aldrin, DDT, Endosulphan, BHO and Heptachlor- have shown up in CPCB's list of "problem areas" across 10 states: West Bengal's Durgapur and Howrah, Jharkhand's Dhanbad, Up's Singrauli, Orissa's Angul-Talcher, MP's Ratlam-Nagda and Korba, AP's Bollaram Patancheru, HP's Kala Amb and Parwanoo, Karnattaka's Bhadravathi—all hubs of industrial activity.

A study over 640 sq km in Guntur last year showed high pesticide residues in a water table just two to five meters deep. But this is an exception. CGWA, in fact, recently told the JPC it was not testing for pesticide residues.

*(The Times of India, February 12, 2004)*

## Poor Quality Groundwater in Punjab

Ajay Banerjee

In what is a shocking warning on the deteriorating condition of underground water in Punjab, a recent study has produced evidence that large tracts of land in the state are being irrigated with poor quality water. It forewarns against the continuous use of such water which will lead to a drop in crop yield—the biggest source of income and the back-bone of the economy in this “granary of India”.

A study by the Punjab Remote Sensing Centre, Ludhiana, with inputs from the New Delhi-based National Bureau of Soil Survey and Land Use Planning, says only 42.3 per cent of the farmlands in the entire state are irrigated with good quality water. The rest of the water is classified into three categories. Poor quality, that is totally unfit for irrigation, 7.7 per cent; saline quality, having high salt content, is used in 5.3 per cent of the area; and lastly it is the sodic quality, having a high content of residual sodium bicarbonate, used 42.1 per cent of the state.

The districts of Bathinda and Moga have only 19.77 per cent and 14.98 per cent of good quality water, respectively. The others on the low-end of the scale are Muktsar, Mansa, Faridkot, Sangrur and Amritsar, where good quality water is just available to 38 per cent, 35 per cent, 33 per cent, 34 per cent and 40 per cent, respectively.

In comparison, Gurdaspur is the best district with 87.58 per cent good quality water. Ludhiana (78 per cent), Ropar (70 per cent), Fatehgarh Sahib (68 per cent) and Hoshiarpur (66 per cent), are among the better districts. The good quality water is present along the flood plains of the river Sutlej due to regular recharge of groundwater with fresh water.

As a part of the study, samples from a total of 3,940 tubewells across the state were collected and a

comprehensive analysis was carried out. This is part of a booklet “National Resources Information for Sustainable Agriculture in Punjab”, collated by the remote sensing centre last week. Already depleting underground water level has been the cause of worry for planners and agriculturists.

First is poor quality of water that is totally unfit for irrigation. Over 42 per cent of the samples in Moga district were found to be of poor quality while Bathinda, Muktsar and Faridkot, have 24.32 per cent, 19.35 per cent, 10.61 per cent and 8.47 per cent of poor quality water, respectively. In these four districts the availability of good quality water is among the lowest. It is either poor, saline or sodic quality. Sangrur and Amritsar also have small pockets of poor quality water. The study says this type of water will cause serious problems to crop yields and restrict soil health.

Saline water can cause salt accumulation on crop root zones. This type of water is used extensively in the districts of Muktsar, Bathinda, Mansa and Patiala. This needs to be mixed with canal water or has to be used in well drained area to avoid accumulation of salt, the findings of the study say. This can render agricultural land useless.

Sodic quality of water is largely found in varying quantities across the state. The worst being Kapurthala that has 71.39 per cent of such water. Other areas largely affected by this phenomenon are Sangrur, Moga, Patiala, Amritsar, Jalandhar and Faridkot. The findings, warn of indiscriminate use of such water while suggesting the addition of gypsum to overcome it.

It may be recollected that the matter of poor quality groundwater was raised by farmers in Bathinda when the President Dr. A.P.J. Abdul Kalam had come for a function four month ago.

*(The Tribune march, 13, 2006)*

## Landfill Sites Poisoning

Abhijeet Anand

*'The content of fluoride, nitrate, sulphate and phosphate is much higher than those recommended by the World Health Organization'.*

Landfill sites have been a major cause of groundwater pollution for a while. This was revealed in a study conducted by the school of Environmental Studies, JNU. Researchers conducted a detailed study on Bhalswa landfill site and came up with alarming facts. They claim that the findings apply to all the 10 landfill sites of Delhi. Water samples collected by them were found to be containing a variety of metals and heavy metals including lead, nickel, zinc, manganese and copper.

Landfill sites do not have boundary walls around them. As the base is not concrete or cemented, garbage and pollutants flow freely into the ground. There is no segregation of waste, leading to lethal substances seeping into groundwater. "There is no planning for disposal of waste at landfill sites. Carcasses of animals rot at these sites. To create more space for waste, the garbage dump is just pressed by heavy rollers. This proves lethal as it only increases groundwater pollution," said one of the researches, Mr. Sunil Kumar Srivastava.

The Central Pollution Control Board has again directed the civic agencies not to dump waste indiscriminately at landfill sites. "Under the Municipal Solid Waste Rules, garbage can't be dumped without segregation. Proper safety management guidelines should be followed," said the former chairman of CPCB, Mr. BK Biswas.

"There has been a rapid increase in groundwater pollution in recent times. In just three years, the

groundwater in Alipur area of North-West Delhi got contaminated. Groundwater is not fit for consumption within one kilometre radius of the landfill site." warn researches.

Dissolved Oxygen, which is a true indicator of pollution, is also very low. "The content of fluoride, nitrate, sulphate and phosphate is much higher than those recommended by the World Health Organization," said Sunil Kumar Srivastava. School of Environmental Sciences says that though at Bhalswa the groundwater level is high, the level of pollution makes it unfit for any use.

The groundwater is a very precious source of water and it should not be wasted," said Dr. AL Rama Nathan from JNU.

An NGO, search foundation, has been promoting the cause of controlling groundwater pollution. "Groundwater is a good source of drinking water and it should be protected from contaminants," said search foundation member, Mr. Dhiraj Singh.

*The detailed report was presented at the national workshop held by IIT Delhi and search foundation.*

*(The Statesman, May 23, 2005)*

## Water Resources Over-Exploited

The Chipco movement leader, Mr. Sunder Lal Bahuguna, has expressed concern over the increasing commercialization of water in various drought hit areas of Rajasthan.

After a tour of Udaipur, Mr. Bahuguna told THE HINDU that marginal farmers and land owners in Udaipur were selling precious drinking water for commercial purposes thereby depriving the masses of this nature's bounty. When the entire area was reeling under acute water scarcity, the industrial sector was claiming the chunk of the available water. In Udaipur, alone those owned wells and ponds were selling about 2.5 lakh litres of water to the Hindustan Zinc Ltd, adding to the water crisis in the area, he said.

Mr. Bahuguna said that concerted efforts by the volunteers of *Chipco* and other social activists, there was a growing awareness among the people of the area on the need to conserve forests. However, he regretted a similar concern was not there regarding the conservation of water, the farming techniques applied by the people too were excessively water consuming and water resources were being overexploited to the peril of the coming generation.

**Simple living:** Modern lifestyle which was being increasingly adopted even in the country's villages, itself was more water consuming. The urban household, which contains amenities like flush tank, needed more water than a rural household. A simple living was a prerequisite for preserving water, the most precious of the natural resources, he said.

The bearded saviour of trees said the vision of *Chipco*, was to protect the remaining forests in the country and get the decision makers to declare water as the main

product of the forests. The hill catchment areas of the river in the Himalayas, the Western Ghats and all other hilly regions should be declared protected forests to keep the flow of the rivers steady. And there should not be any commercial exploitation of these forests.

*Salinity threat:* The *Chipco* leader said 20 million hectares of land in the country was facing threat of salinity and another 90 million hectares land area was in danger of waterlogging. The problem of erosion and salinity was threatening the basic structure of the soil and at least one-fourth of the total land areas—58 million hectares of agricultural land and six million hectares of forest land were seriously affected by soil erosion.

## Environmental and Social Costs

**Shankar Ranganathan**

A Society GNP could just as well be regarded as its GNC—gross national cost:—Edward Goldsmith.

Environmental damage results in increased social costs but these are, considered as externalities and do not figure in the market place. The environment continues to be ravaged because no monetary value has been given to air, soil and water; they are not regarded as relevant to national and international economy though essential to life. If the environment is to be saved, a set of acceptable monetary values should be assigned to air, soil and water related to the production and employment they generate.

*A price-tag for soil: Rs. 7000,000 million*

Consider the soil bank of India. It seems reasonable to assign to it a value of twenty times its annual production. The value of all agricultural produce in 1978 was Rs. 350,000 million or 41% of the GNP. This would make the price-tag of our soil bank Rs. 7000,000 million. There is not another asset as important to the nation. If this price-tag is accepted, would it still continue to be neglected as it is at present whereby the country loses 6000 million tons of precious topsoil every year from erosion by wind and rain, representing an annual loss of Rs. 15,000 million in terms of crops and plant nutrients?

*A price-tag for water:*

*Rs. 3500,000 million.*

Water is as necessary in agriculture, as soil, seed and labour; it is more essential than fertilizer. It can also produce a crop of fish and plant life for human use. In some of the dry regions of India the soil is rich in nutrients and only lacks water to produce a rich crop. In such places water is the most valuable input. In parts of Rajasthan and

Gujarat, a bucket of drinking water sells for a rupee in summer.

To fix a value for all the water used in India for agriculture, industry, potable use and fish culture, would a value of half that of the soil bank be considered reasonable? This would make it worth Rs. 3500,000 million. If this value is accepted, would water not be given the priority it deserves in national plans?

*A price-tag for forests Rs. 1150,000 million*

An abundant supply of water permits several crops to be grown in a year, increasing the productivity. But uncontrolled, water can do great damage. Floods have cost India Rs. 250,000 million in the last 25 years. They have silted up giant reservoirs created by dams like Bhakra and Hirakund reducing their effective life to less than half of what was estimated at the times the dams were built (Bhakra from 88 years to 47 and Hirakud from 110 years to 35). More than Rs. 50,000 million have been spent on large dams like these during the last 25 years. At least half of this expenditure must be regarded as a loss.

If soil and water are our most valuable national assets, how can we protect them and increase their availability and use? Nature has provided in forests the best insurance cover (literally) to protect soil and prevent its erosion. Forests do this by storing and conserving rain water in their root systems. The insurance value provided by forest to the soil may be reckoned to be Rs. 300,000 million; twenty times the annual loss of Rs. 15,000 millions of crops and nutrients which forests would save. Their water storage value is 400,000million; this is what it would cost to construct storage equal to the amount of water which even the existing forests, supposed to be about 20% of the land area, store. Their value as a factory producing fuel wood

and timber may be fixed at Rs. 450,000 million; on the basis that it is twenty times the annual value of timber they currently yield and ten times the market value of all the fuelwood sold annually in the country, which comes from the forests.

For a premium of less than one per cent of the value of our soil and water, the country can re-clothe with forests its denuded and parched land and all the watersheds feeding the rivers. By doing so, agricultural production, currently Rs. 350,000 million can be doubled or even quadrupled. This can be done within twenty years. It will provide productive employment to at least half of the eighty million currently unemployed (1980), increase the purchasing power and consequently the standard of living of rural India, more than half of whom live below the poverty line. It would nearly double the present GNP by land use alone.

### ***Fuel-the critical resource***

The biggest problem that the world, including India now faces is a shortage of fuel, fuel for the home and fuel for industry. Although there has been much talk about developing alternative sources of energy to oil, little has actually been done. In America, President Reagan has recently slashed the funds, Jimmy Carter had earmarked for such development. It indicates that the most powerful country in the world and one which has also done the most to develop alternate means of energy intend to concentrate on developing its oil resources. But in a tropical country like India where the rate of biomass growth is ten times that in temperate countries, the use of solar energy in this renewable form is already practicable.

A ton of wood with a calorific value of 8000 Btus/lb, has 18 million Btus. Oil at Dollar 35 a barrel corresponds

to a price of Dollar 4 to Dollar 6 per million Btus. So the value of wood related to oil as a fuel would be Dollar 72 to Dollar 108/ton (about Rs. 600 to \$s. 900/ton). With oil prices rising above Dollar 40 a barrel and expected to reach Dollar 60 soon, the corresponding value of wood should also increase. Wood as an alternative fuel is therefore already viable. It should be clear that growing fuel wood plantations is more important than drilling for oil. Doing so would also generate much needed employment.

Fast growing tropical species of trees like *Leucaena*, *Leucocephala* are known to produce twenty-five to fifty dry bone tons of wood per acre per year when harvested after two and a half years and work is proceeding in various parts of the world to increase its yield through genetic improvement. The wood has good calorific value as fuel, about 8000 Btus/lb; it is satisfactory for paper making and if allowed to mature, produces good timber. Also, these fast growing species, being leguminous, improve the soil by enriching its nitrogen content. Their foliage provides nutritive fodder for cattle as well as excellent green manure. They will increase water storage, improving productivity of adjacent agricultural land. A thousand business companies can engage profitably in raising plantations on the hundred million acres and more of denuded land in India. This is a matter to consider seriously when industrial recession threatens the existence of many companies.

Aside from producing food and other crops, soil and water provide employment. Agriculture, animal husbandry and fishing in India employ six times as many people as are employed in government, trade and industry together. It is strange that no economist in India has given sufficient thought to the critical need for productive activities which

can gainfully employ large number of people.

This aspect is usually ignored in allocating funds for projects in India which are avowedly planned for the benefit of the people but are often detrimental to the majority and profitable only for a few. In the benefit-cost evaluation of Hydel projects, a favourable ratio is often contrived by assuming inflated benefit and deflated cost. In a majority of such projects, the final cost due to delay in execution and improper estimation has been more than double and sometimes three times the original estimated cost—resulting finally in negative benefit or damage—which is irreversible.

No business company which has to earn its keep could countenance this farcical exercise, but governments do not need to show a profit as they can and do increase taxes to meet their rising expenditure. Those who are so lavish in advocating the use of public money in such extravaganzas would not risk their own money in any of the ventures inflicted on a suffering public.

In a democratic country, many political hearts bleed copiously for the neglected poor, especially during elections. Hydel projects displace many such people from their homes of generations. When they are ultimately relocated, it is often in unsuitable areas which need great effort to develop, frequently beyond their capabilities. There are over five million such people displaced by Hydel projects and many of them now beg on the streets of our cities.

A proper cost-benefit analysis of a Hydel projects would include all costs including the cost of properly rehabilitating people. Work on the project site should not commence until a properly developed area with habitation and necessary infrastructure is ready to receive the

displaced.

The value of the forested area that would be destroyed by submergence should also be determined, related to its annual supply of fuel-wood and other produce at least an equal area in the command or watershed zone should be reforested and the cost of doing so, added to the project cost.

Instead of giant Hydel projects which are a colossal waste of money, damage valuable resources, displace and impoverish the poor, the same amount of money spent on constructing small reservoirs for irrigation will directly benefit the people it is meant to benefit, increase agricultural production and do very little, if any damage to the environment. Such forms of irrigation were practiced effectively in South India and Sri Lanka many centuries ago and ancient anicuts and canals in Tiruchirapalli district of Tamil Nadu still in use.

#### *Water—an ecosystem*

Water, besides enabling crops to be grown on land, is an environment for many forms of life and the seas, rivers and lakes have from ancient times provided a living for many people who have harvested various forms of aquatic life.

#### *A Price-tag for wildlife.*

The world spent over Dollar 30,000 million on chemical pesticides in 1973. Birds, frogs, snakes and other creatures destroy insect, pests and rodents. They are biological agents of control that do not harm the environment as many of the deadly chemical pesticides do, which concentrating through the food chain finally accumulate in the human system. The aesthetic value wildlife provides for human happiness may be related to the billions of dollars spent on holiday travel to nature

resorts.

*A price-tag for recreation*

What would be the recreational value of a park or a river with clear, clean water? If a hundred, thousand people who use it for fishing, swimming and relaxation are deprived of its use due to pollution or construction. Substitute recreational areas would cost 50 million or, more. So that should be the value assigned for its recreational use.

*A price-tag—even for excrement*

Much gas has been generated, perhaps as much at seminars as in biogas digesters of which there are said to be about 80,000 installed in India, more than half of them inoperative for one reason or another. China, who developed biogas technology several years after India, has many million digesters. Presumably they work satisfactorily or there would not be millions of them there. In China, they are an integral part of a village and a biogas unit is attached to each block of ten or more tenements. The importance of motivating the individual is well understood in that totalitarian communist society. Although people in China have known for many centuries the value of night so as a valuable manure and have used it for their crops, each individual is paid the equivalent of Rs. 15/ per month to put his/her excrement into the digester and for the lucky owners of pigs, the equivalent of 5/ a day for pig droppings. If wealth were to be related solely to the value of excrement, pigs would be worth ten times as much as human beings and horses would preheat be millionaires!

Instead of providing subsidized electricity from mal-operated and neglected power stations transmitted inefficiently to rural India, the major benefit of which goes to rich farmers and urban dwellers, it may be good

following China's example of subsidizing rural people directly by paying them for their excrement and that their animals, if they converted it into useful produce like gas and fertilizer to increase production from land. It would also bring about a great improvement in public health as it has done in China.

***Industrializing—creating problems***

Industrializing India is only not providing sufficient employment among even those until now gainfully employed. This is bound to happen when limited resources, which were formerly used by many, are sought to be used by only a few. As a consequence, crime everywhere is rapidly increasing and law and order cannot control it.

“.....Eventually too, the increasing intrusions into the functioning of ecological systems must lead to corresponding economic costs. Thus, when the banks of the Mississippi River were narrowed and lined with concrete, ecological costs were incurred. It may have been necessary to wait for a period of heavy rains to burst its banks and do four hundred million dollars' worth of damage, but it was simply a question of time for this to happen—for ecological costs, in fact, to be translated into economic costs.”

“.....Economic growth must lead to a continual increase in the cost of disease and its control. So much so that in 1975, the U.S. spent 118 billion on health services which is 547 dollars for every man, woman and child. This represents a 13.9% increase from dollars 104 billion two years ago. If medical costs increase at this rate they would reach 500 billion by 1985 or half of today's GNP ....A society's GNP, in other words, cannot be regarded as a measure of the real benefits available to it, but merely of the cost of providing these benefits. A society's GNP

could, in fact, just as well be regarded as its GNC-gross national cost.”

In India, where human life is cheap, it is pointless to talk of medical and other benefits when the basic task of providing full employment is not even attempted and many of the priority projects seem designed to favour the haves. The belief that science and technology will solve our problems is very strong among those who wield power. For them it has supplanted other religions.

There are many things we can do to help ourselves. But if we are unable to solve our basic problems in India, it is not due to a lack of technology—we possess enough technology for our needs, it is due to lack of concern, a lack of vision and a lack of management.

**Slogan:**

The slogan today is “Ecocide”, the murder of the environment: the reckless poisoning of the world-earth, air and water—that man shares with other creatures. The romantic poet had protested against what man had made of man, but what man has made of nature beggars description. If you want proof, look around.

## **There Could Be Wars over Water between Nations**

Q & A : Klaus Topfer

Klaus Topfer, the former heavy duty minister from Germany who has been vocal as well as visible at major environmental meets since the Earth Summit at Rio in 1992, is currently wearing three hats—under-secretary general of the United Nations, executive director of the United Nations Environment Programme and director general of the UN office at Nairobi. He has a key role to play in preventing further damage to the environment and getting countries to back their words and promises with action. In a freewheeling interview with USHA RAI, she talks of the impending water crisis and the need for environment diplomacy to avoid conflicts that are likely to rise over diminishing natural resources.

**Q: Has there been a slowing down of the political interest and concern for environment that was so evident at Rio?**

A: Yes, the tempo of Rio has petered out. There is no longer that political commitment or concern. Due to economic pressures, recession in several regions, unemployment problems in Southeast Asia, political leaders’ were not able to give enough time or finances for environmental issues. But this has to change very quickly for the pressure on the environment is high.

**Q: Why do you think there will be more political will now than there was in 1992-1993.?**

A: The new areas of conflict in the world be over water. This realization is being slowly but steadily realized. The world’s supply of water, already threatened by rising levels of pollution is growing so scarce in some areas that if current trends continue, two-thirds of humanity will

suffer “moderate to severe water stress” within 30 years. There could be wars over water between nations because water quantity and quality has fallen due to poor water allocation, wasteful use and lack of adequate action.

**Q: Why is there such an acute shortage of drinking water?**

A: While the world population has increased by 400 million which is equal to the population of Europe, since Rio the availability of aquapura has decreased. There has also been a 400 to 500 million tons increase in hazardous wastes. Industrial and human waste continues to pollute our rivers and coastal areas. The water of some 300 river basins—like the Nile, the Mekong Delta and Great Lakes of Africa, the Brahmaputra—is a common resource for different countries. Excessive use of water for agriculture has led to depletion of groundwater. If water is tapped or dammed upstream, it creates problems downstream. But unfortunately the philosophy of “I beg my neighbour, has grown.”

Do you know there are two UN reports reflecting concern on the global water situation? The outlook for achieving sustainable development is not encouraging. Gains are being offset by certain negative trends, such as the growing scarcity of fresh water, loss of forests and productive agricultural land and a rise in the absolute numbers of the desperately impoverished people.

**Q: What would be the impact of deleting natural resources?**

A: Already the levels of water shortages and pollution are causing widespread public health problems, limiting economic and agricultural development and harming a wide range of ecosystems. This may put global food supplies in jeopardy and lead to economic stagnation in many areas of the world, triggering a series of local and regional water

crisis with global implications. Do you know that island leaders who spoke so eloquently at Rio now fear they are endangered species? The aim of the Rio conference was to reduce conflicts caused by negative developments. There should be a new push for implementing Agenda 21.

**Q: What is your solution for the current impasse?**

A: The need of the hour is environment diplomacy. With cooperation between the World Bank, UNEP and UNDP, sharing of common resources is to be given paramount importance. In Africa and parts of Eastern Europe, environmental degradation is leading to mass migration of people. So Environment diplomacy is needed to avoid conflicts caused by diminishing resources.

**Q: Is not lack of financial resources and failure of the West to transfer new, clean technologies an important reason for the slow implementation of Agenda 21?**

A: Official development assistance has reduced despite all the promises made at Rio. But the direct private investment for environment is heartening. The \$200 billion private investors’ money has to be used for getting the best environment technology. There has also to be better public-private partnership for efficient use of funds.

**Q: You took over as head of UNEP two months ago. What are your immediate priorities?**

A: I will give top priority to water. There will be a comprehensive assessment of the global water availability; improved water saving technologies will be found and disseminated. Among other things, I would like to see massive desalination programs for coastal waters.

**Future wars will be  
fought over Water, not Oil  
Dr. Gurdarshan Singh Dhillon**

The Supreme Court of India has directed the Union Government to constitute an authority to check unregulated withdrawal of ground water which has resulted in alarming drop in levels of water. The problem is very serious in Punjab but the politicians here are not bothered about it. The future of Punjab is dark in this respect. An expert says, “We must take steps to rectify the situation lest our grand-children inherit a land turned into semi-desert”.

Water, at one time considered to be a free gift of nature, is becoming scarce day-by-day. Experts say that the big problem for the poor nations in the coming days will not be so much as shortage of arable land as the lack of water. The data released by the World Bank indicated that water consumption doubles every 21 years. This provides an idea of the international tension that the struggle for control of water resources could unleash. Mr. Boutros Ghali, Former Secretary General of UN had warned that the next war would not be fought over oil, as was the case with Iraq’s invasion of Kuwait, but over water, which is becoming the most scarce natural resource. A similar warning has also been issued by World Bank Vice-President Ismail Seregaldin who says; “Be under no illusions; the impact of general water shortage is going to hit our cities. In the next century, wars will be fought over water.” He believes that rationing measures will have to be introduced in order to avert next century’s wars. He adds, “it is not a coincidence that conflict over the control of water is even today one of the biggest obstacles to peace treaties between Israel and its Arab neighbours”.

India is not a stranger to these conflicts. It has problems with Pakistan over Indus water. Then there is the dispute with Bangla Desh over Ganga waters. Internally, India has witnessed disputes over the Krishna and Kaveri waters in the South and Punjab river waters in the North. It may seem paradoxical and even unbelievable that in the fifth decade of independence, 42-45 per cent of our population does not have the facility of three litres of drinking water per person per day. In Tamil Nadu, water is sold during summer months. In Ramanathapuram, you can see people almost invading the rains for water.

The Supreme Court directed the Union Government to constitute an authority under the aegis of the Central Ground-Water Board to check unregulated withdrawal of ground water resulting in an alarming drop in levels during the past 25 years all over country. The court asked the Government to issue a notification for constitution of authority by January 30, 1977. The direction was given by a division bench comprising of Justice Kuldeep Singh and Justice Saghir Ahmed on a PIL by an environmentalist lawyer, MC Mehta, alleging depletion of ground water as a result of unregulated withdrawal. The court said the authority should lay down guidelines for conservation as well as withdrawal of ground water. In the above context, the future of Punjab appears to be nothing but dismal and dark. The present well-being of Punjab agriculture is largely dependent on expensive tubewell irrigation. The centre, by its actions, has given a very serious blow to the Punjab economy by transferring a major percentage of Punjab waters and hydel power to non-riparian States of Haryana, Rajasthan and Delhi, where Punjab agriculture is dependent very largely on expensive tubewell irrigation, cheap canal water and Hydel power have been diverted to non-riparian states.

But the most significant and real danger to Punjab agriculture is the dreaded fate of tubewell irrigation. At present, each year, over eight lakh tubewells are drawing sub-soil water with the result that the sub-soil water table has gone down by 3 to 10 feet in different parts of the state. This is making tubewell irrigation not only increasingly expensive but also difficult or even impossible because of the need of lowering the pipes and the drilling on account of the falling water table. There are estimates of the annual recharge of the sub-soil water in Punjab varying from 3 MAF to 10.6 MAF. Considering the annual draw of water to irrigate fifty lakh acres of land, the over-draw per annum is between 12 to 24 MAF. This involves a continuous fall of water-table of about two feet each year. The result is that 96 of the 118 community blocks in the state have been declared unsuitable for further irrigation. The fear is that by the end of the century, most of the eight lakh shallow tubewells will become non-functional because of the fall in water table. Experts have already given the warning that it will not take long to make most of our tubewell irrigated land banani. An expert of the PAU, Ludhiana writes: "How long shall this state of affairs last? We must take steps to correct the situation lest our grand-children inherit a land turned into semi-desert."

And the irony is that all this has been happening through the exercise of powers unconstitutionally usurped by the centre over the Punjab Rivers. Further, this diversion of water, as stated above is from the national point of view, much less productive in distant Rajasthan, than it would have been if utilized in Punjab alone. The production loss to Punjab agriculture by the diversion of canal water even after taking into consideration the corresponding gain to Haryana and Rajasthan areas is estimated between Rs. 2200 to 2500 crores per annum (1981 figures). The loss in the

field of industry and employment is far greater. In addition, the Punjab farmer is losing Rs. 100 to 150 crores each year by having resort to expensive tubewell irrigation. But the greatest calamity that is apprehended is that within about a decade, 40 lakh acres of land under tubewell irrigation will become banani or un-irrigated involving in addition, a waste of most of the private capital investment of Rs. 1100 crores or so. Experts have Suggested that the facts are too glaring and the approaching disaster so unavoidable that the only inference that one can draw is that the impending calamities seem to follow the dictum of Machiaveli, who suggested that the best way to rule is which is used to tradition of liberty and independence is to despoil it.

*(Courtesy Spokesman)*

# The Prospect of Wars over Water

Vikram Sood

Three-quarters of the earth's surface is covered with water but most of it is saline. If the entire water were to be put in a gallon jerry can, then the fresh water available—in rivers, in lakes and beneath the earth's surface—would just fill a tablespoon. Most of this 'tablespoon' is in the rich West and the remainder, quite a bit polluted, in the poor, over populated underdeveloped East. Now imagine if someone were careless and allowed some of the water from the 'tablespoon' to spill over. This loss is permanent and there is no substitute for water. A person can live without food for a month, but only a week without water. Nothing will quench thirst the way water can. Only unfortunately, mankind has grossly misused and abused this precious life-giver.

Environmentalists and Scientists believe that the biggest potential destabilizers in the world are water scarcity and global warming. Boutros-Ghali had warned in the Eighties that future wars could be fought over water. His successor Kofi Annan was also worried about fierce national competition over water resources that contained the seeds of violent conflict. Ismael Serageldin, Vice-President, World Bank, had predicted in 1995 that "if wars of this century were fought over oil, the wars of the next century will be fought over water."

Egypt, which is dependent on the Nile for 98 per cent of its needs, has threatened war if Ethiopia carried through its plans to divert water from the Blue Nile. Across the Suez, water scarcity is becoming acute in the Jordan River shared by Israel, Jordan, the West Bank and parts of Syria, Israel is the main water consumer in the region consuming four to six times more water than the Palestinians and the Arab neighbours.

Environmental activists believe that the Israeli Palestinian conflict is partly linked to the scarcity of water in the Palestinian areas. If Turkey constructs two more dams on the Euphrates and the Tigris, it would deprive Syria and Iraq of their main sources of water. By 2025, 18 countries in the region will be water scarce, according to UN studies. Muslim fundamentalists, active in the region, have now begun to include the water issue in their radical literature as another weapon in their conflict with Israel.

Some of the world's largest cities, including Beijing, Buenos Aires, Dhaka and Mexico City, depend heavily on ground water for their water supply. Drawing water from underground resources, instead of relying on rainfall and surface water, is like sipping water from a glass yet hoping that the water level will not go down. In South Asia, the water table is dropping by about two to three metres a year.

In China, the lower estuaries of the Yellow River are now dry two-thirds of the year, the water-table is falling by 1.5 metres a year and a third of Beijing's wells have dried up. China wants to construct two more dams equal to the size of the massive Three Gorges Project on the Yangtze. China is also planning a series of giant dams across the Mekong, the Salween and Brahmaputra rivers whose waters are vital to all the downstream countries.

By 2025, all of West Asia, Egypt, Libya, Tunisia, Afghanistan, Pakistan, Singapore and South Africa and parts of India and China will face absolute water scarcity—defined as less than 1,000 cubic metres of water per person per year. These countries would not be able to meet their needs for irrigated agriculture, or for domestic, industrial and environmental purposes. Water will have to be transferred out of agriculture to other needs, making these countries increasingly dependent on imported food.

If there is no water, then there is no food either. The

ecological cycle having been broken, we could get into an endless cycle of droughts, famines, floods and cyclones. The poorer countries will be left with no alternative but to import not only food but also water and oil. The pity is that this could happen to those who are self-sufficient in food today and with better water management even ward off the perils of 2025. But the possibility that the same transnational company could be controlling supply of oil, water and food only means the return of the East India Company in another incarnation.

Potential conflicts are likely where rivers and lakes are shared by more than one country. The Nile, the Jordan, the Indus, the Ganga, the Brahmaputra and the Mekong are some of these. In times of water stress and shortages, regions will face water refugees from one region to the other within the country or between two countries.

There could be wars for the control of water supplies; or water resources or systems used as a weapon during a military conflict; or used for a political goal; terrorists could threaten using water sources as a weapon of coercion. Water system themselves could be targets of military action. Then, with multinational giants having entered the business of supplying water privately, for profit, there could be wars for entrepreneurial control. Inequitable pricing and monopolistic practices have already caused distress in Latin America and South Africa. The most dangerous is naturally the one fought with weapons.

Pakistanis fear that India, as the upper riparian, could one day choke off the Indus waters with disastrous consequences to Pakistani Punjab. Kashmir is thus a matter of life and death. Should the rivers that flow into Pakistan begin to lose their flow because of natural reasons; the Indus Waters Treaty between India and Pakistan will come under stress.

Sindhi nationalists in Pakistan have accused the

Punjabi-dominated establishment of signing away Sindhi's needs by accepting the Indus Waters Treaty which ignored their needs from the waters of the Sutlej, Ravi and Beas whose waters flow to Sindh. They also accuse Punjab of diverting more than its share of the Indus waters and regard plans to construct the Kalabagh Dam upstream as another way of depriving Sindh of water. The distributaries of the Indus Delta are dying and the salt water from the sea is creeping up to destroy the mangroves of Sindh.

If better water management and all that goes with it is not put in place quickly enough, it is possible that one day reservoirs like the Nagarjuna Sagar or the Nangal or the Mangla Dam could run dry. It is difficult to imagine a situation where the mighty rivers of South Asia become rivulets unable to reach the sea. As the taps run dry and the crops wither away, there would be upheavals mixed as they would be with regional, caste, sectarian and communal colour. All this may be difficult to imagine but this is a calamity waiting to happen. It is a nightmare about to come true.

The future of this planet will be determined by the decision mankind takes now and how it implements them in the next few years. If there is no change in our pattern of consumption and wastage and pollution, if there is no effort to change our way of life, then that day is not far off when this planet will become a dustbowl. Only sustained early action can prevent this country from becoming a 21st century, Mohenjo Daro. India must not wait for the rest of the world. *A beginning has to be made here and now; we must learn to worship and conserve water like our ancestors did.*

*The writer was Secretary. R&AW.*

# Soon, The World Will Wage Water Wars

Darryl D' Monte

Mr. Boutros Ghali has warned that the next war will not be waged over oil, as was the case with Iraq's invasion of Kuwait, but over water, which is becoming the most scarce natural resource. His predictions are echoed by World Bank Vice-President Ismael Serageldin, who says: "Be under no illusions: the impact of general water shortages is going to hit our cities. In the next century, wars will be fought over water." India is not a stranger to these, conflicts, both internally—as witnessed over the sharing of the Krishna and Cauvery waters—and across frontiers, in the ongoing dispute with Bangladesh.

West Asia, chronically deficient in water, was a potential flashpoint, with Israel occupying the Golan Heights, source of some of the tributaries of the Jordan River and thus controlling supplies to Palestine and Jordan itself. For three years, however, there have been negotiations between the three countries over "trading" water for money. Turkey has been damming the Tigris and Euphrates and thereby depriving Syria and further downstream, Iraq. To complicate matters, the Kurdish separatists occupy the headwaters of the Twin Rivers in Turkey and are fighting to claim their homeland. On the Nile, there are disputes between Egypt, the Sudan and Ethiopia, with the downstream state Egypt being dominant, economically and militarily. Closer home, Bangladesh has been claiming with justification that India has cut off its supplies with the Farakka barrage. At the same time, it does not explain how Bangladesh, which witnesses' very heavy rainfall, cannot conserve its own water. India has problems with Pakistan over the Indus

waters too.

The tragedy is that the world has taken the availability of water for granted: it is wasted with impunity, either by squandering this precious resource or using it for the wrong purposes. By 1990, there were 1.2 billion people in the world without drinking water probably the biggest number in this country and 1.7 billion without sanitation. Considering that something like 80 per cent of all diseases in developing countries are water-borne, the human and economic costs of this scarcity are truly awesome. By 2050, it is estimated that two-thirds of the world's people will be short of water.

It is sobering to remember that only 3 per cent of the world's water is fresh, the remainder being salty. What is even less commonly known is that of this 3 per cent, 99 per cent is either trapped in glaciers or is underground and therefore not economically accessible. In other words, only 0.03 per cent of the world's water resources are available for all uses—in homes, farms and factories. There is simply not enough to go around unless there are drastic changes in the present consumption levels throughout the globe. Humans feel thirst after loss of only 1 per cent of body fluid and are in mortal danger near 10 per cent.

At a recent international symposium in Stockholm, held to coincide with the annual water festival there, participants pointed to agriculture being one of the prime culprits.

To add insult to injury, water is subsidized in agriculture almost everywhere. In the US, the average price paid for this resource is less than one-thirtieth of its cost. Of course, the production of meat and dairy produce accounts for a great deal of water use. If people, stopped eating meat—in Europe today, there is a 20 percent drop in beef consumption in the wake of Britain's "Mad Cow

Disease”—a tremendous amount of water would be freed for other purposes. On the other hand, the new elites of China, India and other developing countries are developing a taste for meat, which is considered essential for modern living. Experts are debating whether such consumption can be discouraged by raising the price of meat or that of water, or both.

Industry is a voracious consumer too. When the Communist Party was in power in Kerala in the late fifties, it offered the Birla's free supplies for its Gwalior Rayon plant near Calicut. Today, “white goods” manufacturers in the West are one step ahead in the effort to cut down drastically on consumption in appliances, just as automobile manufacturers are streamlining the design of new models. In Sweden, electrolux has reduced the consumption of energy and water by 75 per cent in its appliances. A dishwasher uses just 15 litres, which is less than a person would use by hand and a washing machine employs 40 litres for 5 kg. However, this does not answer the fundamental questions like whether the water resources of the world permit every family to own such devices, even assuming that they could afford to.

Indeed, the questions were raised at the Stockholm meet as to whether people had a fundamental right to water, just as they have to life itself. One speaker stressed that international organizations, national and local governments should adopt a basic human requirement of 50 litres per day and what is more, guarantee access to it independently of an individual's status. Half of this goes towards drinking water and sanitation and the remainder for other basic needs like cooking and washing.

The most water-deficient countries are in sub-Saharan Africa; Gambia has just 4.5 litres per day for domestic use. Among our neighbours, Bhutan has less than

15 litres and Bangladesh a little over 17. India and China have reported over 50 litres a head each but this hides enormous regional variation, as well as class distinctions. It is true that India is blessed with some of the highest rainfall and snow melt in the world but it is geographically badly distributed and seasonally erratic.

The emphasis today is on “water markets”: the World Bank estimates that in a decade, around \$700 billion will be invested in water-based projects in developing countries. In the West, the service is even being privatized, like in the UK and French and British companies are bidding for global contracts, like that to provide Buenos Aires its water! There is thus a growing “water industry”, which assesses the cost of cleaning up water in 2000 at \$150 billion.

At the same time, there is need for users to band together and decided priorities for themselves, particularly poor rural societies. Water ought to be managed at the lowest appropriate levels by local people. India already has some outstanding examples, like the pani panchayat system in villages outside Pune, where even the landless have a right to water from the canal and can barter or lease such rights. Only by recognizing that even the poorest or the weakest have a right to this precious resource conflicts at every level can be avoided.

*(The Hindustan Times, September 2, 1996)*

## Why are We Not Harvesting Rainwater?

*Vishal Gulati and Sunil Kumar*

*Excessive exploitation of groundwater is a major reason for the acute drinking water shortage in many districts of Punjab and Haryana.*

The story of depleting watertable is being scripted by human beings themselves. It is a story of shortsighted planning, government indifference and people's ignorance.

Although on the face of it, it seems that more than 70 per cent of the earth's surface is covered with water and there cannot be any shortage of water whatsoever. But when we carefully analyze our hydrosphere, we find that 97 per cent of the water on the earth, found in oceans, is saline and cannot be directly used for human consumption. Out of the remaining 3 per cent, 2 per cent is in the form of glaciers, ice caps and moisture in the atmosphere. What actually remains available for human consumption is only 1 per cent of the total water. Out of this, about 0.66 per cent is available in the form of groundwater and the remaining is present in the form of freshwater in rivers and lakes.

Since it is not possible to supply water to all places from rivers and lakes and it is relatively easier and less costly to draw water from underneath the earth surface, the dependence on groundwater has been increasing sharply, both for irrigation and human consumption. Out of these two, irrigation takes the lion's share. According to rough estimates, in 1970-71, about 41 per cent of the total irrigated area got water from canals and rivers, while 14 per cent was being irrigated by tubewells. But in 1977-78, the area under canal irrigation went down to 31 per cent, while the area under tubewell irrigation went up to 34 per

cent. This was due to the reason that there is no policy that puts any price on the use of groundwater itself. Moreover, some states have been providing electricity free or at nominal charges for running tubewells. All these factors have put the aquifers under severe stress.

In the case of Punjab, Haryana and even Uttar Pradesh, the dependence on tubewells has increased immensely, in these states, the tubewell-irrigated area is about 61.6, 50.8 and 65.5 per cent, respectively, while the canal-irrigated area is only about 38.3, 48.9 and 30.1 per cent, respectively.

Excessive exploitation of ground water is a major reason for the acute drinking water shortage in many districts of Punjab and Haryana.

The watertable in 66 per cent area of Punjab and 33 per cent area of Haryana has declined drastically during the past 25 years ; say studies conducted by the Chandigarh-based Central Ground Water Board; North-Western Region.

At present, there are 16 lakh tubewells in Punjab and Haryana, says the board's Regional Director, M.D. Nautiyal.

In Punjab, in the districts of Patiala, Sangrur and Moga, the watertable is falling at an alarming rate of about 40 cm per year. In Ludhiana and Jalandhar districts, the decline is between 30 cm and 40 cm per year, whereas in Amritsar District the decline is 20 cm per year.

In Haryana, the fall in Southern parts is more than 40 cm per year, whereas in central parts it is between 20 and 40 cm per year. However, in northern parts it is up to 20 cm per year.

The situation is alarming in Amritsar, Jalandhar, Ludhiana and Karnal as there are groundwater troughs in the central parts of the cities. This has resulted in flowing

of groundwater from the surrounding areas to the centre of these troughs.

The studies further reveal that the fall in watertable is more in cities than in rural areas. In the city areas of Amritsar, Jalandhar, Ludhiana, Patiala and Dera Bassi, the watertable is declining at a rate of more than 50 cm per year.

Nautiyal says over-pumping from aquifers through a large number of tubewells has caused a significant decline in the watertable. In cities, where the dependence on ground-water has increased sharply, the rate of groundwater recharge has taken a plunge. The reason being that more and more area in the cities are coming under construction, for erecting residential or commercial buildings, laying roads and pavements. This leaves little open space for the rainwater to seep in to replenish the groundwater reserves.

The board has sent proposals to the Central Groundwater Authority to declare Jalandhar, Patiala, Dera Bassi tehsil, Moga (Blocks 1 and 2), Sangrur Block, Mahal Kalan Block and Ahmedgarh Block in Punjab as notified areas for registration of tubewells. In Haryana, Shahbad, Narnaul, Nangal Choudhary, Samalkha, Karnal and Khol Blocks have been identified as over-exploited areas. Ludhiana and Amritsar have already been declared notified areas, he adds.

In August 2002, a proposal was sent to the authorities concerned to make harvesting of rainwater mandatory in Amritsar, Jalandhar and Dera Bassi tehsil. In Gurgaon and Faridabad, it has already been made mandatory.

In Chandigarh, the shallow water level is increasing in southern sectors. In the monsoon, it reaches up to 2 m, while in northern sectors it is between 30 and 35 m below ground level.

Recent studies have suggested that rainwater harvesting is imperative for tackling the impending crises. Water can be collected on rooftops, compounds, rocky surfaces, hill slopes or artificially prepared impervious or semi-pervious land surfaces.

For the common man the easiest way to tap rainwater is by rooftop harvesting. For this, one needs to channelize water to a recharge structure or a storage tank, says D.S. Saini, Senior Scientist with the board.

The harvested water in the storage tank can be used for irrigating lawns and domestic purposes. The surplus water, which cannot be stored, can be used to recharge the groundwater by adopting various artificial recharge techniques. Bared on the sub-surface lithology, type of aquifer system, availability of water, depth of water-bearing zones to be recharged, different, types of artificial recharge structures can be constructed.

The concept of rainwater harvesting is catching up in many states of our country, but there is a need to make it a mass movement.

Mumbai, Chennai and New Delhi have made it mandatory for builders to adopt rainwater harvesting measures. Since October 1, 2002, it has been made mandatory in Mumbai that any new building coming up on a plot of more than 1,000 sq. m should have a rainwater harvesting structure. The state government is also planning to rope in owners of existing buildings in rainwater-harvesting efforts.

Under its Budget for the year 2003-04, the Karnataka Government has earmarked 50 per cent of the funds for water projects. It has also decided to introduce a Bill in the Legislative Assembly to ensure better management of water projects and schemes in the state, which has about 10 lakh bore-wells.

Even HUDA has made it mandatory that newly constructed buildings, with a rooftop area of more than 100 sq. m, should have a provision for harvesting rainwater.

Although the design of one recharge structure may differ from that of the other, the basic principle behind all these structures is the same. Each such structure aims at collecting rainwater or other run-off by passing it through a filter arrangement and finally making it reach the aquifer.

The filter arrangement generally involves percolation of harvested water through layers of fine gravel, coarse gravel and boulders. A very important thing to be kept in mind is that the water being used for artificial recharge should not be contaminated. As rainwater is the purest form of water found in the hydrosphere, its use for artificial recharge of groundwater is recommended. Setting up of such projects is not recommended on the premises of chemical units.

It is not at all difficult to harvest rainwater, the only requirement is to understand the gravity of the situation and take some remedial measures before the situation goes out of control. The time has come to make sincere efforts to arrest the fall of watertable.

*The Tribune, 6 September, 2003*

## **Become Water Positive, Harvest Rainwater**

Shri Shri Anandmurti

In the beginning, there were no living beings, not even plants. Water enabled the evolution of life; it is an essential factor in earth's evolution, crucial for survival of human beings, animals, plants and the planet as a whole. If there is no water, ecological balance of the planet will be lost and soon the earth could become a barren wasteland.

In the near future, there could be severe crisis in many parts of the world. The only solution is to conserve rainwater. Many ponds, canals, dams, lakes and reservoirs should be immediately constructed to catch the rain water and store it for drinking water. This is the only way out.

There are three main causes of drought: The first is the wanton destruction of plants, the second is low pressure systems over oceans and big seas, and the third is sudden changes in the angular movement of the sun and other celestial bodies like comets, nebulae and galaxies. The third cause can only be controlled by Supreme Consciousness. However, if human beings follow the path of positive microvita and have the grace of Supreme Consciousness, they can also control the third cause.

When there is the sudden appearance of powerful celestial bodies or a sudden change in their angle of rotation, their gravitational pull may disturb the seasons and the natural order of creation. For example, as a result of the strong gravitational pull of a powerful comet or meteor, clouds may not be formed. This phenomenon is called bakudasha in Sanskrit.

Certain deviations of celestial bodies like meteors, comets and satellites take place due to concentration of a huge number of positive and negative microvita.

Movement in universal space is subject to the movement of positive and negative microvita, and this also affects life on earth.

The angularity of the movement of celestial bodies also affects the minds of human beings. Suppose you are outside, enjoying a cool breeze, on a calm, full moon night. A soothing, painless feeling will arise in your mind. But if the feeling continues, the nerve cells in your body may become dull, and if the experience of dullness goes beyond a certain limit, your thinking power may be impaired, even causing some psychic ailment. This occurs because the ecological balance within the human structure is lost.

The amount of existing surface water should be immediately doubled. This can best be done by a decentralized approach to water management which increases the depth or area, or both, of water storage systems. The first step is to increase the depth of those ponds, tanks, dams, lakes, rivers and reservoirs which are already being used for storing water.

The second step is to increase the area of these storage facilities, while the third step is to increase the plantations around them.

Human movement is towards ecological equipoise and supreme synthesis. In the inner world, balance must be maintained as this leads to spiritual progress. Ecological order is not only for the earth but for the entire universe, and it must be maintained both within and without. This subtle balance is ecological balance.

You must prepare yourselves. You have to solve all the problems in the world today. You should prepare detailed plans and programmes and act accordingly.

*The Times of India, 16-6-2017*

## **In Deep Waters**

**K.G. Srivalsan**

*A growing population and the accompanying industrial growth have increased the demand for water. Conserving it is therefore essential.*

Water, the most important liquid, got from rain, springs, ponds, rivers, wells, streams and lakes. A remarkable feature is that it is never used up. Water that is consumed by a person today could be the same that refreshed a man belonging to the Stone Age. Although it constantly replenishes the earth, many areas lack this prized liquid. The quantity of water probably determines the pattern of human settlement and the distribution of plant and animal life to a great extent than any other factor except soil. The demands of a growing population and the accompanying industrial growth are cutting into the available supply. Rationing and re-use in homes and factories may become necessary until a way is found to obtain enough fresh water from the sea. It is therefore a must to conserve water as far as possible.

Conservation is everyone's responsibility and also a uniquely human problem. Strict laws must be effectively enforced to stop the waste and destruction of natural resources. People must be educated on the importance of preserving the environment and accepting conservation as a way of life.

Generally water is used for drinking, washing, preparing meals and removing waste. A bath in a tub consumes perhaps 20 gallons of water. About four to five gallons flow each minute a shower runs. Water is also used for gardening and operating the air-conditioning units and heating systems in houses, shops, offices and for irrigation, industry and firefighting and to generate electricity.

Conservation really begins at the source area, the river basin. Much depends on how activities of this natural unit are coordinated. Conservation can be assured only by careful management of watershed. If the soil is not sufficiently permeable, its retention capacity can be increased by measures such as re-vegetation, contouring and terracing. Proper management of watersheds is necessary to supply pure water to cities. Upstream control also allows more specific planning for downstream practices, such as the construction of a multipurpose dam.

However, water shortage in many countries around the world due to spells of dry weather has led to a sober reappraisal of water resources. For years, several metropolises have sought to solve their problems by building reservoirs. Receptacles that reduce losses in storage and transport, increase the basic amount of water and also reduce waste through improved metering and supplied systems may be a possible solution. In the metering system, house owners hold a responsibility for the amount of water used and this results in a decrease in consumption. Improved sewage treatment and water purification plants, could increase the utility of water through recycling.

Water pollution compounds the problem. The purity of water cannot be assumed unless it is drawn from deep within the earth. Dumping of sewage and industrial wastes increases the cost of treating water for subsequent use, affects aquatic life and renders the waterways useless for recreational purposes. Though oceans can dilute the pollutants, those carried by rivers damage marine life along the continental margins when they flow into the sea.

There are different ways of combating water

pollution, like treating waste water to make it reusable and also by developing methods to limit the natural run off of pollutants into the water from agricultural areas.

Many industrial plants now use good quality water for all their needs, even though poor quality water may be satisfactory for some purposes. If treatment and distribution systems for different uses are installed, consumption of good quality water can be reduced.

But conservation has got its own problems, if viewed from a different angle. For example, if a dam is constructed as a safeguard against floods, it is highly essential to consider whether it will destroy the surrounding habitat and affect the ecology.

It is time to take note of a will and testament of a merchant named Guyot, of Marseilles in France: "Having observed from my infancy that the poor of Marseilles are badly supplied with water which they can only purchase at a high price, I have cheerfully laboured the whole of my life to procure for them this great blessing, and I direct that the whole of my property be laid out in building an aqueduct for their use." That should be the spirit of all of us to take up the challenge of conserving water.

*(The Hindu, April 25, 1992)*

## **Pulses Help to Conserve Subsoil Water**

According to Mr. K.S. Randhawa, Head of Indian Agricultural Research Institute (IARI) Regional Station, Karnal, cultivation of pulses can affect not only wholesome change in weather to provide relief from the scorching heat in summer but also help to conserve precious subsoil water. It can also break effectively the monotony of wheat-paddy rotation to which farmers in north India have become used to, but will also revamp the environment to provide fodder and enhance milk production.

Talking to this correspondent, Mr. Randhawa though lauded the role of the farming community for its role in increased agricultural production but criticized the current practice of transplanting paddy in the month of May for more profit, without the farmers' realizing the related problems, like constant pumping out of subsoil water to the detriment of other crops.

He said the paddy-wheat rotation affects soil health, reduces insects/diseases as also notorious weeds like Phalaris minor and wild oats. The paddy crop, he further added, also needs at least thirty irrigations in May-June, without providing the soil much needed rest soon after the wheat harvest. According to Mr. Randhawa, the same precious water can be properly utilized for raising farm crops like maize (fodder moong, cowpea (Lobia) and moth. These crops, he averred, will help overcome the fodder shortage in summer which in turn affects milk yield in the milch animals. Moreover, after taking produce from them, the farmers can bury cowpea and moong as green manure in the soil. Besides, he said, moth cultivation as a short duration leguminous fodder crop has a bright prospect during these months.

In the past, said the Head, farmers used to graze animals on this crop and later on plough it up before paddy transplantation. Dhaincha, a very useful green manure crop grown during the months of May and June can also improve the soil health before the transplantation. All these crops, he said, besides saving water five times, also serve as cover crops and produce cooling effect in the surroundings during the hot months.

In the newly established orchards, said Mr. Randhawa, there is utmost need of raising cover crops from April to mid-June. This cropping pattern can greatly help in conserving soil moisture for better utilization by the developing plants besides improving the soil health, he added.

Mr. Randhawa believes that the pattern will certainly ensure better output followed by good environment. In view of the prevailing situation, he therefore suggested that paddy transplantation should only be taken up with the onset of monsoon by which time the climatic conditions become most favorable for the paddy crop.

The farming community can also eradicate Phalaris minor as well as wild oats by sowing Gram, Lentil, Berseem, peas, oats, Sarson etc. on some areas in phases every year instead of wheat during the winter season. This way he said the cost of crop cultivation can also be minimized and at the same time the soil productivity is enhanced manifolds.

*(The Hindustan Times, July 6, 1995)*

## Using Reservoir Waters Properly

**B.R. Gupta**

The power generation system is a combination of reservoir hydro plants and stream plants. They should be operated so as to obtain best utilization of available water. Since the operating costs of hydro plants are very low, hydro energy can be produced very cheaply. In a combined system, the generation of thermal power should be displaced by available hydro power so that overall economy is achieved. The extent to which this can be done depends on the availability of water, storage facilities available and the electrical load requirements.

The operation of a combined system is complicated by the fact that most of hydro systems are multipurpose projects which have to be worked under unique restrictions of flood control, irrigation, power generation etc. Though the general pattern and average amounts of river flows are pretty well known from history, the actual daily patterns can be somewhat different from estimated amounts. The rather unpredictable evaporation and seepage losses of water make the situation still worse.

The river flows due to melting of snow can be found from the data supplied by National Remote Sensing Agency, Hyderabad. Similarly the flow due to rain can be found from the data supplied by the meteorological department. Experience has shown that the data supplied by these organizations is pretty accurate. The losses due to evaporation and seepage can also be calculated fairly accurately by the use of well-known formulae.

The guidelines for the operation of a combined system are that there should be enough generation to meet the load requirements but the hydro and stream generations should be so scheduled as to keep the fuel costs minimum.

This requires that the available water should be put to an optimum use.

Optimization of hydro generation involves the factors like operation at best efficiency, optimizing the head and minimizing the spilling of water. Experience has shown that minimizing the spilling is the most important factor.

When a dry period is faced, the thermal generation should be increased to supply the deficit of energy during the dry period. The water discharge should be reduced to the minimum when the storage reaches a certain level.

As mentioned above, some of the factors involved in the above methodology are somewhat variable. However, if the above scientific method is followed, the controversies like; 'under conservation' and 'over conservation' of reservoir water can be avoided to a large extent. Water is precious. It must be put to optimum use.

*(The Tribune, December 1, 1994)*

## Conserve Water, Says Mahabharata

M L Varadpande

Durlabham Salilam Tata Visheshena Paratra Vai— says the ‘Mahabharata’ in its *Dana-dharma-parva*. By this it means water is scarce, hard to get, rare and particularly so on other planets. Hence, the epic advises, it should be carefully preserved, conserved for future use in drought-like situations. For this, various means are suggested including the rain harvesting and building up of water reservoirs, the acts which were considered ‘punyaprada’.

The Mahabharata had precedence in this matter. Indus people knew the basic principles of water management. Study of the Indus site of Dholavira in Gujarat led the archaeologists to conclude that the local population depended for their water supply on rainwater harvesting. In the ancient city of Mohenjo-Daro, apart from tanks at public places, large number of houses had wells for personal use. The Great Bath excavated in the citadel area of the town points to the ritual use of water.

The concept of rainwater harvesting finds mention in the Mahabharata too. Lakes were dug to contain water in the rainy season. “*Varshakale Tadage Tu Salilam Yasya Tishthati,*” says a verse in the *Dana dharma parva* one who thus conserves water earns religious merit equal to performing Agnihotra ritual, says the epic.

It further states that the tank whose rain-harvested water lasts up to *Sharad ritu* will earn religious merit for its digger equal to donating one thousand cows.

The tank in which water conserved in the rainy season lasts up to *Hemanta ritu* earns for its creator, religious merit equal to giving generous gift or donation of gold to Brahmins in a yajna.

The tank in which water remains intact till Shishir

ritu earns for its digger the *punya* or religious merit equal to performing Agnisthama Yajna

The tank in which rain-harvested water lasts upto *Vasant ritu* and serves the thirsty earns for its maker the *punya* equal to performing *Atiratra Yajna*.

And finally, the tank in which stored rainwater lasts up to *Grishma ritu* or summer season earns for its digger the religious merit equal to performing the great *Ashvamedha Yajna*.

Dig the lake for water harvesting and get in turn *dharma, artha* and *kama* as a reward, of all the *danas*, the *jala-dana* or water offering is the greatest and spiritually most rewarding, says the epic.

In this, all the ‘Puranas’ follow the Mahabharata. They encouraged people to undertake the construction of wells, ponds, tanks and lakes to ensure the supply of water in all seasons. It is significant to note that Indian scriptures linked the creation of public utility works with the concept of religious merit or *punya* and making of water reservoirs tops the list.

The importance of water in the religious and spiritual culture of India generated a rich crop of water mythology. Mighty Vedic god, Indra, is the deity of rain and thunder. He killed water demons like *Vritra* and *Namuchi* who were with holding the free flow of water.

King Bhagiratha brought the river Ganga to the earth, the legend which became the theme of huge sculptural panel at Mahabalipuram. Churning of the sea or Samudra Manthan and great deluge or *Mahapralaya* are two grandiose water myths found in scriptures. Sacred spaces on waterfront were termed as ‘Tirthas’. Water in all forms was worshipped and festivals like Nadimaha, Samudramaha were held to herald the importance of water.

Canals were dug for irrigation as a pious and meritorious act. There is an interesting myth in the Mahabharata related to irrigating fields and canal water.

There lived a great ascetic named Ayodadhanya. In his hermitage, he had three disciples—Aruni Panchal, Upamanyu and Ved.

One day he asked Aruni Panchal to repair the breach in the water canal that was flowing through his field. “We should not waste water, hence go quickly and repair the breach in the embankment,” the Guru told his most obedient disciple.

As asked by his Guru, Aruni Panchal rushed to repair the breach. However, despite his best efforts he could not accomplish the task and water continued to come in torrents. Ultimately to stop the flow of water he lay down at the spot where the canal was breached, which had the desired effect.

When Aruni Panchal did not return, worried Guru rushed to his field with his other two disciples and searched for his disciple.

They found him all smeared with mud. Falling at the feet of his Guru, Aruni asked him if he could do any other work for his master.

Amazed at his impetuosity, Guru told him that because of his extraordinary act he would become famous as Uddalaka Aruni. Pleased by his selfless action in stopping the wastage of water, Guru bestowed upon him the profound spiritual knowledge contained in the Vedas and Dharma Shastras.

Parjanya, that is rain, is major source of water in India.

In the ‘Rig Veda’, a deity named Parjanya is mentioned who controls rain. In the case of famine, hymns dedicated to this deity are recited to beget water. In the seventh ‘Mandala’ of ‘Rig Veda’ there is a hymn known as Frog Hymn or *Manduka Sukta* in which the joy of frogs

on begetting rain showers is described humorously.

This hymn and its recitation were the part of rain ritual of Vedic people. In the scriptures, several rituals are prescribed to get rain showers on time.

In the Vana Parva of the Mahabharata, there is an interesting rain legend. Once the kingdom of Anga ruled by Loma-pada suffered from severe drought. The wise men advised the king that if sage Rishyashringa, son of Maharshi Vibhandaka, who has not seen a woman in his whole life, could be lured to Anga country, there would be ample rain. On their advice the king sent beautiful courtesans to the hermitage of sage Vibhandaka. The crafty courtesans seduced Rishyashringa, son of Vibhandaka, who had not seen any woman till then. As soon as the celibate Rishyashringa set his feet in the Anga desha rain started pouring in torrents.

As was the practice of the time, King Lomapada of Anga *desha* must have harvested the rainwater for future use.

*(The Hindustan Times, July 3, 2000)*

## Look At It Anyway. It's wrong to Waste Water

When you leave the tap on while shaving, you make others walk on the razor's edge, in long queues as public taps.



When you waste water on washing your car, you're washing of other people's hopes...for a clean glass of drinking water.



Is it fair on our part to mindlessly use drinking water to irrigate our lawns, when at a small cost, a hand-pump can be installed for this purpose.



When you clean utensils, bear in mind that water should not be wasted. So, don't leave the tap running while doing some other house-hold chores. Remember a wasted bucket

of water could quench many parched throats.

### SAVE WATER-EVERY DROP COUNTS



Why leave taps open? Why deprive people of the right to clean drinking water just because you're lazy or careless?

Check your tanks periodically to make sure that they are not leaking. Leaking tanks don't just mean wastage of water, it can also result in seepage and damage to your property.



Don't waste water when you are cleaning your floors. Sloshing water won't mean a cleaner floor. Using a mop will. So think, don't waste water. Every drop counts.



If you are washing clothes, don't forget that it is not good to waste water. Make sure that everyone in your family and even your neighbourhood, is fully aware of the need to conserve water.



*(The Hindustan Times, May 23, 1992)*

## **Life In A Drop: Save Water, Conserve Life**

### **Anandmurti Gurumaa**

Earth, water, fire, air and ether-these core elements constitute the entire manifest world of sentient beings and things. Nothing can exist in their absence. Indeed, in the current climes of religious intolerance, these fundamental entities can be defied without offending any faith, caste or sect. It is on these lines that Guru Nanak Dev regarded air as our mother and water as our father.

But as a consequence of the exponentially increasing population, wide-spread pollution and man's contribution to global warming, these precious elements are dwindling at an alarming rate and such is the state that today there is a distinct shortage of portable water in many regions across India.

Mother Nature has been very generous to us by giving us so many resources of water-rain, water rivers, lakes, melting glaciers and ground water. Large rivers like Ganga, Yamuna and Godavari have been a valuable source but human greed and foolishness has abused them drastically, reducing rivers to lamentable states. The demand for water is ever increasing but the supply is far, far from adequate. And this ratio is getting skewed by the day.

Given the lack of water in rivers, people have been resorting to pumping out ground water for personal consumption and for farming. Consequentially, ground water table has fallen to alarming levels. On top of that, harmful fertilisers used for growing crops have contaminated ground water such that in many places it is not fit for drinking.

It is time to wake up. Every drop of water is a source of life. It is high time we realize that water sources are not

permanent. Soon, we as a family, society and nation will be struggling to get a drop of clean potable water.

I recollect my childhood when water was plentiful. We would play around in the streets and whenever thirsty, we would just go to any water tap- in anyone's home or street- and drink water straight from the tap without having to worry about germs and viruses. This is unthinkable today ! the water is contaminated with microbes and laced with all sorts of chemicals.

The bottom line is that we have to focus on water conservation and stop polluting our water resources. This means we need to implement laws that penalize companies throwing untreated waste into rivers and laws that prevent harmful chemical farming.

Grow organic, eat organic. If Sikkim can be a totally organic state, why can't others follow suit ? Thirdly, rain water harvesting ought to be made mandatory such that people don't waste a single drop of rain water and government should aid innovative water conserving irrigation projects and encourage farmers to take them up.

Each one of us also needs to do our bit by avoiding use of plastic, recycling waste products and keeping our surroundings clean. Every town, every village should have an eco-friendly garbage sorting and disposal system. Every school and college should have programmes educating youngsters about the sanctity of our natural resources, especially water and air.

Times of India, 25-5-17

## Ways to be Water Wise

**Deepak Rikhye**

*The crucial role of water, for our very existence, explains why it can be a cause of conflict. There is a dire need to conserve this precious liquid to meet the requirements of an increasing population.*

World Bank Vice-President (1995), Ismail Serageldin said, “If the wars of this century were fought over oil, the wars of the next century will be fought over water”. The demand for water, in India, is ever-increasing. An increasing population is the primary reason. A higher population will, in effect, need more food. That will entail a greater dependence on the Agriculture Sector, which will require more water for irrigation.

In India, the Bay of Bengal and the Arabian Sea contribute evaporated precipitated moisture through the hydrological cycle. In the North the aloof, serene and almost inscrutable Himalayas supply water to the Tsangpo- Brahmaputra, the Indus and the Ganges. The Ganges, originates from the Gangotri glacier.

### Utilization of water

Farmers lift water by submersible pumps. If utility of water exceeds rainfall, a declining water table results. Groundwater is generally cleaner by virtue of filtration through strata of rocks. But hard rock strata in the ground affects regions of Peninsular India. Granite and gneiss have less cracks and less joints. This hinders percolation of water. Groundwater is thus limited and isolated. Maharashtra, Karnataka, Tamil Nadu are confronted with such a situation. These regions therefore depend on rivers like the Godavari and Kaveri or Narmada and Tapti which contribute a major role; they are rivers that depend on rain.

## Conservation efforts

The word conversation is derived from Latin. Con, which means together and severe which means to possess. Therefore, “to keep together”. During a bygone era in Tamil Nadu, percolation tanks were made to recharge groundwater for irrigation. In Rajasthan, rain water was stored in *Kundis* (underground water tanks). The same concept was adhered during the Harappan Period (5000-3000 B.C.).

It is interesting to read that rain-water harvesting had to be resorted to in Cherrapunjee; an area that receives the highest rainfall in the country. RK Ghosh, with his decades of experience in water management explained that the Ramakrishna Mission School in Cherrapunjee was closed from November-March every year due to an acute scarcity of water. What was the cause of this water crisis? Deforestation became a crucible for an environmental imbalance in the region. The heavy rainfall, this area is so famous for now flows willy-nilly to the valleys of Bangladesh, away from Cherrapunjee. RK Ghosh designed a plan where from collected on the roof of the school and subsequently was directed to a ground reservoir, as depicted in the sketch. The school is now open throughout the year.

In yet another bizarre example, RK Ghosh was called by a tea estate manager in Assam. Their groundwater (100 ft. deep) was mixed with iron, thereby damaging the submersible pumps. A water body- was created at a depth of 20 ft. The shallow depth produced water without iron. A problem arose. The new water body was on an elephant path. RK Ghosh advised the excavation of another water body. The picture depicts one water source solely for irrigating tea. The other source is for elephants. The elephants do not use the second water body at all.

A harmonious balance was achieved between Man and Nature.

#### **Watershed and river-basin management**

A watershed marks the divide between two drainage systems. Watershed management protects both arable and non-arable land. Trees are planted to prevent soil erosion. This will prevent flooding. We are therefore enhancing productivity by improving soil and water resources. Watershed management programmes are limited to a maximum of 2,000 sq. km (Prof. Murthy) of agriculture. River-basin projects are not governed by an area. A river basin is a natural unit. Projects encompass power generation, afforestation and construction of dams. Two significant examples are the Bhakra and Damodar projects. The Ganga River Basin Project is another example. Soil erosion and siltation of the river is causing floods. The Ganga Action Plan (GAP) is making efforts to overcome problems which include pollutants, resulting in impure water. A fountainhead exists in three areas for our major rivers. They are the Himalayan ranges, the Vindhyan ranges and the Western Ghats.

In India, 90 percent of the surface water that flows of rivers, is lost as run off either into the Bay of Bengal or into the Arabian Sea. This singularly accentuates the potential for further storage of water, both for irrigation and power generation.

The Vedas have extolled the splendor that is intrinsic to India. "A land by the sea and fertilized by rivers that pour down their bounty in streams of plenty. The land of hills and snowy mountains and forests...."

## **SACRED SPACE**

### **Water Power**

\* Every human should have the idea of taking care of the environment, of nature, of water. So using too much or wasting water should have some kind of responsibility and with that, a sense of discipline.

*H.H the Dalai Lama*

\* There is nothing softer and weaker than water, and yet there is nothing better for attacking hard and strong things. For this reason there is no substitute for it.

*Lao Tzu*

\* Let the most absent-minded of men be plunged in his deepest reveries, set his feet a-going, and he will infallibly lead you to water, if water there be in all that region. Yes, as everyone knows, meditation and water are wedded forever.

*Herman Melville, 'Moby Dick'*

\* Water, like religion and ideology has the power to move millions. Since the very birth of human civilization, people have moved to settle close to it. People move when there is too little of it, when there is too much of it, people journey down it. People write, sing and dance about it. People fight over it. And all people, everywhere and every day, need it.

*Mikhail Gorbachev*

\* Fierce national competition over water resources has prompted fears that water issues contain the seeds of violent conflict.

*Kofi Annan*

# PINGALWARA DIARY

(UPTO APRIL, 2017)

Services rendered by Pingalwara Institution for the service of the suffering humanity are:-

## 1. Homes for the Homeless

There are 1764 patients in different branches of Pingalwara now a days:-

(a) Head Office, Mata Mehtab Kaur Ward, Bhai Piara Singh Ward	374 Patients
(e) Manawala Complex	854 Patients
(b) Pandori Warraich Branch, Amritsar	82 Patients
(c) Jalandhar Branch	39 Patients
(d) Sangrur Branch	228 Patients
(f) Chandigarh (Palsora ) Branch	94 Patients
(g) Goindwal Branch	<u>93 Patients</u>
Total <u>1764 Patients</u>	

## 2. Treatment facilities

(a) **Dispensary & Laboratory:-** Pingalwara has a dispensary and a laboratory for the treatment of patients. It has an annual expenditure of about Rs.90 lakhs. Medicines are also distributed free of cost to the poor and needy people.

(b) **Medical Care Staff:-** Experienced medical staff like Nurses, Pharmacists and Laboratory Technicians are available for the care of the Pingalwara residents.

(c) **Blood-Donation Camps:-** A Blood Donation Camp is organized on Bhagat Ji's Death Anniversary every year. The blood is used for Pingalwara residents and road accident victims.

- \* Preserve natural resources.
- \* Service of the poor and destitute is the service of God.
- \* Plant more and more trees to save environment.
- \* Wear Khadi clothes to lessen un-employment.
- \* Simple living and high thinking is a bliss.
- \* Use less of diesel and petrol.
- \* Exercise restraint in your living habits.
- \* Don't forget to plant trees. They are the sign of prosperity of a nation.

*Bhagat Puran Singh ji*

- \* An educated mind is unselfish, creative and aware of its lack of education and is constantly striving to link personal achievements to public good.

*V.N. Naryanan*

- \* The magnetic needle always points towards the north and hence it is that sailing vessel that does not lose her course. So long as the heart of man is directed towards God, he cannot get lost in the ocean of worldliness.

*Sri Ramakrishna*

- (d) **Ambulances:-** Ambulances with basic Medical aid are available for victims of road accidents on G.T. Road, round the clock and provide facilities for taking Pingalwara patients to the hospital.
- (e) **Artificial Limb Centre:-** There is an Artificial Limb Centre at Manawala Complex, dedicated to the memory of Bhagat Ji which provides free of cost Artificial Limbs to amputee cases and calipers to paraplegic ,hemiplegic or polio affected people. 8137 needy people have benefitted till April 2016.
- (f) **Physiotherapy Centre:-** A Physiotherapy Centre equipped with State-of-the-art equipment is functioning in the Manawala Complex since June 2005. On an average 80 patients are treated everyday.
- (g) **Operation Theatres:-** There is a well equipped Operation Theatre in Bhai Piara Singh Ward Amritsar for general surgery and A Micro Surgery Operation Theatre in Manawala Complex where Cochlear Implants and major operations are carried out.
- (h) **Dental, Eye, Ear & Ultrasound Centres:-** These Centres have been set up to provide these services to Pingalwara residents, sewadars and their families.

### 3. Education

Pingalwara Society is running five Educational Institutions for the poor and needy children.

- (a) **Bhagat Puran Singh Adarsh School, Manawala Complex:-** This school provides free education to 723 students from the poor and deprived sections of the society. They are provided with free books and

uniforms. Children being brought up by Pingalwara Society are also studying in this school.

- (b) **Bhagat Puran Singh Adarsh School, Buttar Kalan (Qadian):-** This school is dedicated to the sweet memory of Bhagatji. 452 students are getting free education under the able guidance of well qualified teachers. The school also provides financial help to students who have finished their school studies and are aspiring for higher studies.
- (c) **Bhagat Puran Singh School for Special Education, Manawala Complex:-** This school is providing Special Education to 205 Special children.
- (d) **Bhagat Puran Singh School for the Deaf:-** Bhagat Puran Singh School for Deaf Children is functional at the Manawala Complex since May 2005. The school is equipped with state-of-the-art training aid and has 150 children on its rolls.
- (e) **Bhagat Puran Singh School for Special Education, Chandigarh (Palsora):-**This school caters to the needs of Special adults of the branch.
- (f) **Vocational Centre:-** This Centre is providing free training in embroidery, stitching, craft work, making washing powder, candle making, painting, etc. Young girls from the villages of surroundings areas are the main beneficiaries.
- (g) **Computer Training:-** Computers are available in all the schools for academic and vocational training.
- (h) **Hostel facilities:-** There are separate hostels for boys and girls in Manawala Complex. Many girls are

pursuing higher studies in different colleges.

#### 4. **Rehabilitation**

- (a) **Marriages:-** After being educated, boys and girls at Pingalwara are married to suitable partners. 40 girls and 4 boys have been married off till date.

#### 5. **Environment Related Activities**

- (a) **Tree Plantation:-** Bhagat Puran Singh Ji was deeply concerned about the degradation of the environment. A vigorous campaign of tree plantation is started every year on Bhagat Ji's Death Anniversary. Each year 15,000 to 22,000 trees are planted in various schools, colleges, hospitals, cremation grounds and other public places. These include Amaltas, Kachnar, Behra, Champa, Arjun, Sukhchain, Chandni, Zetropa, Kari-patta were distributed to different institutions.
- (b) **Nursery:-** Pingalwara has its own Nursery where saplings of various plants and trees are prepared. Every year, the aim of nursery is to grow more than 54 different kinds of saplings every year.

#### 6. **Social Improvement Related Activities**

- (a) **Awareness:-** Pingalwara has played an important role in spreading awareness about the evils in the society. This has been done by printing literature on religious, social and environmental issues at the Puran Printing Press Amritsar and is being distributed free of cost. It has an annual expenditure of printing and publicity is about 1 crores 50 lakhs rupees.
- (b) **Puran Printing Press:-** The Printing Press has been updated with an Offset Press.

- (c) **Museum and Documentaries:-** A Museum, and a number of documentaries have been prepared on Pingalwara activities as well as on zero budget natural farming. The C.D.s are freely available from Pingalwara.

A feature film produced by Pingalwara Society Amritsar EH JANAM TUMHARE LEKHE (Punjabi) on Rev. Bhagat Puran Singh Ji, founder Pingalwara and his struggle not only for selfless services of wounded humanity but for Environment Crisis also, will prove a beacon for the generations yet to come after us.

#### 7. **Help to the victims of Natural Calamities**

Pingalwara makes an effort to provide succour to the victims of natural calamities like floods, earthquakes and famines. Aid was sent for the earth-quake victims in Iran, Tsunami disaster victims, Leh landslide and flood affected areas.

#### 8. **Cremation of unclaimed dead-bodies**

Pingalwara cremates unclaimed dead bodies with full honour.

#### 9. **Dairy Farm**

120 cows and buffalos at Manawala Complex provide fresh milk to the Pingalwara residents.

#### 10. **Old Age Homes**

Old age homes at Sangrur and Manawala Complex of Pingalwara caters to the needs of elderly people.

#### 11. **Projects Completed and Under Construction**

Since 1997 ambitious projects of Sangrur, Palsora at Chandigarh and Manawala Complex have been completed. In the year 2009 new buildings—

Administrative Block, Puran Printing Press, Deaf School, T.B. Ward at Manawala Complex and at Head Office and a New Administrative Block have also been completed.

In the year 2013, a new modern Bhagat Puran Singh School for Special Education in Manawala Complex of Pingalwara and a new Block for Pingalwara patients in Pandori Warraich Branch and at Sangrur is under construction and is fast coming up.

**Other Details:**

- a) All India Pingalwara Charitable Society is a Registered Society, registered by Registrar of Companies vide letter No. 130 of 1956-1957 as amended vide No. A-28/4540 dated 07-07-1998.
- b) All donations to Pingalwara are exempted under Section 80 G of Income Tax-II Amritsar letter No. CIT-II/ASR/ITO (Tech.)/2011-12/4730 dated 11/12 January, 2012.
- c) PAN Number of the All India Pingalwara Charitable Society is AAATA 2237R
- d) FCRA (Foreign Contribution Regulation Act) 1976 Registration No. of Pingalwara is 115210002

Wahe Guru Ji Ka Khalsa  
Wahe Guru Ji Ki Fateh

**Dr. Inderjit Kaur,**  
**President,**

All India Pingalwara Charitable Society (Regd.),  
Tehsilpura, G.T. Road, Amritsar. (Punjab).

Details of Banks For Sending Donation Through Online Cheque/Draft, Cheque & Bank Drafts may be sent in favour of : All India Pingalwara Charitable Society (Regd.), Amritsar. PAN No. AAATA2237R						
S. No.	Name of Account	A/C No.	Name of the Bank	IFS Code for Inland Remittance	Swift Code for Foreign Inland Remittance	
1.	<b>FOR FOREIGN CONTRIBUTORS</b> All India Pingalwara Charitable Society (Regd.), Amritsar.	01562010002890	Oriental Bank of Commerce Sharifpura Amritsar	ORBC 0100156	ORBCINBBASR	
2.	<b>INLAND ACCOUNT No.</b> All India Pingalwara Charitable Society (Regd.), Amritsar.	01562010003720	Oriental Bank of Commerce Sharifpura Amritsar	ORBC 0100156	.....	
3.	All India Pingalwara Charitable Society (Regd.), Amritsar.	10978255668	State Bank of India Town Hall, Amritsar	SBIN0000609	SBINHBB274	
4.	All India Pingalwara Charitable Society (Regd.), Amritsar.	630510100026147	Bank of India City Centre, Amritsar	BKID0006305	BKIDINBBASR	
5.	All India Pingalwara Charitable Society (Regd.), Amritsar.	0018002100097336	Punjab National Bank Hall Bazar, Amritsar	PUNB0001800	PUNBINBBAHB	
6.	All India Pingalwara Charitable Society (Regd.), Amritsar.	006601012522	ICICI Bank Ltd., Lawrence Road, Amritsar.	ICIC0000066	ICICINBBFEX	
7.	All India Pingalwara Charitable Society (Regd.), Amritsar.	01151000246510	HDFC Bank Ltd., Mall Road, ASR.	HDFC0000115	HDFCINBB	
8.	All India Pingalwara Charitable Society (Regd.), Amritsar.	00011000096048	Punjab & Sind Bank Hall Bazar, Amritsar	PSIB000A001	PSIBINBB017	
9.	All India Pingalwara Charitable Society (Regd.), Amritsar.	685010100009799	Axis Bank Ltd. City Centre Amritsar.	UTIB0000685	AXISINBB179	
10.	All India Pingalwara Charitable Society (Regd.), Amritsar.	13131000082013	HDFC Bank Ltd. Ghanta Ghar, Golden Temple, Asr	HDFC0001313	HDFCINBB	
11.	All India Pingalwara Charitable Society (Regd.), Amritsar.	01010100015572	Bank of Baroda, Town Hall, Amritsar	BARB0AMRITS	BARBINBBAMR	