

An interview with Dr. Shankar Sharma

14th December, Loyola College, Chennai

D : What is the current nuclear and thermal power situation in India with respect to use of water?

S: The Organization for Economic Cooperation and Development conducted a study in 2005 in USA according to which, 53% of the fresh water sources in USA are being used towards electricity. So the power sector alone has a huge impact on consumptive and general use of water. There are certain processes in coal power plants that need large quantities of water to make steam. But there are some closed cycles where the same water becomes steam, gets condensed and is further used. But that still requires a lot of water. There are lots of other processes of water in coal power plants and nuclear power plants where a huge quantity of water has to be drawn from a nearby resource/water body/ river or even desalinated from the ocean. The water then goes through many processes like cooling, carrying sludge, etc. The wastewater that exits these power plants is not pure water. The temperature is also higher. Unless we are very careful in managing that exit water, it will result in extensive pollution and will have a deleterious impact on marine life because this water has to be let out into a stream, a river or the ocean.

Nuclear power's installed capacity as of today, in India, is only 2.1% of the total power installed capacity in the country. But each nuclear power plant requires tremendous amounts of water for various purposes. The Govt of India is planning to increase the installed capacity of nuclear power alone from around 4700MW to 63000MW in the next 25 years. So, a huge amount of water is required. Most of these power plants are installed in the coastal area. But, India is already water stressed and most of the states in the country are water stressed officially; fresh water stressed. So that's why all the power plants are installed in the coastal region so that they can draw ocean water, desalinate it and bring it to the required quality of water for the turbines and re-use it. But, the temperature at which the waste water enters the water body is significantly higher than the ocean water. In some parts of the world, it is only 1-1.5 deg Celsius higher. Also, the water is supposed to be taken far into the ocean, for example around 2km from the edge and deep, so that there is an easy mixture of water over a period of time. But that is not happening in India. The polluted water is let out into water bodies, for example a river or a lake without sufficiently draining it and also at a higher temp. Those two are the major issues.

D: What are the social issues involved here?

When you set up a large coal power plant or a nuclear power plant, society is committing to provide so much of water, round the clock, year after year. So what happens to the poor people who are dependent on natural water resources? They are deprived of them because they don't have a strong voice. This is an issue for both nuclear and coal power plants. Out of 225,000 MW of total installed capacity, about 120,000 MW is the capacity for coal. 'Prayas' is an

organization that has done a lot of work with the ministry of environment on this issue. Coal power plants have to take clearance from the ministry before being set up. About 700,000 MW of power project proposals are in various stages of application at the ministry of environment. This would require a huge quantity of water in the future. And from the little information that is available, Prayas has calculated that the total amount of additional water required for these 700,000MW can provide fresh water for around 15% of the population of the country and around 9-10% of the agricultural requirements. So the sum total of water required for electricity supply in the country as a whole is a large amount, whether its fresh water or processed water. But India is already water stressed, so the question here is whether we should continue building these large power plants, or should we diligently look for alternatives available for us to meet these requirements.

D: Are there any alternatives on ground as of now?

S: There are a number of alternatives available. To start with, what we need to understand is, whether the so called demand for electricity, past, present and future, can be considered legitimate. Some of them are luxurious demands (wants, not needs). The needs for a common man are basically for lighting or probably charging is cell phone, or for a mixer/ grinder in the kitchen. But what about air conditioned homes? Night time sports? And 24 hour shopping malls? So , the real demand of the system should be and can be much less than what it is, which in turn may bring down the large number of power plants which we may need in the future. This will have a positive impact on the water requirement.

Secondly, our efficiency is one of the worst form of efficiencies prevailing in the power sector in the context of international practices. My own calculation supported by the Power Ministry and Planning Commission shows that if you take the overall efficiency at the power sector's international best practice level, it can give you virtually about 35-40% more power in the existing infrastructure, whereas our shortage is bound to be 10-15%. What it means is that there is absolutely no shortage of power at the moment. By taking the efficiency to the international best practice level, you will indirectly reduce the additional demand for electricity. And certainly it will reduce the number of power plants required.

Efficiency improvement, energy conservation and demand side management are the 3 major plans that we require in the future. What do you do for future electricity demand, the population with the increased population growth? There are a large number of renewable energy sources available, for example - sunlight. If you tap sunlight in the most effective way, it will not require any amount of water. Then, there is biomass and the wind turbine. The water footprint of these technologies is minimal. And India being a tropical country, there is a huge potential there. So basically, managing our demands and our existing resources with optimal utilization of these natural resources, demand side management, energy conservation, clubbed with very careful use of renewable sources, in a distributed mode is what is required. But yes, there are some renewable energy technologies where water is required to some extent. So

if we are very careful, we can manage our electrical requirements without putting a huge burden on the existing water resources.

D: So what is required to promote these alternatives? And are there any major groups working on them?

S: There are a number of groups in fact. They are doing tremendous work. They are going around the country, talking to a lot of youngsters and college students. Also a large number of NGOs are involved. Your own organization is a portal. It is a knowledge distribution device. What is lacking in our country is that although youngsters are concerned about the condition and treatment of our natural resources, they do not have the right information on how we can manage our requirement of energy without having an impact on our natural resources.

There are a lot of knowledge dissemination campaigns going on, but we need much more and we need to bring them to youngsters and college students. Most importantly we need to transform our thinking and a paradigm shift is required among policy makers. More and more societal sections should be involved in such movements and start talking to the authorities, the govt officials, and the policy makers in order to engage them in discussion. They must come out with options that have little impact on society, natural resources and energy footprint. People like me are concerned that this process is taking too much time. The water bodies are getting polluted, we are running out of water resources, and there is limited water available. We can't use water from large water bodies from neighbourhood states like Pakistan and Nepal. The resources available within the geographical boundaries of the country need to be utilized very carefully. We cannot forget that if human beings start using large quantities of water, the other species of the animal kingdom that are dependent on water will be deprived of them. So you may process water from polluted chemical plants, and then use it. But where is that water originally coming from? It is coming from some water stream/ fresh water source. So we are depriving other creatures of fresh water. Because we have the power, we want to harness it as we want and waste it. So we have to be very careful and also be sympathetic to the animal kingdom.

D: Your book mentions how something as simple as rainwater harvesting can reduce the amount of electricity required for pumping water for agriculture. Could you elaborate a little bit on that?

S: If you look at the electricity consumption at the national level, reports indicate that between 35-38% of the total electricity consumed in the country is for irrigation pump sets. And also, the water pumping requirement in industries, farms and residential houses is around 40-45% at the national level. If rainwater harvesting is practiced, the pumping demand of water will come down drastically. Even if we reduce it from 40% to say 15-20%, the amount of electricity that we can save is immense. Also, the pollution and other impacts through electricity can be drastically reduced. Despite the huge energy requirement and impact of electricity on water, rain water harvesting is important ecologically too. By doing rain water harvesting, you are invariably

allowing water to percolate into the ground, you are charging the subterranean water flow. In many parts of the country, especially in urban areas, for example, in districts like Kolar in Karnataka, the borewells have deepened up to 2000 feet. So unless we charge groundwater, where are we going to get water from? The water that we have been drawing from the ground, has been accumulated for thousands of years. And without recharging, if we continue to utilize water, the water reserve will soon run out. This is already happening in many parts of Bangalore where the city urban water supply mechanism is unable to supply water to the people. People are have started building their own borewells. Most borewells that gave good yield initially are drying up due to new neighbouring borewells being constructed. It is a very serious issue, not just from the environment and water point of view, but even the social point of view. So, rainwater harvesting is a necessary practice. Many of the urban areas like Chennai, Mumbai, Bangalore and Mysore receive large quantities of rain water. If we are able to harness even a small percentage of that through rain water harvesting or ground water recharging, water experts would say, that our water problems can be solved without really burdening nature.