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## Fresh Water Supply from Sea water

### Abstract

*Among the many challenges that mankind has stand out as of crucial importance for the survival of man. In this objective, many developed developing countries have taken step for major problem the lack of fresh water .In terms of population growth the world supply of freshwater is dwindling very rapidly every year and therefore to obtain drinking water from al possible sources. Freshwater production from sweater is still being done on a limited scale and the technology which is being widely used is reverse osmosis. This and some others such as solar stills etc. have been developed country. However, some desalination technology not gives us only drinking/freshwater but also linked with the production of salt and other chemicals as by-products and this make freshwater production commercially attractive.*

### INTRODUCTION

Fresh water is a precious mineral created by nature for us. The planet Earth is often called a 'watery planet' and the very existence of life on this planet is because of presence of water here. Today we get our supply of freshwater from the river, dam, glacier and underground sources of freshwater are being discovered and efforts are being made to conservation freshwater as far as we can. Although we know the chemical composition of water- each molecule has two atoms of hydrogen and one atom of oxygen (H<sub>2</sub>O) - to manufacture large quantities of water using chemical means is not only costly but impossible.

In terms of population growth, the world supply of freshwater is dwindling very rapidly every year, and therefore, measures are living undertaken to obtain drinking water from all possible sources. There are many areas in India where purify water is in short supply and thus people even resort to drinking saline water, very often unhygienic chemicals. For example, the presence of fluorine in drinking water causes what is commonly known as flourosis- a disease leading to painful symptoms of bone deformity? The following desalination technologies are being employed to generate freshwater for sea-water.

### Solar stills

These are well-suited for small and isolated communities where freshwater is limited and where power is either not available or is in short supply and the transport of large quantities of water from neighboring places is not practicable. Solar stills are ideal for small coastal villages as they run on a non-expendable energy source. A solar still consists of a box like chamber with glass panels facing the sun. sea water is brought into the chamber by tubes which gets collected in suitable trays. Heat from sunrays makes sea-water boil and the vapors are condensed in a separate chamber as freshwater. Salts are left behind in the trays. A battery of solar stills is used for making it a source of water supply. They are simple to construct and their operating and maintenance costs are minimal. A solar still of 5,000 litres per day capacity has been installed in Avnia village in Gujarat where 500 families obtain there drinking water from this source

### Flash distillation

In the process heated saline water is allowed to flow through a series of chambers which are maintained at different pressures below atmosphere. The pressure progressively decreases towards the water saline and of the series. Saline water thus evaporates in each section of the chamber the vapoure are released and then these get condensed over a bundle of tubes cooled by circulating sea-water inside them. Distillate of freshwater produced at each stage is gathered either separately or collectively to be used as freshwater.

### Electrodialysis

This technique employs ion-selective membranes for the desalination of brackish water. Electrolysis is more economical for salinities below 5,000 ppm (parts per million). The energy cost of the process is directly proportional to the salinity-thus beyond 5,000 ppm, the process is no longer economical. The process involves using sea-water as an electrolyte and separating salts with electrolysis by passing current

### Reverse osmosis

This is the most widely used desalination technique. In this process suitable osmotic membranes are used which reject salts and allow the water to pass through. Several plants with capacities of 50,000 to 100,000 liters have been set up in Indian villages to supply water to the villagers.

A general plan of the process of reverse osmosis is shown in figure. Research and development efforts on reverse osmosis have turned out to be useful not only from the point of view of desalination but for the separation and concentration of chemicals and gaseous mixtures also. The process is simple and does not use any heat energy. The heart of the technique is the semi permeable membranes. Reverse osmosis desalination has become a serious contender to multi stage flash distillation with several added advantages like ease in operation, simple design in view of its modular nature, short start-up and shut down time, etc.

Reverse osmosis (RO) is a membrane process. It uses hydraulic pressure as the driving force to affect the separation of dissolved solids from the solvent. As no phase changers are involved, it can be carried out at an ambient temperature resulting in lower energy consumption and minimal corrosion problems. Some of the advantages of RO are: (1) low capital and maintenance cost, (2) applicability in the processing of thermally labile chemicals, (3) being modular in nature, an RO plant renders itself to be easily designed, fabricated and run, and(4) the input being in the form of hydraulic pressures, a hand operated pump, an electrically opera ted pump, a diesel operated pump or windmill can be used to drive the RO system. In essence, RO present a simples, viable and reliable desalination technique to cater to the needs of a diverse rural society, easily adaptable to the environment and facilities prevailing in villages.

So far about two dozen or more tubular plants and several spiral plants have been installed in the country. Four mobile RO plants were designed and utilized for brackish water desalination in villages, three of which were delivered to Gujarat, Rajasthan and Tamil Nadu for demonstration and adaptation of RO technology in the villages under the government of India's Water Mission Programme.

This technology has been licensed to the following parties who are capable of manufacturing has plants of different size in India; (1).Bharat heavy electronics Ltd., Hyderabad (2). Arrow Technology, A hemdabad.

After the development of technology at the laboratory level, the first pilot plant of 10,000 liter/day capacity was installed in Arnej village, Gujarat Agriculture Uni. campus (GAU), in October, 1981 and was operated for one and half years. This plant served as a pilot plant data were also collected during the period

#### **CONCLUSION**

In future, desalination technology of different types will play a distinct role particularly in India's rural development programme for the supply of potable water. However, it is not certain whether desalination technology can produce enough water at reasonable cost to meet the demand of growing population. It can only supplement other technologies but will not provide a substitute.

There are many countries in the Indian Ocean region which are using desalination technologies as their major source of freshwater supply. Particularly all countries in the Gulf region are largely dependent on desalination technologies for all their domestic needs. It is also to be noted that as our economic condition improves, our demand of freshwater consumption will also increase. Thus, for example, the per-capita consumption of freshwater by a single American is almost as much as 30-40 Indians. Most of the countries bordering the Indian Ocean are developing countries. Therefore, as the economic standard of these countries improves, their water requirement will rise sharply. The only reliable source which will probably meet their need, over and above the existing sources, would be the sea. As time passes, there will be better innovations, and cheaper and more efficient technologies of desalination will be developed to reduce the cost of production of freshwater from sea-water.

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