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The Jaffna Peninsula has an area of 1000 square km and has no rivers and is totally dependent on the annual rainfall of about 1270 mm, of which about 87% falls during the north-east monsoon from October to December, for recharge of the water table in the underground limestone aquifer. In the past, water was drawn from wells for domestic and agricultural use by well sweeps, but from the 1950's onwards pumps have been used to draw water from about 100,000 wells in the Peninsula. Over pumping for agricultural use has drawn down the fresh water stored in the limestone aquifer resulting in sea water percolating into the wells through the fractured limestone, as

sea at Condemanaer and Navacolli, with sluices to claim the rain water and a canal to the salt pans at Nieweli would create more useful arable land."

To increase the availability of fresh water in the Jaffna peninsula we need to look at sources alternative to rain in the peninsula. South of the peninsula is the sea water Elephant Pass Lagoon which has a surface area of about 77 square km. It has a catchment area of about 940 square km in the mainland Vanni, consisting mainly of the Kanakarayan Aru. During the north-east monsoon surplus rain water from the Vanni is discharged into the Elephant Pass lagoon. From this lagoon this fresh water flows into the sea through the eastern end at

This will make Vadamarachchi lagoon a fresh water lagoon. This work was carried out but after a few years the gates perished and sea water was able to enter.

* Provide a spillway and gates at the southern end of Upparu Lagoon, near Ariyalai. This will make Upparu lagoon a fresh water lagoon. The spillway and gates were constructed but the present condition of the gates is that it is no longer watertight and allows sea water to enter freely.

* It can be seen from the above that the scheme was only partially completed in the 1960's and the main key element of the Mulliyank channel to convey fresh water from Elephant Pass lagoon to Vadamarachchi lagoon

ble pipeline from Iranamadu reservoir.

WORK NEEDED TO COMPLETE THE SCHEME

K Shanmugarajah who was Chief Engineer of this project in the 1970's has written a book Water Resources Development Jaffna Peninsula, Fast Books, Australia, 1993. The book details the history of the project, contains detailed designs, details of the work carried out and work remaining to be done. Detailed cost estimates have also been included. At 1991 rates, the cost of completing the project was estimated as Rs 280 million, and projected to cost Rs 350 million in 1995. This estimate will have to be updated to present day costs.

at a cost of Rs 100 million.

* Recondition Ariyalai Barrage: Repair and replace planked bays and replace with screw operated gates. This will make Upparu lagoon a fresh water lagoon fed with rain water from its 220 sq km catchment area.

* Complete Mulliyank Link Channel, bund and roadway: Complete excavation of Mulliyank Link Channel, form bund and roadway and provide control regulator.

* Complete Spill cum Causeway at Chundikulam: At the eastern end of Elephant Pass lagoon at Chundikulam, complete the spill cum Chundikulam causeway, zoned embankment, and flanked embankment with gravel road. The spill plus causeway will be 2100 metres long and the bund 1400 metres long.

Conclusion

In October 2007 at the Annual Sessions of the Institution of Engineers, Sri Lanka, held in Colombo, a Resolution was passed by an overwhelming majority with only one dissenting vote urging the Government to complete this Project. A presentation on the River for Jaffna Project was also made in November 2007 in Colombo at the Nobel Peace Prize winning Pugwash Organisation's Workshop on Learning from Ancient Hydraulic Civilizations to combat Climate Change. A resolution was passed urging the Government to implement the project. It was proposed by Ambassador Jayantha Dhanapala, President, Pugwash Conferences on Science and World Affairs.

The Government is now considering a proposal for a Jaffna Water Supply Scheme. This scheme includes a pipeline about 70 km long from Iranamadu to Jaffna, a treatment works and a storage reservoir at a total cost of Rs 12 billion including an ADB loan of US \$ 80 million. This scheme will draw water from Iranamadu Tank, thus decreasing the acreage that can be cultivated in Iranamadu in the Yala season.

The River for Jaffna project only uses surplus water now running to waste to the sea (in total contravention of Parakrama Bahu's famous dictum!) and does not affect irrigation water. The total cost is only Rs One billion, a fraction of the cost of the Jaffna Water Supply Scheme. If the River for Jaffna is completed the Jaffna underground aquifer will be recharged with sufficient fresh water for extraction for the Jaffna Water Supply scheme without having to run a pipeline all the way from Iranamadu. The Jaffna Water Supply Scheme as presently proposed therefore needs to be carefully re-evaluated as cost savings running into millions of rupees are possible.

In conclusion, a well known Pugwash scientist in USA, Amory Lovins, former energy policy planning adviser to President Jimmy Carter, in his famous book Brittle Power, has drawn attention to the vulnerability of large scale centralized systems for energy and water supply. The proposed Jaffna Water Supply scheme falls into this descriptive category of vulnerability, in contrast to the stability and sustainability of decentralized systems like the River for Jaffna project.

References: 1. Sanmugam Arumugam Commemoration volume (2003). Sri Lanka Pugwash publication
 2. Jayantha Dhanapala Felicitation volume (2007). Sri Lanka Pugwash
 3. Proceedings of a Workshop (2008). Sri Lanka Pugwash

A river for Jaffna

SKETCH OF JAFFNA PENINSULA, SRI LANKA
 SHOWING RIVER FOR JAFFNA PROJECT AREA



no part of Jaffna is more than about 15 km from the sea.

About 60% of Jaffna is occupied by residential usage, home gardens, roads, parks etc.; about 13% (13,700 hectares) is cultivated with food crops and about 13% (13,000 hectares) is cultivable with rain-fed rice paddy. 4% of the land is not arable due to soil salinity and the balance 10% of the Peninsula is occupied by two lagoons, which are presently saline. At present about 30% of the wells in the Jaffna Peninsula are saline. Recent reports from agricultural experts state that more than 4500 hectares of fertile agricultural land have turned saline and are unsuitable for cultivation.

Within the Jaffna peninsula there are two large lagoons, the Vadamarachchi lagoon and the Upparu lagoon with surface areas of about 77 and 26 square km respectively. These lagoons cover a significant proportion (10%) of the peninsula's land area of 1000 square km. These lagoons have openings to the sea and are salt water lagoons but during the north-east monsoon rain water from their catchment areas also collects in them. Paddy cultivation in the Jaffna Peninsula is essentially rain-fed cultivation. Cash crops and market garden crops are, however, irrigated using well water from a long time ago. The Colonial Secretary, Sir James Emerson Tennant in 1857 compared these with the market gardens in Fulham and Chelsea in the suburbs of London.

The earliest known recorded observation about improving the fresh water situation in the Jaffna Peninsula was made nearly 350 years ago. Hendrick van Reede, Captain to the Dutch Governor Rijkloff van Goens, stated: "A dike to contain the

Chundikulam and formerly also through the western end Elephant Pass bridge, and was being wasted.

During the 1950's a scheme was proposed to utilise the monsoon rain water running to waste from the Elephant Pass lagoon, for the benefit of the Jaffna peninsula.

The scheme came to be known as the River for Jaffna project.

Key points of the scheme and details of the work done at that time are as follows:

* Close off the openings in the road and rail bridges in the Elephant Pass causeway at the western end of the Elephant Pass lagoon to prevent fresh water going to the sea from this end. This work was completed.

* Build a bund at the eastern end of the Elephant Pass lagoon at Chundikulam to prevent fresh water going to the sea at that end and also provide a spillway to discharge excess flood water to the sea. This work was completed and Elephant Pass lagoon became a fresh water lagoon for a few years but unfortunately the bund was breached by subsequent heavy floods, thus allowing sea water access since then.

* Excavate a 12 metre wide, 4 km long channel, called the Mulliyank Link Channel, from the northern side of the Elephant Pass lagoon to convey fresh water from the Elephant Pass lagoon to the southern end of the Vadamarachchi lagoon. About 80% was completed when funds ran out and work stopped and the channel was never completed.

* Refurbish the existing

Thondamanaru Barrage (where the northern end of Vadamarachchi lagoon joins the sea) to make it watertight, and improve the discharge gates to allow for discharge of flood water.

was never completed.

* In the brief period that Vadamarachchi and Upparu were fresh water lagoons the benefits to the peninsula were noticeable and many saline wells became potable water wells.

PROJECT BENEFITS

The benefits of completing this project include the following:

* About 13,000 hectares of land can be cultivated with paddy in the Jaffna peninsula. The area presently cultivated is about 8000 hectares due to soil salinity. As it is rain fed, the yield per acre in Jaffna is very poor and is only about one-third of the national average yield per acre. If the Vadamarachchi and Upparu lagoons become fresh water lakes, the water table and water quality in the wells will improve, and using lift irrigation it will be possible to irrigate these paddy fields. The potential for improvement in yield and rice production is staggering.

* About 4400 hectares of land bordering the Vadamarachchi and Upparu lagoons are uncultivable at present as they are saline. When these become fresh water lagoons, after the salt is leached out of the soil, it will be possible to cultivate this land with cash crops and paddy.

* There will be a dramatic improvement in the water quality of the 30% of the Jaffna wells which are now saline. In many cases the water will become suitable for domestic use and agricultural use, increasing the acreage under agricultural cultivation.

Sufficient fresh water will be available in the underground aquifer for the now proposed

Jaffna Water Supply Scheme, without the need for a costly and vulnera-

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Probable present day total costs would be of the order of US \$ 10 million.

If funds for the full project are not immediately available, phased implementation could be considered in the following steps:

* Recondition Thondamanaru Barrage: If this barrage is made watertight Vadamarachchi lagoon will become a fresh water lagoon fed with rain water from its 300 sq km catchment area. This work has recently been practically completed by the State Engineering Corporation

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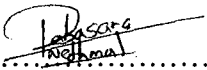
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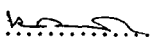
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