

A river for Jaffna - the Arumugam Plan

D. L. O. MENDIS

Eng. S Arumugam published *A River for Jaffna* in 1954 which became known as the Arumugam plan. His son Eng. Thiru Arumugam provided a synopsis of the plan for a Pugwash workshop on "Learning from ancient hydraulic civilizations to combat climate change", Colombo, Nov. 2007, as follows: Jaffna Peninsula with an area of about 400 sq. miles, is relatively flat and has no rivers. It is dependent for recharge of the water table in the underlying limestone aquifer on annual rainfall of about 50 inches, of which about 87 percent is in the NE monsoon, during October to December. In the past, water was drawn from wells by well sweeps, "which fed market gardens like those in Fulham and Chelsea" (Tennent 1855). From 1950s pumps have been used and over-pumping has drawn down the fresh water in the limestone aquifer resulting in sea water intrusion into wells. Now about 30 percent of wells are saline.

Rainfall

To increase availability of fresh water in Jaffna we must look at sources alternative to rainfall in the peninsula.

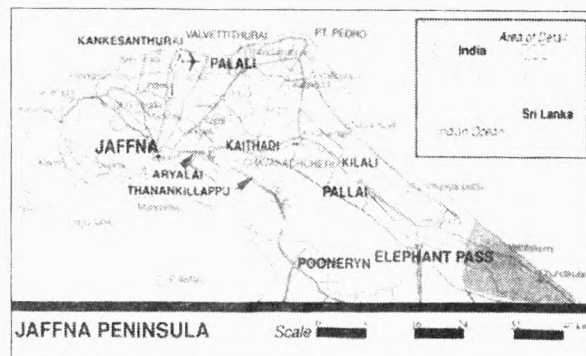
South of the peninsula, the relatively shallow sea water Elephant Pass lagoon has a surface area of about 30 square miles. Its catchment area of about 363 square miles in the mainland Vanni consists of the Kanakarayan Aru basin and three smaller streams. During the NE monsoon these streams discharge surplus water from the Vanni into the Elephant Pass lagoon, which water flowed to waste in the sea through the Eastern end at Chundikulam and through the Western end Elephant Pass bridge. Vadamarachchi and Upparu lagoons with surface areas of about 30 and 10 sq. miles respectively in Jaffna peninsula, cover a significant 10 percent of the peninsula's land area of about 400 square miles.

These salt water lagoons have access to the sea, but during the NE monsoon some rain water from their catchment areas also feed into them. A River for Jaffna, Arumugam Plan proposed to utilize monsoon rain water from the mainland streams running to waste through the Ele-

phant Pass lagoon, for the benefit of Jaffna.

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

- Openings in the road and rail bridges in Elephant Pass causeway at the Western end of Elephant Pass lagoon were closed to prevent fresh water going to the sea from this end.
- A bund was built in the 1950s, at the eastern end of Elephant Pass lagoon at Chundikulam to isolate Elephant Pass lagoon from the sea, with a spillway provided to discharge excess flood water to the sea. Elephant Pass lagoon became a fresh water lagoon, but unfortunately the Chundikulam bund was soon breached by heavy floods, thus allowing sea water inflow to Elephant Pass lagoon since then.
- A 40 foot wide two and a half mile long channel, called the Mullian Link Channel was proposed from the North Eastern side of the Elephant Pass lagoon to convey fresh water from the Elephant Pass lagoon to the Vadamarachchi lagoon at its Southern end, including regulatory gates to control the flow. Unfortunately only about two and a quarter miles of channel was completed in the 1960s, when funds ran out and the work was never completed.



Thondamanaru Barrage at the Northern end of Vadamarachchi lagoon where it joins the sea, was also built, starting in 1947 and completed in 1953, to make Vadamarachchi lagoon a fresh water lagoon. Windmills were also provided to draw water for cultivation.

Following the 1945 Webb proposals, Ariyalai barrage was built in 1955 where the Upparu lagoon connects to the sea, to make Upparu a fresh water lagoon.

A link channel was built between Vadamarachchi and Upparu lagoons so that fresh water from Elephant



Elephant Pass lagoon

Pass lagoon can be supplied to Upparu lagoon via Vadamarachchi lagoon. The present condition is that the gates are no longer watertight and sea water enters Upparu lagoon.

Fresh water lagoons

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, thus establishing the rationale of the River for Jaffna.

The scheme was thus only partially completed in the 1960s and the key Mullian link channel to convey

was opened. This did not happen and he went by air to Pallai instead. He inspected Thondamannar but could not go beyond Muhumalai to the Elephant Pass lagoon. He had described the project as an "all embracing solution for water problems in Jaffna".

At the Annual Sessions of the Institution of Engineers, Sri Lanka, (IESL) in October 2007 a Resolution was passed recommending to Government to undertake early implementation of the project. When the resolution was submitted to President Mahinda Rajapaksa, a sum of Rs. 100 million was released for restoration of Thondamannar barrage and this work has since been done.

The benefits of completing this project include the following:

Agricultural use

About 20,000 acres of land is cultivated with paddy in the Jaffna peninsula. This cultivation is entirely rain fed unlike paddy cultivation on the mainland which is fed by irrigation channels. As it is rain fed, the yield per acre in Jaffna is very poor and is only about one-third of the average yield per acre on the mainland. 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 without depending purely on the rain. The potential for improvement in the yield is staggering.

About 11,000 acres 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 from the soil, it will be possible to cultivate this 11,000 acres with cash crops and paddy.

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

In the existing wells it will be possible to increase the amount of daily pumping without the water going saline, thus increasing agricultural cultivation and livestock production.

Fresh water prawn farming can commence on the banks of the lagoons, with potential for export earnings. Converting the Elephant Pass lagoon into a 30 square mile fresh water lagoon will provide fresh agricultural possibilities on both sides of the lagoon i.e. the Jaffna peninsula side on the North, as well as the Vanni side on the South, once the salinity has been leached from the soil.

Work needed to complete the scheme

Step 1: Recondition Thondamanaru Barrage. Replace and repair perished wooden gates and lifting devices etc.

If this barrage is made watertight Vadamarachchi lagoon will become a fresh water lagoon fed with rain water from its 115 square mile catchment area. As stated this has already been done on the instructions of President Rajapaksa.

Step 2: Recondition Ariyalai Barrage

Repair and replace perished planked bays and replace with screw operated gates. Repair breaches in separation bund between Vadamarachchi and Upparu lagoons as required. This will make Upparu lagoon a fresh water lagoon fed with rain water from its 85 square mile catchment area.

Step 3: Complete Mullian Link Channel

When completed it is a possibility that water in Elephant Pass lagoon in the NE monsoon may be sufficiently low in salt content for diversion to Vadamarachchi and Upparu lagoons as described.

Step 4 : Complete Spillway Causeway at Chundikulam at the Eastern end of Elephant Pass lagoon. When completed Elephant Pass lagoon will become a fresh water lagoon.

Proposed Water Supply for Jaffna project - National Water Supply and Drainage Board

Meanwhile, without any reference to the River for Jaffna project, the NWS & DB in association with SMEC International Pty Ltd of Australia and Ceywater Consultants (Pvt) Ltd had prepared a Jaffna Water Supply and Sanitation Feasibility Study. (Ref. Final Report, March 2006). This may be an example of conflict between regional interest groups and central State authority. A loan of US \$ 80 million equal to Rs 9 billion at present rates, has been negotiated, with a local component of Rs 3 billion making Rs 12 billion total.

A submission has been made to President Rajapaksa that much of this sum of money can be saved if the River for Jaffna project is

completed as planned. A part of these savings may then be transferred to manufacture single super phosphate at Eppawala, and save on imports of fertilizer.

Post conflict rehabilitation of people and restoration of water and soil conservation ecosystems, including the River for Jaffna.

Sri Lanka lost two opportunities to restore its ancient water and soil conservation ecosystems, first in the modern mega Accelerated Mahaweli Development project, and later in the post-tsunami rehabilitation program, PTOMS that was fortunately not implemented.

IDPs

Post-conflict rehabilitation of Internally Displaced Persons (IDPs) and demobilized services personnel largely from rural areas outside the conflict areas, may now be a last chance to restore stable and sustainable water and soil conservation ecosystems, to achieve a durable peace. The River for Jaffna project, one of a very few modern projects without ancient origins, must be an integral part of such rehabilitation based on 'Water for people and nature'.

In a separate study, a basis for resettlement of IDPs with special reference to restoration of Commons and highland cultivation (not new irrigation systems) has been prepared based on the model of Dr. Ray Wijewardena's Kohomba coconut estate in Kaka-palliya.

References: A River for Jaffna by D.L.O. Mendis, Sri Lanka Pugwash References for A River for Jaffna - from Water Resources Development, Jaffna Peninsula by Eng. K. Shanmugarajah, Fast Books, Australia, 1993 Twynham (GA Jaffna) 1879 Report - to convert Elephant Pass Lagoon, Vadamarachchi lagoon and Upparu lagoon to freshwater reservoirs. Horseburg (GA Jaffna) 1916 Report - on implementation of above proposal Balasingham (MLC) & Webb (DIE) 1930 Report - proposed barrages to stop salt water intrusion into the lagoons. Balasingham proposed Mahaweli diversion to Jaffna. Webb proposed two barrages at Thondamannar (built in 1953) and at Ariyalai (built in 1955). Arumugam Plan 1954 - Elephant Pass lagoon scheme.