ASPECTS OF POST CONFLICT DEVELOPMENT IN JAFFNA AND THE VANNI

Eng. Lucius Mendis,
Freelance Consultant
email: dlomendis@gmail.com

Dr Tanuja Ariyananda,
Director, Lanka Rain Water Harvesting Forum
email: tanuja@sltnet.lk

Eng. Thiru Arumugam
Freelance Consultant
thiru.aru@gmail.com

Abstract

'A River for Jaffna', called the Arumugam Plan, after a retired Deputy Director of Irrigation and former General Manager/Director of the Water Resources Board, under retired Chief Justice Hema Basnayake, Chairman, consists of Elephant Pass lagoon scheme, Thondamannar barrage and Ariyalai barrage. Begun in 1950's, it was never fully completed. In 2008, although LTTE held Elephant Pass, President Mahinda Rajapakse ordered restoration of Thondamannar and Ariayalai barrages; and the multiple benefits are evident today. After the Nandikadal military victory in May 2009, 'Jaffna Water Supply and Sanitation project' was announced in the National Water Supply and Drainage Board, designed by Snowy Mountains Engineering Corporation, Australia, which does not make full use of the River for Jaffna scheme. Water from Iranamadu reservoir near Kilinochchi, will be pumped to Jaffna, and treated in imported large-scale, centralized Treatment plant. Presently, efforts are being made to combine the two schemes with massive savings in the huge ADB loan, by drawing water from Elephant Pass lagoon after completing that scheme, and using multiple, decentralized Treatment Plant developed in the R&D division of the NWS&DB. However, unexpectedly, a non-career diplomat, qualified in hydro-ecology, and river development work, has condemned the River for Jaffna project. This paper discusses these issues.

Keywords: Irrigation Department, Arumugam plan, NWS&DB, SMEC Australia.

1. Introduction

The authors wish to thank the Organizers of this Conference for giving them the opportunity to present this paper, which will be an introduction to a bigger conceptual series, ***Science and Civilization in Sri Lanka,*** this paper may be summarized as follows:

A project called ***A River for Jaffna*** was started in the 1960's on the initiative of the late Eng. S. Arumugam, Deputy Director of Irrigation, later Director / General Manager, Water Resources Board, and came to be known as the *Arumugam Plan*. His son Eng. Thiru Arumugam, a co-author of this paper, has been identified with the project thereafter.

The ***International Rainwater Catchments Systems Association*** (IRCSA) is a global organization, set up long after the *River for Jaffna* was mooted, with national member organizations in many countries. The head of the ***Lanka Rainwater Harvesting Forum,*** (LRWHF), is Dr Tanuja Ariyananda a co-author of this paper, who is also the head of the ***International Rainwater Catchments Systems Association*** .

The ***River for Jaffna*** project is identified as falling within the scope and definition of rainwater harvesting. But, when restoration is completed it will complement, greatly augment and even over-shadow the useful work already done by the LRWHF in Jaffna and the Vanni.

Eng. D L O Mendis, a co-author of this paper, worked in the Needham Research Institute in Cambridge, England, in the late 1980s, with Professor Joseph Needham author of the ***Science and Civilization in China*** series. An umbrella project ***Science and Civilization in Sri Lanka*** was conceptualized at that time, and introduced to the Institute of Fundamental Studies in Kandy, when Eng. D L O Mendis was appointed as a member of its Governing Board, under the President of Sri Lanka as the Chairman. The ***River for Jaffna*** is an important item in the *Science and Civilization in Sri Lanka* series. The Director of the IFS is Professor C B Dissanayake.

This paper deals with the current situation in post conflict Jaffna and the Vanni. It describes different stages of the *River for Jaffna* project up to the time the separatist conflict finally ended in July 2009. It also describes work of the LRWHF, in Jaffna and the Vanni throughout the period of conflict. The LRWHF supplements the River for Jaffna project after Thondamannar and Arialay barrages were restored as described in this paper.

Unexpectedly, a new project ***'Jaffna water supply and sanitation scheme'*** has been introduced designed by the Snowy Mountains Engineering Corporation, Australia, (SMEC), based on diversion from storage in Iranamadu reservoir built across Kanakarayan aru near Kilinochchi. As a result, restoration of Elephant Pass lagoon scheme, the last item in the *River for Jaffna* project has been held up. Local people led by the then MP for Kilinochchi, Mr V. Ananda-Sangaree protested that local farmers are short of water for cultivation under Iranamadu scheme, and therefore even a drop of water from storage cannot be diverted to Jaffna. At the time of this writing, a severe drought has dried up the Iranamadu reservoir completely, highlighting the fallacy of transfer of water to Jaffna. It is a cruel irony that this unprecedented situation is being exploited to excavate the bed of Iranamadu reservoir using heavy earthmoving equipment, under the direction of hydraulic engineers who do not understand ecosystems. This will destroy the underlying clay plough pan created over the years, and will eventually endanger the bund itself.

The SMEC project if implemented as planned will involve foreign borrowing to the tune of about US $ 150 million, in addition to government spending to the tune of US $ 34 million. Eng. Thiru Arumugam has addressed the Asian Development Bank in this regard and pointed out that one item in the SMEC project, to increase storage capacity of Iranamadu reservoir at an allocated cost of US $ 10 million, would suffice to complete Elephant Pass lagoon scheme, and the *River for Jaffna* project. Conversion of Elephant pass lagoon to fresh water, will enable this to be the source of water for the SMEC project instead of Iranamadu reservoir. Savings on the proposed pipe-line as pointed out by Eng. Thiru Arumugam would be of the order of US $ 6 million. Cost of a treatment plant from Australia has also been included in the SMEC proposal, whereas the R&D Division of the National Water Supply and Drainage Board has demonstrated their ability to handle this work (*NWS&DB Water treatment modules*)

To compound the confusion that has resulted, an uninvited intervention has been received, from a non-career diplomat, the Sri Lanka Ambassador in Vietnam, directed not to any of the authors of this paper, but to others on an extensive 'loop' on email, beginning with a professional journalist on April 1, 2012. This message, certainly not an April Fool's joke, was forwarded by the journalist through another engineer to Eng. D L O Mendis that very day. It's consequences touch on a wider political context, and there is danger that conflict in Jaffna and the Vanni may even be repeated, if this is not dealt with summarily.

2. A River for Jaffna

Jaffna Peninsula has an area of about 400 square miles and is relatively flat. It has no rivers and is totally dependent for its water supply on the annual rainfall of about 50 inches, of which about 87% falls during the north-east monsoon season from October to December, for recharge of the water table in the aquifers in the underlying fractured limestone. Rainwater harvesting from wells for domestic and agricultural use was done by well sweeps (Tennent, 1857), but in the 1950's pumps were introduced, and thereafter over-pumping resulted in sea water percolating into the wells, and about 30% of the wells were said to be saline.

Within the Jaffna peninsula, two shallow lagoons, Vadamarachchi lagoon and Upparu lagoon with surface areas of about 30 and 10 square miles respectively, cover a significant proportion of the peninsula. These are salt water lagoons which used to have access to the sea, but during the northeast monsoon season some rainwater from their catchment areas also collected in them, thereby reducing the salt content of the water. Much of the land bounded by these three lagoons, famous for its fertile red topsoil, remained uncultivated due to salinity.

South of the peninsula is the relatively shallow sea water Elephant Pass Lagoon with a surface area of about 30 square miles. It has a catchment area of about 363 square miles in the mainland Vanni, mainly consisting of the Kanakarayan Aru and three smaller streams. Iranamadu reservoir built in 1902, across Kanagarayan Aru, spills every five or six years during the north-east monsoon rain season. This spill water and other surplus rain water from the Vanni flowed into Elephant Pass lagoon and into the sea through the eastern end at Chundikulam, and also at the western end Elephant Pass bridge, and was wasted. The River for Jaffna project was proposed to save this monsoon rain water running to waste from Elephant Pass lagoon, for the benefit of the Jaffna peninsula.

2.1 Key Points

Key points of the scheme and details of work done in the 1960's are as follows:

Openings in the road and rail bridges in the Elephant Pass causeway at the western end of the E. P. lagoon were closed to prevent sea water intrusion. Excess fresh water from the mainland rivers flowed into the lagoon. A bund was built at the eastern end at Chundikulam to retain fresh water in the lagoon, with a

spillway to allow excess water to flow into the sea. E. P. lagoon became a fresh water lagoon for a short period but the bund was later breached by heavy floods, and sea water was allowed access to the lagoon again.

- A 40 foot wide two and a half mile long channel, called the Mulliyan Link Channel, from the northern side of the Elephant Pass lagoon was to have been constructed, to convey fresh water from the Elephant Pass lagoon to the southern end of the Vadamarachchi lagoon, including regulatory gates to control the flow. Unfortunately this work was never completed. About two and a quarter miles of channel was completed, when funds ran out and work was stopped.
- Thondamanar Barrage where the northern end of Vadamarachchi lagoon joins the sea had been constructed earlier but was in need of restoration in the 1960's to make it watertight. Restoration work that was carried out included incorporation of gates to allow discharge of flood water, and this made Vadamarachchi lagoon a fresh water lagoon, for a while; but the later condition of the barrage was such that it was no longer watertight and allowed sea water to enter the lagoon.
- A spillway and gates were to be built at the south of Upparu Lagoon where it connects to the sea, near Arialay, to make Upparu lagoon a fresh water lagoon over time, by inflow of rainwater alone. A link channel was to be provided between Vadamarachchi and Upparu lagoons so that fresh water from Elephant Pass lagoon would be supplied to Upparu lagoon via Vadamarachchi – the ***River for Jaffna.*** Arialay spillway and gates were built but the wooden planked gates deteriorated and were no longer watertight and allowed sea water to enter Upparu lagoon.
- Thus, the *River for Jaffna* scheme was only partially completed in the 1960's, and the main key element of the Mulliyan link channel to convey fresh water from Elephant Pass lagoon to Vadamarachchi lagoon was never completed. But, even in the brief period that Vadamarachchi and Upparu lagoons held fresh water, benefits to the peninsula were noticeable, as previously brackish water in many domestic wells became potable. However, when the barrages at Thondamanar and Arialai were no longer water-tight, sea water entered Vadamarachchi and Arialay lagoons, the main components of the *River for Jaffna* scheme that begins with inflow of water from the mainland into Elephant Pass lagoon, as described, went back to its original saline condition.

"Post conflict restoration" work began well before the near 30 year conflict ended in May 2009. At the AGM of the Institution of Engineers, in October 2007, a Resolution proposed by Eng. D L O Mendis, was passed, for restoration of the River for Jaffna project. Again, at the conclusion of a November 2007 Pugwash Workshop in Sri Lanka, on the theme *"Learning from Ancient Hydraulic Civilizations to combat climate change"* at which Eng. Thiru Arumugam presented a paper on *A River for Jaffna*, a Resolution proposed by Ambassador Jayantha Dhanapala, a Sri Lankan career diplomat and the twelfth President of the prestigious international ***Pugwash Conferences on Science and World Affairs*** for 2007-2012, was seconded by Eng. D L O Mendis, and passed unanimously. The immediate result of these two Resolutions was that the President of Sri Lanka, H.E. Mahinda Rajapakse ordered that the River for Jaffna be taken up for restoration, even though Elephant Pass lagoon, the A9 main road to Jaffna, and a major part of the Vanni were all still under the control of the LTTE[1], and restoration was done.

2.2 Project Benefits

The benefits of completing this project that were spelled out in the 1960's and remain to the present day, include the following:

[1] The Liberation Tigers of Tamil Eelam, a rebel group that carried on a rebellion against the elected government, were finally defeated in battle at Nandikadal, near Mullaitivu, on the eastern shore of the Vanni mainland in May 2009. Post conflict Rehabilitation, Reconstruction and Reconciliation, began officially thereafter. (Mendis, 2009)

• About 20,000 acres of land is cultivated with paddy in the Jaffna peninsula. This cultivation is entirely based on rainwater harvesting, unlike paddy cultivation on the mainland which is fed by irrigation channels. The yield per acre in the rain fed Jaffna fields is very poor being only about one-third of the average yield per acre on the mainland fields. When 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 direct rainfall. The potential for improvement in the yield is staggering.
• About 11,000 acres of land bordering Vadamarachchi and Upparu lagoons are not cultivable at present as they are saline. When these become fresh water lagoons, it will be possible after the salt is leached from the soil to cultivate this 11,000 acres with cash crops and paddy[2].
• There will be 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.
• 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 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 is leached out from the soil as already seen in the land bordering Vadamarachchci and Upparu lagoons[2].

2.3 Work needed to complete the scheme

Mr K Shanmugarajah[3] Chief Engineer on this project in the Irrigation department in the 1970's authored a comprehensive book titled "Water Resources Development in Jaffna Peninsula" (Fast Books, Australia, 1993). The book detailed the history of the project, with detailed designs, details of work carried out, and work remaining to be done. The following descriptive comments made at the time his book was published, have been updated to the present time, and the work remaining to be done at this time is described.

2.3.1 Work remaining to be done at the present time (mid 2012) is as follows:

Complete Mulliyan Link Channel - Complete excavation of Mulliyan Link Channel, form bund and roadway, causeway, and provide control regulator. Provide link channel between Vadamarachchi and Upparu lagoons. When this work is completed there is a possibility that the water in the Elephant Pass lagoon at the height of the north east monsoon will be sufficiently low in salt content to enable it to be diverted to Vadamarchchi and Upparu lagoons as required.

---

[2] This expectation was in fact fulfilled to a great extent in 2012. The Governor of Jaffna, Maj. Gen. G A Chandrasiri reported that some 3000 acres had been cultivated with onions and other subsidiary food crops in the Maha 2011 – 2012 season in the land bordering Vadamarachchi and Upparu lagoons. This is part of the 11,000 acres available as mentioned in the second item under PROJECT BENEFITS, above. This was possible due to the leaching out of salt in that land bordering the lagoons by seasonal rains, after reconstruction of Thondamannar barrage in 2008 mentioned above, prevented the ingress of sea water. (Island newspaper March 10, 2012)

[3] Sadly, Eng. Shanmugarajah passed away on April 29, 2012 after a long illness bravely borne, following a car accident. He kept in touch with developments on the project to the end, through the authors of this paper.

Complete Spill cum Causeway at Chundikulam - At the eastern end of Elephant Pass lagoon at Chundikulam, complete spill cum causeway, Chundikulam causeway, zoned embankment, and flanked embankment with gravel road. The spill plus causeway will be 7000 feet long and the bund 4700 feet long. When completed Elephant Pass lagoon will become a fresh water lagoon over time, with inflow from the mainland Kanagarayan Aru, Nethali Aru, Perementhal Aru, Theravil Aru, and other streams. Repair and improve 5 mile long access road from Paranthan-Mullaitivu road to Chundikulam causeway.

3. Post conflict Rain water Harvesting in Jaffna and the Vanni

Rainwater harvesting is defined as collection of run-off rainwater as a water supply for domestic use, agriculture, and environmental conservation. Human beings have collected and used rainwater throughout the millennia. India has a 4000-year-old tradition of harvesting rainwater for domestic consumption and agricultural use, while in China the tradition is even older (6000 years). The cisterns for the harvesting of rainwater mentioned in the Bible were spread throughout the entire Mediterranean.

Sri Lanka has a long history of rain water harvesting. One of the earliest policy statements on water resources development and management in Sri Lanka, mentions rain water harvesting. The famous proclamation by King Parakarambahu the Great (1153-1186 AD),

"..... .let not even a small quantity of water obtained by rain, go to the sea without benefiting man" (Arumugam, 1969, quoted from Mahawansa), shows the wisdom and commitment of ancient kings and people to conserve and efficiently manage water resources. The ancient storage tank (reservoir) systems of the dry zone (Brohier, 1934, etc.) and complex water collection and distribution system of the Sigiriya rock fortress, are examples that bear ample testimony to this.

Today, rainwater harvesting is used in wet and dry countries, in poor, rural, and modern, urban situations, for water supply and for sanitation in homes. It is utilized in addressing agricultural productivity and food security for poverty alleviation, even in places with only 200 mm of annual rainfall. Rainwater harvesting is employed in flood mitigation in rain-drenched countries, and in solving infiltration problems of sealed surfaces in urban areas and industrial complexes, or in avoiding polluted water and toxic ground water.

Since the early 1980's, there has been an important trend of increasing international collaboration with regard to development and promotion of rainwater catchment systems, world- wide. Many countries have taken the initiative to promote and implement the technologies for example, China, Thailand, Burma, Japan, Botswana, Kenya, India, Australia and Germany. Some of these country initiatives were supported and presented at International Rainwater Catchment Systems Association (IRCSA) conferences *www.irsca.org*

Sri Lanka has a "National Policy on Rainwater Harvesting and Strategies" since 2009. The policy objective is aimed at encouraging communities to control water near its source by harvesting rain water, supplementing the ancient water and soil conservation ecosystems, commonly called the ancient irrigation works (Brohier 1934, Arumugam 1969 etc). This would result in, minimizing the use of treated water for secondary purposes, reduction of flooding, improving soil conservation and groundwater recharge, providing water for domestic use with adequate treatment, agricultural benefits, and reduced energy consumption.

There has been a significant increase in the use of roof water harvesting in Sri Lanka, which has proved to be a boon to rural people, particularly for domestic water supplies in water scarce situations. Rainwater harvesting has brought much relief during times of drought, and water scarcity, and recently in areas affected by tsunami; and for many other people living in rural areas of Sri Lanka. An estimated thirty five thousand roof water harvesting systems are presently in operation, scattered over a large number of districts. Lanka Rain Water Harvesting Forum (LRWHF: www.lankarainwater.org) an NGO

which has been operating since 1996 has actively promoted the concept of rainwater harvesting in all districts through demonstration projects, awareness programs, training, research and development, and networking

Similarly, studies have shown that collection of runoff water can be used for agriculture as well as to improve the ground water levels both qualitatively and quantitatively. A study was carried out by LRWHF in Kurundamkulama (a village in Mihintale in Anuradhapura District) to harvest/collect run-off rainwater in a 5 m^3 underground tank enabling the farmers to cultivate a crop during Yala season. As a result the incomes of the families in the study area increased substantially (Weerasinghe *et al*. 2005). Collection of run-off rain water in this manner not only conserves water but also reduces soil erosion and degradation of the land.

Another study conducted by LRWHF in Nikaweratiya (Shanthi de Silva, 2005) has shown that collecting rainwater in ponds or *pathahas*, as in the ancient systems, elevates the ground water level by allowing the water to percolate into the ground, thus, increasing the quantity of water available for both domestic and agricultural use even during the dry season.

In Jaffna peninsula where good quality water is scarce, due to over exploitation and pollution, if we develop, utilize and support overland rainwater harvesting and conserving rainwater in watersheds by minimizing run off to the sea, ecosystems can "produce" enough good quality water for humanity, food and nature, can purify polluted water, can reduce the risk of natural disasters like floods, droughts and fires, can stabilize the climate and strengthen biodiversity. The SMEC project now described as the Jaffna – Kilinochchi water supply and sanitation does not meet these criteria. It should be modified to take advantage of the *River for Jaffna* project described above which meets all these criteria. The *River for Jaffna* project should therefore be completed without delay, with completion of the Elephant Pass lagoon scheme.

4. A Concluding Note

Ever since Adam Smith published his classic ***An Inquiry into the Wealth of Nations,*** in 1776, the philosophy underlying human development has been assumed to be *self-interest*. But, Professor Kristen Renwick-Monroe of U/California at Irvine, USA, in her study **The Heart of Altruism**, ***Perceptions of a Common Humanity*** (1996) discussed a contrary motivation, which she labeled ***Altruism.*** Eng. Mendis, had discussions with her in Irvine, about ten years ago. Also, in a long friendship with Professor Joseph Rotblat, the founding father figure of the ***Pugwash conferences on Science and World Affairs***, Eng. Mendis saw *altruism* as his lifelong motivation and inspiration, for which Rotblat and Pugwash shared the Nobel Peace prize in 1995.

Eng. Mendis was honoured to give an ***Invited Address*** at the AGM of British Pugwash in April 1996 titled *Environment and Conflict.* In that address *Eng.* Mendis described the original underlying motivation for development of the ancient water and soil conservation ecosystems, in Sri Lanka, as *altruism,* on account of the influence of Buddhist philosophy. After Professor Rotblat passed away on August 31 2005, (coincidentally, Eng. S Arumugam‘s birth centenary), a Memorial Service was held in the Royal Society, at which Eng. Mendis was again invited to make a presentation. In that ***Tribute***, (Pugwash Workshop *Proceedings)* Eng. Mendis said that according to the Buddha dharma as he understood it, Joseph Rotblat was close to achieving *arahathood* at the time of his death. Eng. Mendis has recently renewed contact with Professor Renwick-Monroe, who is now on an assignment in Harvard University. He hopes to share with her in the future, information on post conflict development activities in Jaffna and the Vanni.

References

Arumugam, S. (1969). *Water resources of Ceylon*. Water Resources Board, Sri Lanka.

Brohier, (1934).

Lo A. K.F. (2006***),*** "Storm Water Collection for Best Watershed Management", *Proceedings of the International Rain Water Harvesting Workshop*, Kandy, Sri Lanka, 2006.

Raghavan S. (2006), "Rainwater Harvesting – Need, Relevance and Importance of Groundwater Recharge in Urban Areas with Particular Reference to Coastal Cities"**,** *Proceeding of the International Rain Water Harvesting Workshop*, Kandy, Sri Lanka, 2006.

Shanthi de Silva (2005), "Impact of Artificial Recharging of Groundwater with Rainwater: a case Study in Kotewehera of Sri Lanka", *Lanka Rain Water Harvesting Forum,* Sri Lanka, 2005.

Weerasinghe P.A , Ariyananda T.N, Weeraratna C.S. (2005), "Rainwater Harvesting for Home Gardens in Dry Zone of Sri Lanka", *Proceeding of XII IRSCA Conference,* New Delhi, India, (2005).

Qiang Z. (2003), "Rain Water Harvesting – a Best Practice for Poverty Alleviation", *3rd World Water Forum, Rain water harvesting and utilization session*. Kyoto, Japan, (2003).