

A HYDROLOGICAL SOLUTION TOWARDS RACIAL INTEGRATION FOR ONE SRI LANKA

**A RIVER BINDS ALL THE LIVING BEINGS IN HER BASIN
BY A SINGLE THREAD OF WATER**



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2006.05.22

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Abstract

‘Development’ is what majority of people in the North wish by their hearts and the thinking of ‘Separation’ could be certainly effaced by a promising strategy to develop the northern region in Sri Lanka.

Water is the first prerequisite for any human civilization and if we could provide irrigation water facility to the North, through a promising diversion, it will heal the land cracking gaps between the two races.

River ‘Mahaweli’ is the wisdom of development in Sri Lanka, which could connect provinces by feeding the massive spider web like irrigation network and also collects 650MW of energy to the National Grid.

If she could stretch her left hand a little bit more towards north, the beauty is certain to bind all the civilians together by a single thread of water.

But the present flow capacity of river Mahaweli is not adequate for any more new projects unless she is fed by a promising diversion from the western slope of the country through a comprehensive water resource management.

Therefore it is proposed to divert **350 MCM** from Kelani basin in to Mahaweli basin, {such that 200MCM from the Kehelgamuoya and 150 MCM of seasonal spillage from Maussakele and Castlerigh} through a tunnel of **6.5 km** from the ‘Norton’ reservoir(**886m** MSL) to a proposed reservoir at ‘Diyagala’ (**800m**MSL) in the Mahaweli basin.

The loss of energy at Kalani system can be compensated through increased power production at Mahaweli system.

The irrigation system proposed for ‘North Development’ is aimed to harvest & store the entire monsoon rainfall from November to February and to be fed by the diversion during the driest period from July to September.

This is going to be an ‘**Effective Water Resource Management**’ in the country and ‘**Productivity**’ of water stored at ‘**Norton Bridge**’ will be golden in value in future, if we could build up the ‘**North Bridge of Peace**’ for ‘**One Sri Lanka**’.

01. The Problem in depth:-

1.1 Land & Community in the North

The northern land of Sri Lanka belongs to the dry & semi arid zone which gets below 1000 mm of a rain fall by the North-East monsoon.

The rain is but heavily showered from November to February and the land is burned to be cracked by the undisturbed hot sun during rest of the year.

The Community in the North is well known to be much courageous and they make a living of labor by drawing their drinking & irrigation water requirement difficultly but methodically through deep dig percolation wells.

1.2 National Vision of Future

Development is what majority of people in the North wish by their hearts and the thinking of separation could be certainly effaced by a promising strategy to develop the North. Also, such a planning for development has to be very attractive and acceptable by all the parties concerned, in the North and South as well.

But what is the strategy to do this wisdom of heeling the wounds of a 30 years conflict and binding the two races together again?

02 Towards a Sustainable Solution:-

2.1 The Water Bond

Water is the first prerequisite for any human civilization and if we could provide irrigation water facility to the North, through a promising diversion, it will certainly heel the land cracking gaps between Singhalese and Tamils.

River Mahaweli is the wisdom of development in Sri Lanka, which connects provinces to feed the massive spider web like irrigation network of 186000Ha in extent and collects 650MW to the National Grid of energy.

If we could use this wonderful river in a comprehensive hydrological strategy to develop the North, she is certain to efface the thinking of separation, in accordance with the natural phenomenon; ***“A RIVER BINDS ALL THE LIVING BEINGS IN HER BASIN, BY A SINGLE THREAD OF WATER.”***

2.2 Effective Water Resource Management

Sri Lanka is a country which faces both monsoon winds to receive an annual mean

rainfall of 2000mm. But unfortunately that is not equally distributed either upon the entire land or during the entire period of a year. As a result, 43.7% of total river flow of Sri Lanka is descending to the sea without being used productively.

Moreover the people living in the North, Northwest, East and Southeast are almost dying due to scarcity of water, while the western slopes are heavily showered and flooded.

Therefore the timely importance of forming strategies for an effective water resource management in Sri Lanka is emphasized and two main facts are furnished hereby to be considered in strategic planning scenarios.

1. Western slopes of the country is heavily showered during activation of the Southwest monsoon and the resulting flood flows of western rivers have to be diverted to feed the dried out eastern river basins, by the time.
2. Monsoon rain intensity over the eastern slopes and planes of Sri Lanka, is much higher and the entire annual precipitation is recorded almost during three months. Therefore water harvesting in surface storages, just as it was done in the ancient cascade tank-based irrigation system in the “North Central”, should be adapted as a water management scenario of immense importance.

‘North Development’ too, has to be based on the two above scenarios, because the flow of the river Mahaweli is not adequate for any more new projects unless it is fed by a promising diversion from the western slope of the county. It will be not only a diversion for development but also a measure of flood prevention in the western region.

03. North Development Mahaweli Irrigation Scheme:-

The proposed scheme comprises three major phases such as;

1. Mahaweli Flow Improvement Project
2. Mahaweli Waterway Improvement Project
3. North Development Mahaweli Irrigation Project

04. The First Phase-Mahaweli Flow Improvement:-

4.1 Kehelgamu Oya / Mahaweli, Inter-Basinal Diversion

The closest vicinity of the two basins of Kehelgamu Oya and Mahaweli, is situated at Diyagala of Ambagamuwa division.

If we could transport a water flow through a tunnel(6.5km) from Norton reservoir (886m MSL), it could be dropped in to Mahaweli basin at Diyagala(800m MSL) with a considerable potential head for power generation.

Therefore it is proposed hereby, the interbasinal diversion of 350MCM from the Kalani basin of the Western slope in to Mahaweli basin of the Eastern slope, as a measure of flow improvement in Mahaweli.

4.2 The Loss at Old Laxapana

The loss of power production (50MW) at old Laxapana due to this diversion can be compensated by the increment of power production at Mahaweli side and there is no need of closing the existing power plant because this is going to be only a seasonal operation.

During the period of activation of Northeast monsoon (November to February), the proposed diversion is not operated because Mahaweli is well fed by the intensive rain fall over the eastern slopes. Also it is the season of proposed rainwater harvesting in the northern mild sloppy planes.

4.3 Power Production at Diyagala

Generating Head -	86m
Annual flow -(200/Kehelgamu +150/Maussakele spill to Castlerigh)-	350 MCM

4.4 Is Colombo Water Supply Affected?

Kehelgamu Oya belongs to the basin of river Kalani and there could be a restriction against the new proposal, upon Colombo water supply, which could be affected due to the diversion.

But the quantity wise loss of 350MCM due to the diversion is 4.3% and it is nothing in comparison with the annual Kalani out flow of **5474MCM** to the sea.

Whence the Colombo water supply becomes problematic with saline seawater effect the diversion is not operated at all because that's the very period of proposed rain water harvesting in the North, under the Northeast monsoon.

However, in spite of this diversion, 'Colombo Water Supply' will become an issue in the near future unless new strategies are formed by the management scenarios, because drawing the bulk drinking water requirement of water at a so down most location of a polluted urban river may create lots of problems, in public health concern.

Therefore a by-proposal is suggested hereby to draw water scientist's & hydrologist's attention to see the feasibility for a fresh water supply to Colombo by diverting 'Bopath Ella' to Kalatuwawa reservoir so that a fresh drinking water supply could be assured to the capital city.

05. The second Phase (Mahaweli Waterway Improvements) :-

The main objective, 'North Development', is expected to be achieved by feeding the NCP canal of the 'Mahaweli Master Plan' and to go hand in hand with the Moragahakanda project in the aim of providing irrigation water facility for the proposed systems I,J &K in the North. (pl. see fig-04)

In order to achieve the maximum productivity of water from the diversion, the existing up stream waterway of the river Mahaweli has to be improved at several localities. The conceptual model for waterway improvements, comprises two small reservoirs at Diyagala and Gampolawela.

5.1 The Reservoir At Diyagala(800m MSL)

High level reservoirs can be considered as the heart of a country, which hold on a stock of water and energy to improve stability, maintainability, and resilience of the socioeconomic structure for a sustainable development.

They also improve aquifer / ground water rechargeability and maintain a fare level of soil moisture content and humidity which immensely help the undisturbed functioning of natural water cycle of the local ecosystem.

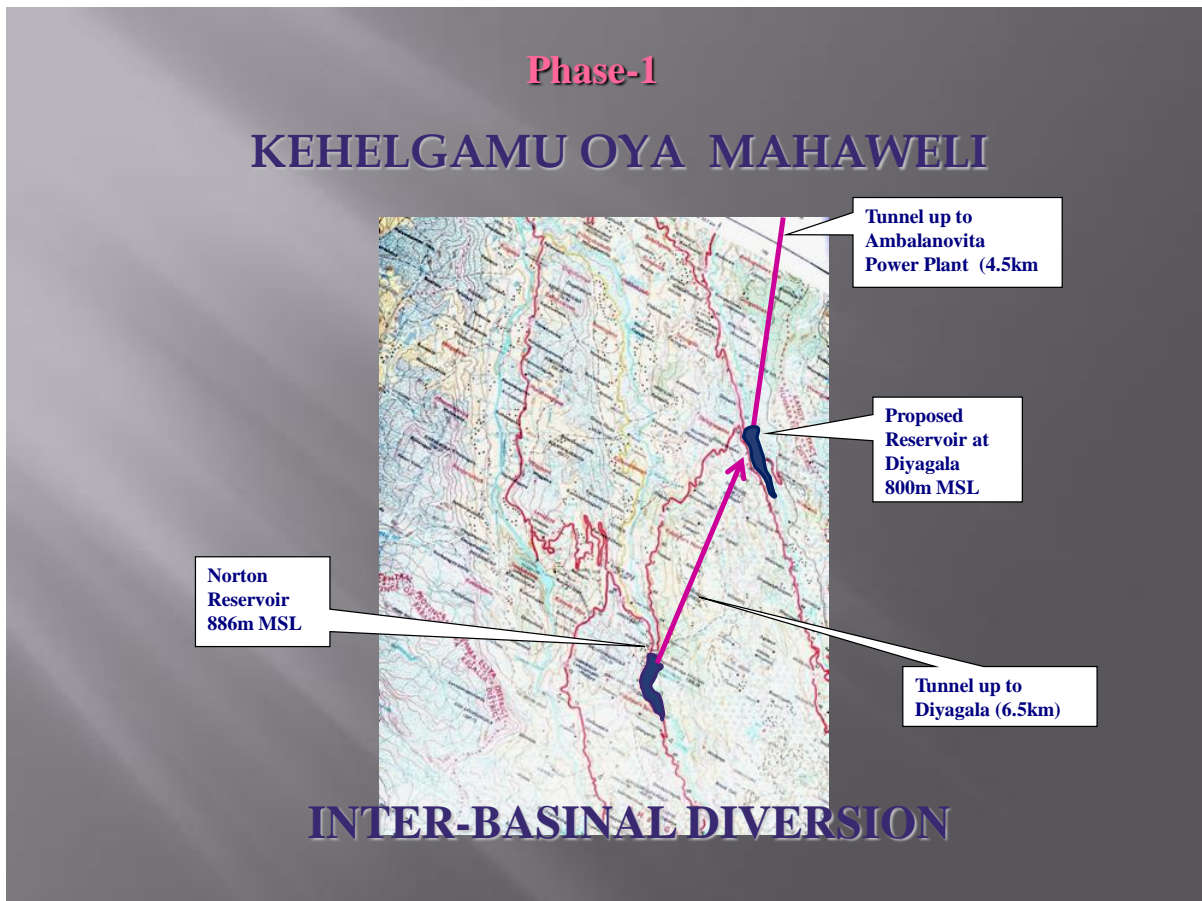


FIGURE-01 (The Inter-basinal Diversion from Kalani to Mahaweli -a created drawing)

FIGURE-01

The proposed reservoir at Diyagala increases the stock of renewable resources and it does not violate the three dimensional aspects of sustainability in Social, Ecological and Economic concern upon value addition to national assets.

Therefore it is proposed hereby to construct a dam(800m MSL) across the river at Diyagala for a reservoir with potentiality for hydropower generation.(pl see fig-01)



FIGURE-02(proposed tunnel intake at Norton reservoir-886MSL)

5.2 Power Production At Ambalanovita

The flow from the intake of Diyagala reservoir, is transported further down stream up to Ambalanovita through a tunnel (4.6km) for power generation.

Generating Head -	225m
Annual flow -	350[Kelani] + 153[Mahaweli] = 393 MCM

5.3 A Buffer Storage Reservoir At Gampolawela

Gampolawela is the locality where a considerable flow of Mahaweli including the proposed diversion (but excluding Kotmale power out flow and Atabageoya flow), is available and therefore a buffer storage reservoir is proposed there with a short dam at 540m MSL.(pl see fig-03&04)



FIGURE-03 (Locality for the proposed dam site –Gampolawela reservoir)

The two main objectives of the proposed reservoir at Gampolawela are;

1. **A Buffer Storage To Support Disaster Management Scenarios.**

It is very vulnerable not to have a buffer storage reservoir, in the upper Mahaweli basin up to Polgolla because a flood situation (even a 100 year flood) could not be managed within, and the civilians living in densely residential flood planes at down stream basin are in utmost danger.

An uncontrollable flood or a dam failure at Kothmalaoya basin too, may create a similar situation in the Mahaweli basin and therefore the proposed reservoir at Gampolawela with a buffering capacity, could be of immense importance in disaster management scenarios.

A clear standby free board of 15m (at least) is suggested, in order to provide adequate room there, for a flood stock, in case of a dam failure or an uncontrollable flood at upstream.

At least, it may hold on an impulsive flood stroke until down stream civilians are removed to safe grounds from inundations in case of an emergency.

Phase-2



FIGURE-04 (Proposed buffer storage reservoir at Gampolawela-540mMSL)

2. Power production at Gampolawela

Though the potential head availability is less at Gampolawela, there is a considerable flow for power generation throughout the year.

Generating Head -	50m
Annual flow -	580 MCM

No additional improvements along the existing waterway up to Moragahakanda reservoir, are required because the tunnel capacities at Ukuwela(2000cusec) and Bowatanna (1000cusec) are more than enough to transport the additional flow of 250MCM from the diversion.



FIGURE-05 (Cascade of Mahaweli Reservoirs -a created drawing)

06. The third Phase (North Development Mahaweli Irrigation Project) :-

The proposed North Development is aimed to be launched under Moragahakanda Project in the Mahaweli Master Plan and the development of new irrigation settlements under the Systems I, J& K in the North are specially focused.(pl see fig-06)

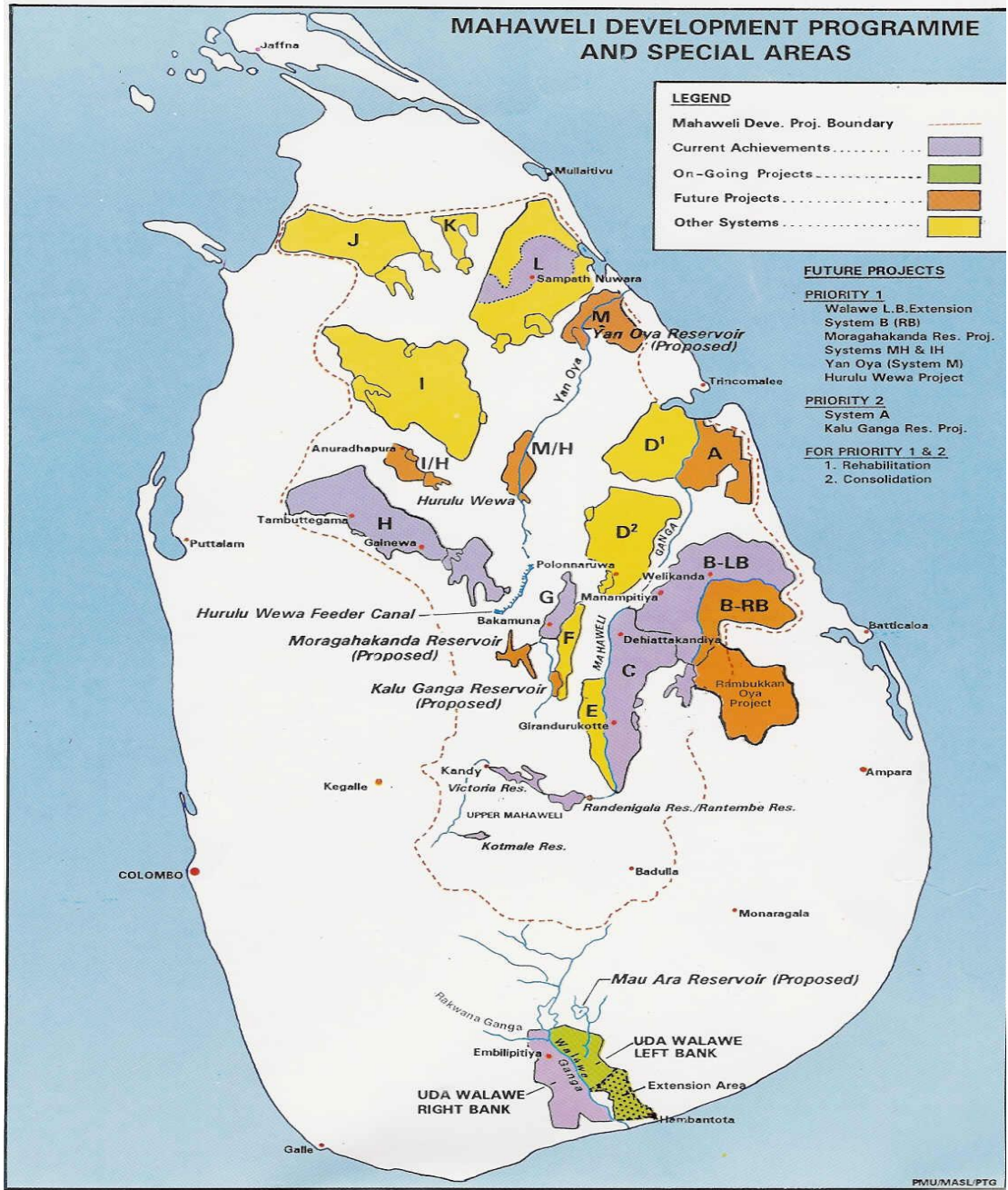


FIGURE-06 (Mahaweli Development Map-National Atlas/ Survey Department)

Water budget required for the North Development is approximately **600 MCM** and only **200MCM** is expected to allocate from the Kelani Mahaweli interbasinal diversion. The balance of **400 MCM** is supposed to be harvested & stored from the Northeast monsoon just as it was done in the ancient tank-based cascade irrigation system of 'Rajarata'.

6.1 Most appropriate Irrigation technology for the North

6.11 Water Science In The Past

Being Sri Lankans, we are well equipped with unique skills in water science gained through genetic & hereditary aptitudes because our forefathers were the proud people who introduced the ‘Tank-based Cascade Irrigation’ technology to the world in the 4th century BC. (pl see the figure-07)

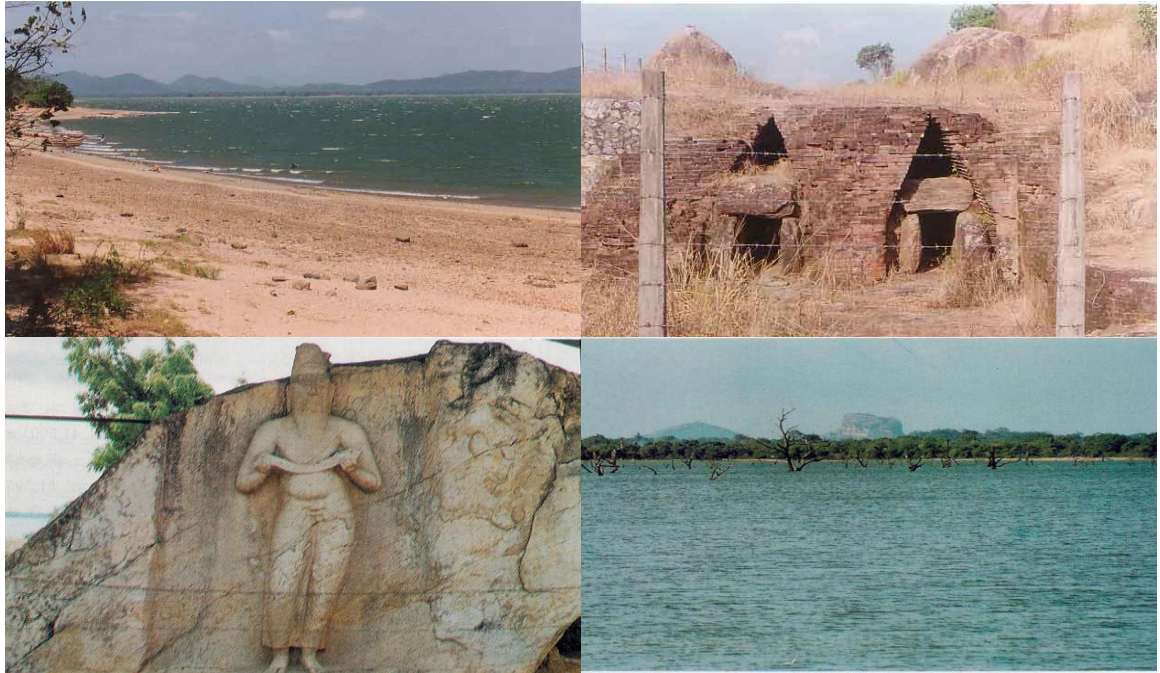


FIGURE-07 (Water Science & Culture in the Past – a created picture)

The massive irrigation network including **17,000** identified reservoirs(surface storage tanks) belongs to the late kingdom of ‘Rajarata’ in the North Central province, still stands in good level of functioning to prove the socioeconomic and ecological sustainability of the water techno-civilization in the past.

6.12 Invasion By The Modern Technology

The modern water technology established under ‘Mahaweli Development Scheme’ is a **canal-based irrigation system** and the sustainability of the built up sub civilization is still being studied. So far experienced several shortcomings and compatibilities with the technology are furnished bellow for consideration.

1. There is no special methodology to harvest the monsoon rainfall within the irrigation network and the undisturbed surface runoff is only to washout the land and to descend through drainages.
As a result, even after two days of a heavy shower, the costly irrigation water from the far distant diversion itself, has to be issued for farm lots or the cultivation is dried out.
Besides that, fertilizers such as phosphates, nitrates & organic matter are not recycled naturally within the system and as the due impact soil fertility is lowered through undisturbed erosion,

2. 'Canal-based Irrigation' pays meager attention upon soil and moisture conservation of the ecosystem and when it happened to close a canal just for repairs, whole the land is dried out soon, without leaving a drop of water even in a well, and therefore, it is a common sight that Mahaweli settlers move miles away carrying baskets & pots for water.
3. A meager development could be observed in the residential hamlet lots because a dry upland was always selected for settlements. Therefore farmers are living moreover in a cottage in the paddy field at the vicinity of water, isolating their hamlet.

That is due to lack of planning in soil and moisture conservation in canal-based irrigation technology and as a result, sustainability and coexistence of the newly established sub civilization is still on the threshold of uncertainty.

4. Sociologists attention has to be drawn to study how could people of a society becomes so selfish with relation to the socioeconomic structure of the adapted irrigation techno system behind the new settlements.

It is to observe that Mahaweli settlers are fighting with each other in sharing water for their farm lots and 'Water Management' has become a difficult activity, which is hardly likely to materialize without involvement of government official.

But it is difficult to believe how villagers under the ancient "tank based cascade irrigation system" are motivated to perform the activities such as, water management, equity based fishery and maintenance of the irrigation network by themselves through collective efforts.

Where there is a great civilization emerged anywhere in the world, there is a well planned water scientific system behind, and contrary, an ill-planned system may ruin a civilization.

6.2 Multi Watershed Contour Irrigation

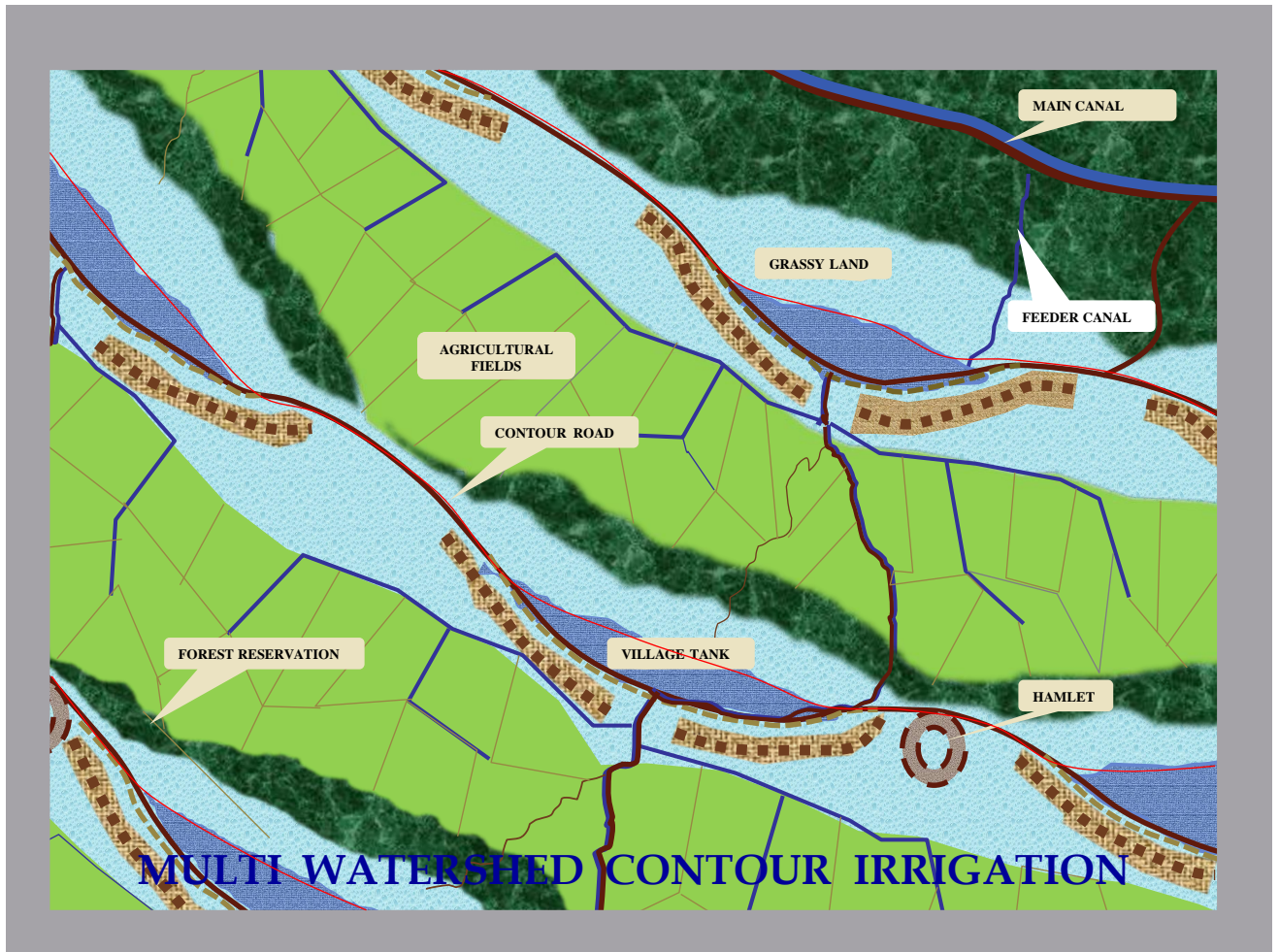


FIGURE-07 ('Multi Watershed Contour Irrigation'-an innovative combination of new and conventional technologies/2006-© by Cyril H Thalpe Gamage)

An appropriate irrigation technique, which could be considered as an integration of all the good features from the ancient and modern irrigation technologies is suggested herein for consideration. (pl see figure-07)

Wave like contour roads are constructed (with a fill whenever the road deviates downwards the contour) creating separate watersheds in cascade. A watershed comprises several small surface reservoirs of the same level in line.

It suits for the mild sloppy planes in the dry zone and the monsoon rainfall too is well harvested & stored within the system just as it was done in the ancient technology.

As shown in the figure-07, the system is also fed by a main canal from the diversion and saving the cultivation through a minimum supply of irrigation water in the dry season is focused.

As a measure of water saving during the dry season, the canal network is fed while the tanks are kept at the dead storage level. In order to do that a lined feeder canal is designed inside each tank, to feed the sluice outlets without having a live storage in the tank.

As shown in the figure-08, only the dead storage is maintained in the tank during the dry season as a measure of saving the fishery and biodiversity of the local ecosystem.

A broad grass land and a strip of jungle is preserved in the catchment, just as it was done in the ancient technology, to be a buffer zone against erosion and also to absorb nutrients from the surface runoff as a measure of natural water purification.

The forest is to supply timber and energy requirement of the settlers and grass lands motivate dairy and animal husbandry at the level of self sufficiency at least.

Hamlets are located down the tanks, just as in the ancient technology in the purpose of dam safety and to meet shallow ground water table for percolation wells.

A continuous strip of an agro-economic zone is stretched and an export market oriented new agriculture is suggested to implement under the 'North Development' because paddy cultivation in the country is already at the level of self sufficiency.

Water budget for the 'North Development Mahaweli Irrigation Project' is seasonally balanced depending upon rainwater harvesting and the proposed diversion as well, as explained in the figure-08.

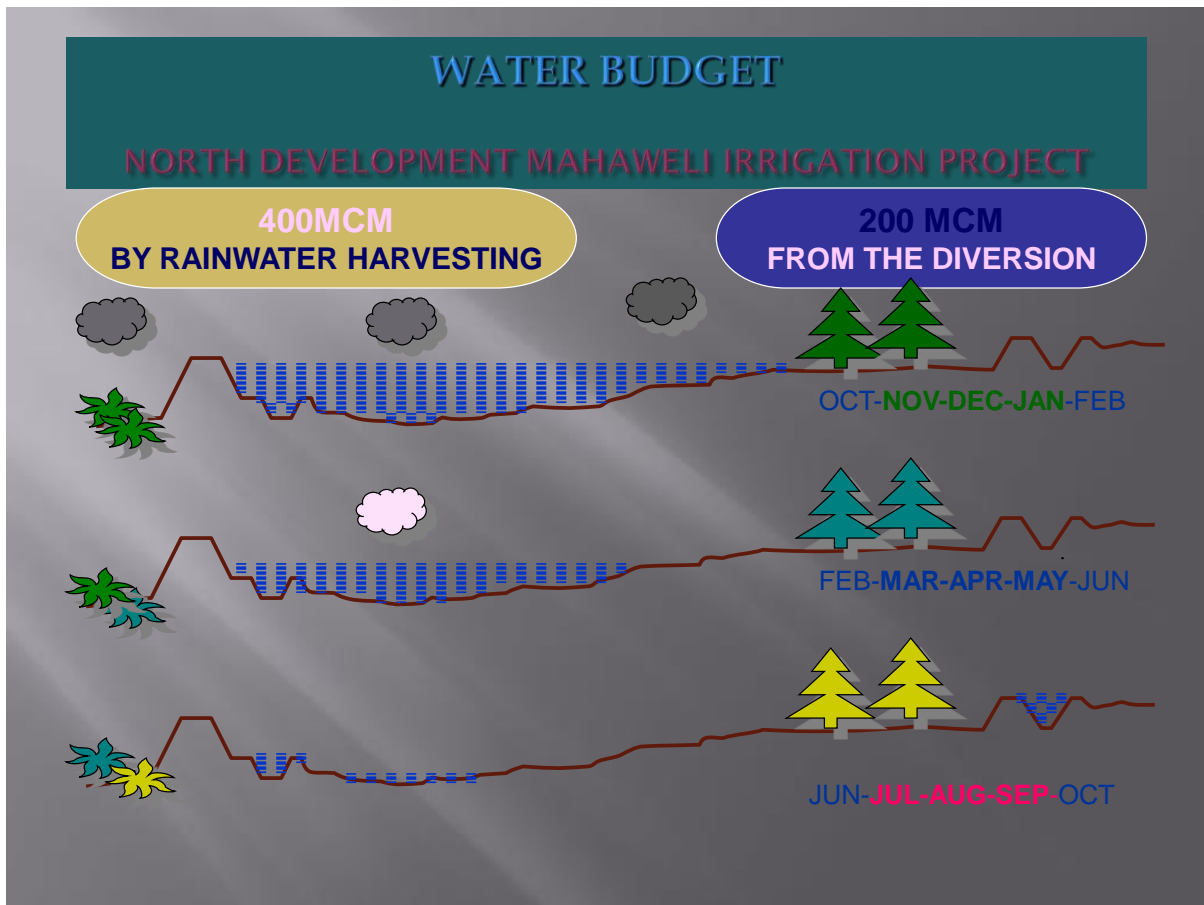


FIGURE-08 (Water Budget for North Development)

The entire flow capacity from the diversion is 350 MCM but only 200MCM is aimed to be released for the North and the rest of 150MCM is allocated for the Eastern Development under Maduruoya Reservoir.

6.3 A Live Fence To Protect Both The Cultivation And Elephants.

The famous issue of motherland between man and wild elephant, is yet to have a reliable solution. Electric fences were built up at several localities in the country in order to protect paddy, sugarcane cultivation and irrigation settlements but none of them are properly functioning by now due to practical difficulties to afford for maintenance. The big creature seems to have studied the technique and used to break electric wires by means of a dry log. However a considerable number of men and elephant lives are lost annually by the never ending conflict.

Wilpattu national park and Madu road sanctuary come across the path of proposed 'North Development' project and therefore, a live fence of densely grown Palmyra plants is suggested to be a reliable solution for the problem of wild elephants.



FIGURE-09

The proposed “Thal Aramba” live fence is supposed to be a narrow strip of plants in three rows and it requires 10 to 15 years to grow and well grown trees cannot be moved by elephants.

Trees are planted in rows closer to each other and several elephant passes of about 15 ft of width, are left till the rest of the fence is well established and ultimately they too are closed.

Besides the use as a barrier, Palmyra is a plant of immense use specially for Tamils and they used to make several food products & handicrafts out of it, for the local market.

6.4 A Zone Of Racial Integration

‘Socio-economic Development under One Sri Lanka’ is the main objective to achieve and therefore, the scope for a sociological approach leading towards territorial integrity is suggested hereby for consideration.

A boundary, by all means brings the sense of separation and our collective effort should be focused to efface the existing boundaries between the two races who involved in a flickering conflict for centuries.

While the Norton water flow, through the proposed diversion, crosses the Vanni district boundary for 'North Development', a special land strip along Nochchikulam, Tantirimalee, Neriyakulam & Tammannakulam etc. is selected and developed in the aim of racial integration by introduction of the main components such as;

1. Mixed Blood Settlements

Settlers are specially selected from Sinhala & Tamil mixed blood families.

2. Common Religious Facilities

'Mixed Religious Places' are introduced such that; a church, a temple a kovil, and a mosque etc are facilitated almost together.

3. Multi Cultural Education

'Multi Cultural Mixed Schools' are introduced and children can choose their mother tongue up to Junior Secondary level of education. Teaching of English up to that level is aimed to gain competency as the common language and further education is in English medium.

A religion could not be an asset of a particular nation or a race, and therefore a Global Concept has to be formed to accept all the world religions as different philosophies of immense importance for mankind, born in different ages of the global human civilization, and it too has to be accepted as a science for open studies.

Therefore the timely importance of integrating the religions and cultures in to a single subject as 'Religious Philosophies', for the schools in the zone of racial integration, is emphasized.

'Multi Cultural Education' introduced by the National Education Commission under the reforms -1997, is suggested to practice in this special zone of racial integration.

E N D

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