

Challenges in Utilizing Water Resources in Lower Reaches of Kanakarayanaru of Northern Sri Lanka for Efficient and Equitable Water Allocation

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Abstract— Even though the Northern part of Sri Lanka is dry zone, it has potential water resources by the means of constructed tanks and diversion along the river basins. But some part of this region still frequently suffering many water related issues and water scarcity, not only in the domestic usage but also for demand for agriculture. Meanwhile, inefficient rain water management especially, during the heavy rain period in the Monsoon time allows to reach rain water in to the ocean without any proper usage. These issues should be addressed by way of sustainable water resources development and efficient water management process. The Kangarayan Aru is the largest river basin in the Northern Province. Water resource has been almost exhausted in the upper reaches of this basin with the recent augmentation of Iranamdu Irrigation Reservoirs in Kilinochchi District. However, there is ample water potential in the lower reaches of KanakarayanArue below the Iranamdu. That should be considered for the sustainable solution for increasing water demand across the water sectors to support irrigated agriculture, urban development and domestic needs for growing populations within and out of this basin. This paper outlines the research problem of an ongoing research and spell out a possible research solution to manage water resources in sustainable manner in the study area of Lower reaches of Kanakarayan River basin

Index Terms—Sustainable Water Resources, Lower Reaches, River Basin, Equitable Water Allocation, Kanakarayanaru, Iranamadu.

1 INTRODUCTION

SRI Lanka is endowed with a hydraulic civilization natured by a rich Irrigation Heritage. While we are compelling to keep these traditions alive, Integrated Water Resources Development and Management of water and land resources have to be practiced for the sustainable use adroit intervention with new technologies and management tools in order to meet the growing demands of the country in domestic, industrial, agricultural, tourism sectors etc.

WaterResource is the primenaturalresourcein Northern Sri Lanka—the main factor which contributes to theprovince'socio economic development from ancient times.Northern Province being anagricultural area, irrigated agriculture has a unique contribution towards its agroecconomy from ancient times to-date. Of the 103 distinct River Basins in the Island, twenty one river basins are covered within Northern Provinceand none of them is called perennial river type while all of them belong to the category of seasonal rivers.

The KangarayanArubasin is the largest river basin with 896 Sq. Kms. of catchment area in the Northern Province.The Kanakarayanaruriver basin has been predominantly madewith an agriculture-based system. Its upper basin, supplies water to

three Major Irrigation Scheme including Iranamdu Irrigation Scheme and 64 Minor Farmer Managed Irrigation Schemes comprising about 12,100 hectares of agricultural land.

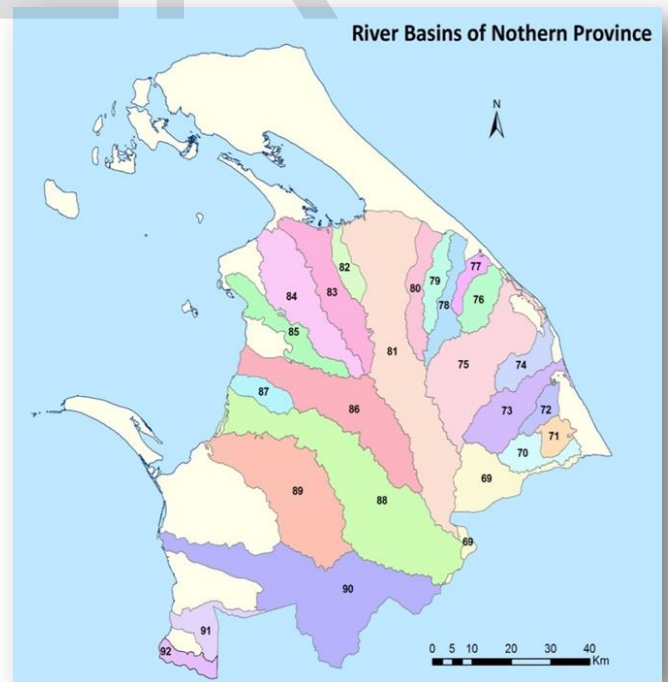


Figure 1:- Northern River Basins

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Iranamadu Irrigation scheme in Kilinochchi District is fed by Kanakarayan Aru River basin and it is the largest reservoir in the Northern Province. The Iranamadu scheme was established in several stages since 1902 and presently it has the water holding capacity of 131 MCM to provide irrigation facilities to 9,000 ha of paddy lands. Now, again, it has been augmented to 148 million m³ with funds provided under Asian Development Bank Assistance. As such, inflow from upper catchment of Kanakarayan Aru has exhausted considerably. It is obvious that water potential in the lower reaches of Kanakarayan Aru below the Iranamadu tank should be taken into consideration for water resource management for the immediate need of water supply to Jaffna Peninsula and other subsidiary needs.

Lower reaches of Kanakarayan Aru from downstream of Iranamadu Tank has catchment area of 199 km² only on the right hand side to A9 road, is being considered to generate the inflow

Recent concluded hydrological studies of the Mahaweli Consultant Bureau (MCB) for the catchment areas D/S of Iranamadu revealed that the yields are very much higher per annum of total inflow (84.3 MCM) as well as total inflow (55.1 MCM) during rainy period November to January. Hence, it is obvious that there is high potential to meet the water requirement in the different sector throughout the year.

Recently, the lower basin was selected for more complex water diversion scheme to the vicinity of Elephant Pass lagoon to provide water to Jaffna Water Supply Project due to depleted water resources in the aquifers. In addition, it is expected that water is required for the upper reaches of vadamarachchi lagoon for recharging of ground water for use of and irrigated agriculture and in the wedge region between Northern side of Elephant pass lagoon and below the command area of Iranamadu Scheme for Irrigated Agriculture for bringing more land under irrigation to sustain the food demand of the growing population.

This increased pressure on scarce water resources, from inside as well as from outside the basin, calls for an integrated approach to water resources management to be effectively adopted within this study area, to enhance productive, social, equitable, and environmentally sustainable uses of the water resources in order to solve the long outstanding water necessity this area.

In the context of increasing scarcity due to environmental consequences and competition among the water sectors to support irrigated agriculture, urban development and domestic needs of the growing population, Sustainable water resource management has become a crucial factor for the socio-economic development of Sri Lanka particularly in the dry zone of the country. Though during the past decade, sustainable development has received much attention everywhere in our region, Meeting the objective of sustainable water resources management is also one of the greatest challenges for

our country particularly in the dry zone of the country. Lower Reaches of Kanakarayan Aru River basin in Kilinochchi District of Northern Province is no exception. One of the biggest concerns for ample water- resources in this region is the sustainability of the current and even future water resources allocation.

2 OBJECTIVE OF THE RESEARCH

The overall objective of this research study is to identify the lapses in sustainable water resources management practices in the study area of Lower reaches of Kanakarayan River basin for efficient and equitable use this paper describes the current practices taken for water resource management with a view to updating sustainable strategies and into practice.

The specific objectives of the proposed research are

- Identify the current practice of Water Resources Management in the Study area.
- Identify the possible water stress issues in the basin.
- Identify the different water resources management scheme. strategies can be adopted to overcome salinity issue.

3 RESEARCH GAPS AND REVIEW OF LITERATURES

Through the literature review of River for Jaffna by Mr.S.Arumugam, Revived River for Jaffna Project by Irrigation Department and Water Resources Development -Jaffna Peninsula by Eng.K.Shanmugarajah -1993, It is observed that even though the project is technically feasible, the issues has been raised on environmental and social consideration such as disturbance to present ecosystem and livelihood of the fishing community, if the lakes were converted to fresh water lagoons. As such, expertise are proposing different version of original River for Jaffna proposal in order to address above issues, But, none of them materialized and with the result of salinity free water from contaminated ground water aquifers in Jaffna lagoon areas could not be reclaimed with potential. As a consequence result, People of Jaffna is facing severe problem for drinking while part of Kilinochchi People for Irrigation purpose.

Owing to these reasons various other solutions have been examined mainly to meet the drinking water requirement for the people of the Jaffna peninsula and one of the alternative purpose suggested was to take water from Iranamadu reservoir by increasing the capacity of the reservoir. While the drinking water supply project was in the implementing stage Iranamadu farmers demanded taking water to Jaffna peninsula and so understandably, this component of the project had to be dropped.

Now, Mahaweli Consultant Bureau consultant (8) has proposed supplementing the drinking water requirement by

diverting water of KanakarayanAru stream below the Iranamadu reservoir. Accordingly, the MCB Consultants proposed modified "River for Jaffna" project as an alternative solution to provide water for drinking and Irrigation water to Jaffna peninsula. This proposal has been formulated under this study considering the Geological, Topographical, climatic conditions of Jaffna Peninsula, Water availability and water Quality improvements etc. while keeping the option to implement the original River for Jaffna project for a future date. The hydrological analysis of this study for the catchment areas under lower reaches of Kanakarayanaru shows that the yields are very much higher than the requirement of drinking water of 12 MCM per annum of total inflow for Jaffna peninsula as well as total inflow during rainy period from November to January. It is also reported nearly about 75 MCM in catchment yield of 199 Sq. Km. spilled in to Elephant Pass lagoon annually. This analysis reveals that an ample amount of water still passing into the Elephant pass lagoon as waste even after rainy season.

This study report clearly state that there is a ample water potential in the lower reaches of KanakarayanAru below the Iranamadu scheme. Further, this study mainly focuses addressing supply of drinking water requirement of Jaffna peninsula by constructing inevitable Infrastructure. It is not studied in depth to utilize excess water within the catchment and outside-catchment. However, this study recommend that it is required further Comprehensive study in this regards.

Madhusudan Bhattarai, Dhruba Pant, V. S. Mishra, HariDevkota, Shuku Pun, R. N. Kayastha and David Molden, highlighted to address the similar issue in my study in KanakarayanAru Lower Reaches.

In order to fill this gap, My study area mainly focus addressing issues mentioned as how we should efficiently manage the ample water resources generated below the Iranamadu improve the efferent use of water and equitable use of different sectors for the purpose of Drinking water supply,, Irrigated agriculture and Re-charging coastal aquifer etc.

4 METHODOLOGY

The detail field study on the downstream of Kanakarayan river basin will involve the following major exploratory activities:

- 1) Initial assessment of the present resources in the basin.
- 2) Assessment of water use patterns, the degree of water scarcity and competition.
- 3) Preparing an inventory of formal and informal water user organizations and their legal status regarding water rights. Assessment of arrangements and institutions related to water resources management and conflict resolution.

- 4) Making an inventory of new water development projects and assessment of possible impact on present water use patterns. Gain insight on the inclusion and exclusion processes of the proposed and ongoing development efforts.
- 5) Assessments of existing water use and water balance, and carrying out a water accounting process in the basin.
- 6) Collection of the secondary level information on the Kanakarayan river basin.

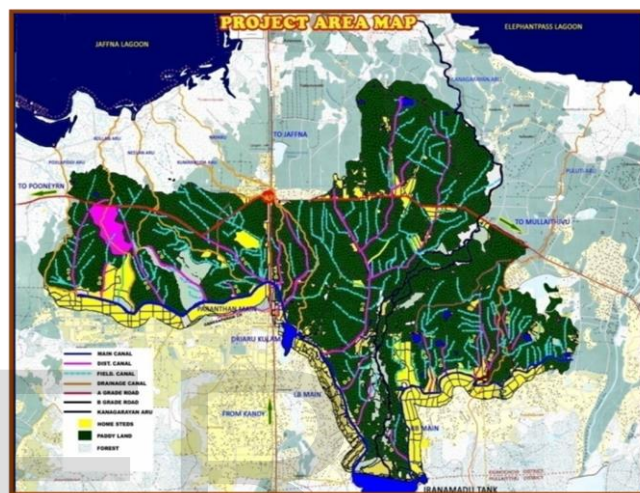


Figure 2. Study area

Outline of the Study

- 1) This study provides answers to the specific objectives
- 2) Describe the characteristics of the Kanakarayan river basin, which include physical, hydrological and socio-economic factors, and water use activities. This section provides the broad-level overview of the Kanakarayan river basin, and its lower reaches subbasin, where the water diversion project work is proposed.
- 3) Provides the water balance results conducted at a major diversion of the lower Reaches of Kanakarayan-river basin and it will also provide water availability and constraints in the basin. Further, it provides information on the present level of use and future development potentials of the water infrastructure.
- 4) Implementation for Best water management practices in the existing water schemes.
- 5) Assess the feasibility study on Jaffna Water Supply Project, an interbasin water transfer project designed to divert 12 MCM of water out of the lower reaches of

Kanakarayan River to the Jaffna city to meet the city's growing drinking water needs.

- 6) Provides an overview of the sustainable water resources that could be applied in the context of Kanakaryan river basin and would be replicated to other schemes.

5 ANALYSIS

1) The water balance study by introduction of simulation modeling in the Kanakarayan river basins will be carried out to assess whether there is sufficient water available in the basin for the water resources management within the basin and out of the basin, and to analyze the likely hydrological impacts and other major consequences in the basin after the planned water diversion. The water accounting study in the Kanakarayan river basin was conducted adopting the standard procedures as per data availability in the basin. Hydrological data from 1979 to 2008 will be analyzed for the water accounting task. Some typical years will be selected for water accounting computation, where the average year relates to average rainfall in the basin.

2) Also, it will be analyzed an overview of the Feasibility of the Jaffna Water Supply Project through the inter basin water diversion scheme.

3) It will also be analyzed to implement integrated water resources management (IWRM) approach under Kanakaryan lower reaches helps to manage and develop water resources in a sustainable and balanced way, taking account of social, economic and environmental interests.

4) It recognizes the many different and competing interest groups, the sectors that use and abuse water, and the needs of the environment.

5) It will be studied to assess alternative means for increasing efficient water use, through better management of multiple water uses in the lower Reaches Kanakarayan river basin in order to reduce the increasing scarcity and competition for water uses across the sectors.

6 BENEFIT OF THE RESEARCH

This study will facilitate to identify existing water management practices, water use patterns, the degree of water scarcity and competition among different sectors in order to evaluate the degree of challenges in water resources. In the meantime, It will further help to identify the way and means of assessing the water availability by introducing the novel concept of simulation modeling for the use within and out side of lower reaches of Kanakarayan kulam.

7 CONCLUSION

To conclude, as far as water sectors concerned, water efficiency

could be achieved by implementing sustainable water resources management in the means of applying appropriate technological and institutional incentives to optimize water usage among different groups in a equitable manner.

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