Interlinking of Thamirabarani and Vaigai River basin based on its possible water quality parameters in South Tamil Nadu, India

Dr. S. Bhagavathi Perumal¹, Prof. S. Kandasamy²

¹Professor, Civil Engineering, Sri Sairam Engineering College, Chennai, Tamil Nadu, India. ²Professor, Civil Engineering, Sri Sairam Engineering College, Chennai, Tamil Nadu, India.

Abstract

Water availability is becoming dearer and dearer day by day in Tamil Nadu due to monsoon vagaries and increasing population propulsion. The spatial and temporal variations in the rainfall over Tamil Nadu has led to denotation of water 'surplus' and water scarce river basins in the state. This project is an attempt for possibility studies and finding parameters for interlinking the rivers in Tamil Nadu state aims at transferring water from water 'surplus' to the water scarce basins. The study was carried out from January 2018 to December 2020 at regular intervals. This aims the prevailing reductionist concept of 'surplus' flows in some river basins irrespective of its diverse ecological needs and of its diversion to water scarce regions. The project touches on the fact that though the interlinking proposal has been made to reduce the water scarcity in the rain scarce areas of western and southern parts of Tamil Nadu, the choice of this gigantic project as the appropriate mechanism to achieve the goal is questioned. The project is focused on the justifiability of the assumption of an arithmetic expansion in irrigated land as the only possible solution towards maintaining Tamil Nadu food security. Based on the above observations, it identifies the need for a totally transparent techno-economic and environmental feasibility study and comparison with other possible options, before the interlinking project is given final approval. Using Remote Sensing and Geographic Information System the various parameters such as Soil, Geology, Geomorphology, Land use, Slope, Rainfall, Drainage, Basin, Relief were analyzed. All relevant data the transfer of equitable water could be distributed there by the water scarcity for drinking and irrigation purposes could resolve by linking various water channels.

Keywords: Parallelepiped, Minimum Distance, Mahalanobis Distance, Maximum Likelihood, Spectral Angle Mapper, Spectral Information Divergence, Binary Encoding, Neural Net, ISO data and K-means

1. INTRODUCTION

Water is one of the most significant natural resources. It is a godsend that water constitutes more than three fourths of the area of the earth and hence, it is selected, properly, as 'watery planet' or 'blue planet'. Overall water resources of the earth, the unutilizable division for more than 99%. In fact, reasonably, a trivial amount of less than

0.4%, including 0.3% of utilizable groundwater and even less proportion surface waters, is available for direct consumption [1]. Thus, the serviceable surface waters comprise a very scanty proportion in the entire global water resources. Appropriate planning is essential for sensible exploitation of this precious commodity for striking an appropriate balance between demand and availability, and availability and utilization at the worldwide, provincial and local levels for the sustainability of their ecosystems.

1.1. Study Area

Thamirabarani River is 130 kilometers in length and the Thamirabarani basin is situated between latitudes 8.21°N and 9.13°N and between 77.10°E longitudes. The forty meters deep Vanatheertham waterfalls are located near the origin of the Thamirabarani River. The river is feed by its tributaries as well as by monsoons. The Thamirabarani has several tributaries, which join at different points during its course. The tributaries Peyar, Ullar, Karamaniar and Pamba join near the Papanasam Reservoir. A major tributary of Thamirabarani is the Servalar River, which joins at a distance of 22 kilometers from its origin. The Manimuthar River, which originates in the Agathimalai Ranges and joins Thamirabarani near Ambasamudram. Gadana River joins at a distance of 43 kilometres from its origin. The Pachaiyar River joins near Gopalasamudram. Chittar River flows for seventy-three kilometers before joining this River. The river flows for 125 kilometers out of which 75 kilometers are in the Tirunelveli district. The Vaigai is a river in Madurai, Tamil Nadu state of southern India. The major tributaries of the river Vaigai are, Suruliyaru, Mullaiyaaru, Varaganadi, Manajalaru and Kridhumaal. Vaippar is a river in the state of Tamil Nadu. It originates from the hills bordering the state of Kerala and runs through Teni and Virudhunagar districts before entering the Gulf of Mannar. Gunnar is a river flowing in the Virudhunagar and Tirunelveli districts of the state of Tamil Nadu. The sanctuary area is within the 15 m (49 ft.) high embankments of the community irrigation tank. The total length of the embankment is 4.010km and detailed study was made from January 2018 to December 2020.

2. METHODOLOGY

The Methodology provides the framework for the interlinking of two rivers with the aid of Remote Sensing and GIS that has

been followed in this project shown in figure 1. The several tributaries should consider while planning about the interlinking of rivers, the main factor should analyzed in this area are shortest way, Land use and Land cover structures, Relief and Distance, Flow and Current of water, Dams, Canals, Slopes and so on. The planning and development is important stage in this project before enter in to the action the various parameters related to environment and social factor should investigate [2]. The various parameter scrutinized in this project are Land use, Land cover, Relief, Drainage, Geology,

Geomorphology, Rainfall and River Basins. The four possibility should consider while study about interlinking of rivers they are Dam to River, Canals to Pond, Canal to River, River to River. The multi-layer analysis introduced in this project for analysis several parameter data in the GIS environment, possible area should estimate from the level of classification [3]. The several calculation also considered in this analysis for better finding of possibilities, they are Rainfall estimation, Slope of the Basin, Relief of the Basin, Distance and length of the river and tributaries [4].



Figure 1: Frame Work for the Interlinking of two Rivers

2.1. Thamirabarani River Basin and Sub Basin

The Thamirabarani River consists of 5 River basins and 45 Sub **Table 1:** Thamirabarani River Basin and Sub Basin basins [5]. The table 1 shows the detailed element of Thamirabarani River basin and sub basins

S.NO	NAME OF RIVER BASIN	AREA IN HECTARES	NO.	NAME OF THE SUB BASINS	AREA IN HECTARES
1.	Vaippar Basin	72881.98	1	Vasudevavallur I	25971.73
			2	SankaranKoil II	7476.14
			3	SankaranKoil III	6218.72
			4	Thiruvenkadam part	29810.02
			5	Jamin Devarkulam	3405.37

2. Karuppanabi 31777.79 3. Naduvakurichi I 2393.20 4. Naduvakurichi I 2393.20 4. Naduvakurichi I 4004.11 5. Marukalankulam 5252.10 6. Uthumalai 2462.16 7. Melaneelithanallur I 5576.53 8. Melaneelithanallur II 11063.25 9. Senkottai 18734.39 10. Tenkasi 21022.38 11. Hannumanthi 7596.73 12. Chithar I 602.070 13. Chithar II 19486.02 14. Kelapavoor 11358.34 15. Alankulam 10081.06 16. Manur I 23608.29 17. Mela-ilumtakulam 1215.90 18. Kodikurichi 316.99 19. Thirvenkadam part 10970.58 20. Sankarankovil II 8581.85 3. Sankarankovil II 8581.85 21.	2.	Chithar Minor Basin	235593.8	1.	Vasudevavallur II	28314.15
3. Naduvakurichi I 2393.20 4. Naduvakurichi II 4064.11 5. Marukulankulam 5252.10 6. Uthumalai 2462.16 7. Melaneelithanallur I 5576.53 8. Melaneelithanallur I 10063.25 9. Senkottai 18734.39 10. Tenkasi 21022.38 11. Hanumanathi 7596.73 12. Chithar II 9486.02 13. Chithar I 9486.02 14. Kelapavoor 11358.34 15. Alankulam 10681.06 16. Manur I 23062.9 17. Melai-altankulam 11970.58 20. Sankarankovil I 5097.28 21. Sankarankovil I 5097.28 21. Sankarankovil I 5097.28 22. Arubasamudram 73474.69 3. Cheranmadevi 20625.23 4. Devanallur 36567.88 5. <t< td=""><td></td><td></td><td></td><td>2.</td><td>Karuppanathi</td><td>31777.79</td></t<>				2.	Karuppanathi	31777.79
4. Naduvakurichi II 4064.11 5. Marukalankulam 5252.10 6. Uthumalai 2462.16 7. Melaeelithanallur I 5576.53 8. Melaeelithanallur II 11063.25 9. Senkotai 18734.39 10. Tenkasi 21022.38 11. Hanumanathi 7596.73 12. Chithar I 6020.70 13. Chithar I 19486.02 14. Kelapavoor 11358.34 15. Alankulam 10681.06 16. Maura I 230508.29 17. Melainathkulam 1215.90 18. Kodikurichi 316.99 19. Thiruvenkadan part 10970.58 20. Sankarankovil I 5097.28 21. Sankarankovil I 5097.28 22. Ambasamudram 73474.69 3. Thambaraparani Minor 241865.75 1. Mauru II 2055.42 2. Ambasamudram <td></td> <td></td> <td></td> <td>3.</td> <td>Naduvakurichi I</td> <td>2393.20</td>				3.	Naduvakurichi I	2393.20
5. Marokalankolam 5252.10 6. Uthumalai 2462.16 7. Mclaneclithanallur I 5576.53 8. Mclaneclithanallur II 11063.25 9. Senkottai 18734.39 10. Tenkasi 21022.38 11. Hanomanathi 7596.73 12. Chithar I 6020.70 13. Chithar I 19486.02 14. Kclapavoor 11358.34 15. Alankulam 10681.06 16. Manur I 23608.29 17. Mcla-ilanthakulam 1215.90 18. Kodikurichi 316.99 19. Thirovenkadam part 10970.58 20. Samkarankovil I 5097.28 21. Sankarankovil I 8581.85 23. Thambaraparani Minor 241865.75 1. Manur I 2455.42 . Ambasamudram 73474.69 3. Cheranmadevi 20625.23 . 4.				4.	Naduvakurichi II	4064.11
6. Uthumalai 2462.16 7. Mclaneclithanallur I 5576.53 8. Melaneelithanallur II 11063.25 9. Senkottui 18734.39 10. Tenkasi 21022.38 11. Hanumanathi 7596.73 12. Chithar I 6020.70 13. Chithar I 6020.70 13. Chithar I 19486.02 14. Kelapavoor 11358.34 15. Alankulam 10681.06 16. Manur I 23608.29 17. Mela-ilanthakulam 1215.90 18. Kodikurichi 316.99 19. Thiruvenkadam part 10970.58 20. Sankarankovil I 5097.28 21. Sankarankovil I 5097.28 21. Sankarankovil I 20625.23 4. Devanallur 23650.09 7. Kadayam 20625.23 4. Devanallur 23650.09 7. Kadayam<				5.	Marukalankulam	5252.10
7. Mclancelithanallur I 5576.53 8. Melaneelithanallur II 11063.25 9. Senkottai 18734.39 10. Tenkasi 21022.38 11. Hanumanathi 7596.73 12. Chithar I 6020.70 13. Chithar II 19486.02 14. Kelapavoor 11358.34 15. Alankularm 10681.06 16. Manur I 23608.29 17. Mcla-ilanthakularm 125.90 18. Kodikurichi 316.99 19. Thiruvenkadam part 10970.58 20. Sankarankovil I 5097.28 21. Sankarankovil I 5097.28 21. Sankarankovil I 2007.28 21. Sankarankovil I 20625.23 4. Devanallur 36567.88 5. Palayamkottai 26711.53 6. Thambaraparani 23650.09 7. Kadayam 19987.89 8.				6.	Uthumalai	2462.16
8. Melaneelithanallur II 11063.25 9. Senkottai 18734.39 10. Tenkasi 21022.38 11. Harumanathi 7596.73 12. Chithar I 6020.70 13. Chithar II 1948.602 14. Kelapavoor 11358.34 15. Alankulam 10681.06 16. Manur I 23608.29 17. Mela-ilanthakulam 1215.90 18. Kodikurichi 316.99 19. Thiruvenkadam part 10970.58 20. Sankarankovil I 5097.28 21. Sankarankovil II 5097.28 21. Sankarankovil II 5097.28 21. Sankarankovil II 8581.85 33. Thambaraparani Minor 241865.75 1. Manur II 24655.42 24. Anbasamudram 7347.69 3. Cheranmadevi 20625.23 4. Devanallur 36567.88 5. Palayamkotai 26711.53				7.	Melaneelithanallur I	5576.53
9. Senkottai 18734.39 10. Tenkasi 21022.38 11. Hanumanathi 7596.73 12. Chithar I 6020.70 13. Chithar I 19486.02 14. Kelapavoor 11358.34 15. Alankulam 10681.06 16. Manur I 23608.29 17. Mela-ilanthakulam 1215.90 18. Kodikurichi 316.99 19. Thiruvenkadam part 10970.58 20. Sankarankovil I 5097.28 21. Sankarankovil I 5097.28 21. Sankarankovil I 5097.28 21. Sankarankovil I 5097.28 21. Sankarankovil I 20625.23 4. Devanallur 36567.88 5. Palayamkottai 26711.53 6. Thambaraparani 23650.09 7. Kadayam 19987.89 8. Pappakudi 16193.01 4. Nambiar M				8.	Melaneelithanallur II	11063.25
10. Tenkasi 21022.38 11. Hanumanathi 7596.73 12. Chithar I 6020.70 13. Chithar I 9486.02 14. Kelapavoor 11358.34 15. Alankulam 10681.06 16. Manur I 23608.29 17. Mela-ilanthakulam 1215.90 18. Kodikurichi 316.99 19. Thiruvenkadam part 10970.58 20. Sankarankovil I 5097.28 21. Sankarankovil I 5097.28 21. Sankarankovil I 2455.42 21. Sankarankovil I 2455.42 23. Cheranmadevi 20625.23 4. Devanallur 36567.88 5. Palayamkottai 26711.53 6. Thambaraparani 23650.09 7. Kadayam 19987.89 8. Pappakudi 16193.01 4. Nambiar Minor 87258.61 1. Thirukurinkudi				9.	Senkottai	18734.39
11. Hanumanahi 7596.73 12. Chithar I 6020.70 13. Chithar II 19486.02 14. Kelapavoor 11358.34 15. Alankulam 10681.06 16. Manur I 23608.29 17. Mela-ilanthakulam 1215.90 18. Kodikurichi 316.99 19. Thiruvenkadam part 10970.58 20. Sankarankovil I 5097.28 21. Sankarankovil I 5097.28 21. Sankarankovil I 2455.42 21. Sankarankovil I 20625.23 4. Devanallur 36567.88 5. Palayamkottai 26711.53 6. Thambaraparani 23650.09 7. Kadayarn 19987.89 8. Pappakudi 16193.01 4. Nambiar Minor 87258.61 1. 883in 16. Therkku Nanguneri 15830.74 3. Valliyur 7051.45 <t< td=""><td></td><td></td><td></td><td>10.</td><td>Tenkasi</td><td>21022.38</td></t<>				10.	Tenkasi	21022.38
12. Chithar I 6020.70 13. Chithar II 19486.02 14. Kelapavoor 11358.34 15. Alankulam 10681.06 16. Manur I 23608.29 17. Mela-ilanthakulam 1215.90 18. Kodikurichi 316.99 19. Thiruvenkadam part 10970.58 20. Sankarankovil I 5097.28 21. Sankarankovil I 8581.85 3. Thambaraparani Minor 241865.75 1. Manur II 24655.42 2. Ambasamudram 73474.69 3. Cheranmadevi 20625.23 4. Devanallur 36567.88 5. Palayamkottai 26711.53 6. Thambaraparani 23650.09 7. Kadayam 19987.89 8. Pappakudi 16193.01 16193.01 16193.01 4. Nambiar Minor Basin 87258.61 1. Thirukurinkudi 10489.86				11.	Hanumanathi	7596.73
13. Chithar II 19486.02 14. Kelapavoor 11358.34 15. Alankulam 10681.06 16. Manur I 23608.29 17. Mela-ilanthakulam 1215.90 18. Kodikurichi 316.99 19. Thiruvenkadam part 10970.58 20. Sankarankovil I 5097.28 21. Sankarankovil I 5097.28 21. Sankarankovil II 8581.85 3. Thambaraparani Minor 241865.75 1. Manur II 24655.42 3. Thambaraparani Minor 241865.75 1. Manur II 24655.42 3. Cheranmadevi 20625.23 1. Devanallur 36567.88 5. Palayamkottai 26711.53 6. Thambaraparani 23650.09 7. Kadayam 19987.89 8. Pappakudi 16193.01 4. Nambiar Minor Basin 87258.61 1. Thirukurinkudi 10489.86 8				12.	Chithar I	6020.70
14. Kelapavoor 11358.34 15. Alankulam 10681.06 16. Manur I 23608.29 17. Mela-ilanthakulam 1215.90 18. Kodikurichi 316.99 19. Thiruvenkadam part 10970.58 20. Sankarankovil I 5097.28 21. Sankarankovil I 8581.85 3. Thambaraparani Minor 241865.75 1. Manur II 24655.42 3. Thambaraparani Minor 241865.75 1. Manur II 24655.42 3. Thambaraparani Minor 241865.75 1. Manur II 24655.42 3. Cheranmadevi 20625.23 1 Devanallur 36567.88 5. Palayamkottai 26711.53 6 Thambaraparani 23650.09 7. Kadayam 19987.89 1 1930.1 4. Nambiar Minor Basin 87258.61 1. Thirkurinkudi 10489.86 2. Therkku Nanguneri 15830.74				13.	Chithar II	19486.02
15. Alankulam 10681.06 16. Manur I 23608.29 17. Mela-ilanthakulam 1215.90 18. Kodikurichi 316.99 19. Thiruvenkadam part 10970.58 20. Sankarankovil I 5097.28 21. Sankarankovil I 8581.85 3. Thambaraparani Minor 241865.75 1. Manur II 24655.42 3. Thambaraparani Minor 241865.75 1. Manur II 24655.42 3. Thambaraparani Minor 241865.75 1. Manur II 24655.42 3. Cheranmadevi 20625.23 2. Ambasamudram 73474.69 3. Cheranmadevi 20625.23 4. Devanallur 36567.88 5. Palayamkottai 26711.53 6. Thambaraparani 23650.09 7. Kadayam 19987.89 8. Pappakudi 16193.01 4. Nambiar Minor 87258.61 1. Thirukurinkudi 10489.86 2. Therkku Nanguneri				14.	Kelapavoor	11358.34
16. Manur I 23608.29 17. Mela-ilanthakulam 1215.90 18. Kodikurichi 316.99 19. Thiruvenkadam part 10970.58 20. Sankarankovil I 5097.28 21. Sankarankovil I 5097.28 21. Sankarankovil I 2455.42 23. Thambaraparani Minor 241865.75 1. Manur II 2455.42 24. Ambasamudram 73474.69 3. Cheranmadevi 20625.23 4. Devanallur 36567.88 5. Palayamkottai 26711.53 6. Thambaraparani 23650.09 7. Kadayam 19987.89 8. Pappakudi 16193.01 4. 16193.01 4. Nambiar Minor Basin 87258.61 1. Thirukurinkudi 10489.86 2. Therkku Nanguneri 15830.74 3. Valliyur 7051.45				15.	Alankulam	10681.06
17. Mela-ilanthakulam 1215.90 18. Kodikurichi 316.99 19. Thiruvenkadam part 10970.58 20. Sankarankovil I 5097.28 21. Sankarankovil I 8581.85 3. Thambaraparani Minor 241865.75 1. Manur II 24655.42 3. Cheranmadevi 20625.23 1. Devanallur 36567.88 5. Palayamkottai 26711.53 1. Devanallur 36560.09 7. Kadayam 19987.89 16193.01 1489.86 8. Pappakudi 16193.01 16193.01 4. Nambiar Minor 87258.61 1. Thirukurinkudi 10489.86 Basin 2. Therkku Nangu				16.	Manur I	23608.29
18. Kodikurichi 316.99 19. Thiruvenkadam part 10970.58 20. Sankarankovil I 5097.28 21. Sankarankovil I 8581.85 3. Thambaraparani Minor Basin 241865.75 1. Manur II 24655.42 2. Ambasamudram 73474.69 3. Cheranmadevi 20625.23 4. Devanallur 36567.88 5. Palayamkottai 26711.53 6. Thambaraparani 23650.09 7. Kadayam 19987.89 8. Pappakudi 16193.01 16193.01 16193.01 4. Nambiar Minor Basin 87258.61 1. Thirukurinkudi 10489.86 2. Therkku Nanguneri 15830.74 3. Valliyur 7051.45				17.	Mela-ilanthakulam	1215.90
19. Thiruvenkadam part 10970.58 20. Sankarankovil I 5097.28 21. Sankarankovil II 8581.85 3. Thambaraparani Minor 241865.75 1. Manur II 24655.42 3. Thambaraparani Minor 241865.75 1. Manur II 24655.42 3. Thambaraparani Minor 241865.75 1. Manur II 24655.42 3. Cheranmadevi 20625.23 3. Cheranmadevi 20625.23 4. Devanallur 36567.88 3. Cheranmadevi 26711.53 6. Thambaraparani 23650.09 3. Cheranmadevi 23650.09 7. Kadayam 19987.89 8. Pappakudi 16193.01 4. Nambiar Minor 87258.61 1. Thirukurinkudi 10489.86 8 Pappakudi 16193.01 1. Stato.74 3. Valliyur 7051.45				18.	Kodikurichi	316.99
20. Sankarankovil I 5097.28 21. Sankarankovil II 8581.85 3. Thambaraparani Minor Basin 241865.75 1. Manur II 24655.42 2. Ambasamudram 73474.69 3. Cheranmadevi 20625.23 4. Devanallur 36567.88 3. Cheranmadevi 23650.09 7. Kadayam 19987.89 3. Pappakudi 16193.01 4. Nambiar Minor Basin 87258.61 1. Thirukurinkudi 10489.86 2. Therkku Nanguneri 15830.74 3. Valliyur 7051.45				19.	Thiruvenkadam part	10970.58
21. Sankarankovil II 8581.85 3. Thambaraparani Minor Basin 241865.75 1. Manur II 24655.42 3. Thambaraparani Minor Basin 241865.75 1. Manur II 24655.42 4. Ambasamudram 73474.69 3. Cheranmadevi 20625.23 4. Devanallur 36567.88 3. Cheranmadevi 26711.53 5. Palayamkottai 26711.53 6. Thambaraparani 23650.09 7. Kadayam 19987.89 8. Pappakudi 16193.01 4. Nambiar Minor Basin 87258.61 1. Thirukurinkudi 10489.86 2. Therkku Nanguneri 15830.74 3. Valliyur 7051.45				20.	Sankarankovil I	5097.28
3. Thambaraparani Minor Basin 241865.75 1. Manur II 24655.42 2. Ambasamudram 73474.69 20625.23 3. Cheranmadevi 20625.23 4. Devanallur 36567.88 5. Palayamkottai 26711.53 6. Thambaraparani 23650.09 7. Kadayam 19987.89 8. Pappakudi 16193.01 4. Nambiar Minor Basin 87258.61 1. Thirukurinkudi 10489.86 2. Therkku Nanguneri 15830.74 3. Valliyur 7051.45				21.	Sankarankovil II	8581.85
2. Ambasamudram 73474.69 3. Cheranmadevi 20625.23 4. Devanallur 36567.88 5. Palayamkottai 26711.53 6. Thambaraparani 23650.09 7. Kadayam 19987.89 8. Pappakudi 16193.01 4. Nambiar Minor Basin 87258.61 1. Thirukurinkudi 10489.86 2. Therkku Nanguneri 15830.74 3. Valliyur 7051.45	3.	Thambaraparani Minor Basin	241865.75	1.	Manur II	24655.42
3. Cheranmadevi 20625.23 4. Devanallur 36567.88 5. Palayamkottai 26711.53 6. Thambaraparani 23650.09 7. Kadayam 19987.89 8. Pappakudi 16193.01 4. Nambiar Minor Basin 87258.61 1. Thirukurinkudi 10489.86 2. Therkku Nanguneri 15830.74 3. Valliyur 7051.45				2.	Ambasamudram	73474.69
$ \begin{array}{ccccccccccccccccccccccccccccccccccc$				3.	Cheranmadevi	20625.23
5. Palayamkottai 26711.53 6. Thambaraparani 23650.09 7. Kadayam 19987.89 8. Pappakudi 16193.01 4. Nambiar Minor Basin 87258.61 1. Thirukurinkudi 10489.86 2. Therkku Nanguneri 15830.74 3. Valliyur 7051.45				4.	Devanallur	36567.88
6. Thambaraparani 23650.09 7. Kadayam 19987.89 8. Pappakudi 16193.01 4. Nambiar Minor Basin 87258.61 1. Thirukurinkudi 10489.86 2. Therkku Nanguneri 15830.74 3. Valliyur 7051.45				5.	Palayamkottai	26711.53
7. Kadayam 19987.89 8. Pappakudi 16193.01 4. Nambiar Minor Basin 87258.61 1. Thirukurinkudi 10489.86 2. Therkku Nanguneri 15830.74 3. Valliyur 7051.45				6.	Thambaraparani	23650.09
8. Pappakudi 16193.01 4. Nambiar Minor Basin 87258.61 1. Thirukurinkudi 10489.86 2. Therkku Nanguneri 15830.74 3. Valliyur 7051.45				7.	Kadayam	19987.89
4. Nambiar Minor Basin 87258.61 1. Thirukurinkudi 10489.86 2. Therkku Nanguneri 15830.74 3. Valliyur 7051.45				8.	Pappakudi	16193.01
2. Therkku Nanguneri 15830.74 3. Valliyur 7051.45	4.	Nambiar Minor Basin	87258.61	1.	Thirukurinkudi	10489.86
3. Valliyur 7051.45				2.	Therkku Nanguneri	15830.74
				3.	Valliyur	7051.45
4. Perunkudi 19644.20				4.	Perunkudi	19644.20

	Total Area	682308.00			682308.00	
			3.	Karamaniar III	14585.90	
			2.	Karamaniar II	10548.77	
5.	Karamaniar Minor Basin	44707.87	1.	Karamaniar I	8003.47	
			7.	Radhapuram	9616.65	
			6.	Nambiar V	12666.63	
			5.	Nambiar IV	11959.08	

2.2. Vaigai River Basin and Sub Basin

The Vaigai River consists of 4 River basins and 12 Sub basins. The table 2 shows the detailed element of Vaigai river basin and sub basins

S.NO RIVI	NAME OF ER BASIN	AREA IN HECTARES	NO.	NAME OF THE SUB BASINS	AREA IN HECTARES
1.	Vaigai	4,64,051	1.	Suruliyar	1,15,496
			2.	Thalaivaigai	45,894
			3.	Periyakulam	36,830
			4.	Andipatti	21,958
			5.	Cholavandhan	1,68,000
			6.	Uppar	37,021
			7.	Manjalar	38,852
2.	Gunnar	1,56,044	1.	Therkar	62,668
			2.	Goundanadhi	93,376
3.	Vaippar	27,712	1.	Arjunanadhi	23,969
4.	Pambar	28,878	1.	Thirumanimuthar	23,969
			2.	Upper Palar	4,909
То	tal Area	6,76,685			6,76,685

Table 2: Vaigai River Basin and Sub Basin

2.3. Rainfall data Rainfall Data

The rainfall various according the season of the area. These majorly classified in four seasons such winter, hot weather period, southwest monsoon and north east monsoon [6]. The

table 3 and 4 shows the rainfall data for Tirunelveli and Madurai respectively

Seasons	Period	Rainfall in mm	Percentage
Winter	Jan. & Feb.	79.18	9%
Hot Weather period	Mar. to May	172.39	19.6%
Southwest Monsoon	June. to Sep	147.98	16.8%
Northeast Monsoon	Oct. to Dec.	480.23	54.6%
	Total	879.78	100.00

 Table 3: Rainfall Data for Tirunelveli District

Table 4. Kalillali Dala 101 Madulai Distile	Table 4:	Rainfall	Data	tor	Madurai	District
---	----------	----------	------	-----	---------	----------

Seasons	Period	Rainfall in mm	Percentage
Winter	Jan. & Feb.	52.3	6.1
Hot Weather period	Mar. to May	171.0	19.7
Southwest Monsoon	Jun. to Sep.	242.3	27.9
Northeast Monsoon	Oct. to Dec.	401.9	46.3
	Total	867.5	100.00

3. RESULTS

3.1. Pictorial Representation of Parameters

The various parameter such Land use, Rainfall, Drainage, Geology, Geomorphology and Soil map of Thamirabarai and Vaigai river is shown in figures 2 to 14 were generate with the help of Remote Sensing and Geographical Information System analysis. The various image processing technique used in this analysis such as parallelepiped, Minimum Distance, Mahalanobis Distance, Maximum Likelihood, Spectral Angle Mapper, Spectral Information

Divergence, Binary Encoding, Neural Net, ISO data and Kmeans with the help of ENVI and ERDAS image processing software [7]. These factor should consider for the initial process for interlinking thamirbarani and vaigai rivers, these clearly shows the rain fall data, drainage possibilities and existing, land coverage details, structure and features of earth surface



Figure 2: Thamirabarani Land Use Map



Figure 3: Thamirabarani Rainfall Map



Figure 4: Thamirabarani Drainage Map



Figure 5: Thamirabarani Geology Map



Figure 6: Thamirabarani Geomorphology Map



Figure 7: Thamirabarani Soil Map



Figure 8: Vaigai Landuse Map



Figure 9: Vaigai Rainfall Map



Figure 10: Vaigai Drainage Map



Figure 11: Vaigai Geology Map

4. CONCLUSION

This project provides information at a provincial level about the various possibilities and parameters for interlinking of Thamirabarani River and Vaigai River. The study shows the environmental and social factor are majorly supporting for achieving interlinking of rivers. The Thamirabarani and Vaigai Rivers origin and settling area present inside the Tamilnadu, so there is no possibility of confliction among the states. While interlinking these rivers unquestionably the total south Tamilnadu water scarcity will be reduced, majorly the following districts Dindigul, Theni, Tuticorin, Sivanganga, Madurai, Virdhunagar, Ramanathapuram, Tirunelveli and Kanyakumari will get benefit and possibility of increase the water storage capacity for the irrigation and drinking purpose. In other hand interlinking of thamirabarani and Vaigai Rivers helps to control the floods in south Tamilnadu and the surplus water flow may be used for diverse purpose such as Agriculture, Irrigation, Electric power generation and so on



Figure 12: Vaigai Geomorphology Map



Figure 13: Vaigai Relief Map



Figure 14: Vaigai Relief Map

REFERENCES

- [1] Amarasinghe U.A., et al., 2005: *Spatial Variation in Water Supply and Demand across River Basins in India.* International Water Management Institute, Colombo, Sri Lanka, 41.
- [2] Amarasinghe U.A., et al., 2007: Changing consumption patterns and Implication for water demand in India (Draft prepared for the IWMI-CPWF project on Strategic Analysis of National River Linking Project of India), 43.
- [3] MOWR, 1999: Integrated Water Resource Development: A Plan for Action. Report of the National Commission for Integrated Water Resources Development Plan, Ministry of Water Resources, Govt. of India, 1; 515.
- [4] NWDA, 2003: A Presentation CD on Interlinking of Rivers. National Water Development Agency, Ministry of Water Resources, Govt. of India.
- [5] Narseen Jahan. A Direction to Resolve Water Conflict in Ganges- Brahmaputra Basin. Journal of Applied Hydrology. 2003. 16 (4A) 59-65.
- [6] Patel V.B. *The Concept of National Water Grid.* Journal of Applied Hydrology. 2003. 16 (4A) 14-30.
- [7] Prakasa Rao B.S., et al. *IRS- 1C/1D WiFS Study on Interlinking of Rivers in Peninsular India*. Communicated to Journal of Applied Hydrology. 2008.