

Inter - State Dispute over Water and Safety in India: The Mullaperiyar Dam, a Historical Perspective

A.J. Thatheyus^{1,*}, Delphin Prema Dhanaseeli², P.Vanitha²

¹PG and Research Department of Zoology, The American College, Madurai, India

²PG and Research Department of History, Jayaraj Annapackiam College for Women, Periyakulam, India

*Corresponding author: jthatheyus@yahoo.co.in

Received December 25, 2012; Revised April 21, 2013; Accepted May 11, 2013

Abstract The conflict between the two southern most states of India, Kerala and Tamil Nadu over Mullaperiyar dam issue is for safety and water. The waters of Mullaperiyar of Kerala were diverted to irrigate the drought prone districts of Tamil Nadu during the legacy of the British based on the Periyar lease deed. This interstate project is serving as a source of water and hydel power to Tamil Nadu but now Kerala is not permitting to keep the water at full storage level citing various reasons. The issue came to the Supreme Court, the apex body of the judicial system in India. Politicians of both the states started using this issue for their benefits and exploiting the emotions of the local people. The details about the river, dam, lease deed and the origin of the conflict are traced along with the aspects of safety and environmental concerns. The demands of Tamil Nadu and the arguments of Kerala in connection with the possibility of the new dam are also discussed.

Keywords: Mullaperiyar dam, dam safety, interstate dispute, water conflict, Tamil Nadu, Kerala

1. Introduction

Water is the elixir of life and essential for all daily human activities. As fresh water resources are unevenly distributed, water is becoming a very valuable resource. Hence, its scarcity has triggered desperation in certain regions which have little access to water. Since Biblical times conflicts arose between people for sharing water resources. Water has become the fuel of several conflicts in many regions around the globe [1].

Conflicts can be caused by water use which includes military, industrial, agricultural, domestic and political uses. Water conflicts have great ramifications and our laws are not sufficient to address those issues. Though interstate conflict has a law, it is limited to adjudication only and hence severely limited. With reference to disputes on water sharing, there are no formal declarations on water sharing and hence the tribunals are using the principle of equitable proportion. Where does the water come from and where does it go have become very critical issues in every water conflict [2]. Dams, water management, and the conflicts are not new to post colonial India. There are also disputes with Bangladesh, Nepal, China and Pakistan. Within India, most of the important river systems are inter-State, and hence there are conflicts. Among them, the Sutlej-Beas dispute in north western India and the Cauvery dispute in Southern India are notable. The conflicts in Assam and Arunachal Pradesh on division and utilization patterns of the Brahmaputra are also emerging. Tamil Nadu is also involved in disputes on water with the three major neighbouring States Karnataka, Kerala and Andhra Pradesh.

In the present work an attempt has been made to study the dispute between Kerala and Tamil Nadu over the Mullaperiyar dam. The demands of Tamil Nadu and the arguments of Kerala over the water storage level, safety, new dam and solutions for the conflict are analysed.

2. Mullaperiyar

Mullaperiyar dam is a portmanteau of Mullaiyar and Periyar as the dam is located after the confluence of the Mullaiyar and Periyar rivers. Mullaperiyar also known as Periyar and Mullaiperiyar, the west flowing perennial river originates from the Sivagiri group of hills in the Western Ghats traversing through Idukki and Ernakulam districts of Kerala and joins the Arabian Sea. Mullaperiyar dam, Idukki and the Lower Periyar hydel projects and the Periyar Valley Irrigation Project of Kerala are located in the main Periyar River. There are densely populated human settlements along the downstream stretch of this river including the metropolitan township of Kochi. The total drainage area of the Periyar river basin is 5398 sq.km of which 114sq.km lies in Tamil Nadu.

3. Periyar Lease Deed

The Mullaperiyar dam project initiated in the latter half of the nineteenth century by the erstwhile Madras Presidency in the then Princely State of Travancore in South India was a measure to rehabilitate the famine affected, drought prone districts of Madurai and Ramanathapuram. A lease agreement was made between the Maharaja of Travancore, Vishakam Thirunal Ramavarma and the Secretary of State for India for

Periyar irrigation works on 29 October 1886. Apart from 8000 acres of land 155ft above the Periyar water level, 100 acres of land was also given on lease to the then Madras government. This deed allowed the complete diversion of water from about 648 sq.km of the Periyar basin above the dam to the then Madras State. As per the contract, Kerala was entitled to receive a lease amount of five rupees per acre i.e. rupees 40, 000 per annum. The lease amount was to be deducted from the tribute payable by the Travancore State to the British.

The lease was for a period of 999 years which may be renewed for another 999 years. The lease deed inter alia granted full right to construct and use the leased land for irrigation works to the Secretary of State for India. The British Government argued that the waters of the Periyar were useless to Travancore as the nearby regions were uninhabited jungles. But the Maharaja signed the deed after more than twenty years long resistance saying “I am signing this agreement with my blood!” The government of Travancore claimed that the lease value must be appraised in terms of the high utility of the land to the British [3]. The geographical location of the dam is $9^{\circ} 32' 0''$ northern latitude and $77^{\circ} 8' 30''$ eastern longitude. Now the dam is located in the Peermedu taluk of Idukki district in Kerala State [4].

But a different story is also quoted [5]. Many years before the construction of the dam confusion took place.

The limits of Travancore state end near the cities Adur and Kottarakara which are sixty two km away from the dam site. But the then British government wrongly considered it as the part of Travancore State and approached it through a letter requesting permission to build a dam in the proposed site. But the king could not respond as the site was not in his own territory. Later in March and September of 1863 again, the then Governor wrote to the king for permission, and the King announced his acceptance [5].

The two taluks Devikulam and Peerumedu did not form part of Travancore until 1889. They were under the Raja of Poonjar who was the descendant of Pandya kings and it was never in the territory of Travancore until 1889. The precursors of the modern Kannan Devan Hills products company executed their first agreement with the Raja of Poonjar in 1879. It is also said that the Raja of Travancore would have got this area from Raja of Poonjar on lease. Moreover there was absolutely no access from the region of Travancore to these two *taluks* till 1935, but according to the Census report of 1951, these two *taluks* were approachable from the then Madurai district through the passes of Thevaram, Kudalur, Bodinaikkanur, Cumbum and Sivagiri. As trade flourished through these passes, many people from Madras state came and settled in these *taluks*[6].

Fig. 1 Mullaperiyar Dam adjoining areas

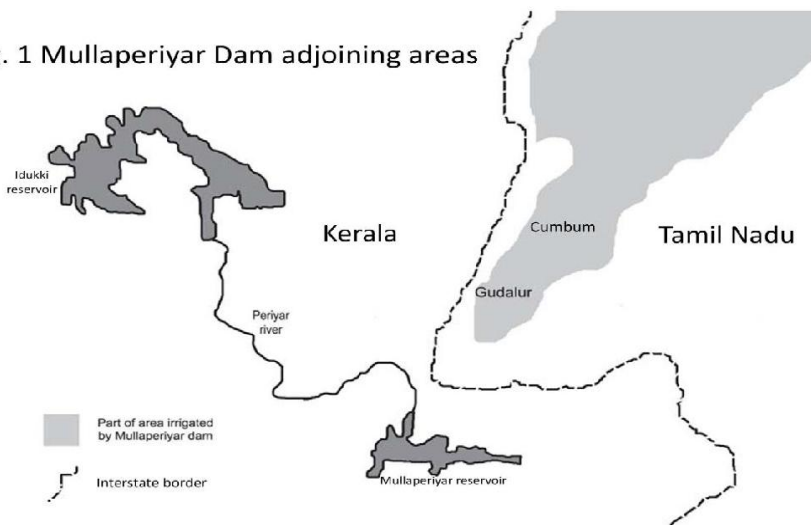


Figure 1. Mullaperiyar Dam adjoining areas



Fig 2. Mullaperiyar Dam Photograph

Figure 2. Mullaperiyar Dam photograph

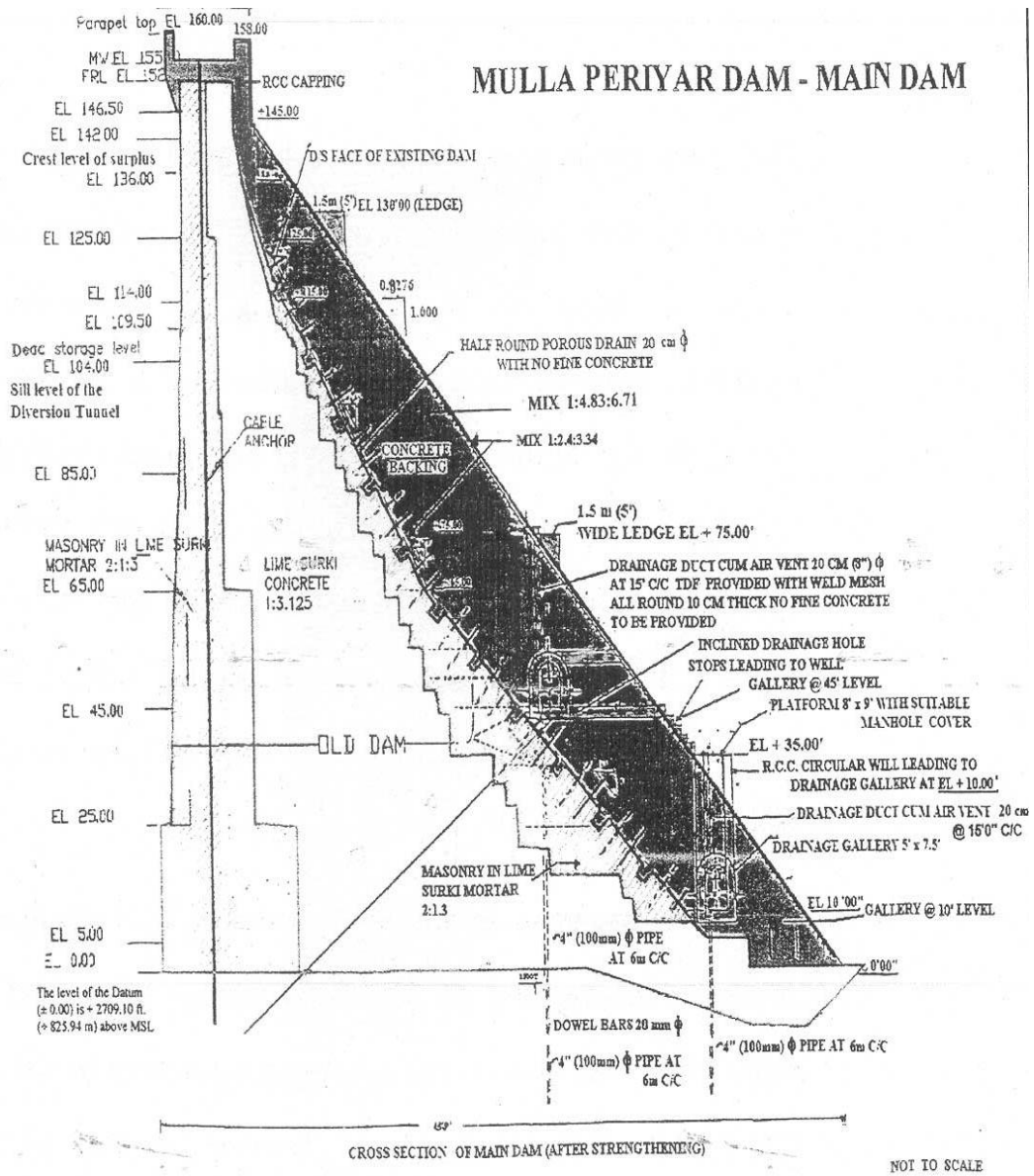


Figure 3. Section of Mullaperiyar Main Dam

Table 1. Details of Mullaperiyar dam

S.No.	Parameter	Value (Unit)
1	Coordinates	9° 31' 43" N 77° 8' 39" E/ 9.52861 N 77.144417 °E
2	Project sanctioned	1884
3	Construction began	1887
4	Dam opening year	1985
5	Total catchment area	4976 (sq.km)
6	Dam height	173 (m)
7	Dam width at base	144.5 (ft)
8	Dam length at foundation level	200 (ft)
9	Dam length at top	1241 (ft)
10	Second dam (at the left) length	221 (ft)
11	Second dam (at the left) height	53 (ft)
12	Dead storage at water depth	125 (ft)
13	Reservoir capacity	15,661 (TMC)
14	Annual water supply to Tamil Nadu (at 136 ft storage water level)	22.5 (TMC) or 640 Mm ³
15	Annual water supply to Tamil Nadu (at 152 ft storage water level)	33.75 (TMC) or 960 Mm ³

4. Cauvery River Dispute

The Cauvery river dispute has some common elements with that of Mullaperiyar dam dispute like an agreement between a 'weak' princely State and the British Presidency and the fight for the allocation of water. The sharing of the water of the Cauvery River has been under dispute between Karnataka (old Mysore) and Tamil Nadu (the old Madras Presidency) for over a century. Unlike the disputes of Narmada, Krishna and Godavari rivers, the Cauvery dispute is about the re-sharing of waters that are already being fully utilized is their totality. Following the talks between Madras and Mysore Governments in 1890 and 1891, Mysore proposed a set of rules about Cauvery waters and to this Madras government made certain modifications and both the governments accepted to this 'the Madras-Mysore agreement of 1892' in February 1892. In 1924 another agreement entitled the 'Final agreement' between the Mysore and the Madras Governments with reference to the construction of a dam at Krishnarajasagar was signed on 18 February 1924 by A.R. Banenji, the

Dewan for Mysore and P.Hawakins, Secretary, PWD, for Madras. Both the 1892 and 1924 agreements have been subjected to prolonged legal battle in the current phase of the Cauvery dispute. In Cauvery dispute, it has not been possible to find a solution through negotiations. Adjudication based on adversarial proceedings has enhanced only divisiveness. Initiating a process of conciliation and co-operation can narrow down differences to reach a sustainable settlement. The Cauvery water disputes Tribunal was set up in 1990 by the intervention of the Supreme Court based on the request from Tamil Nadu and Kerala, two of the basin states in 1970 itself. The Tribunal in 2007 gave its verdict to share the total 740 TMC water as 419, 270, 30 and 7 TMC for Tamil Nadu, Karnataka, Kerala and Pondicherry respectively.

Tamil Nadu wants Karnataka to abide by the decisions of the Tribunal and Supreme Court. It expects Karnataka to release at least 205 TMC of water to save its standing crop. It also asserts that water sharing is a national issue requiring the intervention of the Central Government. When the rains fail, Karnataka itself faces water scarcity and it cannot release the required water to Tamil Nadu. Hence it refuses to accept the decisions of the Tribunal and expects a National Water Policy which would apply to all shared water resources.

5. Mullaperiyar Dam

Periyar Project is one of the earliest trans-basin projects in India which was commissioned by the British in 1895 in the then Travancore Princely State. It is an inter-state inter-basin scheme which diverts water from the upper reaches of the Periyar River in Kerala State into the eastern plains of Vaigai river basin in Tamil Nadu State for irrigation [7]. The dam is located at an elevation of about 850 msl in the upper reaches of Periyar river just after its confluence with Mullayar tributary in the protected forests of Periyar Tiger Reserve in Kerala. The catchment area of the dam is about 648 sq.km with the average rainfall of 2000mm. Periyar dam is the first *surki* (brick powder in lime) concrete dam in a “V” shaped gorge in the Western Ghats over Periyar River [8].

The front and rear sides of the dam are constructed with uncoursed rubble masonry in lime surkhi combination mortar. The proportion of lime surkhi mortar is two parts of lime, one part of surkhi and three parts of sand. The hearting, which accounts for more than 60% of the volume of dam is built of lime surkhi concrete with 3.125 parts of stone and 1 part of mortar. During the 1980s, a concrete backing of 10m width was attached to the old dam on the downstream side for strengthening the old structure.

Table 2. Characteristics of Mullaperiyar dam - Reservoir

S.No	Parameter	Values
1.	Catchment area (sq. km)	624
2.	Full Reservoir level (m)	46.33
3.	Maximum Water level (m)	47.24
4.	Gross Capacity of Reservoir	15.662 TMC
5.	Gross storage at 104 ft	5.092 TMC
6.	Gross storage at 136 ft	11.210TMC
7.	Gross storage at 155 ft	16.617 TMC
8.	Probable Maximum Flood	306399 cusecs
9.	Recorded Maximum Flood	298519 cusecs

Table 3. Characteristics of Mullaperiyar - Main dam

S.No	Parameter	Values
1.	Length (m)	366
2.	Top of dam including parapet (m)	48.16
3.	Height of dam from deepest foundation (m)	53.64
4.	Top width of dam with parapet (m)	6.4
5.	Downstream slope	0.9276 to 1.0
6.	Upstream Slope	1 to 20

Table 4. Characteristics of Mullaperiyar - Spillway

S.No	Parameter	Values
1.	Location	Right Saddle
2.	Crest level (m)	41.45
3.	Number of vents (old) (m)	10 in Nos. with size 10.98 x 4.88
4.	Number of vents (additional) (m)	3 in Nos. 12.16 x 4.88

The total width at the top after the strengthening has been increased to 6.4m. Thus, it is a composite heterogeneous structure of rubble masonry on the upstream, lime surkhi concrete hearting (which accounts for more than 60% of the volume of the dam), again rubble masonry on the downstream, an ungrouted open joint and a 10m concrete backing.

Table 5. Characteristics of Mullaperiyar - Baby Dam

S.No	Parameter	Values
1.	Location	Left Bank saddle
2.	Type	Composite gravity structure
3.	Top of dam (m)	48.17
4.	Length of dam (m)	73.15
5.	Height of dam (m)	16.15

The maximum height of the Main dam is 53.64 m. On both sides of the main valley, there are small saddles and the one on the left side was blocked by a Baby Dam of the same type with 73.15m length and 16.15m height which is connected to the high ground by means of an Earthen Dam. The saddle on the right flank is utilized as an escape channel and now serves as a spillway with 13 control gates. The crest level of spillway is 867041m (Table 1, Table 2, Table 3, Table 4 and Table 5).

Later on, 3 more spillway vents were added with control gate each vent is of size 12.16m × 4.88m.

There is a huge quantity of dead storage provided to raise the remainder water to the level at which it can be passed through the tunnel into the eastern side of the river watershed. The level of the sluice through which the water drawn by Tamil Nadu is 15.75m below the crest of the dam which leaves a dead storage water depth of 41.01m (125ft) when full, the lake holds 15.661 TMC of water out of which 9.176 TMC is utilizable as it lies above the level of the sluice.

The reservoir of the dam constitutes a major wildlife tourist site known as Periyar lake (Thekkady lake). The dam constructed with lime and *surki* mortar and considered as the first of its kind to be accomplished by the British Royal Engineering Corps was completed in 1895. The raw materials required for the construction of the dam were supplied from Tamil Nadu and Madurai served as the base for sending such materials [5].

The Periyar project, as originally envisaged, benefits 90,000 acres of the first paddy crop and 60,000 acres of the second paddy crop and the entire command area had been localized in the erstwhile districts of Madurai and Ramanathapuram [3]. The purpose of the dam was to divert the waters of the west flowing Periyar river

eastwards that causes flood havocs in Travancore region, through the construction of a masonry dam and taking the water from the reservoir through the tunnel cut across the watershed and Western Ghats to the rain shadow region of Theni, Madurai, Dindigul, Sivagangai and Ramanathapuram districts of Tamil Nadu.

The first person to suggest the idea of this project was Muthu Arula Pillai, the Prime minister of the Ramnad Raja who sent twelve men to enquire its feasibility in 1798 (Table 6). Though their report was favourable, the project was not undertaken due to scarcity of funds. In 1807, Mr. Parish, the then collector of the Madurai district made a survey in the jungle but was affected with jungle fever. Hence he deputed the task to Captain Caldwell the district engineer. He made a survey in 1808 and reported that the scheme of diverting Periyar was impossible. Nothing was done until 1837 when Colonel Faber started some operations on a small scale which were discontinued later. It was Captain Ryves, an Engineer in 1861 reported in favor of the project. Later Captain Payne the Executive Engineer of the district made a survey in 1867. The report of Captain Payne was approved by Captain Prendergast, the officiating Superintending Engineer of the eighth division and the government deputed Captain Ryves to prepare a long report [9]. Colonel (then Lieutenant) Penny Cuick and Mr.R.Smith revised the project incorporating several modifications from 1868 to 1870. Until 1882, Colonel Pennycuick's proposal to build masonry was not accepted but he was directed to revise the plans and estimates for the project. His scheme including a masonry dam, a huge lake and a tunnel through the watershed was sanctioned in 1884 and the work began late in 1887 [10]. In 1887, Connemara, the then Governor of Madras and his personal secretary Harrington along with the collector of Madurai started the construction work of the dam [5].

The 155ft high masonry dam was built by British Army Engineering Corps under the supervision of Colonel Penny Cuick in Kerala's Idukki district. According to A.T. Mackenzie, one of the engineers involved in the execution of the project, the site was an unhealthy jungle with an elevation of 3000 feet where rain and malaria impaired the work for a considerable portion of the year, where even unskilled labour was unobtainable and to which every material had to be transported at great cost from a railway 76 miles off and up a steep *ghat* road [11]. The discharge of the river was equal to half the average flow of Niagara and it was very difficult to lay the foundation and the work was swept away again and again. After laying the foundation, it was highly difficult to pass the ordinary flow of the river and the constant high freshes without damage to the masonry of the dam. According to the chief engineer, Colonel Penny Cuick, it was the most anxious, difficult and exhausting of any which had come within his experience.

When the funds were stopped by the British government as the under constructed dam was washed away by floods, a second masonry dam was completed in 1895 with the personal funds of Penny Cuick as he had developed an intimate relationship with the people of the then Madras Presidency. The Mullaperiyar dam was first opened by Sir.Lord Wenlock, the then Governor of Madras Presidency in 1895. Though the dam is situated in Kerala's Idukki district, it is owned and operated by the Tamil Nadu government. Water from the dam is brought

through a 1.6 km tunnel till through Kerala-Tamil Nadu border. Then this water flows in open canals to reach Suruliyar River which feeds the Vaigai dam in Tamil Nadu. From this, a network of canals takes the water to the agriculture fields.

6. Amendment of the Lease Deed

The Periyar lease deed in its inception did not envisage power generation. Later in 1932 when the British proposed to generate power utilizing Periyar river water, the State of Travancore objected it. After independence in 1947, the two States, Kerala (successor to Travancore) and Madras State (successor to Madras Presidency) informally agreed to maintain *status quo* with regard to the Periyar Lease Deed. The withdrawal of the channel and tunnel increased from 1320cusecs to 1600cusecs in 1956. Without any formal concern from Kerala State, the Madras State started power generation using Mullaperiyar waters in 1959. The hydel power project was commissioned in 1965 with four units of 35 MW each.

Table 6. Milestone in the development of the dam and the associated disputes

S.No	Milestone	Period
1.	Muthu Arula Pillai proposed the dam	1798
2.	Captain Ryves report in favour of the Project	1861
3.	Captain Payne made a survey	1867
4.	Revision of the Project by Col. Penny cuick	1870
5.	Sanctioning the project	1884
6.	Periyar Lease Deed Signed	1886
7.	Beginning of dam construction	1887
8.	Completion of Second masonry dam	1895
9.	Amendment of the Lease deed for power	1932
10.	Formal agreement by Kerala and Tamil Nadu on Lease deed	1947
11.	Power generation started by Madras state	1959
12.	Hydel Power Project	1965
13.	New agreement on power generation	1970
14.	Questioning the safety of the dam	11 may 1962
15.	Joint inspection for assessing safety of the dam	1964
16.	CWC inspection -MWL to 152	1964
17.	CWC directed to keep MWC to 145 ft	1978
18.	MWL to 136ft	1979
19.	CWC increase MWL to 145ft	1980
20.	CWC increase MWL to 152ft	1986
21.	Supreme Court verdict to keep the water level at 142ft	27 Feb 2006
22.	Kerala Irrigation and water Conservation Amendment Act	March 2006
23.	Talks between Kerala and Tamil Nadu initiated	25 Sep 2006
24.	Experts from IIT, New Delhi the safety of the dam	2008
25.	Kerala proposed the new dam	14 Aug 2007
26.	High level Empowered Committee Constituted by the Supreme Court	18 Feb 2010

In 1970, the 1886 agreement was amended and a new agreement ratifying the Periyar hydroelectric project with effect from 1954 was entered into by both the States [12]. Though the amendment allowed the dam to continue for

999 years, it deleted the provision of extension of the deed to yet another 999 years. It also raised the lease amount to Rs.30 per acre and the provision for the review of the lease rate after every 30 years. Tamil Nadu also handed over the fishing rights in the reservoir to Kerala. Kerala receives an annual lease rent of Rs.0.26 millions per annum for an area of 8,692.97 acres and the royalty towards power generation comes to Rs. 0.767millions per annum. The total benefit to Kerala is 0.767million rupees per year and it is also benefited by the Periyar Lake which is popular for wildlife tourism.

7. Origin of the Conflict

Following heavy floods in 1961, the news paper “Times of India” from Bombay carried a report on 11 May 1962 questioning the safety of Mullaperiyar dam. As it was built with lime *surki* mortar and without any provision for inspection because of the absence of scouring sluice to drain the reservoir fully, fear about safety of the dam was raised. Later a joint inspection was made in 1964 and it was decided to limit the water level at 152ft instead of 155ft.

There was seepage and wetness in the downstream face of the dam right from initial filling. It was treated by guniting (a process by which concrete can be applied on irregular vertical and overhead surfaces) the upstream face and by grouting (filling the cracks and crevices in masonry using mortar) the inside dam body during 1930-1935 and 1961-1965 consuming about 543 tons of cement. In spite of this, the seepage through the dam caused a sense of insecurity among the people living in the downstream [3].

When Kerala raised the issue of safety of the dam with the Central Water and Power Commission (CWPC) in 1964 it made an inspection along with engineers of both the States who decided to lower the Maximum Water Level (MWL) to 152 ft from 155ft. Later, in 1978 the Central Water Commission (CWC) directed to keep the MWL to 145ft (Table 7). The safety issue came to public domain when Kerala press reported major leaks in 1979. The feeling of insecurity was further aggravated by the Machhu II dam failure in Gujarat in August 1979.

The technical officers of both the States with the then CWC Chairman Dr. K.C Thomas inspected the dam and suggested emergency, medium-term and long-term measures [13]. Lowering the reservoir level to 136ft was one of the emergency measures. Exploring the possibility of constructing a new dam was suggested as an alternative to long-term measures which was dropped in further discussions. In 1980, the CWC suggested to increase the water level to 145ft after completing emergency and medium-term measures. Later in 1986, the CWC again issued a “Memorandum on Rehabilitation of Mullaperiyar Dam” to increase the water level to 152ft after executing the strengthening measures. In the meantime, Tamil Nadu carried out the measures directed by CWC. The emergency measure of raising the shutters of the spillway fully to lower the reservoir level to 136ft was executed in 1979. In 1981, reinforced concrete capping for the entire length of the main dam was provided. As a medium-term measure, the cable anchoring was strengthened in 1991. In 1994, the long-term measure of strengthening the dam

with reinforced concrete backing on the rear face was executed. The emergency measure of providing additional spillway capacity for controlling the water level was completed in 1997 [14]. The additional measure to strengthen the baby dam suggested by CWC was not carried out as Kerala objected it. By this time, public agitations were organized in Tamil Nadu to raise the water level in the dam. But from 1980 onwards Kerala refused to raise the level from 136ft. At the same time, Tamil Nadu had increased its withdrawal from the dam by employing additional facilities to satisfy the demands from newly irrigated lands [3]. Various writ petitions were filed before Kerala and Madras High Courts regarding Mullaperiyar dam issue during 1997-1998 and they were transferred to the Supreme Court of India to avoid the possibility of conflicting orders from the two High Courts [13]. When the Minister of water resources convened a meeting of the chief ministers of both the States as per the direction of the Supreme Court in 2000, no consensus was reached and hence an Expert Committee was announced with CWC member B. K. Mittal as chairman to analyse the issues of safety and water storage level of the dam [13]. This committee recommended raising the water level to 142ft and the Supreme Court gave its final verdict on 27 February 2006 to keep the water level at 142ft. It also viewed that after completing the strengthening measures the level could be raised to 152ft.

In March 2006, Kerala Legislative Assembly passed the Kerala Irrigation and Water Conservation Amendment Act, 2006 which empowered Kerala’s Dam Safety Authority (KDSA) to evaluate safety of all dams in Kerala. KDSA was also empowered to advise the government to suspend the functioning or to decommission a dam if public safety demanded. KDSA brought about 22 dams constructed between 1895 and 1963 under its jurisdiction and fixed 136ft as the safe storage level for Mullaperiyar dam. But Tamil Nadu took this matter to the Supreme Court on March 31, 2006 and prayed to declare the Kerala act as unconstitutional. Advocates Harish Salve and Pararasan respectively for Kerala and Tamil Nadu had arguments in the Constitution Bench of the Supreme Court [15]. According to Kerala government, if Mullaperiyar is an interstate river, it must be dealt by an independent tribunal and Supreme Court has no power to intervene in the Mullaperiyar dam issue. It also argued in another angle that if Mullaperiyar is the river of Kerala alone, then the Dam Safety Authority of Kerala is constitutional. Moreover Supreme Court has no authority to intervene in a pre-constitutional agreement. Now the provision of water is governed by the 1970 agreement between Kerala and Tamil Nadu. According to this agreement, only the dam area is leased to Tamil Nadu and not the water. When Kerala is not receiving any benefit out of this project, it is free to revisit or cancel the 1970 agreement. Kerala also objected to raise the storage level to 142 ft as wide forest regions inhabiting conserved flora and fauna would be inundated. Kerala can easily divert the water to Idukki reservoir instead of keeping it in Mullaperiyar dam through alternative route as Tamil Nadu has control over the dam alone. It was also argued that the legislature of Kerala can put an end to the contract or annul it.

In September 2006, the Constitution Bench of the Supreme Court directed the two States to sort out the issue either independently or with the intervention of the central

government. The talks had begun on 25 September 2006 after the direction from the Supreme Court. During the talks, the then minister for public works of Tamil Nadu, Duraimurugan insisted on raising the water storage level to irrigate large areas of agricultural fields. But N.K Premachandran the then Kerala's minister for water resources argued that raising the water level in the dam would impair the safety of 3.5 millions of people living in the downstream districts of the Periyar river. Despite several meetings, no consensus was reached and the dam controversy came to its peak in December 2006 when Tamil Nadu pulled itself out of talks initiated by the then Union Minister of Water Resources, Saifudin Soz.

Meanwhile Kerala had studied the safety of the dam with independent experts. The experts from IIT, New Delhi in 2008 reported the dam as hydrologically unsafe and scientists from IIT, Roorkee viewed that the dam is in a quake-prone area. When Kerala proposed to build a new dam on 14 August 2007 and the Ministry of Environment and Forests, Government of India (GOI) granted permission to conduct a survey on 16 September 2009 [16]. Tamil Nadu objected to this idea of new dam and approached the GOI and the Supreme Court; its appeal was rejected on 21 October 2009. On 10 November 2009 a three judge-bench suggested to hear the Mullaperiyar dam issue by a five-judge bench as it involves substantive questions of constitutional law.

Finally on 18 February 2010, the Supreme Court constituted a high level Empowered committee to study the issues of safety, water storage level and the dam safety act of Kerala. According to the announcement, Tamil Nadu and Kerala would nominate a member each, who could be either a technical expert or a retired judge. This Empowered committee headed by the former Chief Justice of India, A.S. Anand was asked to look into all issues concerned with the dam's safety and storage level.

This decision of the Supreme Court was opposed by the then Tamil Nadu Chief Minister, M. Karunanidhi and his party [15]. He refused to nominate a member to the Empowered committee and wrote a letter to the Congress President Sonia Gandhi to mediate between the two States [17]. But it was opposed by the then leader of opposition, J.Jayalalitha who argued that such a move would be advantageous to Kerala in this issue [15]. N.K. Premachandran, the then water resources minister of Kerala spoke in the Kerala State Assembly that Kerala has the right to construct, own, operate and maintain the proposed dam, while being ready to provide water to Tamil Nadu on the basis of a new agreement. Former Supreme Court judge, K.T Thomas was announced as the member to represent Kerala in the five member committee [15]. On 20 February 2010, the then DMK government in Tamil Nadu pitched for central intervention in the Mullaperiyar dam dispute and it was necessary for an amicable settlement to maintain national integrity, sovereignty and for ensuring cordial relationships among states. On 8 March 2010 Tamil Nadu government refused to adjudicate the issue with Kerala before the Empowered committee [15]. But this request was turned down by the Supreme Court [15]. After consulting legal experts Tamil Nadu government decided to participate in the committee and the retired Supreme Court judge, A.R.Lakshmanan was nominated to represent the state. The Empowered Committee visited the dam site on 21 December, 2010 and

made a recommendation to inspect the dam wall immersed in water.

As per the direction of the Empowered committee, the team from CWPRS (Central Water and Power Research Station) and CSMRS (Central Soil and Material Research Station) under the leadership of Dr. Rajpal Singh inspected the dam along with the divers from Orissa, who were led by Ratnakar Dalai on 5 December 2011. Abbas, the leader of the farmers of the five districts of Tamil Nadu using water from Mullaperiyar, opposed the visit of the team led by Rajesh Gopal of National Tiger Reserve [18]. Kerala opposed the active involvement of Central Water Commission (CWC) in the functioning of the Empowered Committee. A Coordination committee to assist the Empowered committee was formed which is chaired by a representative from the CWC and CWPRS.

The coordination was asked to assess the two reports which Kerala prepared with the help of experts from IIT [15]. The Empowered Committee inspected the dam on 21 December 2010 [18].

Tamil Nadu filed an application in the Supreme Court to restrain Kerala from proceeding with the construction of the new dam. It also wanted a direction to Kerala to permit carrying out necessary repairs to the dam to ensure safety. The five judges Constitution Bench extended the tenure of the five member Empowered committee by another six months from 30 April 2011 [15]. The five members Constitution Bench of the Supreme Court on 24 August 2011 extended the tenure of the Empowered Committee till 29 February 2012 [15].

Table 7. Approaches to dispute resolution

S.No	Approaches to dispute resolution	Period
1.	CWPC inspection and advised to keep MWC at 152 ft	1964
2.	CWPC inspection and advised to keep MWC at 145ft	1978
3.	CWPC inspection and advised to keep MWC at 136ft	1979
4.	CWPC inspection and advised to keep MWC at 145ft	1980
5.	CWPC inspection and advised to keep MWC at 152ft	1986
6.	CWC Expert committee was announced by the Supreme Court	2000
7.	Team from CWC and CSMRS inspected the dam	2011

8. Safety

In Mullaperiyar conflict, the primary issue for Kerala is the safety of the people living downstream of the dam. It argues that the dam has outlived its life which was built when dam building technology was in its infancy. The leaks observed in the dam, leaching of the *surki* mortar, seismic disturbances and severe floods have enhanced the fears of Kerala over the safety of the dam. According to Kerala, if the dam breaches it would wash away a stretch of about 25 km between Mullaperiyar and Idukki dams affecting about 0.1 million people. If this causes damage to Idukki dam, it would further destroy human settlements of millions of people [3]. Kerala also complains that no repair work has been carried out in the main dam below 112 ft due to stagnating water. On 18 August 2006, there was a tremor of 2.1 on the Richter scale with its epicenter 17 km from the dam site. When Kerala employed experts

from IIT, New Delhi and Roorkee to study the safety aspects, their reports confirmed the views of Kerala with reference to hydrology and seismicity.

9. New Dam

The major issue of conflict now is the proposal for a new dam and Kerala is strongly supporting it while Tamil Nadu is opposing it vehemently. The expert committee formed in 1979 inspected the dam and suggested several long-term measures. One of them is to explore the possibility of locating a new dam within a reasonable distance from the existing dam. The team after inspection suggested a site, 1300 feet below the existing dam. But in the memorandum on "Strengthening proposal of Mullaperiyar dam" submitted by the Central Water Commission in 1986, construction of a new dam was not pursued. According to the expert committee report of March 2001 submitted to the Supreme Court, the proposal to construct a new dam was not found feasible and hence it was dropped. But Kerala argued that such a proposal alone will be a sustainable solution to assure water to Tamil Nadu and save the people living downstream in Kerala. The existing dam was constructed about 2869 feet above the sea level while the proposed dam is to be 2629 feet above the sea level. Hence it is difficult to get water from such a dam [18]. The new dam is planned on a 6010million rupees project which includes 430millions of rupees for decommissioning the old dam. The new dam is now planned with a height of 136 feet [18].

The Empowered committee visited the proposed site for the new dam on 21December 2010. The team of officials led by K. Jeyakumar, the then Additional Chief Secretary of the Kerala government explained the technical feasibility of the new dam based on the technical report prepared by the Kerala government. The new site is about 366 meters away from the existing dam and this team expressed that only fifty hectares of land will be submerged and there would be no loss of vegetation as mainly Eucalyptus trees would be removed. The committee earlier visited the existing dam including inspection gallery, baby dam and earthen dam along with the officials and the representatives of Kerala and Tamil Nadu States [15].

The Kerala Irrigation Department (KID) approached the Kerala Forest Department (KFD) for the allocation of 50 hectares of forest area as the site for the proposed dam; but the KFD is in a fix as the site encloses Periyar Tiger Reserve which is one of the thirty eight reserves dedicated to the tigers and an elephant reserve and fears that the construction of a new dam would result in ecological imbalance in this area. The KID claimed that the 6010million rupees project will have no biodiversity impact and displacement of people. But obtaining clearance will be a cumbersome process as it requires permission from a number of state and national agencies and final clearance from the National Board for Wildlife chaired by the Prime Minister. But the conservationists are worried about the decommissioned old dam and the impact of massive construction of the new dam on the fragile ecosystem and the biodiversity-rich area of the tiger reserve and the aquatic inhabitants [15].

The idea of a new dam emerged during the discussions between the two States mediated by the central

government. Tamil Nadu argued against the new dam right from the beginning and opposed the Ministry of Environment and Forests for granting permission to survey for the new dam. According to Kerala, as the existing dam is old and its safety is in question, it is imperative to build a new dam. But Tamil Nadu fears that the new dam will replace its historic rights and doubts whether the old deed will be in force. In 2009, Tamil Nadu suggested in the Supreme Court that the idea of a new dam can be considered only when Tamil Nadu has control over it. Now there is heavy political pressure in both the States for and against this proposal and the Empowered committee is also analysing the feasibility of the new dam. Constructing a new dam and decommissioning the old dam in the Periyar Tiger Reserve area would alter the habitat of local flora and fauna.

10. Environmental Concerns

Mullaperiyar dam being situated within the Periyar Tiger Reserve is of prime environmental concern. Kerala correlates its ecoconcern with the water storage level by emphasizing that raising the water level would result in the submergence of reservoir fringe area that has emerged (11.219 sq.km) after lowering the level from 152 ft to 136 ft. In 2001, a team of scientists from Kerala Forest Research Institute, the Tropical Botanical Garden and Research Institute, Centre for Water Resource Development and Management and Salim Ali Centre for Ornithology and Natural History studied the impact of raising water level and reported that increasing the storage level would cause damage to wildlife habitat. But Tamil Nadu argues that only 1.4 percent of the Periyar Tiger Reserve area would come under submergence by increasing the reservoir level which will not drastically alter the ecology of that region. Tamil Nadu expressed its view that Kerala's main aim was to save its tourism resorts and associated human settlements which would submerge when the reservoir level is raised back [3].

11. Political Pressure

The conflict between Kerala and Tamil Nadu over Mullaperiyar dam issue deepened over time. Its ramifications spread into other realms when the legal battle between Kerala and Tamil Nadu gained momentum in 2000. It could reach its peak in 2006 when Kerala passed the controversial amendment. As a result the tussle came into public sphere and led to issues revolving around economic dependency. In 1976, Kerala built a mega dam in Idukki with a height of 555ft and water storage area of 16,000 acres with a hydel power project of 800 MW capacities. But the dam was not having much catchment area and water supply. Hence Parameswaran Nair, the then chief engineer of Kerala electricity board made a recommendation to reduce the level of Mullaperiyar dam from 152ft to 136ft and to divert the 16ft water to Idukki reservoir. Hence Kerala induced K.K. Thomas the then MLA of Peermedu constituency to gather local people's support in making a propaganda that the dam was weak and its breach would cause damage in the downstream of Periyar [5]. The issue has become a point of focus for

within and interstate power politics. For pressing Kerala to raise the level in the dam, several political parties in Tamil Nadu threatened to stop the food supply to Kerala and the transport between the two States. In 2006, against the amendment, Tamil Nadu made a unanimous political call to block all routes to Kerala. The new dam proposal again created similar moves in Tamil Nadu towards an economic blockade against Kerala. Tamil Nadu leaders reason out as Kerala depends on Tamil Nadu for its food supply, Tamil Nadu has the right to use the waters of Kerala [3]. V. Gopalsamy the leader of Marumalarchi Dravida Munnetra Kazhagam (MDMK) party in Tamil Nadu involves himself in the protests against the new dam construction. He gave a petition to Prime Minister, Manmohan Singh in 2004 and 2005. When Kerala enacted the new dam safety act in 2006, he organized a protest march from Madurai on 19 September 2006 and from Theni on 8 November 2007. He also made a protest walk in connection with Mullaperiyar dam issue from Madurai to Gudalur in December 2006. He participated in a fast in 2007, 2009 and 2011 and organized economic blockade in 29 December 2009 at Cumbum. On 9 February 2010, he organized demonstration against the issue at Tamukkam, Madurai. With several organizations he could organize obstacles in thirteen roads connecting Kerala on 28 May 2010 [18]. But the political leaders of Kerala are of the view that the farmers of Tamil Nadu depend on Kerala for selling their produce. These moves indicate that the Mullaperiyar conflict is a sensitive issue and the emotions of local people can be exploited by politicians according to their whims and fancies. Thus the dam issue has much space for the party leaders in the local politics both in Kerala and Tamil Nadu.

12. Kerala's Arguments

The 1886 lease deed was forced upon the Travancore ruler. The power generation in Idukki reservoir will come to a halt if the Mullaperiyar dam level is increased from 136ft to 152ft. Kerala argues that the gross area irrigated by the Mullaperiyar dam increased from 24,280 ha in 1896 to 69,200 ha in 1970 - 71 (when the water level was 152ft) to 92,670 ha in 1994 - 95 (when the water level was reduced to 136ft). Premchandran, the then Kerala Minister for Water Resources suggested that a more equitable solution to the issue would be to create excess storage capacity within Tamil Nadu's territory. According to Mining and Geology department of Kerala and the Centre for Earth Science Studies Thiruvananthapuram, Mullaperiyar dam stands over deep-seated fractures vulnerable to earthquake. Failure of Mullaperiyar dam would pose threat to 3 millions of people living in Idukki, Kottayam, Ernakulam, Pathanamthitta and Alappuzha and to a number of dams in the downstream including the Idukki dam. Kerala also wants to have a hike in the lease amount on water supplied to Tamil Nadu as it earns Rs.170 millions from cultivation using Mullaperiyar dam water. According to the agreement, the lease amount is thirty rupees per acre and it is subject to revision every thirty years. The Left Democratic Front gave a promise to construct a new dam during the 2011 assembly election. The live storage at 152 feet level is 10,600 mcft and the dead storage at 104 feet is 5100 mcft. At 136 feet storage level, the irrigation potential is 70,000 acres. Even after

independence both states renewed the agreement without any compulsion. If the dam site is in an earthquake prone area, the new dam is also at risk.

13. Tamil Nadu's Demands

Tamil Nadu receives about 640 Mm³ (about 22.5 TMC) from the Periyar River annually for power generation and irrigation of lands. Tamil Nadu is depending upon the waters of Mullaperiyar for paddy cultivation in 2, 47,000 acres in the five districts.¹⁸ If the storage level is increased it would receive additionally 320Mm³ (11.25 TMC) of water [3]. Farmers in Tamil Nadu argue that water rights which have been established during the past century cannot be reverted. Tamil Nadu claims that the increase in the area of irrigation was due to the modernization of Periyar-Vaigai project through the reduction in seepage losses. CWC informed the construction of a new dam unfeasible in 2001. The five districts have 2, 47,000 acres under Mullaperiyar water irrigation. As the water storage level was reduced to 136ft, Tamil Nadu has experienced a reduction in the crop yield to the tune of 700 millions of rupees with a reduction in hydel power generation also [5]. According to a report; there was a loss of Rs.400000 millions due to the reduction in the storage level between 1980 and 2005. The agricultural lands which had a three yearly cropping pattern had to resort to the bi-annual cropping. But Kerala contradicted it by reporting that the gross area under cultivation in the Periyar command was 1,71,307 acres in 1979 - 80 and after lowering the level to 136 ft it reached 2,29,718 acres in 1994 -1995.

Due to this dispute, in Rannathapuram and Sivagangai many lands became unused lands and the lands of biannual pattern became single per year. The first region, Cumbum valley is experiencing water scarcity [18]. If the new dam comes, the Periyar lease deed will become futile and the water level will be maintained at 136ft till the construction of the new dam. Kerala will have control over the new dam and Tamil Nadu has to request Kerala every time for water. As the new dam is going to be constructed below the existing dam, the water storage level would be below 136ft and hence it would be difficult to withdraw water for Tamil Nadu.

14. Conclusion

The attempts made so far to resolve the dispute could not achieve the expected solution as they addressed only the apparent issues and they could not aim at a long-term solution and ensure the participation of the multiple stakeholders. The problem has to be solved amicably as both States are misunderstanding each other resulting in social unrest. As politicizing the issue has vexed matters, it has to be stopped. Kerala is not openly refusing to provide water from Mullaperiyar to Tamil Nadu and at the same time the safety of the dam is a cause of concern for Kerala. It claims that a new dam alone is the solution. Even if it is accepted that the lease agreement was forced by the British on the Maharaja of Travancore, both Kerala and Tamil Nadu as equal states after independence ratified the original agreement and entered into a supplementary agreement in 1970. A river whose catchment lies in more the one State is an inter - state river. Of the 5,398 sq. km of the catchment of Mullaperiyar, 114 sq. km is in Tamil

Nadu. Tamil Nadu's rights over Periyar are not riparian rights but are based on the lease agreement. Tamil Nadu has the right to maintain the dam and draw water as per the lease agreement. As per the internationally accepted principle on water sharing, Tamil Nadu has the usage rights over the water as its usage period exceeds a century. If Tamil Nadu is denied of Periyar water at required level, livelihoods of several people in the five districts will be affected and the lifeblood (agriculture) of Tamil Nadu will be severely impaired leading to famine and suicide of farmers. As Tamil Nadu is concerned about the safety of the dam, it is investing huge amount of money and other resources for strengthening the dam. But Kerala is not cooperating with Tamil Nadu in carrying out the dam strengthening measures as it is interested in building a new dam. It has been proved scientifically that some amount of water must leak as seepage to keep the dam safe and healthy. Hence Kerala need not have much fear in this angle. The Kerala government has failed to abide by the directions of the Supreme Court of India. The view of Central water commission or the judgment of the Supreme Court has to be accepted. The two Governments should agree on a safe water storage level. Both Kerala and Tamil Nadu must ensure that the issue is not allowed to escalate that will result in misunderstandings between the people of both states who have a cordial, peaceful and harmonious relationship for a long period of time. Both the states depend on each other in several aspects. Through sustained and purposeful discussions, this issue has to be resolved to mutual satisfactions. But several rounds of talks held at different levels like Chief Ministers, Chief- Secretaries, Irrigation Ministers and other officials of the two states during the past three decades failed and hence a mutual agreement is doubtful. The implicit issues of the conflict and the points of divergence of mutual interest between the States have to be flushed out to have open deliberations in public fora. Unbiased scientific data on dam safety and water use has to be the basis of solution. The various alternatives that would emerge out of this public debate can be scrutinized to arrive at a draft for a new agreement that would satisfy the grievances and insecurities of both the States. The empowered committee has been using the services of the Central Water Commission, Central water and Power Research Station, Geological Survey of India, Bhaba Atomic Research Centre and Central Soil and Material Research station for the different studies and tests conducted at the dam site

and in their laboratories. Hence both states can wait patiently with confidence for its report. As the issue falls on Constitutional domain, and if both the states are not in a position to abide by the directions of Supreme Court, Constitutional remedy through the Parliament can be implemented. Above all, magnanimity has to be imbibed in the minds of people and politicians of both the states.

Acknowledgments

The authors thank the authorities of their colleges for the encouragements.

References

- [1] Cunningham, WP., and Saigo, BW. 1997 *Environmental Science A Global Concern*, IV Edition, Wm C Brown Publishers, Chicago, USA.
- [2] Iyer, R., 2010. *Water, Conflicts and the Laws in India*, Training Programme on Understanding and Resolving Water Conflicts, Kerala.
- [3] Madhusoodhanan, CG., and Sreeja, KG. 2010. *The Mullaperiyar Conflict*, NIAS Backgrounder on Conflict resolution, B4-2010, National Institute of Advanced Studies, Bangalore, India.
- [4] Jayaraj, SV., 2003. *Periyar Dam Project*, Mani Offset Printers, Uthamapalayam, Tamil Nadu, India.
- [5] Thennarasu, M., 2011. *Mullaperiyar*, Dinamani, August 17 2011.
- [6] Nesamony 1955. Speech in the *Lok Sabha* on 15 December 1955, *Lok Sabha Debates on the Report of the States Reorganisation Commission*, Vol. I, Proceedings from 14 to 21 December 1955, *Lok Sabha Secretariate*, New Delhi, February 1956.
- [7] Joy, KJ., and Paranjape, S.2010. Proceedings of the Training Programme on understanding and Resolving Water Conflicts, 5-9 April, 2010, Kerala.
- [8] Rao, TS. 2008. *Is Mullaperiyar Dam Safe*, <http://tshivajirao.blackspot.com> (accessed on 11 January 2012).
- [9] Nelson, JH., 1868. *The Madura Country A Manual*, The Asylum Press, Madras, India.
- [10] Francis, W., *Madura Gazetteer*, Cosmo Publications, New Delhi, India.
- [11] Mackenzie, AT., 1879. *History of the Periyar Project*, Madras Government Press, Madras, India.
- [12] Krishnakumar, R. 2006. *Frontline* Vol. 23 (5).
- [13] Krishnakumar, R., 2000. *Frontline* Vol. 17 (24).
- [14] MOWR 2011. Ministry of Water Resources, Government of India, <http://mowr.gov.in> (accessed on 11 February 2012).
- [15] The Hindu, Daily Newspaper, 2009 to 2011.
- [16] The New Indian Express, Daily Newspaper, 2008 to 2011.
- [17] The Times of India, Daily Newspaper, 2010.
- [18] Dinamalar 2008. Mullaperiyar dam issue, Daily Newspaper, 2008.