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# THE LOWER BHAVANI PROJECT IN TAMIL NADU: IRRIGATION ENGINEERING, WATER GOVERNANCE AND REGIONAL DEVELOPMENT IN A POST-INDEPENDENCE COMMAND AREA

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***Abstract***
*The Lower Bhavani Project (LBP) in Erode district, Tamil Nadu, is widely described as the first major irrigation scheme initiated in independent India. Constructed between 1948 and 1955, it impounds the Bhavani River, a tributary of the Kaveri, behind the Bhavanisagar earthen dam and distributes water through a 201 km contour canal and older subsidiary channels to a command area in the Erode, Tiruppur and Karur districts. This paper presents a documentary review of the project's origins, physical characteristics, operation, socio-economic role and contemporary governance challenges. Drawing on public encyclopaedic, governmental, and press sources, it shows that reported figures for command area, full reservoir level, and dam height differ materially between sources, and it proposes a reconciliation table. It then examines three persistent policy tensions: the decades-long dispute over concrete lining of the canal and its effect on groundwater recharge, the unauthorised abstraction of canal water for non-ayacut and commercial use, and the allocation of scarce storage in deficit years. The review concludes that the project's future performance depends less on new construction than on measurement, transparent scheduling and participatory management, and it outlines a research agenda to support these.*

***Keywords: Lower Bhavani Project; Bhavanisagar Dam; canal irrigation; contour canal; canal lining; groundwater recharge; water governance; Tamil Nadu.***

## 1. Introduction

Large surface irrigation systems built in the first decades after independence remain the backbone of agricultural water supply in much of peninsular India. Many are now more than seventy years old, serve populations and economies very different from those they were designed for, and face rising competition from domestic, industrial and environmental demands. Understanding how such systems have evolved is therefore of both historical and practical interest.

The Lower Bhavani Project is a representative case. The Bhavani River rises in the Nilgiri hills and flows eastward to join the Kaveri. After a series of proposals dating from the early nineteenth century, the upper and lower Bhavani schemes were finally implemented in the mid-twentieth century [3]. The lower scheme, centred on the Bhavanisagar Dam, began in 1948 and is generally regarded as the first major irrigation project started after independence [1], [3]. Its canal system continues to supply irrigation water to farmland in the Erode, Tiruppur and Karur districts and drinking water to several towns and villages [7], [13].

Despite its prominence in regional policy debates, the project has received limited consolidated treatment in the accessible literature. Information is scattered across tourism material, encyclopaedic entries, departmental announcements and newspaper reports, and these sources frequently disagree. This paper aims to (i) consolidate the available information on the project's history and physical characteristics, (ii) identify and tabulate inconsistencies in the reported data, (iii) analyse the main

governance controversies of recent years, and (iv) propose priorities for future research and management.

## 2. Study Area and Methodology

### 2.1 Study area

The Bhavanisagar Dam lies on the Bhavani River in Erode district, roughly 16 km west of Sathyamangalam, between Mettupalayam and Sathyamangalam [1], [5]. The reservoir adjoins the Sathyamangalam Reserve Forest, and the Bhavanisagar forest range falls within that forest division [5]. The reservoir is fed by an eastern catchment that includes the Upper Bhavani, Avalanche, and Emerald systems, and a western catchment that includes the Pykara and Moyar sub-basins, so it receives inflow in both the southwest and northeast monsoon seasons [4], [5]. Downstream, the LBP canal runs through the Erode district and neighbouring Tiruppur and Karur districts [2], [7].

### 2.2 Methodology and limitations

This study is a documentary review. No primary hydrological, remote-sensing or field data were collected. Sources comprise encyclopaedic entries, the Tamil Nadu tourism authority's description of the dam, an institutional description of Bhavanisagar, and press reports quoting Water Resources Department (WRD) officials and farmers' associations. Where sources disagree, all reported values are presented, and the discrepancy is discussed rather than resolved arbitrarily. Several sources are secondary or advocacy-oriented, and statements attributed to farmers' associations or officials are reported as those parties' claims. The findings should therefore be read as a structured synthesis and a basis for primary research, not as an engineering audit. Obtain authoritative values from WRD design reports, the project's administrative orders, and gauge records.

## 3. Historical Development

Construction of the Bhavanisagar Dam began in 1948 and was completed in 1955; the reservoir opened in 1956 and is said to have cost approximately □21 crore [1] [4] [5]. According to some sources, the canal network was first used for irrigation in parts of the ayacut as early as 1952, when the dam was still under construction [5]. The project was a part of the early planned-development approach of the 1950s, when river-valley schemes were considered as tools to achieve food security and regional development.

M. A. Eswaran of Erode, a legislator in the early 1950s, is credited with popularising the Lower Bhavani canal [2]. This attribution is to be taken with a pinch of salt until it can be confirmed in the archives. The scheme was not unplanned; the existing Kalingarayan Canal, along with the Thadapalli and Arakankottai canals, was already irrigating some of the area, and the reservoir now supplies the main LBP canal and the existing canals.

## 4. Physical and Engineering Properties

### 4.1Bhavanisagar Dam and reservoir

Bhavanisagar Dam is a long earthen dam. According to published sources it is approximately 8.8 km long and according to tourism literature it is one of the largest earthen dams in India and second largest dam in Tamilnadu after Mettur [4, 6]. The assertion that it is the second largest earthen dam in the world is made many times in tourism and descriptive sources, but in such sources it is not backed up by any method of ranking, nor can it be used as evidence in scholarly writing. The gross storage capacity of the reservoir is reported to be 32.8 thousand million cubic feet (tmc ft), or around 930 million cubic metres [1] [13].

**Table 1. Principal Reported Characteristics of the Lower Bhavani Project**

| Parameter | Reported value | Source |
|---|---|---|
| River / location | Bhavani River, Bhavanisagar, Erode district | [1], [4] |
| Construction period | 1948–1955; opened 1956 | [1],[4],[5] |
| Reported cost | About ₹21 crore | [4], [5] |
| Dam type and length | Earthen embankment; about 8.8 km | [4], [6] |
| Gross storage | 32.8 tmc ft (about 930 million m³) | [1], [13] |
| Canals served | LBP canal; Kalingarayan Canal (feeding Thadapalli and Arakankottai channels) | [1], [4] |
| LBP canal length | About 201 km (125 miles), valley-side contour canal | [2] |
| Installed hydropower | 16 MW (8 MW on river outlet; 8 MW on right bank canal) | [1] |

Values are as reported in the cited sources; see Section 7 for discrepancies.

### 4.2 The canal system

The LBP canal runs along the valley contours and is approximately 201 km long [2]. A contour canal is constructed parallel to the ground contour, allowing gravity flow over long distances with minimal earthwork and no pumping. The disadvantages are not new: long unlined reaches are subject to significant seepage and continuous embankment and cross-drainage maintenance is required. However, seepage losses also contribute to local groundwater recharge, and this duality underlies the controversy over lining, discussed in Section 6.

### 4.3 Hydropower

This project has two hydropower stations: the Lower Bhavani powerhouse with four (4) 2 MW power units and a right bank canal powerhouse with two (2) 4 MW power units, totalling 16 MW installed capacity [1]. Generation is a by-product of irrigation releases and is therefore relatively modest compared with the state system. It is important primarily as a by-product of controlled releases.

## 5. Command Area, Operation and Hydrological Variability

### 5.1 Command area

According to the official Ayacut of the LBP canal, the land area is 2.07 lakh acres, corroborated by a government order and cited by the farmers' representatives [7], [9], and supported by WRD officials. A total of 17,000 more acres benefit from water-harnessing, and approximately 25,000 acres of the Dharapuram cut receive water, though not for irrigation; it is mainly part of the ayacut [9]. Other reports cite the dam's irrigation capacity as 2.5 lakh acres per year [13]. The encyclopaedic entry of the area is 2.07 lakh hectares [2], which seems to be a unit error, and appears to be more than 2.5 times larger than the number. According to Wikipedia, about 103 thousand acres of land are under the LBP canal, 15.7 thousand acres under the Kalingarayan canal, and 24.5 thousand acres under the Thadapalli and Arakankottai channels [1].

**5.2 Seasonal Operation**

Wetting is scheduled to release water. For instance, a government release during the second crop season in 2024 was made under a five-wetting program, and according to farmers, they cultivated approximately 103,500 acres based on that; in addition, about 45,000 acres were irrigated in the Dharapuram cut area [11]. The irrigation season is said to end by 30th April, followed by the closed season for canal maintenance work [7]. For the first crop, releases usually start in monsoon-dependent months after storage becomes available.

**5.3 Inter-Annual Variability**

Storage variance is very large. Farmers reported in April 2024 that they had received inflow of only 13 cusecs and less than 4 tmc ft in storage, and a controversy brewed over whether releases to other areas had been given priority over the LBP Ayacut, invoking the 2007 order of the Cauvery Water Disputes Tribunal [11]. The reservoir level in May 2025 was approximately 70 ft, with 11.11 tmc ft in storage, which led WRD to release 100 cusecs, primarily for drinking water needs in Sathyamangalam, Gobichettipalayam, and Bhavani taluks [12]. By late June 2025, with significant catchment rainfall, storage had increased to 21.84 tmc ft with an inflow of almost 5,000 cusecs and an outflow of 1,355 cusecs into the LBP canal [13]. Variations between scarcity and surplus in a single year highlight the critical importance of monsoon timing in the command area and the need to coordinate drinking-water priorities, crop scheduling, and downstream commitments.

The variations between scarcity and surplus in a single year highlight the critical importance of the timing of the monsoons in the command area, and the need for coordination between drinking-water priorities, crop scheduling and commitments downstream.

**6. Socio-Economic Issues and Governance Concerns**

**6.1 Agricultural and Domestic Water Supply**

The project's main benefit is stabilising agriculture in a climate-dependent area that would otherwise rely on irregular rainfall and well irrigation. In addition to crop production, the canal is also a significant source of domestic water. It feeds Erode Corporation and municipalities like Gobichettipalayam, Sathyamangalam, and Chennimalai, together with over sixty revenue villages [8], and also serves as drinking water to Sathyamangalam, Gobichettipalayam, and part of the Bhavani taluks [13]. These statements align with the cited parties' claims and merit checking against municipal water supply records. Still, they all point in the same direction: the system now serves a multi-sectoral population.

**6.2 The Concrete Lining Controversy**

The biggest policy issue is lining the canal with concrete to minimise seepage. The state appointed a committee to find an alternative solution, and a 2009 government order declared lining a permanent solution [8]. Farmer groups protested, saying lining would stop the seepage that replenishes wells and helps keep trees around the canal; according to one advocacy report, that would kill almost 100,000 trees, and 64 panchayat presidents signed up to protest [8]. It was put on hold, brought back, and then put down again due to opposition, and the 2013 one was dropped as well [2], [8]. The press reported a □100 crore sanction for lining the left bank in 2024, and the government was reported to have limited work to renovating old masonry and structures. The replacement of the lining began in 2021 at an estimated cost of □709.6 crore, and as reported by WRD, the project is 94 per cent complete so far; work is still underway at 115 locations where the canal is dry for lining [7]. It aims to improve the canal's structural integrity and water-carrying efficiency, along with its distributaries [7]. The

department is said to have installed no-fines concrete lining on the bed of the Grand Anicut canal system in the Cauvery delta after farmers raised groundwater concerns. An empirical question — one that can only be answered after testing — is whether such a design would be appropriate for the LBP, and how much it would cost in terms of conveyance efficiency.

### 6.3 Unauthorized Abstraction

A second tension relates to using canal water outside the ayacut. According to farmers,, this pumping is allowed only on seasonally irrigated ayacut lands in the off-season, under a government order dated 1967 that allows pumping water from wells up to 50 m from the canal [10]. In 2024, WRD started issuing notices to farmers and companies for allegedly withdrawing canal water for non-agricultural and commercial purposes, following a writ petition alleging that educational institutions, bottled-water and beverage industries are withdrawing water from the canal [10]. These are allegations by the petitioners, and the notices are not findings of fact; they reflect the growing mismatch between the system's original agricultural mandate and today's demand.

### 6.4 Allocation in Deficit years

There is not enough storage in some years to satisfy all commitments (as demonstrated in Section 5.3). In April 2024, conflicts over allocation decisions indicate that users dispute and do not fully understand the rules for allocating water between the LBP ayacut and the other ayacut and/or drinking-water supply [11]. Public debate is also hindered by contested statistics, such as a farmers' association's public statement challenging a political figure over the area irrigated through the canal, which relied on the official ayacut figure [9]. But transparent, consistent data is a prerequisite for solving allocation conflict.

## 7. Discussion: Data Discrepancies

The review shows that basic descriptive parameters are reported inconsistently, which has practical implications for planning and for research. Table 2 summarises the main discrepancies identified.

**Table 2. Discrepancies in Reported Project Parameters**

| Parameter | Reported values | Likely explanation / action |
|---|---|---|
| Official ayacut | 2.07 lakh acres [7], [9]; 2.5 lakh acres irrigated annually [13]; 2.07 lakh hectares [2]; 103 + 15.7 + 24.5 thousand acres by channel [1] | Hectare entry is probably a unit error. Differences between 2.07 and 2.5 lakh acres may reflect extensions or indirect beneficiaries. Obtain GO and WRD ayacut register. |
| Full reservoir level | 105 ft in recent WRD-sourced reports [12], [13]; 120 ft in older descriptions [1], [5] | 120 ft may denote dam height or an earlier design level. Verify against the WRD reservoir operation manual. |
| Dam height | About 62 m [6]; about 40 m (120 ft) [5] | Different datums or definitions (height above riverbed versus above foundation). Verify with design drawings. |
| Earthen-dam ranking | "Second largest in the world" [4], [5] | No supporting methodology cited. Avoid in academic use. |

Sources are cited by number in the reference list.

Particular attention is given to the full-reservoir-level discrepancy, as the operational storage figures reported in 2025 are based on the 105 ft full level and a gross capacity of 32.8 tmc ft [12], [13]. In contrast, older descriptive sources use 120 ft as the full level [5]. WRD should provide the storage–elevation level curve; mixing the two would yield incorrect results for researchers calculating storage–elevation relationships or reservoir performance indices.

More broadly, the whole lining issue reflects a struggle between two valid performance criteria. The engineering criterion values conveyance efficiency, since water lost to seepage through the canal is considered lost. The cThe community criterion values the canal as a distributed recharge source that benefits wells, trees, and drinking water beyond the nominal ayacut. The first criterion cannot be evaluated without information on seepage volumes, and the second criterion cannot be evaluated without information on the extent of recharge and well performance, none of which was found in the sources investigated. This lack of measurement, not a lack of good intent, is the primary challenge in solving the problem.

## 8. Conclusions and Recommendations

The Lower Bhavani Project illustrates the impact of a mid-twentieth-century irrigation project on agriculture and settlement in western Tamil Nadu, built with a giant earthen dam and a gravity-fed contour canal. Today, it faces largely management and governance issues: its infrastructure is ageing, its uses are competing, its data is contested, and its lining and allocation are in contention. Based on the evidence reviewed, the following priorities have emerged.

1. Authoritative data baseline by making the official Ayacucho register, stage–storage curve, design FRL and dam dimensions public and resolving the discrepancies in Table 2.
2. Measure canal loss by reach and monitor observation wells in the canal; quantify seepage/recharge to provide data to model and compare lining, no-fines concrete, and other options to demonstrate with facts instead of assumptions.
3. Using remote sensing and GIS techniques identify the actual irrigated area by season, including Dharapuram cut and indirectly irrigated areas and compare with the formal ayacut.
4. Publish the rules of allocation for deficit years, including the priority between drinking water and first and second crops and other ayacut, as well as real-time reservoir and release data.
5. Enhance participatory management using water user associations and enforce regulations on abstraction around canals using a transparent and evidence-based approach.
6. Compare the pre- and post-renovation conveyance efficiency, tail-end delivery cost, and maintenance cost of the outcome of the renovation at a cost of □709.6 crore.

Future research should integrate these data with farm-level surveys of cropping patterns, water productivity, and income, and with historical archival work on the project's design and early operations. This effort would provide a data basis for planning the system over the next fifty years.

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