

Design and Implementation of a Web-Based Fishermen Welfare Management System: A Case Study of Tamil Nadu

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Abstract:

The Tamil Nadu Fishermen Welfare Board Management System really flipped the script on how fishermen's records and welfare programs get handled. Back in the day, it was all manual — paper everywhere, the same stuff written again and again, and always some delay. If you wanted to dig up a file, honestly, it felt impossible. Now, everything happens online. Fishermen just log in, keep tabs on their contributions, and apply for whatever welfare they need — accident relief, help for their kids' education or marriages, financial support, you name it. No headaches. Admins have it easier too. Their dashboard is secure, and they can review what's coming in, update info, or pull reports whenever. The database stays sharp, updates fast, and doesn't mess around with errors. No more crawling through a pile of files just to find one answer. Automating this isn't just for show — it wipes out paperwork and cuts out all that manual nonsense. Things are moving faster now, and the usual snags are almost nonexistent. Fishermen are finally receiving the assistance they were promised. Gone are the days of endless waiting and getting lost in a maze of bureaucracy. This system demonstrates that web technology can truly improve government services, making them more efficient, transparent, and equitable for the people of Tamil Nadu.

Keywords — Fishermen Welfare Management System, Web-Based Application, E-Governance, Database Management, Welfare Schemes.

I. INTRODUCTION

Government services have changed a lot in recent years. Most things that used to mean long queues and stacks of paperwork can now be done online. E-governance made that possible — and for the most part, it works. But not everyone has benefited equally. Fishermen, despite being central to coastal economies, are still largely left out of this shift.

In Tamil Nadu, the Fishermen Welfare Board offers schemes covering accidents, education, marriage, and financial hardship. The problem is that almost all of it still runs on paper — lost forms, repeated entries, slow approvals,

and no way to track what's happening with your application.

For a fisherman with unpredictable income and no guarantee of what tomorrow looks like, that kind of delay isn't just frustrating — it's a real problem. When something goes wrong, he needs support quickly, not after weeks of chasing an office.

This project addresses that directly. The proposed web-based Fishermen Welfare Management System brings the entire process online — registration, contribution tracking, welfare applications, and report generation — through a single, secure platform. Fishermen apply once and track their status in real time. Administrators manage everything from a centralized dashboard. The goal is simple: make

welfare services work the way they should for the people who need them most.

II. PROBLEM STATEMENT

In recent years, the rapid growth of information technology has transformed the way government services are delivered to the public. Digital platforms have made services more efficient, transparent, and easily accessible. Despite this, the welfare management process for fishermen in Tamil Nadu is still built almost entirely on paper. The cracks in that system are pretty hard to ignore at this point.

Paper-Based Records

Physical documentation is vulnerable in ways that digital records simply are not. Files get damaged by water, eaten by pests, or misplaced during office moves. When a record is lost, reconstructing it takes forever and often ends up incomplete. There's no backup. If an administrator needs to pull up a fisherman's contribution history from a few years ago, she might spend hours going through physical registers — assuming those records even still exist.

Time-Consuming Operations

Every transaction — registering a new member, processing a contribution, verifying a claim — requires multiple rounds of manual handling, verification, and documentation, significantly slowing administrative workflows. A claim that could be resolved in minutes with the right data at your fingertips instead takes days or weeks. For a fisherman who already lost income due to an accident, those days really count.

Difficult Data Management

Searching, updating, and maintaining records across multiple registers and files becomes increasingly complex and error-prone. A single wrong entry — a mistyped date of birth or wrong scheme code — can cause a claim to be rejected without clear explanation. And since there's no centralized system, records at one office often don't match what another office has.

Lack of Transparency

Beneficiaries have limited visibility into claim status, approval progress, or contribution history, reducing trust in the system. A fisherman who

submits an application has no way of knowing whether it is being processed or sitting forgotten in a pile. He cannot find out without physically visiting the office and asking. That creates frustration, erodes trust, and wastes everyone's time. Together, these problems make a strong case for building something better.

III. LITERATURE SURVEY

Fisheries management has been stuck for a while now. It feels outdated, and honestly, people are tired of it. Fishermen want a system that actually works for them — not one built around paperwork and bureaucracy. Right now, getting any kind of support means filling out form after form, waiting on slow responses, and dealing with officials who've never spent a day at sea.

Researchers keep pointing out the same problems. Data gets siloed, departments don't coordinate, and the tech is years behind. There's no real-time information, and nothing connects across offices.

Arumugam and Krishnan (2020) found that even basic digitization of membership records cut processing time nearly in half — but the systems they studied only handled registration, nothing more. Nair et al. (2019) identified integration as the real gap: every department ran its own platform, and none of them talked to each other. A fisherman needing accident relief and education assistance had to navigate two completely separate processes. Ramesh and Gopal (2021) tested a welfare portal in Kerala and found that simplicity and Tamil language support mattered far more than features — a system people could actually use beat one loaded with functions they'd never touch.

The conclusion is pretty clear. Most existing platforms track catch, log sales, or manage supply chains. Very few are built around the welfare of the people doing the fishing. That's the gap this project is trying to fill.

IV. PROPOSED SYSTEM

The envisioned system is a web-based Fishermen Welfare Management System, intended to modernize the current manual

approach. The goal is to create a digital platform that's quicker, more dependable, and, frankly, easier to navigate. The concept is simple: move the entire process online, from the initial registration of a fisherman to the day they receive their benefits.

Fishermen will be able to register online, submitting their personal and professional information. After registration, they'll have access to a single platform for applying to various welfare programs. This includes accident relief, educational support, marriage assistance, funeral expenses, and more, eliminating the need for repeated trips to government offices. They'll also be able to track their application status, review their contribution history, and download their digital membership card.

The system will also feature a dedicated login for administrators. Using this interface, officials can verify user information, approve or reject applications, and manage all records from a centralized dashboard. They can track the distribution of welfare schemes and generate reports as needed, which makes monitoring and decision-making far more straightforward than digging through paper registers.

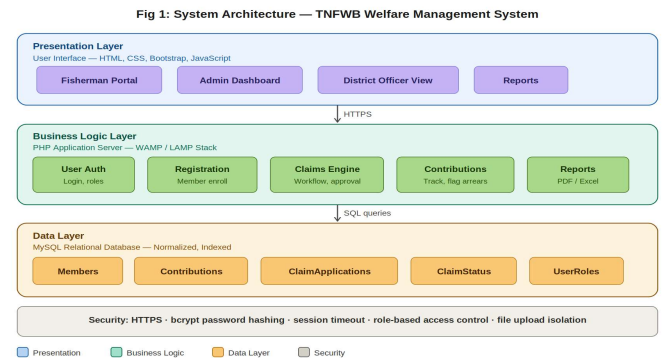
To ensure data security, all information is stored in a well-structured database, and access is restricted to authorized users through proper authentication. The interface is designed to be simple enough that users with basic technical knowledge can operate it without difficulty.

Table 1: Features of the Proposed System

Feature	Description
Member Registration	Online enrollment with document upload and field verification support
Contribution Tracking	Automated contribution tracking with real-time balance and arrear flags
Welfare Claims Management	Online application with multi-stage approval workflow and status tracking

User Management	Role-based access for Admin, District Officer, and Fisherman Member
Reports Generation	Real-time reports filterable by date, district, and claim type with export
Digital ID Card	Auto-generated membership card with QR code for identity verification

V. SYSTEM ARCHITECTURE



The system follows a standard three-tier web architecture consisting of a presentation layer, a business logic layer, and a data layer. This separation keeps things organized and makes it much easier to update or scale parts of the system without breaking everything else.

The presentation layer is what users see and interact with. It is built using HTML, CSS, JavaScript, and Bootstrap so that it works on both desktop computers at government offices and smartphones in the field. The layout is kept clean and easy to navigate because the system needs to be usable by people who are not particularly tech-savvy.

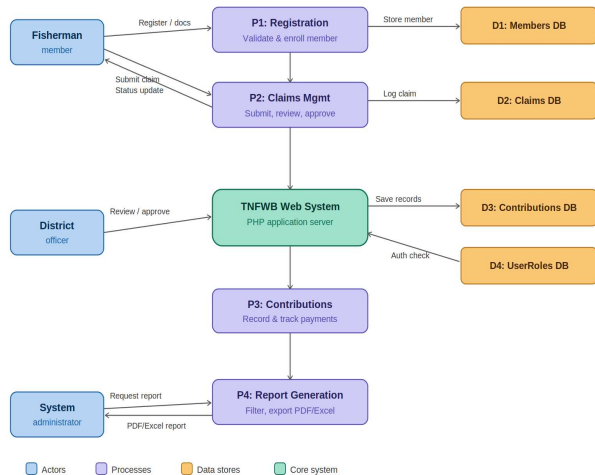
The business logic layer handles all the rules that govern how things work — validating registration inputs, calculating contribution balances, moving claims through the approval workflow, generating reports. This layer runs on a PHP server, which is well-suited to government web applications and runs reliably on the WAMP and LAMP stacks already common in Indian government IT setups.

The data layer is a MySQL relational database that stores everything: member records, contribution histories, claim applications, status

logs, and user accounts. The database is properly normalized to avoid duplication and indexed on frequently queried fields to keep response times fast even as the member base grows.

Security is handled at multiple levels. Communication between browser and server is over HTTPS. Passwords are hashed using bcrypt before storage. Sessions expire after a period of inactivity. Role-based access control ensures that each user can only see and do what their role permits.

Fig 2: Data Flow Diagram — TNFWB Welfare Management System



VI. MODULE SPECIFICATIONS

A. User Management Module

This module controls who gets into the system and what they can do once they're inside. It handles admin login and authentication, manages accounts across all three user roles, and takes care of password management including secure resets.

There are three roles in the system. The System Administrator has full access and can create or deactivate other accounts. The District Officer manages applications within a specific area and handles claim approvals. The Fisherman Member can view their own profile, check contribution history, and submit welfare applications.

Login attempts are validated against hashed credentials, failed attempts are logged, and accounts get temporarily locked after too many consecutive wrong entries. Nothing fancy — just solid, practical security that works.

B. Member Registration Module

This module handles new fishermen joining the system. The registration form collects personal details, identification documents, boat registration info where applicable, and contact information. Once submitted, the application goes into a queue for a District Officer to review and either approve or reject.

Document uploads are supported during registration, so verifying officers can check supporting materials without physically visiting the applicant. Approved members automatically receive a unique Member ID that is used for everything going forward — contributions, claims, and the Digital ID Card.

C. Member Contribution Module

Welfare benefits are funded through regular member contributions, and this module keeps track of all of that automatically. Every payment is recorded with a timestamp, balances update in real time, and members can check their own contribution history whenever they want.

The system flags overdue accounts so administrators know who needs a reminder. When contributions come in through offline channels — at a district office counter, for example — an administrator can update the records manually. Everything creates a clean audit trail, which makes disputes easy to resolve.

D. Claims Management Module

This is the heart of the system. Members can apply for the following welfare schemes:

- Accident Relief — financial support for fishermen injured in fishing-related accidents
- Missing During Fishing — support for families of fishermen who go missing at sea
- Death During Fishing — compensation for families in case of death while at sea
- Natural Death — assistance to family upon the death of a registered member
- Funeral Expenses — direct payment toward funeral costs
- Education Assistance — scholarship support for children of registered members
- Marriage Assistance — one-time grant for the marriage of a member's daughter

- Pregnancy Assistance — financial support for pregnant wives of registered members

Each application requires supporting documents, uploaded directly through the portal. The claim then moves through a defined workflow: submitted by the member, reviewed by the District Officer, and approved or rejected with a reason given. Members track their application status in real time and receive notifications when something changes. No more guessing games.

E. Reports Module

Administrators can generate reports across all areas of the system with a few clicks. All reports can be filtered by date range, district, or claim type, and exported to PDF or Excel for submission to higher authorities or for use in board meetings.

Table 2: Reports Available in the System

Report Name	Description
Death Report	Summary of natural death claims with approval status and amounts
Accident Relief Report	Accident claim details filtered by date, district, and status
Missing Fishermen Report	Records of missing-at-sea cases and support disbursed to families
Funeral Expenses Report	All funeral assistance applications and payment confirmations
Marriage Assistance Report	Marriage grant applications grouped by district and date range
Education Assistance Report	Scholarship applications and disbursements by academic year
Member Contribution Report	Full contribution history with arrear flags for all members

VII. IMPLEMENTATION

We built the system on a WAMP stack to keep development simple, then moved everything

over to a Linux-based Apache server once it was ready to go live. The way we worked was pretty straightforward: make a module, test it, fix any issues, and repeat. Catching problems early like this saves a lot of headaches—you don't want to find everything broken all at once when you thought you were almost done.

For the database, we focused on keeping things neat with normalization. The main tables—Member, Contribution, ClaimApplication, ClaimStatus, and UserRoles—are all connected with foreign keys. To keep search times speedy, we added indexes on busiest fields like Member ID, District Code, and Claim Date so even as the data grows, you don't feel a slowdown.

We deliberately kept the frontend simple. The interface follows layouts familiar to people who use Tamil Nadu government portals, so users don't have to relearn anything. And every form label comes in English and Tamil. This is huge for older users who are just more comfortable reading in their mother tongue.

When someone uploads supporting documents for their claim, those files are stored outside the public web directory. The only way in is through authenticated PHP scripts. Plus, we check file type and size both on the user's side and the server's end, so there's no chance for misuse.

VIII. RESULTS AND EVALUATION

The system was tested through unit testing, integration testing, and a proper user acceptance test (UAT). Unit tests covered all core logic — contribution calculations, claim status transitions, report generation. Integration tests confirmed that data moved correctly between modules and that database transactions were handled without issues.

For the UAT, 30 participants from two coastal districts in Tamil Nadu took part: 20 fishermen with varying levels of digital experience and 10 district-level administrative staff. Each participant completed a set of tasks — registering as a new member, submitting a claim, checking application status, and for admin users, generating a report. Their interactions were observed and they completed a structured feedback questionnaire at the end.

Table 3: User Acceptance Testing Results

Evaluation Criteria	Fishermen (n = 20)	Admin Staff (n = 10)
Registration Process	82% completed without help	95% found it straightforward
Claim Submission	78% completed without assistance	100% completed successfully
Status Tracking	85% tracked independently	100% successful
Report Generation	N/A (Admin function only)	90% generated correctly
Overall Satisfaction	80% rated satisfactory or higher	93% rated satisfactory or higher

IX. CONCLUSION

This project set out to answer a pretty simple question: can a web-based system actually fix the mess that is manual welfare administration for fishermen in Tamil Nadu? Based on what was built and tested, the answer is clearly yes.

The web-based Fishermen Welfare Management System replaces a fragmented, paper-heavy process with something that genuinely works for the people using it. Fishermen can register once, apply for benefits from any device, and know exactly where their application stands at any given moment. Administrators can verify claims, generate reports, and manage member data without wading through physical files. The whole thing runs faster, makes fewer errors, and treats beneficiaries with the transparency and respect they deserve.

The user testing backed this up. Satisfaction rates were high across both fishermen and administrative staff. The system didn't just work in a controlled setting — it worked with real people from coastal districts who had never used anything like it before.

That said, there is definitely more that could be done. A dedicated mobile application would improve the experience for fishermen who rely entirely on smartphones. Aadhaar integration

would speed up identity verification during registration. SMS alerts in Tamil would reach members who do not regularly check the portal. And a data analytics layer on top of the reports module could help policymakers spot patterns in claims and contribution defaults, allowing for more proactive support interventions.

The fishermen of Tamil Nadu contribute to one of the most economically and culturally important sectors in the state. They deserve welfare services that are fast, honest, and easy to use. This system is a meaningful step in that direction — and it proves that practical, well-designed technology can genuinely improve people's lives.

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