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P Tamizharuvi
PG Scholar, Department of
Agricultural Extension
Education, Institute of
Agriculture Research
&Technology, NMV
University,
Muthuramalingapuram,
Aruppukottai, Tamil Nadu

A Pazhanivel
PG Scholar, Department of
Social Work, Annamalai
University, Annamalai Nagar,
Tamil Nadu, India

Dr. L Mohammad Ghouse
Assistant Professor,
Department of Agricultural
Extension Education, Institute
of Agriculture Research
&Technology, NMV
University,
Muthuramalingapuram,
Aruppukottai, Tamil Nadu

Corresponding Author:
P Tamizharuvi
PG Scholar, Department of
Agricultural Extension
Education, Institute of
Agriculture Research
&Technology, NMV
University,
Muthuramalingapuram,
Aruppukottai, Tamil Nadu

Government schemes and policy implementation for agricultural disaster management in Tamil Nadu: A case study of Cuddalore district

P Tamizharuvi, A Pazhanivel and L Mohammad Ghouse

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Abstract

Agricultural vulnerability to climate-induced disasters is a growing concern in Tamil Nadu, particularly in low-lying coastal districts such as Cuddalore. The state faces recurring floods, cyclones and droughts that severely disrupt rural livelihoods. In response, the Government of Tamil Nadu has implemented a range of targeted schemes and policy frameworks designed to mitigate risk, provide timely relief and enhance resilience. These include the State Disaster Response Fund (SDRF), crop insurance schemes like PMFBY and waterbody rejuvenation through Kudimaramathu and IAMWARM. At the district level, Cuddalore has effectively localized these interventions through disaster planning, real-time early warnings and sectoral coordination. This article critically explores the implementation and effectiveness of these schemes, highlighting both progress made and challenges faced in disaster-prone rural areas.

Keywords: Disaster management, agriculture, Tamil Nadu, Cuddalore district, policy implementation, crop insurance, irrigation, climate resilience

1. Introduction

Natural disasters have always posed a serious challenge to agricultural life in Tamil Nadu especially for those living and farming along its vulnerable coastal belt. In places like Cuddalore, where rivers meet the Bay of Bengal and the land lies just above sea level, farming is not just a livelihood but a daily act of resilience. Here, agriculture is deeply intertwined with the rhythms of the monsoon. When the rains come on time, they bring life and nourishment. But when they fail or arrive with ferocity, they leave behind devastation flooded fields, destroyed homes and broken livelihoods. Over the past few decades, the climate has become increasingly unpredictable. Floods that used to be occasional now strike more frequently. Cyclones make landfall with greater intensity and droughts last longer than they did before. These shifts are not isolated they reflect broader changes in monsoon behaviour, rising temperatures and global climate anomalies. For farming communities already living on the edge, these changes are more than weather they are existential threats. In response to these growing challenges, the Government of Tamil Nadu, along with local administrations and community institutions, has stepped up with a comprehensive framework of policies and schemes. These measures aim to do more than just provide relief they are designed to help communities reduce risk before disaster strikes, recover quickly after and build the kind of long-term resilience that can withstand future shocks.

2. Policy Framework at the State Level

2.1 Tamil Nadu State Disaster Management Authority (TNSDMA)

The TNSDMA is responsible for planning and coordinating disaster preparedness and response under the provisions of the Disaster Management Act, 2005. It prepares the State Disaster Management Plan and supervises District Disaster Management Authorities (DDMAs). The Tamil Nadu State Disaster Management Policy (2023) emphasizes proactive risk mitigation, real-time warning systems and community-level preparedness.

2.2 State Disaster Response Fund (SDRF)

The State Disaster Response Fund (SDRF) serves as Tamil Nadu's frontline financial safety net in the wake of natural disasters. It is the fund that steps in when everything else fails when floodwaters have receded, crops have rotted in the fields and families are left picking up the pieces of their lives.

This fund is especially critical for farming communities who depend on timely harvests for survival. When disasters strike and over 33% of a crop is lost, SDRF ensures that farmers aren't left entirely empty-handed. It provides compensation to help them begin again replanting, purchasing seeds, at the very least, settling debts they can no longer repay.

SDRF also supports those who lose more than just crops. For families whose homes are damaged or destroyed, it offers relief to rebuild or repair huts and basic infrastructure. When livestock perish a common tragedy during floods and cyclones farmers are eligible for monetary support to replace what was lost, be it cattle, goats, poultry. And in the worst cases, when disasters claim human lives, the fund offers financial assistance to the bereaved families, helping them through their grief without the added burden of financial insecurity.

What makes SDRF effective is its direct benefit transfer (DBT) mechanism. The money doesn't get delayed in red tape or lost in transit it goes straight to the affected person's bank account, ensuring transparency, speed and dignity in support. At the district level, local revenue officials assess the damages and coordinate disbursement, turning policy into timely action.

Cuddalore, which have witnessed repeated flooding, this fund has been a critical lifeline. After the 2023 northeast monsoon, thousands of farmers received relief through SDRF, helping them restart their lives after weeks of displacement, crop loss and uncertainty.

3. Key Agricultural Schemes with Disaster Mitigation Components

3.1 Pradhan Mantri Fasal Bima Yojana (PMFBY)

The Pradhan Mantri Fasal Bima Yojana (PMFBY) is more than just an insurance scheme it's a promise of protection for farmers standing at the mercy of unpredictable skies. In a state like Tamil Nadu, where farming is deeply intertwined with the monsoon, this scheme plays a vital role in safeguarding the livelihoods of those who feed the nation.

For small and marginal farmers, who often operate on razor-thin margins, even a single failed crop can push an entire family into debt. PMFBY softens that blow by offering heavily subsidized insurance premiums, making the scheme accessible to even the most economically vulnerable cultivators. With just a modest contribution, these farmers are covered against the many faces of disaster floods, droughts, cyclones, pest outbreaks and more.

The policy works on the principle of yield-based insurance. If a farmer's harvest falls below the average due to a recognized calamity, the scheme steps in to compensate for the shortfall. This allows them not only to survive the season but to prepare for the next buying seeds, repairing land, even just making ends meet during recovery.

3.2 Kudimaramathu Scheme

The Kudimaramathu Scheme is not just a government initiative it's a revival of a centuries-old tradition where

communities took collective responsibility for the health of their water bodies. In Tamil Nadu, where the rhythm of agriculture depends entirely on the availability of water, especially in monsoon-dependent districts like Cuddalore, this scheme breathes new life into both the land and the people who work it.

At the heart of Kudimaramathu is community participation. Instead of waiting for large infrastructure projects, local villagers and farmers themselves are encouraged to take up the task of desilting traditional tanks the lifelines of Tamil Nadu's rural irrigation system. These tanks, once neglected and silted up, are brought back to function through simple, hands-on restoration.

What's particularly impactful is that the excavated silt, rich in nutrients, isn't discarded it's redistributed to farmers' fields. This boosts soil fertility naturally, reduces the need for chemical fertilizers and improves crop productivity. It's a win-win that combines soil health with water conservation.

The restored tanks now have greater water storage capacity, which serves two crucial purposes:

- During monsoons, they act as buffers, absorbing excess rainfall and reducing the intensity of flooding in nearby villages.
- During dry spells, they store enough water to support irrigation, even when rainfall is delayed or insufficient.

In disaster-prone districts like Cuddalore, this traditional yet innovative model helps farmers become more self-reliant and climate-resilient. The Kudimaramathu Scheme, in essence, reconnects communities with their land and water reminds us that sometimes, the best solutions lie in our own forgotten practices, brought back to life with purpose and participation.

3.3 IAMWARM Project

The IAMWARM Project represents Tamil Nadu's long-term commitment to reshaping how water is used and valued in agriculture. At a time when erratic rainfall and frequent droughts have left farmers vulnerable, IAMWARM steps in not just as an infrastructure initiative, but as a movement toward smarter, sustainable farming.

At its core, IAMWARM is about modernizing irrigation. Instead of relying solely on outdated canals or unregulated water use, the project upgrades irrigation systems with efficient structures that deliver water when and where it's needed. Farmers no longer have to gamble on unpredictable monsoons alone they now have better control over their water resources.

One of the project's strongest pillars is its focus on precision agriculture. By using tools and training to measure, monitor and minimize water usage, farmers learn how to produce more with less. This is particularly important in water-scarce districts like Cuddalore, where even one missed rainfall can make the difference between a healthy harvest and a failed season. IAMWARM also encourages the adoption of SRI (System of Rice Intensification), a technique that helps rice farmers use fewer seedlings, less water and less fertilizer while achieving higher yields. In flood-prone regions, where fields may go from waterlogged to parched within a month, SRI gives farmers a more adaptable, resilient way to grow paddy. Implemented across multiple river basins in Tamil Nadu and supported by the World Bank, IAMWARM is more than a scheme it's a shift

in mindset. In districts like Cuddalore, it helps move agriculture from survival-based practices to climate-smart farming, ensuring that even in the face of extreme weather, farming remains viable, productive and sustainable.

4. Implementation at the District Level: The Case of Cuddalore

4.1 District Disaster Management Authority (DDMA)

The District Disaster Management Authority (DDMA) of Cuddalore is the nerve centre for disaster preparedness and response at the grassroots level. In a district that faces frequent floods, cyclones and storm surges, the DDMA plays a crucial role in ensuring that warnings are not just issued but that they reach the people who need them and that support is ready before disaster strikes.

In 2023, the DDMA took proactive steps that show just how seriously Cuddalore is preparing for emergencies. Officials mapped out 239 flood-prone villages each one carefully identified based on past disasters, topography and vulnerability. This mapping wasn't just a paperwork exercise it allowed authorities to prioritize where help is needed most and develop village-specific response plans. To protect people during high-impact events like cyclones, the district activated 28 cyclone shelters and 14 multipurpose evacuation centers. These aren't just concrete buildings they're safe spaces equipped with food, water, sanitation, medical supplies and basic comfort. For families living in low-lying areas or near rivers, these centers are often the difference between safety and tragedy during peak monsoon.

Communication during disasters can be a matter of life and death. The DDMA has strengthened its emergency network using VHF radio systems a critical backup when mobile networks fail and SMS alerts sent through the TNSMART app and district channels. These alerts give farmers, fishermen and rural residents time to evacuate, secure livestock, protect vital resources before the worst arrives.

What makes the DDMA's approach stand out is its coordination. It brings together departments like Revenue, Agriculture, Animal Husbandry, Public Works and Health ensuring that disaster response isn't handled in isolation but as a unified, community-focused effort.

4.2 Agricultural and Horticultural Support

The district administration has been actively rolling out a range of agriculture and horticulture schemes to help farmers not only recover from disasters but rebuild stronger than before. At the heart of this effort is TANSEDA (Tamil Nadu State Seed Development Agency), which ensures that farmers have access to high-quality seeds, even after floods or cyclones wipe out their standing crops. By distributing climate-resilient and high-yielding varieties, TANSEDA plays a crucial role in enabling quick replanting and restoring confidence among affected cultivators.

To address water scarcity and promote efficient usage, the district implements the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY). Through this scheme, farmers receive support for micro-irrigation systems like drip and sprinkler setups, helping them grow crops even during dry spells while conserving every drop of water a vital tool in a district that oscillates between flood and drought. For those seeking to shift toward sustainable practices, Paramparagat Krishi Vikas Yojana (PKVY) provides organic input kits and training in eco-friendly farming methods. This reduces the

dependency on chemical inputs and enhances soil health, which is especially important after floods degrade topsoil and microbial life.

Meanwhile, MIDH (Mission for Integrated Development of Horticulture) supports the development of horticultural infrastructure, including polyhouses, shade nets, vermicompost units and nurseries. These protected environments give crops a fighting chance against erratic weather and allow farmers to diversify their income through fruits, vegetables and floriculture. Backing all these schemes are facilities like bio-fertilizer production units, certified seed farms and soil testing laboratories. These services are not just technical they are lifelines for post-disaster recovery, helping farmers restore fertility, assess damage and plan wisely for the next planting cycle.

4.3 Early Warning and Farmer Training

When a flood or cyclone is on the horizon, information becomes as important as irrigation. In Tamil Nadu, the TNSMART app has become a vital tool in the hands of farmers especially in vulnerable districts like Cuddalore. This mobile-based early warning system delivers location-specific alerts straight to farmers' phones, giving them critical hours or days to act. Whether it's moving livestock to safety, harvesting early, simply preparing the family for evacuation, timely information has saved both lives and livelihoods. But knowing about a disaster is only half the battle. Preparing for it physically and mentally is just as essential. That's where the ATMA program (*Agricultural Technology Management Agency*) steps in. This initiative focuses on building farmers' capacity to cope with changing weather patterns and the threats they bring.

Through ATMA, farmers receive hands-on training in disaster preparedness, learning practical steps they can take to minimize losses. For instance, they are taught how to reinforce storage spaces, protect input materials, construct drainage channels around their fields. Another crucial element of the program is the demonstration of climate-resilient crops varieties that can survive submergence, resist salinity, grow with limited water. Seeing these crops perform well on model plots gives farmers the confidence to adopt them on their own land.

Additionally, the ATMA program supports input management, teaching farmers when and how to apply fertilizers and pesticides based on changing weather patterns and how to store inputs safely during the monsoon. This reduces waste, lowers costs and improves overall productivity even in challenging conditions.

5. Challenges in Implementation

While Tamil Nadu's disaster management framework has become increasingly robust and districts like Cuddalore have shown commendable progress in implementation, several critical challenges continue to stand in the way of full-scale resilience particularly for small and marginal farmers. One of the most persistent hurdles is limited awareness. Many farmers still do not fully understand their entitlements under insurance schemes like PMFBY or the relief they can access through the SDRF. Without adequate information, they either remain unenrolled or are unable to claim support when disasters strike. This information gap often leaves them vulnerable, dependent on local moneylenders or ad hoc coping strategies. Another concern is the low adoption of essential mitigation practices, such as

the relocation of livestock before floods or the creation of elevated fodder storage areas. Although awareness is gradually growing, practical knowledge often doesn't reach the last mile, especially in interior or tribal pockets. In several cases, disaster preparedness is seen as a government responsibility rather than a shared community effort.

Infrastructure limitations also remain a barrier. Remote blocks in Cuddalore still lack proper roads, drainage systems, access to cyclone shelters. Without these basic supports, even the best policy frameworks struggle to reach the most affected families in time. Furthermore, the disconnect between traditional knowledge and formal planning limits the adaptability of disaster responses. Local wisdom such as observing wind patterns, reading soil behaviour, managing tank overflows often holds deep value, but is rarely documented or integrated into official preparedness strategies. To truly strengthen disaster resilience, what's needed now is participatory extension an approach that listens to farmers, works with their realities and tailors communication to their context. Localized climate advisories, issued in simple language and local dialects, can empower timely action. And more importantly, stronger last-mile connectivity both in terms of roads and relationships must be built, so that relief doesn't just exist on paper but reaches the hands that need it most, exactly when they need it.

6. Conclusion

Tamil Nadu's approach to managing agricultural disasters is no longer reactive it is gradually becoming strategic, science-informed and people-centered. With robust funding mechanisms, integrated policy frameworks and active local bodies, the state has built a disaster management ecosystem that is both structured and evolving. In this journey, districts like Cuddalore stand out not just as vulnerable zones, but as frontline examples of adaptive resilience in action. The combined deployment of crop insurance, community-led water management and real-time digital alerts is helping farmers recover faster, protect their livelihoods and plan for the future. The inclusion of schemes like PMFBY, Kudimaramathu, IAMWARM and mobile apps like TNSMART proves that when policy meets people where they are, change is not only possible it's visible. Yet, the path to resilience isn't paved solely with policies and funds. It requires bridging the gaps ensuring that every farmer knows their rights, can access their entitlements and feels supported before, during and after a crisis. The real success of any disaster management strategy lies not in how quickly relief is delivered, but in how confident and capable a farmer feels the day after a disaster. As Tamil Nadu continues to refine its model, a greater emphasis on community participation, localized decision-making and knowledge sharing will be key. Traditional wisdom must walk hand in hand with modern tools. Equity must be as central as efficiency. If these principles continue to guide the state's efforts, Tamil Nadu's agricultural disaster management framework may well become a replicable model for the rest of India a model that doesn't just respond to disasters but helps rural communities thrive despite them.

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