

Eco-Colonialism and Public Health: Anti-Malarial Fishery Programs in Colonial Madras Presidency

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Abstract: This research examines the pioneering role of the Madras Fisheries Department in combating malaria in colonial South India through biological control measures, particularly the use of larvicidal fish. Focusing on the period between 1908 and 1926, it explores how fisheries officials such as Mr. Wilson, Sir F. A. Nicholson and James Hornell developed and implemented ecological strategies to reduce mosquito populations in tanks, wells and moats across the Madras Presidency. The study highlights experimental work conducted at Sunkesula and Ippur fish farms, municipal partnerships for fish distribution and the innovative transformation of malaria-infested fort moats at Vellore and Chingleput into productive fish farms. Drawing from administrative reports, archival records, fisheries reports and ecological observations, the research demonstrates how these anti-malarial measures reduced disease incidence. By analyzing these efforts as a case of early integrated development policy, the paper contributes to broader discussions on colonial public health, environmental governance and sustainable rural livelihoods. It underscores the significance of localized, eco-sensitive interventions in addressing interconnected challenges of health and economic development in colonial India.

Keywords: Colonial Public Health, Larvicidal Fish, Malaria, Environmental Governance.

The colonial period in India was marked by recurring public health crisis, among which malaria emerged as one of the most persistent and deadly threats. Particularly in the Madras Presidency, the challenge of mosquito-borne disease prompted the colonial administration to adopt innovative and often experimental strategies for disease mitigation. One of the most remarkable and understudied responses came from the Madras Fisheries Department between 1908 and 1926, which harnessed biological control methods, especially the use of larvicidal fish to target mosquito larvae in both rural and urban water bodies.

This research paper investigates the evolution of these anti-malarial strategies under the leadership of key figures such as Mr. Wilson, Sir Frederick A. Nicholson and James Hornell. The department's efforts combined empirical research, ecological sensitivity and public health foresight. Through large-scale experiments at the Sunkesula, a settlement near Sunkesula anicut of Tungabhadra River located in Kurnool District and coordinated municipal collaborations across Bellary, Tondiyarpet and Kurnool, larvicidal fish such as *Chela argentea*, *Haplochilus* and *Therapon jarbua* were successfully bred and distributed to control malaria vectorsⁱ. Simultaneously, the conversion of fort moats at Vellore and Chingleput into fish farms exemplifies how anti-malarial strategies were integrated with inland fisheries development and rural livelihood enhancementⁱⁱ.

By situating these biological interventions within the broader colonial context, this study offers a new perspective on how environmental management, disease control and rural economic policy intersected in early twentieth-century South India. It argues that the fisheries-based approach to malaria control not only reflected colonial innovation but also laid the groundwork for future models of sustainable development and integrated rural governance.

Colonial Public Health and Environmental Challenges

By the late 19th and early 20th centuries, malaria had become a severe public health menace in British India, particularly in the Madras Presidency. The dense network of irrigation canals, tanks and stagnant water bodies, while crucial for agriculture and rural livelihoods, also served as ideal breeding grounds for the *Anopheles* mosquito. The rise in malaria cases was not merely a medical issue, it significantly impacted labour productivity, military efficiency and the general economic health of the colonial economy. In districts such as Kurnool, Chingleput and Bellary, recurring malaria outbreaks impeded both agrarian output and infrastructural expansion.

The colonial administration's growing understanding of disease ecology, particularly the discovery of the mosquito-malaria link by Ronald Ross in 1897, prompted a shift from reactive to preventive public health policies. However, chemical interventions like kerosene spraying and quinine distribution, while effective to an extent, were not sustainable at scale across the diverse geography of southern India. As a result, the state began exploring ecologically adaptive strategies, including biological control methods that could be integrated into local environments and economies.

Institutional Framework by Madras Fisheries Department

The institutional groundwork for the fisheries-based approach was laid with the establishment of the Madras Fisheries Department in 1907, following the recommendations of Sir Frederick A. Nicholson, a retired civil servant and early advocate of organized inland fisheries in India. The department was created not only to develop inland and marine fisheries but also to explore their potential role in improving rural livelihoods and food security.

Nicholson's vision was further expanded by James Hornell, who served as the first Director of Fisheries from 1908. Hornell, an ethnographer and marine biologist, recognized that fisheries science could serve multiple administrative objectives such as public health, food supply and economic development. Under his leadership, the department became an experimental hub for applied science in the service of colonial governance.

A key figure in implementing biological control was Mr. Wilson, a fisheries officer who conducted pioneering research on larvicidal fish at the Sunkesula Fish Farm starting in 1908. His work received institutional support through collaboration with the Sanitary Commissioner of Madras, Municipal authorities and District Collectorsⁱⁱⁱ. The institutional culture of the Fisheries Department was thus marked by a strong emphasis on experimentation, interdepartmental coordination and evidence-based policymaking which is unusual in a colonial context often criticized for bureaucratic rigidity^{iv}.

Additionally, All India Malaria Conferences, such as the one held in Madras in 1913, provided a platform for disseminating these findings and generating broader administrative interest in biological control. The Fisheries Department was quick to seize upon this opportunity, positioning itself as an essential player in public health interventions across the Presidency^v.

The department's ability to implement large-scale anti-malarial programs was also facilitated by favorable administrative mechanisms. Funding for specific projects like the moat fish farms at Vellore and Chingleput was sanctioned through Government Orders (G.O.s), which legitimized the allocation of public health and rural development budgets to fisheries-based schemes. For example, G.O. No. 3592 sanctioned Rs. 16,000 for the Vellore Fort moat conversion, reflecting official endorsement of innovative, multi-sectoral solutions^{vi}.

Furthermore, the department functioned as a nodal agency distributing larvicidal fish to municipalities, overseeing fish breeding farms like those at Ippur, a village in Guntur district and Sunkesula, coordinating with local health officers to monitor effectiveness. These efforts were supported by intersectoral cooperation between the Public Health Department, Revenue Department and Local Boards^{vii}.

Municipal Collaboration and Regional Implementation

While the initial research and breeding of larvicidal fish were centralized at experimental stations like the Sunkesula Fish Farm, the real success of the anti-malarial program hinged on its effective regional implementation. This was made possible through a robust network of municipal collaborations, which allowed the Madras Fisheries Department to translate scientific findings into practical, localized solutions. From 1910 onwards, the department worked closely with municipalities, local boards and sanitary officers to supply larvicidal fish for mosquito control in urban and semi-urban areas plagued by malaria. Municipal areas in and around Madras city, as well as smaller towns such as Bellary, Tondiyarpet and Markapur, became key sites for the practical application of larvicidal fish technology. These towns were chosen not only due to their high malaria burden but also because they had municipal institutions capable of implementing public health programs, including water body management.

- In Tondiyarpet, a suburb of Madras, the Fisheries Department collaborated with municipal authorities in 1915 to stock local wells and tanks with larvicidal fish. A subsequent inspection by sanitary officials found that wells containing these fish were completely free of mosquito larvae, demonstrating the program's viability and prompting broader adoption^{viii}.
- In Bellary, the Daroji Tank—a major source of stagnant water and mosquito infestation—was stocked with a mix of carp and larvicidal fish. These efforts were especially critical as the tank served large populations and was situated near army cantonments, where malaria had been a persistent issue.
- Markapur, located in the Kurnool district, also benefited from similar interventions. Fishes were introduced into community tanks, where local officials reported a marked decline in mosquito density^{ix}. These regional successes were crucial in legitimizing the use of biological control in public health operations.

One of the most ambitious and illustrative examples of regional implementation was the Nallamalais Project, initiated in December 1915^x. Situated in the malaria-prone forested tracts of Kurnool district, this project was specifically aimed at tackling the high prevalence of malaria among tribal and forest-dwelling populations^{xi}. The Nallamalais scheme involved:

- The breeding and transport of larvicidal fish to isolated jungle waterholes, which were significant breeding sites for mosquitoes, especially during the dry season.
- Collaboration with forest officials and local revenue administrators to gain access to remote water bodies.
- An emphasis on environmental management, including the removal of weeds, debris and foreshore pools, which often harboured larvae despite the presence of fish.

The project's success showcased the potentials of community-adapted ecological interventions. Field surveys conducted by the department in 1916 revealed that when both fish stocking and environmental clean-up were done in tandem, mosquito larvae were completely eliminated from treated areas^{xii}.

To facilitate regional implementation, the Fisheries Department developed a structured logistics chain. Fishes were bred in centralized hatcheries such as Sunkesula and later Ippur, where conditions were optimized for species like *Haplochilus* and *Chela argentea*^{xiii}. Special transport boxes were designed to carry live fish over long distances, taking advantage of species' high adaptability and survivability. Regional distribution hubs were established to serve surrounding areas, allowing district sanitary officers and municipal engineers to collect stocks for use in local tanks, ponds and wells. This decentralized, yet centrally coordinated model, allowed for rapid deployment of biological control across a geographically diverse and hydrologically complex region. It also reduced dependence on more expensive and unsustainable measures like chemical larvicides^{xiv}.

Implications for Integrated Vector Management (IVM)

The anti-malarial initiatives of the Madras Fisheries Department during the early 20th century provide significant historical precedent for what is now known as Integrated Vector Management (IVM). These efforts anticipated the core principles of IVM: ecological sustainability, cost-effectiveness, intersectoral collaboration and community involvement. By employing larvicidal fish such as *Haplochilus*, *Chela argentea* and *Therapon jarbua* in diverse aquatic environments, the department demonstrated how biological control could serve as a viable alternative to chemical larvicides^{xv}.

The integration of fish breeding, environmental sanitation and systematic health surveillance in colonial Madras reflected an early form of what is now termed Integrated Vector Management. At sites such as the Nallamalais scheme, where larvivorous fish were released into hill streams, the moat fisheries at Vellore and Chingleput, where fortified enclosures were converted into breeding grounds and the tank-based programs at Sunkesula and Ippur, where irrigation reservoirs doubled as fish nurseries, interventions were carefully adapted to specific ecological and socio-economic contexts. These projects reveal a deliberate attempt to align environmental modification with disease control, anticipating principles central to present-day IVM. The collaborative participation of municipalities, sanitary boards and local communities in stocking, upkeep and reporting suggest not a mere model, but a prototype of integrated governance that resonates strongly with contemporary frameworks emphasizing ecological sensitivity, multi-sectoral coordination and community engagement.

These early 20th-century programs underscore the importance of interdepartmental coordination between fisheries, sanitation and medical authorities in sustaining long-term vector control. Their legacy informs contemporary practices, reminding us that effective vector management must go beyond technology, encompassing local knowledge, environmental stewardship and institutional synergy for lasting public health outcomes.

Economic and Social Dimensions

The anti-malarial fishery programs initiated by the Madras Fisheries Department were not confined to public health; they also generated significant economic and social impacts, transforming neglected or disease-prone spaces into productive assets and introducing new livelihood opportunities. By converting mosquito-infested tanks, wells and even fort moats into fish farms, the government created dual-purpose spaces that served both public health and rural economic needs. For instance, the moat at Vellore Fort, once a malaria hazard, became a lucrative fishery enterprise. By 1939–40, it generated an annual income of Rs. 2,500 through leased fishing rights^{xvi}. These projects reduced the economic burden of malaria while simultaneously introducing a stable source of protein and income to local communities. The programs encouraged inland fisheries development in districts like Chingleput and Nellore. Fish distribution hubs enabled rural populations to access fresh fish year-round, enhancing food security and supporting emerging local markets.

The expansion of hatcheries, distribution systems and fish farming created employment in fish breeding, transport, pond maintenance and even in training programs. Fisherfolk, traditionally reliant on erratic marine fishing, found more consistent work and income through structured inland aquaculture.^{xvii}

The initiatives promoted local participation. Community members were educated about the importance of larvicidal fish, trained in basic aquaculture practices and engaged in maintaining water bodies. This participatory model encouraged grassroots in public health engagement and scientific temper among rural populations, aligning with broader colonial goals of 'improvement' and civil society formation. By reducing the incidence of malaria, the projects indirectly improved labour productivity. In towns like Tondiyarpet and Markapur, healthier populations could contribute more effectively to local economies. Schools, such as the Reformatory School near Chingleput Fort, reported fewer malaria cases, leading to better attendance and educational outcomes.

CONCLUSION

The Madras Fisheries Department's anti-malarial initiatives illuminate a distinctive conjuncture in colonial governance where experimental science, urgent public health needs and the concerns of economic development were interwoven into a structured policy programme. Far from representing marginal or eccentric experiments, the deployment of larvicidal fish in tanks, wells, moats and reservoirs emerged as a high-impact intervention with measurable effects on malaria reduction across diverse terrains of the Presidency. These schemes prefigured strategies later formalised in global health as integrated approaches to vector management, demonstrating an early recognition of ecological and community-based methods.

More broadly, the fisheries-cum-public health programmes exemplified a moment of developmental optimism, where natural resource management, sanitary reform and rural uplift were envisioned as mutually reinforcing. While situated within the coercive and extractive logic of colonial rule, these interventions nonetheless contributed to shaping sustainable water-use practices and community participation in health. The study thus reframes the Madras experience not merely as a localised experiment but as a critical episode in the genealogy of malaria eradication and environmental governance, underscoring the long-term significance of early twentieth-century eco-colonial innovations for debates on technoscience, development and public health

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