Monsoon in Colonial Malabar: Histories, Memories and Everyday Life

THESIS
Submitted to the University of Calicut
for the award of the Degree of
DOCTOR OF PHILOSOPHY IN HISTORY

Submitted by

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2025

DECLARATION

I hereby declare that the work presented in the thesis entitled **"Monsoon in Colonial Malabar: Histories, Memories and Everyday Life"** is based on the original work done by me under the guidance of **Dr. C.A. Anaz**, Assistant Professor, Department of History, Farook College (Autonomous), and has not been included in any other thesis submitted previously for the award of any degree. The contents of the thesis are undergone plagiarism check using iThenticate software at C.H.M.K. Library, University of Calicut, and the similarity index found within the permissible limit. I also declare that the thesis is free from AI generated contents.

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CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF GRAPHS

LIST OF MAPS

LIST OF APPENDICES

LIST OF ABBREVIATIONS

EAM	-	East Asian Monsoon
IMD	-	Indian Meteorological Department
IPCC	-	Intergovernmental Panel on Climate Change
ISM	-	Indian Summer Monsoon
KLDC	-	Kerala Land Development Corporation
KSA	-	Kerala State Archives
KSDMA	-	Kerala State Disaster Management Authority
LRF	-	Long-Range Forecasting
MWP	-	Medieval Warm Period
NWM	-	North-East Monsoon
RAE	-	Regional Archives Ernakulam
RAK	-	Regional Archives Kozhikode
SAM	-	Southeast Asian monsoon
SWM	-	Southwest Monsoon
TEK	-	Traditional Ecological Knowledge

ABSTRACT

Today, climate change has emerged as the most important environmental issue worldwide. climate influences all aspects of life on the earth. The monsoon circulation dominates the climate of India and Kerala in particular. “monsoon” comes from the Arabic word ‘mausim’ meaning season. It describes a seasonal wind shift over a region that is usually accompanied by a dramatic increase in precipitation. The South Asian monsoon, also known as the Indian summer monsoon, is one of the most spectacular phenomena of the global climate system occurring with remarkable regularity year after year. Any changes in monsoon seasonal rainfall can impact the socio-economic conditions of the densely populated country. Kerala’s agricultural economy largely depends on monsoon rainfall, and the changes in rainfall and temperature badly affected farmers' enthusiasm and Initiative for cultivation. Therefore, there is a need to study rainfall and temperature trends across the state in detail and their impact on the production of crops in Malabar.

The monsoon has long shaped the social, economic, and cultural fabric of Malabar, influencing both historical and everyday experiences. This study explores the role of the monsoon in colonial Malabar, analyzing how it intersected with imperial policies, agrarian economies, maritime trade and local livelihoods. Drawing from archival records, oral histories and indigenous narratives, the research examines how colonial governance responded to and was challenged by monsoonal rhythms. It also delves into the memories and lived experiences of communities, revealing how seasonal changes were embedded in daily practices, belief systems, and resilience strategies. By bridging environmental history with social memory, this thesis offers a nuanced understanding of the monsoon’s enduring significance in shaping colonial and postcolonial Malabar.

The monsoon in colonial Malabar was far more than a seasonal weather phenomenon -it was a force that shaped governance, economy and everyday life. This study has highlighted how the monsoon influenced colonial policies, disrupted and sustained agrarian and maritime economies, and became deeply embedded in the cultural memories of local communities. By analyzing historical records and oral traditions, the research underscores the resilience and adaptability of Malabar’s people in the face of monsoonal uncertainties. Contemporary analysis highlights how shifts in monsoon behaviour, influenced by climate change, have transformed livelihoods, societal structures and cultural practices. This inquiry demonstrates that the monsoon is not merely a climatic event but a pivotal force shaping human existence. Ultimately, this thesis demonstrates that the monsoon was not just a backdrop to colonial history but an active agent in shaping the lived realities of the region, leaving an enduring impact on both its colonial past and postcolonial present.

Keywords*:* Climate Change, Monsoon, South Asian Monsoon, Rainfall, Indigenous Narratives, Social Memory, Everyday Life, Colonial Malabar, Environmental History.

സംഗ്രഹം

ആധുനികകാലത്ത് ലോകമെമ്പാടുമുള്ള ഏറ്റവും പ്രധാനപ്പെട്ട പാരിസ്ഥിതിക പ്രശ്നമായി കാലാവസ്ഥാ വ്യതിയാനം ഉയർന്നുവന്നിട്ടുണ്ട്. മനുഷ്യജീവിതത്തിന്റെ എല്ലാ മേഖലകളെയും കാലാവസ്ഥ സ്വാധീനിക്കുന്നുണ്ട്. ഇന്ത്യയുടെ പ്രത്യേകിച്ച് കേരളത്തിന്റെ കാലാവസ്ഥയിൽ മൺസൂൺ ചംക്രമണം വലിയ രീതിയിൽ ആധിപത്യം പുലർത്തുന്നതായി കാണാം. "മൺസൂൺ" എന്നതിന്റെ അർത്ഥം "സീസൺ" എന്ന അറബി പദമായ മൗസിം എന്നാണ്. ഇന്ത്യൻ വേനൽക്കാല മൺസൂൺ എന്ന അറിയപ്പെടുന്ന ദക്ഷിണേഷ്യൻ മൺസൂൺ, വർഷം തോറും ശ്രദ്ധേയമായ ക്രമത്തിൽ സംഭവിക്കുന്ന ആഗോള കാലാവസ്ഥാ വ്യവസ്ഥയുടെ ഏറ്റവും മനോഹരമായ പ്രതിഭാസങ്ങളിലൊന്നാണ്. മൺസൂൺ മഴയിലുണ്ടാവുന്ന മാറ്റം ജനസാന്ദ്രതയുള്ള രാജ്യത്തിന്റെ സാമൂഹിക-സാമ്പത്തിക സാഹചര്യങ്ങളെ ബാധിക്കും. കേരളത്തിന്റെ കാർഷിക സമ്പദ്വ്യവസ്ഥ പ്രധാനമായും മൺസൂൺ മഴയെ ആശ്രയിച്ചിരിക്കുന്നു. കൂടാതെ മഴയിലും താപനിലയിലുമുള്ള മാറ്റങ്ങൾ കർഷകരുടെ ഉത്സാഹത്തെയും കൃഷിയോടുള്ള ആഗ്രഹത്തേയും മോശമായി ബാധിച്ചു. അതിനാൽ, സംസ്ഥാനത്തുടനീളമുള്ള മഴയും താപനിലയിൽ ഉണ്ടാകുന്ന മാറ്റങ്ങളും മലബാറിലെ വിളകളുടെ ഉൽപാദനത്തിൽ അവ ചെലുത്തുന്ന സ്വാധീനവും വിശദമായി പഠിക്കേണ്ടതുണ്ട്.

'മൺസൂൺ' വളരെക്കാലമായി മലബാറിലെ സാമൂഹിക, സാമ്പത്തിക, സാംസ്കാരിക ഘടനയെ രൂപപ്പെടുത്തിയിട്ടുണ്ട്, ഇത് ചരിത്രപരവും ദൈനംദിനവുമായ അനുഭവങ്ങളെ സ്വാധീനിക്കുന്നു. കൊളോണിയൽ മലബാറിൽ മൺസൂണിന്റെ പങ്ക് ഈ പഠനം പ്രധാനമായും അന്വേഷിക്കുന്നു. കൂടാതെ സാമ്രാജ്യത്വ നയങ്ങൾ, കാർഷിക സമ്പദ്വ്യവസ്ഥകൾ, സമുദ്ര വ്യാപാരം, പ്രാദേശിക ഉപജീവനമാർഗ്ഗങ്ങൾ എന്നിവയുമായി എങ്ങനെ ഇടപഴകുന്നു എന്ന് വിശകലനം ചെയ്യുന്നുമുണ്ട്. ആർക്കൈവൽ രേഖകൾ, വാമൊഴി ചരിത്രങ്ങൾ, തദ്ദേശീയ വിവരണങ്ങൾ എന്നിവയിലൂടെ മുന്നേറുന്ന ഈ ഗവേഷണം, കൊളോണിയൽ ഭരണം എങ്ങനെയാണ് മൺസൂണിനോട് പ്രതികരിച്ചതെന്നും എങ്ങനെയാണ് മനുഷ്യജീവിതത്തിന് ഒരു വെല്ലുവിളി ആയതെന്നും പരിശോധിക്കുന്നു. സമൂഹങ്ങളുടെ ഓർമ്മകളിലേക്കും ജീവിതാനുഭവങ്ങളിലേക്കും ഇത് ആഴ്ന്നിറങ്ങുകയും ദൈനംദിന ആചാരങ്ങളിലും വിശ്വാസവ്യവസ്ഥകളിലും പ്രതിരോധ തന്ത്രങ്ങളിലും കാലാനുസൃതമായ മാറ്റങ്ങൾ എങ്ങനെ ഉൾച്ചേർന്നുവെന്നും വെളിപ്പെടുത്തുന്നു. പരിസ്ഥിതി ചരിത്രത്തെ സാമൂഹിക ഓർമ്മയുമായി ബന്ധിപ്പിക്കുന്നതിലൂടെ, കൊളോണിയൽ, പോസ്റ്റ്-കൊളോണിയൽ മലബാറിനെ രൂപപ്പെടുത്തുന്നതിൽ മൺസൂണിന്റെ പ്രാധാന്യത്തെക്കുറിച്ച് ഈ പ്രബന്ധം സൂക്ഷ്മമായ ഒരു ധാരണ നൽകുന്നു.

കൊളോണിയൽ മലബാറിൽ' മൺസൂൺ' ഒരു സീസണൽ കാലാവസ്ഥാ പ്രതിഭാസത്തേക്കാൾ ഭരണം, സമ്പദ്വ്യവസ്ഥ, ദൈനംദിന ജീവിതം എന്നിവയെ രൂപപ്പെടുത്തിയ ഒരു ശക്തിയായിരുന്നു. കൊളോണിയൽ നയങ്ങളെ മൺസൂൺ എങ്ങനെ സ്വാധീനിച്ചുവെന്നും കാർഷിക, സമുദ്ര സമ്പദ്വ്യവസ്ഥകളെ എങ്ങനെ നിലനിർത്തിയെന്നും പ്രാദേശിക സമൂഹങ്ങളുടെ സാംസ്കാരിക ഓർമ്മകളിലെങ്ങനെ ആഴത്തിൽ ഉൾച്ചേർന്നു എന്നും ഈ പഠനം എടുത്തുകാണിക്കുന്നു. ചരിത്ര രേഖകളും വാമൊഴി പാരമ്പര്യങ്ങളും വിശകലനം ചെയ്യുന്നതിലൂടെ, മൺസൂൺ മൂലമുള്ള അനിശ്ചിതത്വങ്ങളെ നേരിടുന്നതിൽ മലബാറിലെ ജനങ്ങളുടെ പ്രതിരോധശേഷിയും പൊരുത്തപ്പെടുത്തലും

എങ്ങിനെയെന്ന് ഈ ഗവേഷണം അടിവരയിടുന്നു. കാലാവസ്ഥാ വ്യതിയാനത്തിന്റെ സ്വാധീനത്താൽ മനുഷ്യന്റെ ഉപജീവനമാർഗ്ഗങ്ങളെയും സാമൂഹിക ഘടനകളെയും സാംസ്കാരിക രീതികളെയും എങ്ങനെ മാറ്റിമറിച്ചുവെന്ന് ഈ സമകാലിക വിശകലനം എടുത്തുകാണിക്കുന്നു. മൺസൂൺ വെറുമൊരു കാലാവസ്ഥാ പ്രതിഭാസമല്ല, മറിച്ച് മനുഷ്യന്റെ നിലനിൽപ്പിനെ രൂപപ്പെടുത്തുന്ന ഒരു നിർണായകശക്തിയാണെന്ന് ഈ അന്വേഷണം തെളിയിക്കുന്നു. ആത്യന്തികമായി, മൺസൂൺ കൊളോണിയൽ ചരിത്രത്തിന്റെ പശ്ചാത്തലം മാത്രമല്ല, പ്രദേശത്തിന്റെ ജീവിത യാഥാർത്ഥ്യങ്ങളെ രൂപപ്പെടുത്തുന്നതിൽ ഒരു സജീവ ഘടകമായിരുന്നുവെന്നും, കൊളോണിയൽ ഭൂതകാലത്തിലും പോസ്റ്റ് കൊളോണിയൽ വർത്തമാനത്തിലും ശാശ്വതമായ സ്വാധീനം ചെലുത്തുന്നുവെന്നും ഈ പ്രബന്ധം തെളിയിക്കുന്നു.

പ്രധാന വാക്കുകൾ: കാലാവസ്ഥ മാറ്റം, മൺസൂൺ, ദക്ഷിണേഷ്യൻ മൺസൂൺ, മൺസൂൺ മഴ, തദ്ദേശീയ വിവരണങ്ങൾ, സാമൂഹികസ്മൃതി, നിത്യജീവിതം, കോളോണിയൽ മലബാർ, പരിസ്ഥിതിചരിത്രം.

CHAPTER 1
INTRODUCTION

Today, climate change stands out as one of the most pressing environmental concerns worldwide. Since weather and climate influence every aspect of life on Earth. The study of climatic variations is essential to understand human societies and the natural world across time. Climate history forms a branch of the wider interdisciplinary field of environmental history. Environmental history, which primarily examines landscapes, resources and ecosystems, differs from climate history, which concentrates on atmospheric changes, such as variations in rainfall and temperature, as well as oceanic dynamics, including ocean currents, Sea Level fluctuations and tsunamis. Within climate History, the study of monsoon holds a significant area because it has a profound influence in shaping the environmental, social, and economic history of many regions, particularly South and Southeast Asia. In India, particularly in Kerala, the monsoon circulation plays a decisive role in ascertaining climate patterns. “Monsoon” came from the Arabic word *mausim*, means “season”, it describes both the wind systems that carry heavy rains to Southern Asia as well as the rains associated with it. The present-day monsoon system continues to follow an established seasonal pattern similar to that of the past, it shows marked differences in the intensity of rainfall, its timing and spatial distribution when compared to earlier times, primarily as a result of human-driven climate changes combined with natural climatic variability.

Seasonal variations exert drastic changes on people's daily lives, compelling human societies to plan their daily activities in anticipation of these changes. In Kerala, the climatic conditions are considerably impacted by the geographical features of Western Ghats and the Arabian Sea. The state experiences two distinct phases of Monsoon: The Southwest Monsoon (*Edavappathi*) and the Northeast Monsoon (*Thulavarsham*). Among these, The Southwest Monsoon, which typically arrives in early June, constitutes the prominent rainy season. Whereas, the Northeast Monsoon, which usually occurs between October and November, contributes relatively slower levels of rainfall than its southwestern counterpart.

Monsoon rains have historically been deeply embedded in the social, cultural, and religious fabric of Kerala. Beyond its climatic significance, the monsoons have influenced various elements like the region's economy, culture, festivals, customs, rituals and traditions, while also shaping the maritime trade networks across the Indian Ocean. The fertile conditions created by Monsoon attracted the influx of foreign travelers to Kerala in search of spices. A substantial share of Kerala's spices was cultivated along the Western Ghats, the first landmass that the moisture-laden southwest winds encounter after crossing the Arabian Sea, resulting in intense rainfall and high-yielding agricultural zones. Kerala's agrarian economy is heavily reliant on monsoon rainfall, and the recent shifts both in rainfall patterns and temperature have adversely affected farmers' enthusiasm and initiative for cultivation. Therefore, this highlights the necessity to systematically analyze rainfall and temperature trends across the state, with attention to their impact on the production of crops in Malabar. Such climatic changes are also intertwined with how individuals and societies recollect historical memories and remember specific moments and events connected to their agrarian life. Geographically, Kerala is crisscrossed by rivers, and a significant portion of its land lies below sea level, rendering the state highly vulnerable to flooding during intense monsoon rains. Consequently, disaster management strategies and heightened alertness became crucial during the monsoon season.

The Problem: The Monsoon in Social History

The study of climate change takes up a prominent area of environmental studies, social activism and pure science, it remains under explored in the field of history. Therefore, this thesis seeks to address this gap by providing a historical analysis of the socio-cultural conditions of colonial Malabar through the lens of monsoon variations**.** The relationship between changing monsoon patterns and cultural transformation under the colonial capitalism represents a complex yet deeply interrelated historical phenomenon. During the colonial period, particularly under British colonialism in South Asian environmental conditions, such as monsoon variability, intersected with the socio-economic transformations of colonial capitalism, leading to profound cultural and societal shifts. Crucial to this inquiry are questions such as: How did shifts in monsoon patterns align with the commercialization of agriculture and long-distance trade during colonial regime? In what ways did colonial capitalism reshape cultural perceptions and traditional relationships with monsoon rains? The systematic measurement and documentation of monsoon patterns in colonial India started in the late 18th century and assumed greater organization in the mid-19th century under British rule. Recognizing the importance of understanding the monsoon for agricultural planning, revenue collection and famine prevention. The British administration established the colonial rainfall archives and formalized methods and policies to measure monsoons. This raises further questions such as: What motivated the colonial governments to establish meteorological departments and prioritize systematic rainfall measurement? How did colonial meteorological records influence policies on agriculture, irrigation and resource management? Finally, this study also concentrates on traditional rain knowledge in the colonial context: continuities and changes. It examines subsequent questions such as how colonial rule impacted indigenous rain-related rituals, customs and forecasting methods, and what tensions arose between traditional ecological knowledge and colonial scientific frameworks to monsoon prediction.

How has the monsoon phenomenon shaped the social, cultural and historical aspects of everyday life in Kerala? The rains brought by the monsoon, in addition to the rivers and river valleys they have replenished, have also structured the establishment of human settlements. The monsoon goes beyond just rainfall; it embodies the essence of human life, agricultural systems, cultivation practices, labour dynamics, land ownership, and governance, all of which have been deeply influenced by its impact. Agricultural settlements and agrarian societies were thus not only established through the essential water sources provided by rivers, canals, streams and lakes formed during the rainy season, but also nurtured by the shared experiences of rainfall. They generated distinct identities, enriched by their collective connection rooted to the land and its cycles. However, the experience of monsoon rains was not uniform across social groups. For instance, the experience of rain for a landlord may not be the same as for a farmer reflecting the structural inequalities embedded among these agrarian groups. The everyday experiences of the monsoon were therefore meditated by social position, occupation or class, giving rise to diverse perspectives on its significance.

Research indicates that waterways played a crucial role in transporting goods from the inland hilly regions to the coastal areas. These waterways facilitated the trade of goods, which in turn fostered the growth of traditional port towns in Kerala. The monsoon was instrumental in both the emergence and sustenance of these port towns, which became key hubs for exporting spices and forest resources. Through such dynamic export and import activities, Kerala evolved into a resource-rich region, attracting the arrival of European powers to gain control over these valuable resources.

Theories: Interdisciplinary Environmental History

Environmental history is an interdisciplinary field, drawing on insights from multiple disciplines to analyze the historical patterns of human interactions with the natural world. Within this framework, ecological history explores the reciprocal relationships between human and nature over time, seeking to understand how human societies have lived, worked, and conceptualized about the rest of nature, considering the changes brought about by time. Although human species are inherently a part of nature, they have, compared to most other species, caused extensive alterations to the conditions of land, sea, air, and the other forms of life sharing our tenure on the planet. These environmental modifications in turn, have affected our societies, cultures and our histories. Environmental historians tend to think that the intrinsic interdependence between human societies and individuals with the environment, characterized by mutual transformation, deserves constant recognition in the writing of history.[1] It serves as a methodological framework for studying societies and economies and examining the interplay between environmental forces, social institutions and economic transformations over time. The Annales School, in its pursuit of a holistic understanding of history, emphasized that historical developments were not solely shaped by human agencies but also by external forces beyond its control. These forces, which were not always passive or separate from human activity, included physical and visible elements such as geography and climate.

Annales scholar Fernand Braudel, masterpiece The *Mediterranean,* articulates theoretical framework of this study. It highlighted how landscapes and long-term climatic patterns played a crucial role in shaping material conditions of life. The French Annales School of historiography, in particular, paid systematic attention to the interactions between society and the natural world. The relationship between

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1 J. Donald Hughes, *What is Environmental History*? Polity Press, Cambridge, 2016, p.1.

human-driven climatic change and social transformation has been a central theme since the emergence of environmental history as a distinct discipline in the early twentieth century.[2]

Human ecology begins with the recognition that all forms of life need a foundation of sustenance in the atmosphere; thereby locating social organizations within a defined territorial base. Braudel illustrated meticulously by counting geographical features of Mediterranean— mountains, hills, valleys, seas, coasts and the islands.[3] Through concept of *longue durée*, which is explicitly described by Braudel's work, immediately established his status in this historiographical method. Theoretical foundations to history of environment interlinking climate and history. Climatology is the study of climate, which includes the collective patterns of all-weather events. It is important to recognize that climate varies across different time scales, including monthly, yearly, decadal, centennial and millennial fluctuations.[4] During the medieval period, Roger Bacon expanded on the Greek concept of climate zones, introducing more precise subdivisions. He explored the Sun's perceived motion and its effects on the Earth as a symmetrical body, along with the optical properties of water droplets in the atmosphere.[5]

Forerunners of this field history, like Emmanuel Le Roy Ladurie and British climatologist Hubert Horace Lamb, explored climate and humanity's expansion. Ladurie's, *Histoire du climat depuis l'an mil*, he examined "Little Ice Age" (15th–19th century), while Hubert Horace Lamb introduced the term "Medieval Warm Period"

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2 Justin Mathew, 'Capitalism, Climate Crises, and Methodological Challenges in Environmental History', *Economic and Political Weekly*, Vol.58, Issue.28,15th July 2023.

3 Alejandro Tortolero Villasenor, 'Annales School and the Environmental History of Latin America', *Historia Caribe*, Vol. XII -June 2017, p.307.

4 Helmut E. Landsberg and John E. Oliver, 'Climatology', John E. Oliver (ed.), *Encyclopedia of Earth Sciences Series*, Springer, 2005, p.272.

5 Bernardo Bastien, 'History of Climatology', 21st May 2018, p.3., *Research Gate,* https://www. researchgate.net/publication/325272364.

(11th–12th century).[6] Environmental determinism is also another branch, frequently used to interpret historical social collapses and to forecast the future of contemporary human societies. It is not a new concept, first introduced by Thomas Robert Malthus in 1798. Historically, it has been used to justify colonization and fascism, promoting the idea that tropical climates fostered so-called degenerative societies, while the variable climates of temperate regions encouraged stronger work ethics and more civilized societies. In the 1950s, this ideology was revived by eugenicists and neo-Malthusians through the concept of carrying capacity.[7]

Environment as decline of the Bronze Age Civilizations: Environmental factors have played a decisive role in human habitat selection, with climate change affecting the ecological environment, which in turn leads to social unrest and chaos. The primary reason for decline of the Mayan, Sumerian, Egyptian and Indus-Valley Civilizations is environmental degradation. Dr. Sanjeev Kumar, for instance, argues that a reduction in water availability, perhaps resulting from climatic changes or because tectonic activity caused rivers to change course, could have played a significant role in the decline Indus Valley civilization.[8]

Similarly, one of the reasons for the collapse of Egyptian civilization has been linked to environmental degradation Geological and geo archaeological investigations strongly indicated that climate change in Egypt was caused heavy rain it leads to floods of the Nile River. These reasons have been thought to have resulted sudden

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6 Dr. Felix Schneider, 'On Historical Climatology: A Brief Introduction', in Hans Lampalzer and Gerald Hainzl (eds.), *Climate, Changes, Security: Navigating Climate Change and Security Challenges in the OSCE Region*, Republic of Austria, 2024, pp.88-89.

7 G.-Fivos Sargentis, Demetris Koutsoyiannis, Andreas Angelakis, et al., 'Environmental Determinism vs. Social Dynamics: Prehistorical and HistoricalExamples', *World,* 2022, pp.357–358., https://doi.org/10.3390/ world3020020.

8 Martin Karl Skoglund, *Climate and Agriculture in The Little Ice Age: The Case of Sweden in a Wider European Perspective,* Swedish University of Agricultural Sciences, Department of Urban and Rural Development, Uppsala, Sweden, 2023, p.39.

decline of civilization.[9] The classic Mayan Civilization collapsed over centuries as the rain dried up, which badly affected the decrease in agriculture.[10] The deterioration of Sumerian Civilization owed to an intensification in dryness and wind movement, after a volcanic eruption, it induced a substantial deprivation of land-use conditions.[11]

Review of Literature: Climate, Nature and History

Climate serves as a function of time, and it varies subject to fluctuations; therefore, possessing its own history. Even the most extensive records we have, those spanning periods of a hundred years fail to capture a precise picture of the climate of any given region. All this is recognized by meteorologists, geographers, glaciologists, geologists and palynologists, who encounter evidence of it every day in their research.[12] The Swedish historian Gustav Utterstrom published an article titled "*Climatic Fluctuations and Population Problems in Early Modern History*, is an important paper related to the climatic fluctuations in Scandinavia, Central and Western Europe.[13] Historians of climate can be ranged for the most part into one of two categories, according to their intellectual backgrounds. Bryson, Fritts, Lamb, Mitchell and Von Rudloff, who are experts in the natural sciences: in biology, or more often in meteorology, have naturally sought to complement the knowledge and explanation of present-day climate, which both limit and delimit their colleagues' research, with another dimension stretching back into a historical angle. Honor where

9 Fabian Welc, and Leszek Marks, 'Climate change at the end of the Old Kingdom in Egypt around 4200 BP: New Geoarchaeological Evidence', *Quaternary International*, Vol. 324, 4 March 2014, p.125.

10 J. P. Rozelot and Zahra Fazel, 'Does Climatic Changes Could Have Destroyed Great Civilisations' I.P.Roze lot and E.S.Babayev (eds.), *Variability of the Sun and Sun-like Stars: from Asteroseismology to Space Weather*, *EDP Sciences*,2018, p.4.

11 *Ibid*., p.3.

12 Emmanuel Le Roy Ladurie**,** Barbara Bray(trans.), *Times of Feast, Times of Famine: A History of Climate Since the Year 1000*, Doubleday & Company, New York,1971, p.7.

13 Gustaf Utterstrom, 'Climatic Fluctuations and Population Problems in Early Modern History', *The Scandinavian Economic History Review*, Vol III,1955, p.3.

honor is due: these scholars have been able to enrich and adduce new and far-reaching ideas on the physical causes of, and large-scale variations in climatic change.[14]

Another group of researchers is composed of geographers, archaeologists, and professional historians whose specialization in economics or demography brings them in engagement with old archives, either documentary or archaeological, concerning climatic events. A prominent example is Gustav Utterstrom, starting from the analysis of agricultural conditions in eighteenth-century Sweden, has been able to render an account of climatic fluctuation in modern Scandinavia, demonstrating that the exceptionally mild winters in Sweden between 1721 and 1735 had a beneficial influence on the sowing of grain, pasturing of cattle, employment, public and longevity.[15] John Titow, Utterström, and Emmanuel Le Roy Ladurie belong to the second group of historians who exemplified this archival tradition. Emmanuel Le Roy Ladurie investigated in the history of agriculture, which led him, by a logical progression and even inevitable transition, to the history of climate. In his research, he examined archives and registers, to trace the history of certain groups of French peasants in the sixteenth and seventeenth centuries. These sources, as is usually the case, were extremely informative regarding the chronology of climate: with meteorological references to harsh winters and excessively wet summers accompanying all the records of poor harvests, famines, shortages and on occasion, years of abundance. The country dwellers of traditional societies constantly remained at the mercy of climatic benediction or calamity. But, fascinating as these descriptive documents were, in themselves, they did not enable one to throw much light on contemporary meteorology.[16] A historiography of more recent climates, therefore requires an engagement with the broader work of the most varied and recent

[14] *Ibid.*, p.1.

[15] *Ibid.*

[16] *Ibid.*, p.2.

specialists, from the professional meteorologists who reveal the climatology of the nineteenth and twentieth centuries to the pioneers of pollen research, indispensable to anyone interested in climatic variations of the early Middle Ages.[17]

Environmental history, like many other branches of historical inquiry, holds an interdisciplinary approach. The writings of environmental history gained global prominence in the 1970's, emerging from a broader intellectual movement to incorporate ecological perspectives into historical research. In India, environmental history took shape during the 1980s, evolving as a part of subaltern studies.

An Environmental History of the World: Humankind's Changing Role in the Community of Life authored by J. D. Hughes analyzed how men correlate their community life with the environment. He explained the significance to the study history of nature as an essential framework in comprehending the present state world's ecological problems. Alfred Crosby, in his seminal highly fascinating book *Ecological Imperialism: The Biological Expansion of Europe, 900-1900*[18] advances the argument that Europeans' displacement and states that the replacement of native peoples in the temperate zones was driven less by military conquest and more by biological factors. He demonstrates how colonizers had made certain development over their colonies. Subsequently, these people ensured their dominance over the most important agricultural lands globally. In the revised edition of this work, Crosby reaffirms global historical significance of European ecological expansion. In doing so, he illustrates how they were making their own world into a massive and diverse adjunct to socio-economic condition of European nations.

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[17] *Ibid.,* p.5.

[18] Alfred Crosby, *Ecological Imperialism: The Biological Expansion of Europe, 900-1900,* Cambridge University Press, New York,1986.

William Beinart and Lotte Hughes, in their influential work *Environment and Empire*[19] provide a pioneering contribution to history of environment for Britishers. This work analyzed environmental change was deeply intertwined with the social and political issues.

In the broader Indian context, a number of pioneering publications have shaped the field of environmental history. Among them, David Arnold and Ramachandra Guha's work, *Nature, Culture, Imperialism: Essays on the Environmental History of South Asia,*[20] brings together important work explained both forests and water, played a significant role in shaping history of South Asia.

The pioneering work of Guha, *The Unquiet Woods*: *Ecological Change and Peasant Resistance in the Himalayas* lays foundation works on environment, positioning it as an evaluation of British policies. Centered on both historical and sociological dimensions, the study highlights lower-class protest as it emerged as a separate field only after Second World War. This study discusses both these aspects of environmental movement like Chipko Movement. From a sociological perspective, Guha significantly reveals that the most celebrated environmental movement in the third world is perceived by its participants as a struggle to defend of traditional rights in the forest rather than being above all a peasant movement, and only secondarily, if at all, an 'environmental' or 'feminist' movement. The historical approach, meanwhile contributes to a decentering of Chipko, by locating within a much longer continuum of peasant movements in the Himalaya. Consequently, this study has evolved into a broader history of environmental degradation and peasant movements mostly

19 William Beinart and Lotte Hughes (eds.), *Environment and Empire,* Oxford University Press, 2007.

20 David Arnold and Ramachandra Guha, (eds.), *Nature, Culture, Imperialism: Essays on the Environmental History of South Asia,* Oxford University Press, Delhi, 1995.

concentrated against cutting forest. This work is explained in the context of both historical and sociological context of Chipko Movement.[21]

Ramachandra Guha, in his notable work *Environmentalism: A Global History,*[22] explores the role played by diverse cultural and national traditions in the making and shaping of diversity. It helps to understand how the trajectories of environmental movement originated. Complementing this, *This Fissured Land: An Ecological History of India, by* Madhav Gadgil and Ramachandra Guha (1993), beautifully describes ecological consciousness of Indian people.

Madhav Gadgil and Ramachandra Guha's book *Ecology and Equity*: The *Use and Abuse of Nature in Contemporary India,*[23] explained how use and abuse of resources held in post-colonial India. The collaborative work by J.R. McNeill, J.A. Padua, and Mahesh Rangarajan, *Environmental History: As If Nature Existed* [24], brings together present writings on ecological economics and environmental history. The volume addresses concerns regarding the inseparability of economic and ecological processes.

The work *Ecological Nationalisms: Nature, Livelihoods and Identities in South Asia,*[25] edited by Gunnel Cederlof and K. Sivaramakrishnan, examines the intersection to nature, nationhood, and nationalism through critical questions such as: In which way is nature took by politics when asserting identity, interests and rights?

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21 Ramachandra Guha, *The Unquiet Woods*: *Ecological Change and Peasant Resistance in the Himalayas,* University Press, New Delhi,1994, p.xii.

22 Ramachandra Guha, *Environmentalism: A Global History*, Longman, New York, 2000.

23 Madhav Gadgil and Ramachandra Guha, (eds.), *Ecology and Equity*: The *Use and Abuse of Nature in Contemporary India,* Routledge, New York, 2005.

24 J.R. McNeill, J.A. Padua, and Mahesh Rangarajan, (eds.), *Environmental History: As If Nature Existed*, Oxford University Press, New Delhi,2010.

25 Gunnel Cederlof and K. Sivaramakrishnan (eds.), *Ecological Nationalisms: Nature, Livelihoods and Identities in South Asia*, Permanent Black, New Delhi, 2006.

The work *Nature and Nation: Essays on Environmental History* by Mahesh Rangarajan explores broader consequences, including the environmental shifts in a major Asian society and polity, emphasizing how these shifts have also come under closer scrutiny, over the last three decades. Each essay in this collection, first published between 1998 and 2012, addresses a wide array of diverse themes, that gain coherence when situated within a wider context of political shifts and intellectual changes. While debates persist on when, why and how these specific shifts took place, their occurrence is widely acknowledged. The issues connected with these changes are of global significance not just because of altered power relations across nations, but also because of their ecological and environmental dimensions. Economic and ecological, state-making and uniqueness, nature and nation have all converged and cohered to form the center of analyses of change in this new century.[26]

Mahesh Rangarajan and Sivaramakrishnan's work *India's Environmental History*[27] Vol.I &Vol.II represent a collection essay related to history of India's environment. The edited volume *Monsoon and Civilisation,* by Yoshinori Yasuda and Vasant Shinde[28] analyzed a collection of scholarly articles related to monsoon circulation. The work is organized into five parts: Part I titled Asian monsoon variability and human adaptation, Part II Indian monsoon variability and human adaptation, Part III Holocene climate history and the Harappan civilization, Part IV monsoon and civilization and the last part V climate and civilizations.

Sebastian Prange's work *Monsoon Islam* focuses on Indians' Malabar Coast and how Islam spread through socio-economic, religious and political challenges. The

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26 Mahesh Rangarajan, *Nature and Nation: Essays on Environmental History,* Permanent Black, Ranikhet, 2017, pp.1-2.

27 Mahesh Rangarajan and K. Sivaramakrishnan (eds.), *India's Environmental History,* Orient Blackswan, 2011.

28 Yoshinori Yasuda and Vasant Shinde (eds.), *Monsoon and Civilization,* Lustre Press, New Delhi, 2004.

work centers on two dynamics: first one is the emergence of Islam through agency of Muslim traders and other is how Muslim community cooperated other caste people across the medieval Indian Ocean world. In other words, it analyzes the travels of Muslim communities in space and time, as well as their internal responses to changes in their social and political environments. The core argument is that during this period, a distinct form of Islamic thought and practice emerged from these twin processes. This Monsoon Islam through Indian Ocean was molded by traders not sultans, forged by marketable requirements rather than in battle.[29]

Patricia Tusa Fels, work about *Monsoon Mosques* describes Malabar and coastal South East Asia, where religious structures became splendid creations of rising wooden roofs, a sophisticated elaboration on the local timber construction techniques. This book presents a group of buildings little studied and not typically considered together. The mosques visually represent an 'appropriation' of a local vernacular, buildings based on local needs and available materials. The religion arrived via maritime networks, and the mosques arose out of the earth of each unique place. The geography produced certain consistent similarities and Cultural traditions produced unique differences. Kerala mosques drew inspiration from the styles of the big wooden temples, palaces and homes of the Malabar Coast. The Malaysian and Indonesian mosques followed a similar trajectory-adapting parts of the local vernacular and creating a house for prayer suited to the extreme climate and made of local materials. All appropriated the big rain-shedding roof of the tropics, pyramids of wood that rise to reach the skies.[30] The work *Chasing the Monsoon: A Modern Pilgrimage through India by Alexander Frater* explores a touching portrait of the lives

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29 Sebastian Prange, *Monsoon Islam: Trade and Faith on the Medieval Malabar Coast,* Cambridge University Press, 2018, p.3.

30 Patricia Tusa Fels, *Monsoon Mosques: Arrival of Islam and the Development of a Mosque Vernacular,* Mapin Publishing, North America, 2020, p.11.

of the Indian people and how they are positively and adversely affected by the monsoon.[31]

Sunil Amrith work *Unruly Waters* explore the reason of India's experience of imperialism cast an elongated shadow over the history of Asia's waters. British colonialism was a spiral of enduring trauma for many Indians, including the educated elite who led India's nationalist movement in - first half of the 20th century. Beyond the outright violence that the British government of India deployed, this trauma resided in a sense of profound social and economic destabilization.[32] The third reason is that Indian subcontinent occupies a crucial position in monsoon system, placing monsoon as the thread that runs through unruly waters. In its simplest definition, the monsoon is "a seasonal prevailing wind.[33]

In *Monsoon Economies India's History in a Changing Climate,* Tirthankar Roy critiques comparative economic history for its unmindful and often unsophisticated approach with regards to the role of geography in shaping human lives and reciprocal effects of human activities on their environment. While natural resource endowments do receive attention, Roy emphasizes a broader notion of geographical agency, encompassing the concepts of climate, soil, elevation and vegetation, as a more extensive idea than resource extraction. He also highlights the bias inherent in resource-focused analysis, as most of the economic historians explained that notion of what resources matter to economic change depended on what resources mattered for nineteenth-century Britain. This book claims that water is a more valuable

31 Alexander Frater, *Chasing the Monsoon: A Modern Pilgrimage through India,* Penguin Books,1990.

32 Sunil Amrith, *Unruly Waters: How Mountain Rivers and Monsoon Have Shaped South Asia's History*, Penguin Books, UK, 2020, p.12.

33 *Ibid*., p.1.

economic resource.[34] He also investigates a range of environmental factors in India, including relief activities to famine, the conceptualization of water scarcity.

The Monsoon India: The Land and the People (1972), by Dr. P. K. Das provides vivid descriptions of the monsoon. Several centuries ago, seafaring traders discovered a pattern of alternating winds over the Indian Ocean and the adjoining Arabian Sea, which appeared to flow from one direction for six months of the year before reversing its direction for the remaining half of the year. Winds that persistently reverse their direction with surprising regularity each year are now known collectively as monsoons.[35] Das's work offers historical background of the seasonal wind, planetary and regional facets of monsoons etc.

Dr. Panna Lal's *India: A Regional Geography* renders a comprehensive account of India's geographical climate, agriculture, geographical distribution, cultural diversity and ecology. It also offers valuable insights into the spatial dimensions of the geographical climate in India[36]. Complementing this, *The Climate Solution: India's climate-change Crisis and What We Can Do about it* by Mridula Ramesh explores myriad facts of the multifaceted challenges such as in which way women are impacted by a warming weather, and how variations of climate stance a security risk to the Indian State. It also helps to comprehend the broad-brush strokes of climate change impact, including rising temperatures, heat waves, floods, sea level rise, droughts and rising infection outbreaks. This work also analyses how the climate variations will make forced human migration as one of the foundational trends in the current century.[37] Similarly, the work *'Geography of the Environment' by* Mohammed

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[34] Tirthankar Roy*,* *Monsoon Economies: India's History in a Changing Climate*, Westchester Publishing Services, United States of America, 2022, p.20.

[35] Dr. P.K. Das, The *Monsoon India: The Land and the People*, National Book Trust, 1986.

[36] Dr. Panna Lal, *India: A Regional Geography***,** Anmol Publications, 2012.

[37] Mridula Ramesh, *The Climate Solution: India's climate-change Crisis and What We Can Do about it*, Hachette India, 2018.

Shafi and Mehdi Raza brings together essays related to the environment. This work also helps to apprehend themes of sustainable agriculture and environmental security in India.[38]

The unpublished dissertation *Impact of Climate Change and Agricultural Production in Kerala* by Joby Jose attempts to examine the implications of climate change on agricultural productivity across selected districts of Kerala. Through this study, he outlines the cropping patterns in Kerala in relation to climatic distribution and also provides insights into prevailing climatic trends in the state. Complementing this, M Raghavan's work *State Failure and Human Miseries: A Study with Special Focus on Famine in British Malabar* deals with a discarded piece of history relating to British Malabar, a region today that largely encompasses the northern and central districts of Kerala. This study mainly identifies the causes and defining features of famine, tracing their occurrences in Malabar from the period when the East India Company dominated as a commercial organization to the end of the British colonial rule in 1947 and connecting them with the features of famine that we compiled at the outset.

M. Raghavan used empirical material from archival sources, existing theories postulating the causal mechanisms underlying the famine condition of Malabar.[39] The work *Malabar Manual* by William Logan provides a detailed description of the Geographical features of Malabar along with an account of landscape features, climatic conditions, natural calamities, etc. Likewise, K.N. Ganesh's *Prakrithiyum Manushyanum* describes the interrelationship between man and nature, with particular

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38 Mohammed Shafi and Mehdi, *Geography of the Environment,* Rawat Publication, New Delhi, 1994.

39 M Raghavan, *State Failure and Human Miseries: A Study with Special Focus on Famine in British Malabar,* Kalpaz Publication, Delhi, 2016, p.14.

attention to the study of how nature has influenced the relationship between the human mind and body. [40]

Research Objective

1. To investigate the origins of geo environmental processes in colonial Malabar, with particular reference to the interactions between human communities and their ecosystems. This ecosystem includes human settlements, human subsistence, agriculture, etc.

2. To analyze the ways in which people adapted agricultural practices to the variations of the monsoon. It serves as a means to recollect farmers' memories in their everyday lives through climatic changes.

3. To trace out documentation of monsoon knowledge through colonial archival records.

4. To examine the role of traditional ecological knowledge in understanding and complementing the scientific approach.

5. To identify cultural and social transformations influenced by monsoon variations of people in colonial Malabar.

6. To examine the interrelationship between monsoons and floods in the early 20th century.

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[40] K.N. Ganesh, *Prakrithiyum Manushyanum*, Kerala Sasthra Sahithya Parishat, Thrissur, 2014.

Hypotheses

1. The monsoon was not merely a static backdrop but a dynamic and ever-evolving environmental force connected to cultural and economic systems.

2. Understanding historical perspectives on the monsoon necessitates meticulous studies grounded in specific temporal and spatial contexts.

3. In nineteenth and twentieth century Malabar, archival sources indicate that British colonialism facilitated the large-scale reconfiguration of the traditional environmental knowledge, embedding it with the logics of commercial geography and a functionalist interpretation of natural forces.

4. The establishment of meteorological departments marked a socio-cultural intervention that transformed society's engagement with the monsoon, shifting from an experiential, memory-based understanding to a standard and quantified system of rainfall records.

5. Contemporary perceptions of the monsoon reflect a multi-layered cultural framework that integrates the interplay of indigenous knowledge, colonial influences, and modern scientific and environmental interpretations of nature.

Sources

Primary as well as secondary sources were collected from a range of archival repositories, libraries and related institutions. Primary sources consist of archival data, government official correspondence, government reports, newspapers, interviews, and official telegrams and letters. These were accessed at the Kerala State Archives (KSA), Thiruvananthapuram, Regional Archive, Kozhikode (RAK), Regional Archives, Ernakulam (RAE), and Revenue Recovery Library, Thalasseri. Official Archives are the key of colonial record that form the core of this study, offering insights into British commercial and geographical perspectives on landscapes and ecological specificities. The major archival record used this study include Rain report correspondence file, Daily rain report of the Malabar district, Guide to records of Malabar district, Manual of Administration, Season reports, Madras Presidency Records, The Gazetteer of India – country and people, Report on the meteorology of India 1860- 1940, Volumes I and II of Malabar District Gazetteer, Practical guide to the climates and weather of India. Among the most innovative sources for the study are Broad Statement of Rainfall (1858-1940), an archival source which provides critical data to understand regional variations in monsoon patterns. Another significant archival collection is Statistical Atlas of India: Madras and Malabar, it helps to illustrate demographic and climatic data, document trends in agricultural production, land-use patterns and environmental issues, and is vital to understand historic climate patterns and assess colonial interventions.

Popular and Print Media

Confidential file pertaining to the flood in Malabar: serves as a crucial source to study disaster management strategies of the past societies. It provides detailed information on flood, people and affected areas, as well as the state's responses. In addition, newspapers such as Malayala Manorama, Mathrubhumi, Deepika, Deshabhimani are invaluable resources, as their daily reports recorded public responses to state-managed relief measures and environmental policies. Collectively, these sources helped in understanding the evolution of environmental awareness on climate stress and changing monsoon patterns.

Folk Archives

Rain Proverbs and the History of Agricultural Knowledge: In 19th and 20th-century Kerala, agricultural proverbs functioned as significant repositories in shaping farming practices and influencing the agrarian society's cultural and economic landscape. These proverbs served as valuable storehouses of indigenous knowledge, guiding farmers in decision-making regarding crop selection, planting seasons, harvesting techniques, and weather predictions. Many parts of the study used extensive collections of rain proverbs and sayings, songs related to the rain. Illustrative examples include *Kumbhathil mazha paithal kuppayilum Manikyam, Makarathil mazha peythal Malayalam mudiyum, Vrishika kaattuthiyal mazha illa, vavu kazhinjal varshamilla, vishu kazhinjal venalilla* etc.

Flood songs in Arabi Malayalam literature: Flood songs embody an integrated understanding of the ecology, religion and music of the recurrent floods in twentieth-century Malabar, serving as a form of collective memorialization. *Tufan Mala, Kerala Jala Khora Vruthandam, Malabar Vadam, Jalayoga Geetham, (Ponnani Ahmed Kutty) Vellappokka Mala,* represent the prominent Arabic - Malayalam literary works constituting an important epoch in the study of environmental history in Kerala.

Krishigeeta: An oral text was composed in the 18th century, which offers a rich account of rain lore/water lore of the folk, account of the seeds, paddy cultivation and connected with the broader aspects of agrarian life. Krishigeeta emphasizes that the finest way to know the intensity of rains is to display the usual atmospheric conditions and wind patterns, precisely how modern-day meteorologists forecast the weather.

Monsoon Theyyam: This study also draws upon monsoon ritual performances like the Karkidaka Theyyam, Vedanpaattu, Aadi Vedan and Karkidothi.

In addition to this, a wide range of other primary and secondary sources were collected from libraries which include, CH Muhammed Koya Library, Sahithya Academy (Thrissur), Appan Thampuran Library, KIRTHADS , (Kozhikode), CDS (Thiruvananthapuram) M.S. Swaminathan Research Foundation (Puthoorvayal), UPASI Tea Foundation (Meppadi Regional Centre), Wayanadu Tea Museum, Chundale Estate Wayanad, Kerala Agricultural University, (Ambalavayal), ICAR Krishi Vigyan Kendra, (Wayanad), The Office of Disaster Management in (Kalpetta), Wayanad Paitthraka Museum, (Ambalavayal), Regional Coffee Research Station, (Chundale). Additionally, several travel accounts of anonymous authors '*Periplus of the Eritrean Sea',* James Tod: *Travels in Western India,* Francis Buchanan Travelogue, Jean Baptiste Tavernier: *Travels in India,* Francois Bernier*, Travels in the Mogul Empire A.D.1656-1668,* were accessed for understanding climatic changes.

Methodology

Interdisciplinary Environmental History: This study adopts an interdisciplinary approach, aiming to engage in a close dialogue with geography, ecology, anthropology, memory studies, and historical climatology. These connected fields allowed the present study to analyze the archival sources to contextualize the changing patterns of the monsoon as a lens to study the social history of peasantry and farming. The interdisciplinary framework allowed the study to examine class and gender dimensions of environmental experiences. Furthermore, the study explored diverse monsoon narratives to enrich the ongoing discussions on the implications of the climate crisis on contemporary human societies and economies.

Environmental anthropology: The methodological engagement of this study positions landscapes and environmental forces like the monsoon rain as active agents that influence the formation of social institutions, practices, and structures of everyday life.

Memory studies: Assisted this study to investigate how non-human natural forces contribute to memory processes. Insights from memory studies were employed to investigate the relationship between collective memories of environmental change and how those changes have shaped societies and economies.

Historical climatology: This interdisciplinary field enabled the present study to understand the past climate and weather through the analysis of archival documents like rainfall measurements and revenue records on landscape changes. This also facilitated an analyzation of social impacts and responses, uses of climate knowledge, and cultural engagement of communities with climate.

Historical geography: Aided in understanding of how past societies managed extreme rain events and the consequent transformation of landscapes along with associated economic crisis. Insights from historical geography further enabled the study to examine colonial ideologies and their reflections on evolving approaches towards climate and weather, including rain patterns, and flood and drought events, as well as agricultural patterns

The study employs a method of an analytical and descriptive study, primarily based on the interpretation of primary data. Field work was conducted for collecting village oral traditions related to agriculture. This work is carried out with an interdisciplinary perspective. Unstructured interviews were designed to elicit the memories and experiences of farmers about monsoons. Archival research provided data on seasonal variations and rainfall records of Malabar and Madras were collected, with different archives in Kerala giving valuable knowledge about the subject. Extensive fieldwork and interviews facilitated to understand primary and life experience from the farmers and tribes, through the oral history research method. Given that the local climate and its distribution are vital in determining the agricultural pattern of an area, which in turn determines the quantity and quality of agricultural production, any climate change is sure to inevitably impact the economic and social life of the people in any country. The study is descriptive in its documentation of the monsoon settings in Kerala, elaborating the differences in geo climatic features, especially in the geographical regions of lowland, midland, and highland. At the same time, the study holds an explanatory nature as it analyzes and interprets the trends in rainfall and temperature in the Malabar region.

Colonial Malabar as a Geographical Position

The selection of Monsoon in Colonial Malabar as the focus of this study is motivated by several considerations. Here used Colonial Malabar as "British Malabar" because the region's historical, political, and administrative legacy continued to shape its identity even after the end of colonial rule in 1947. This enduring influence meant that British Malabar was not only a colonial construct but also an important framework for understanding the region's post-independence trajectory. By examining Malabar in this way, the study highlights how colonial legacies extended beyond the colonial period itself, continuing to impact society, governance, and culture well into the modern era. Other reasons are Firstly, Monsoon functions as a conceptual and geographical category, making it essential to develop tools for studying the monsoon from a historical perspective. Such a source has become accessible to us only in very recent times. Studies about monsoon came in to existence very recently. Secondly, given that monsoon is a global natural phenomenon, studying it in its entirety is very difficult, thus situating the analysis within a specific regional context is essential for meaningful interpretation. Moreover, the Malabar region, historically significant for being under direct British administration, offers a compelling case in this regard. It not only experienced the profound ecological and socio-economic impacts of the monsoon but also became a site of extensive British interventions. By concentrating on "Monsoon in Colonial Malabar," this research seeks to critically assess the strategies and policies introduced by the British regarding meteorological observation and weather forecasting. Such an inquiry offers valuable insights into the intersection of colonial governance, scientific knowledge systems, and environmental management during a period of weighty imperial control. For the contemporary analysis, this study also considers post-colonial natural calamities like floods in 1961,2018 ,2019 alongside contemporary disasters in Kerala.

Kerala's most defining feature is its climate, which is largely governed by the seasonal monsoons, which blow from southwest to northeast between June and August and from northeast to southwest in October and November. The first monsoon in *Malayalam,* the local language of Kerala state, is called "*Kalavarsham",* originating from the Arabian Sea and the second one is "*Thulavasham*", arriving from the Himalayan mountains[41] Kerala constitutes a distinct natural geographical unit, rising as its core, from the blue Arabian Sea, growing in irregular steps, and culminating in the evergreen forest-clad Sahyadri of Western Ghats.[42]The topography of Kerala can be broadly divided into three: *Malanad, Idanad,* and the Coastal area.[43] The climate of Kerala particularly temperature and precipitation, is closely mirrored in its biotic landscape. The specific topography, combining abundant rainfall for nearly 10 months of the year, high humidity, and uniformly high temperature has fostered the characteristic vegetation of Kerala. This temperature and rainfall pattern can be termed 'Megathermal' or tropical rain type. The climate of Kerala is tropical maritime and monsoonal in character.[44] Kerala is described as the land of monsoons, as the first burst of the southwest monsoon over the Indian subcontinent takes place here.[45]The timely onset, optimum duration and reasonable strength of the southwest monsoon are of vital importance to the life and economy of not only Kerala but also

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41 *Preparatory Survey for Wayanad Comprehensive Environment Conservation and Community Development Project in India Final Report*, International Cooperation Agency (JICA), Vol.III: Annexes December 2014, Japan, p.44.

42 Western Ghats situated at the southwest corner of the Indian peninsula, the state extends from 08.2^0 to 12.8^0 N parallel and 78.8^0 to 77.5^0 E meridian, covering an area of 78,864 km^2. See, in P.A. Menon and C.K Rajan, *climate of Kerala,* classic publishing house, 1989, pp.5-6.

43 The coastal area lies up to 7.5 meters above sea level. Between 7.5 meters and 75 meters is *Edanad*, and above these two is *Malanad,* approximately 950-1000 meters high. *Malanad* is a region adjacent to the Western Ghats. *Edanad* is the area that slopes down to the seashore to the west. The coastal area is a narrow, land-like area near the sea. Se., in. K N Ganesh, *Keralathinte Innalekal,* Department of Cultural Publications, Thiruvananthapuram, 1990, p.11.

44 William Logan, *Malabar Manual*, Charithram Publications, Trivandrum, 1981, p.17.

45 *Ibid.*

the entire South Asian region.[46] Following its onset in Kerala, the monsoon current and the monsoon rains move northwards to cover the entirety of India. The period of four months from 1st June to 30th September are designated as the Southwest monsoon season. In Kerala, it is locally known as *Edavapathy*.

The Western Ghats have been a momentous factor in Kerala's geographical location.[47] Kerala was free from foreign invasions due to its strategic geographical position. The crest line of the Western Ghats typically lies at a distance from 50 to 80km, from the Arabian Sea, however in certain areas it approaches so close to the shore as to restrict the width of the coastal plain to as little as 7.5km. It is not uncommon for spurs and ridges to end as cliffs along the coast.[48]

This study primarily focuses on the area of Malabar, which is situated approximately 10 degrees north of the Equator, stretching from Cape Comorin in the south to Mount Delli in the north. This word historically signifies mountaineers, not that the inhabitant's dwell amid lofty mountains, although the greater part of the country, stretching along the seacoast, consists of flat and marshy terrain. The name likely originates from the original colonists, who were mountain race.[49] Malabar

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46 *Ibid.*

47 The Western Ghats, the mountain chain running sequentially parallel to the west coast of the Indian peninsula, occupy 1,60,000 sq. km covering 1600 km stretched between the states of Gujarat, Maharashtra, Goa, Karnataka, Kerala, and Tamil Nadu. In other parts of the world, also such mountains, gifted as they are with high levels of environmental heterogeneity, are treasure troves of natural diversity. In the Western Ghats, the annual rainfall varies from as much as 8000 mm in the southwestern corner of upper Nilgiris to a mere 500 mm in the Moyar gorge just 30 km to its east. In contrast, the annual rainfall spans a range of no more than 1000 mm over hundreds of kilometers across the Deccan Plateau. Mountains also create isolated habitats far away from other similar habitats, promoting local speciation.se., in. Madhav Gadgil, *A Walk up the Hill Living with people and Nature*, Penguin Random House India, Haryana, 2023, p.267.

48 Dr. P.N Chopra, *The Gazetteer of India: Indian Union*, Vol. II, Ministry of Education and Social Welfare,1973, p.7.

49 Malabar is a province on the western coast of India extending from 10° 12' to 12° 15' North Latitude and between the parallels of 75° to 76° 50 'east longitude. The coast runs diagonally in a south-easterly direction and forms a few headlands and small bays. It is bounded on the North by the province of Canara, on the East by those of Coorg and

proper comprises of the nine taluks of Chirakkal, Kottayam, Kurumbranad, Calicut, Wynaad, Ernad, Waluvanad, Ponnani and Palaghat.[50]

The climate of Malabar can be categorized into three distinct seasons. The hot season extends from February to May, during which the thermometer ranges from 80 to 90 degrees. The regular monsoon commences in June and continues till the full moon in October or November, characterized by rain falls with scarcely any intermission for several days and is then followed by a few days of fair weather. In October, the onset of showers of rain with distant thunder indicate the commencement of the North-East monsoon, accompanied by cool land winds which prevail till February during the nights, but shift to a strong sea breeze a little before noon. In March or April, sudden and intense thunderstorms with rain blow over in an hour; generally following very close and sultry weather. During the rainy season, the thermometer scarcely varies by degrees, and when kept in cool situations readings range from 65° to 80° occasionally dropping to 60° in the morning during the prevalence of the wind in December and January.[51] Overall, the climate of Malabar exhibits the uniformity of temperature throughout the year as tested by the thermometer. The thermometer shows a mean annual temperature on the seacoast of 81^0 Fahr. It rarely exceeds $90\ ^0$, and it seldom falls below 70^0 The climate of Malabar

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Mysore, to the southeast by Coimbatore, and on the South by the Small province of Cochin. Malabar is divided into 18 Taluks or Districts, containing 2,222 Deshoms or Villages; few or none of them are compact. By a census taken in 1827, the whole of the population amounted to 10,22,215, which gives 160 individuals to the square mile. A large portion of the country to the east is mountains and hills overrun with forest, and the population is densest along the coast and for some distance into the interior.se., in. Ward and Connor, *A Descriptive Memoir of Malabar,* Government of Kerala,1995, p.1.

50 C.A. Innes, *Malabar Gazetteer*, Government of Kerala,1997, p.1.

51 Ward and Conner *op.cit.,* p.5.

was consistently warm, sometimes hotter, but never very hot.[52] During June, July, and August, the peak southwest monsoon season, the wind blows all day and night.[53]

A defining characteristic of the climate is the remarkable regularity of the seasons. Logan recounted his experience one day at the end of February or the beginning of March regarding the likelihood of rain's arrival. A local resident predicted that the first shower would occur at the 22nd of March at 2. P.M. and indeed, the rain began at that precise time, within ten minutes or so. This is not guessed, for the 22nd of March corresponds to the vernal equinox, and 2. P.M. in the day precisely marks the hour at which most frequently the daily battle between sea breeze and land wind onsets. In certain seasons, though not in all, the first distant rumble of thunder along the line of Ghats betokens that 2. P.M. has just struck or is about to strike. This daily atmospheric battle begins as soon as nature's pendulum commences slowly to swing back as the sun passes across the equator into the northern hemisphere. The regularity of this seasonal pattern, accurate to months and almost two days and hours perfectly, seems astonishing to people accustomed to living in settled climes.[54]

Outline of the Chapters

The proposed study will be presented in chapters as described below:

1. The First Chapter serves as the introductory chapter, presenting a general overview including the objectives, methodology of study, principal arguments, and sources, followed by a review of the literature.

2. The second Chapter, 'Winds of Social Change: Monsoon in South Asian Architecture and Literature' examines the role of monsoon in Asia, exploring

52 William Logan*, op.cit.,* p.37.

53 *Ibid*., p.38.

54 *Ibid*.

regional ecologies and monsoon in south Asian architecture and literature, monsoon winds and the rhythms of life: shipping, trade, and rain narratives within Malayalam literature.

3. The Third Chapter, 'Rain Memories, and the Agrarian Past: Stories from Malabar' aims investigates how oral histories, memories, proverbs, folklore, and Arabi Malayalam literature engage with the issue of climate change. It examines the rainfall and temperature trends across the state and their impact on the production of crops in colonial Malabar. It aims to recollect the historical memories of farmers and societies that chose to remember certain moments and events related to their agrarian life. The first sub-chapter explores the practice of rain rituals in Kerala. The second sub-chapter analyses narratives embedded in rain proverbs, *Njattuvela* concepts, rain songs, and *Krishigeetha.* The third sub-chapter discusses Monsoon *Theyyam,* while the final segment of the chapter outlines depictions of climate variations in Arabic Malayalam literature.

4. The Fourth Chapter, 'Measuring Rainfall: Colonialism and the History of Meteorology in India' deals with how the British colonizers established institutions for monitoring climatic variations. It addresses the development of the meteorological organization in India, the history of meteorological operation in South India, the Meteorological Department under the Government of Madras, scrutinizes how rain affected wars among other related topics.

5. Fifth Chapter, 'Rain Fears: The Flood Narratives and the Anthropocene Future' primarily deals the great flood of 1924, the flood of 1961, and the flood of 2018, along with other significant contemporary natural disasters, analyzing their immediate and long-term impact on affected communities. It explores how people handled these calamities, gradually rebuilding their lives and

restoring a sense of normality through flood relief measures, government policies and programs. This chapter also analyzes how the monsoon as a gendered experience.

6. The Sixth Chapter is the conclusion. The concluding part of the work synthesizes the findings of the study.

Relevance of the study

The present research is significant as it not only links history with environmental and cultural studies but also offers critical lessons for managing human-environment relationships in the context of the contemporary climate crisis. Employing an interdisciplinary approach through, the study integrates meteorological reports on rainfall variations, weather patterns, folklore studies, thereby complementing scientific studies and regional geography. It also attempts to further evaluate climate change studies to understand historical interactions with the monsoon, forming a framework to contextualize present environmental crises such as flood, famine, landslides, and their socio-economic impacts. This study highlights the role of Monsoon rituals, beliefs, and adaptations in colonial Malabar illustrating how people amalgamated nature into their cultural identity. It also examines the policies and programs of british administrations to manage monsoon-related challenges, including the establishment of a Meteorological department, implementation of relief methods during floods and in times of famine. The monsoon has been a central determinant in shaping the socio-economic and cultural structures of Malabar. This study also demonstrates how exploring its impact during colonial times provides valuable insights into how environmental forces influenced historical developments.

Scope of the Study

This study enquires about the profound influence exerted by the monsoon in Colonial Malabar, analyzing its historical, social, cultural, and environmental dimensions. Adopting a multidisciplinary approach, this study aims to interlink history, culture, and environmental studies, providing an understanding of how the monsoon shaped the everyday life and collective memory in colonial Malabar. It draws upon archival research, memory studies, and oral history documentation to construct a wide-ranging narrative of the monsoon's heritage. It explores the role of the monsoon in forming the socio-economic dimensions of colonial Malabar and investigates rainfall records of the Malabar Presidency, alongside archives, local narratives, and indigenous knowledge systems, to assess the monsoon's influence during the colonial period. Moreover, the study highlights the enduring impacts of colonial and post-colonial monsoon policies and practices while also tracing the historical continuity of monsoon-related cultural practices and evaluating their relevance in the contemporary context of climate change and sustainability.

The monsoon exerts a pronounced influence on human thought and mentality. Man's everyday life is related to various aspects such as shelter, food, dressing, occupation, travelling, festivals, customs, marriage, which are correlated to monsoon. Understanding nature therefore needs to be addressed beyond the standpoint of the present-day environmental movements and academic ecology, raising questions about how has natural forces have influenced the relationship between people's minds and bodies. So, this study attempts to address such questions by providing reliable answers. It also intends to show how monsoons affect the everyday life of people in Malabar. It draws upon the memories and histories of people in colonial Malabar to depict their everyday life, and how they were deeply embedded in social practices and cultural experiences.

CHAPTER 2

WINDS OF SOCIAL CHANGE: MONSOON IN SOUTH ASIAN ARCHITECTURE AND LITERATURE

This chapter explores the multifaceted dimensions of the monsoon beginning with its ecological impact across the Indian landscape and the broader Monsoon Asia region, followed by an examination of seasonal patterns unique to India. The term "social change" describes how societal norms, beliefs, institutions, and behaviours evolve and transform. Environmental consciousness, political activity, economic restructuring and technological advancements have all contributed to these changes, which have altered the material and cultural environments in which the wind system operates. The monsoon stands as one of the most defining environmental forces in Southeast Asia, shaping not only the ecological frameworks of the Indian subcontinent but also its cultural, economic and historical routes. It further delves into the rich literary representations of the monsoon, historical documentation by foreign and indigenous travelers, and the critical role of monsoon winds enabling maritime trade and influencing coastal architecture. Finally, it considers the deep emotional and cultural resonances of rain as depicted in Malayalam literature, emphasising the monsoon's presence as both a natural phenomenon and a cultural metaphor. It specifically examines the monsoon's influence on modern socioeconomic conditions.

Climate history has recently emerged as a crucial section of global environmental history. It had interconnection between water resources on the one hand and deforestation, rainfall, soil erosion, climatic change, global warming, drought, famine and various natural calamities on the other.[1] British writings on the Indian environment became increasingly distinctive from the 1760s, as the East India Company began transitioning from a commercial to a territorial power. Increasingly, the company looked India to settle and develop its agricultural, commercial, and human resources. The climate also became an essential metaphor for differences between the rulers and the ruled. It was believed that India had been subdued because its climate render people passive and resigned, whereas the invigorating climate of northern Europe was thought to have produced an energetic race, well-suited for conquest and exploration.[2] The important feature of Indian meteorology is the wind system's semi-annual reversal, causing the monsoon winds.[3] 'Monsoon' has different kinds of etymology and disciplines produced their understanding. Meaning can be connected with seasonality of surface winds flowing persistently both winter and summer.[4] Etymology of the word Monsoon- examines how the formation of the term 'monsoon, originates from the Arabic word 'Mausim', which means a season. In Portuguese (monção), Malayalam (mazhakkalam) Dutch (moesson), and English (monsoon): this exploration is integral to socio-cultural narratives and climate knowledge across civilizations. Seamen used the word for centuries to describe alternating winds over the Arabian Sea. The winds blew from the northeast for six months of the year and from the reverse direction, south-west, for the remaining six months. Several historical references have been made to the seasonal reversal of winds over India and other parts of Asia.[5]

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1 Ranjan Chakrabarty, *Climate, Calamity and the Wild: An Environmental History of the Bengal Delta, c1737-1947*, Primus Books, Delhi, 2022, p.35.

2 Mark Harrison, *Climates and Constitutions: Health, Race, Environment and British Imperialism in India 600-1850*, Oxford University Press, New York, 1999, p.1.

3 *Ibid*.

4 C. S. Ramage, *Monsoon Meteorology*, Academic Press, New York and London,1971, p.1.

5 Dr. P. K. Das, (ed.), *The Monsoon India: The Land and the People,* National Book Trust, New Delhi,1968, p.1.

Monsoon Ecologies of the Indian Subcontinent

The Indian Subcontinent is composed of the continental lithosphere and is one of the very significant components of the Indian Plate. The Indian Plate includes most of South Asia, the Indian subcontinent, a portion of the basin under the Indian Ocean, parts of Tibet (South China), and western Indonesia. The plate has a convergent margin along the Himalayas in the north, transform margins in the west and the east and an oceanic ridge in the Indian Ocean.[6] Much of the subcontinent is essentially tropical and depends on the monsoon winds that sweep across the Indian Ocean from June to October to supply much of the rainfall. In the north, however, the plains receive much less reliance upon the winds, and rivers are fed by melting snows in mountainous areas of northern India itself. The Indian subcontinent can be divided into geographic units. The northern region extends from the northwest lands watered by the Indus River to the northeastern region watered by the Ganges River. The central area, south of the Vindhya Mountain range, is called the Deccan and it includes hills and forest zones and the high and arid Deccan plateau. The southern region is separated from the rest of the land by the Nilgiris Hills. The climate is largely tropical, with rainfall for much of the subcontinent depending upon the monsoon winds that sweep across the Indian Ocean from June to October. However, the northern region's plains, where great rivers are fed by melting mountain snows, are less dependent upon the winds than peninsular India in the south.[7]

K. N Chaudhuri says, "One of my inspirations, Braudel, taught me that the idea of an Indian Ocean economy that connects all the coastal areas has validity," and

[6] A K Jain, and D M Banerjee, (eds.), 'The Indian Subcontinent: Its Tectonics', *Proceedings of the Indian National Science Academy,* Vol.86 (1), March 2020, p.775.

[7] John D. Rockefeller, 'third collection of Asian Art'*, Website at Asia society museum.org,* accessed on 6/01/2025,11:45 pm.

derives inspiration from Braudel's work. First, starting with ocean-based monsoon winds, he distinguished three large ocean trading zones: the Arabian Sea, the Bay of Bengal, and the South China sea. All these trading areas had strong economic zones at their base, making it easy for them to develop and generate economic growth due to the annual cycle of monsoons: from April to August, south-westerly winds, and from December to March, north-easterly winds. These winds sustained shipping and geographic trade activity. In terms of the maximum effective annual trading radius, the coastlines of the three seas were more interconnected with each other than their contact with the rest of the world. Naturally, the critical ports were located where these circuits converged. Khambayat, Surat, Calicut, Goa, and Melaka were the most important ports along these two seas. Therefore, in the early sixteenth century, the Portuguese traveller Tomé Pires could refer to the 'two arms' of Cambay: one of which reached Aden in the west and the other in the east.[8]

Monsoon Asia

The Eurasian Continent is divided into Monsoon Asia, Arid Asia, Atlantic Asia, and Boreal Asia. Monsoons predominantly affect the climate in Monsoon Asia; the prevailing southwest Monsoons cause the rainy season, while the prevailing northwest monsoons cause the dry season.[9] Monsoon Asia explains the geographical region influenced by monsoonal winds, which bring seasonal rainfall. The area includes South Asia, Southeast Asia and East Asia. All the regions of monsoon Asia experienced seasonal monsoon, which is important for agriculture, trade, and the development of civilizations.[10] The socioeconomic conditions of most of the

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8 *Ibid*., pp.99-100.

9 Yoshinori Yasuda, 'Discovery of Riverine Civilizations in Monsoon Asia', in Yoshinori Yasuda & Vasant Shinde, *Monsoon and Civilization,* Luster press, Roli Books, 2004, p.12.

10 *Ibid.*

developing countries in the South Asian region largely depend on the Indian summer monsoon rains. It also played an important role in the rise and fall of ancient civilizations in this region. However, the influence of the Indian summer monsoon in ancient Indian civilizations were not fully explored, though there were some attempts to correlate monsoon variation with their rise and fall. The Indus Valley or Harappan civilization flourished in the western part of India from its early development, through its urbanization and very fast transformation into a rural society. A sustained decrease in Indian summer monsoon rainfall likely contributed to the decline of the urban phase of the Indus civilisation.[11] One of the causes for the decline of the Vedic civilization due to climate change and neotechnic activities that caused widespread salinization of soils and the formation of saline lakes in the green fertile regions of the Vedic settlements.[12]

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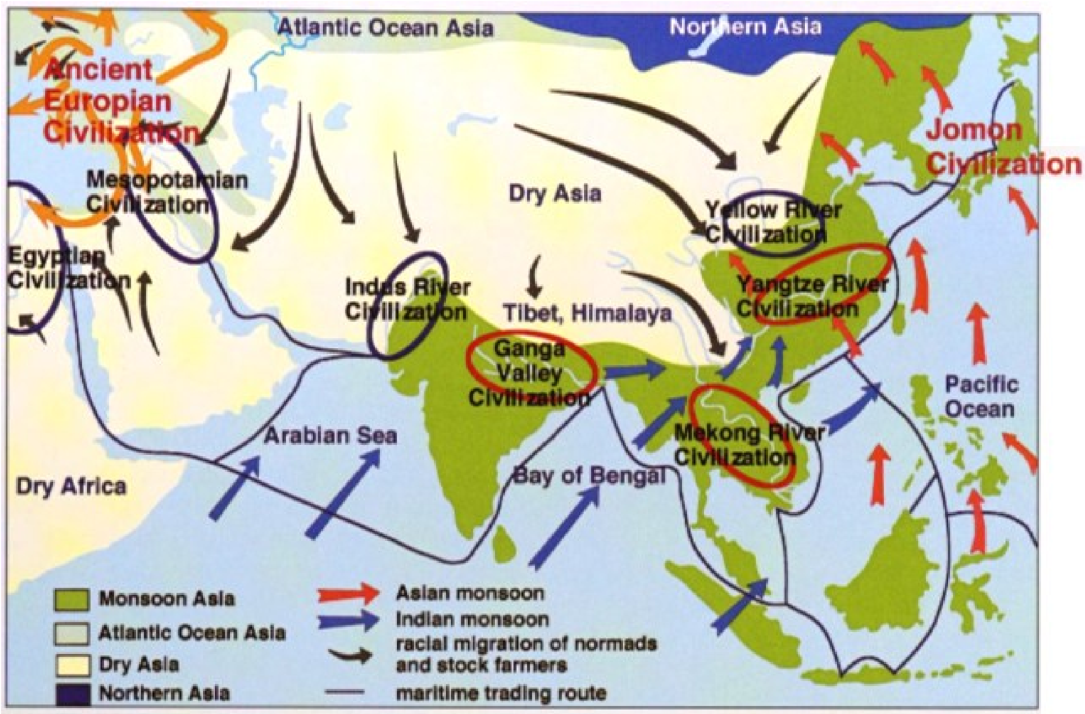
11 Amzad Hussain Laskar and Archna Bohra, 'Impact of Indian Summer Monsoon Change on Ancient Indian Civilizations During the Holocene', *Frontiers in Earth Science,* Vol.9, September 2021, p.1.

12 *Ibid*., p.6.

Map 2.1

The map showing climate division of Mesopotamian, Egyptian, Indus, and Yellow River Civilizations



Source: Yoshinori Yasuda, *Discovery of Riverine Civilizations in Monsoon Asia,* Yoshinori Yasuda & Vasant Shinde, *Monsoon and Civilization*, Luster press, Roli Books, 2004, p.13.

The four great civilizations-Mesopotamian, Egyptian, Indus, and Yellow River Civilizations are plotted on the climate division map 2.1. The four ancient civilizations emerged along with great rivers that flow at the boundary zone between the wet and dry regions. The Tigris and Euphrates rivers, which gave rise to the Mesopotamian Civilization, flowed in the region where the wet Atlantic Asia came into contact with Arid Asia. The Indus River, flowed at the boundary zone between the wet Monsoon Asia and Arid Asia. The Yellow River civilization rose in the 'S' shaped region of the Yellow River, which was at the boundary between the Arid Asia and Monsoon Asia. The Nile River cannot be clearly positioned between such wet and dry regions. However, the banks of the Nile River constitute fertile, humid areas, while dry deserts extend just a short distance away from the Nile River. Besides, the Nile River flowing through the desert can itself be considered a contact zone between wet and dry regions.[13]

What is the long term geographical and historical factors that have contributed to the harmony of the Monsoon Asia region, encompassing South and Southeast Asia? The basic reason for this harmony is geographical. Unlike other macro-regions such as China, Africa, or Europe, the Arid zone and the Indian Ocean condition its open and dual nature. One hand, there was a large area of great sedentary wealth and agriculture; on the other, we had availability of high resources and trade.[14] The Asian monsoon is the largest and strongest monsoon system in the world. Although monsoons are a regional phenomenon driven by the heat contrast between the continent and the ocean, it is so large that their behaviour exerts a significant influence on the global climate. The Asian monsoon is divided into three subcomponents: the South Asian monsoon, the Southeast Asian Monsoon (SAM), and the East Asian Monsoon (EAM).[15] These three types of seasonal variation are influenced by the everyday activities of the people.

Northeast Monsoon and Southwest Monsoon

India's economy mainly depends on two monsoons: the southwest monsoon, which brings rainfall to the entire country from June to September, and the northeast monsoon, which primarily brings rainfall to the southern peninsula from October to December. During the pre-monsoon season, it rains in March-May; however, in most

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[13] Yoshinori Yasuda, op.cit., pp.11-12.

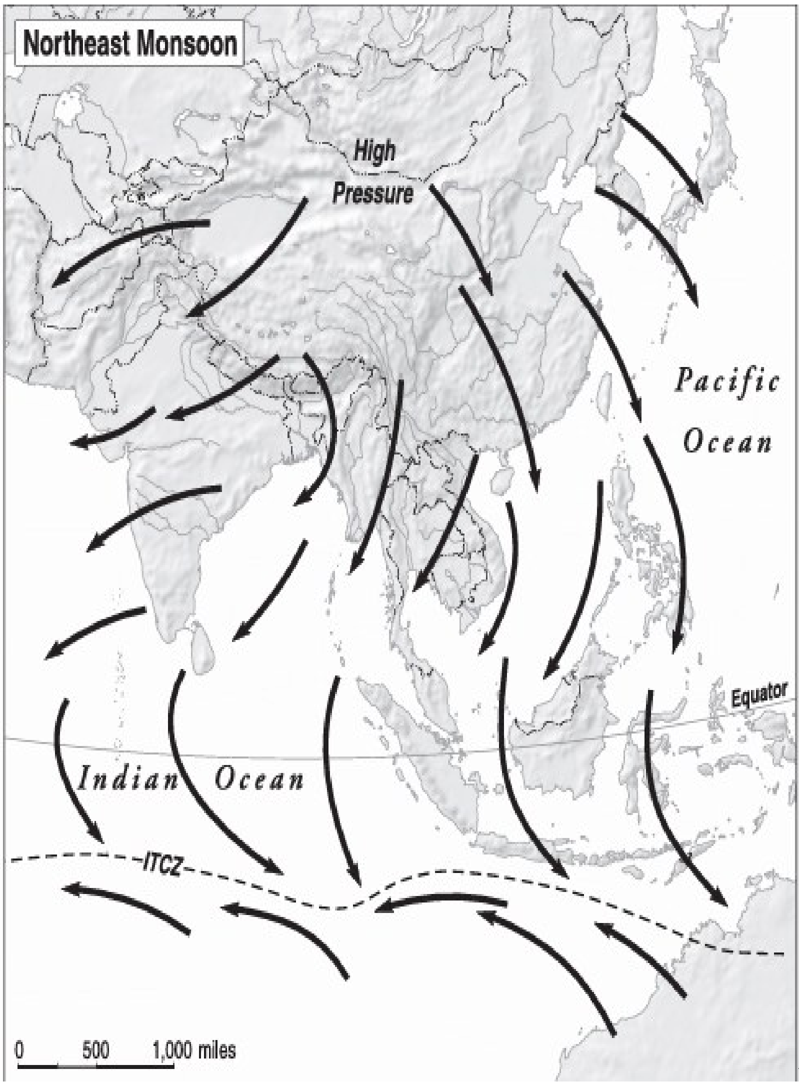
[14] Jos Gommans, 'Space and Time in the Making of Monsoon Asia', in David Henley and Nira Wickramasinghe(eds.), *Monsoon Asia* A Reader on South and Southeast Asia, Published online by Cambridge University Press: 04 January 2025, p.114.

[15] Peter D.Clift, Ryuji Tada and Hongbo Zheng, 'Monsoon Evolution and Tectonics-Climate Linkage in Asia: An Introduction', *Geological Society London Special Publications* 342(1), August 2010, p.1.

places, the rainfall in the pre-monsoon is less in comparison to the other two monsoon seasons.[16]

Map 2.2

Map showing the winds during the northeast monsoon, which blows from Dember to March



p

Source: Sunil Amrith, *Unruly Waters: How Mountain Rivers and Monsoons Have Shaped South Asia's History,* Penguin Books, UK,2020.

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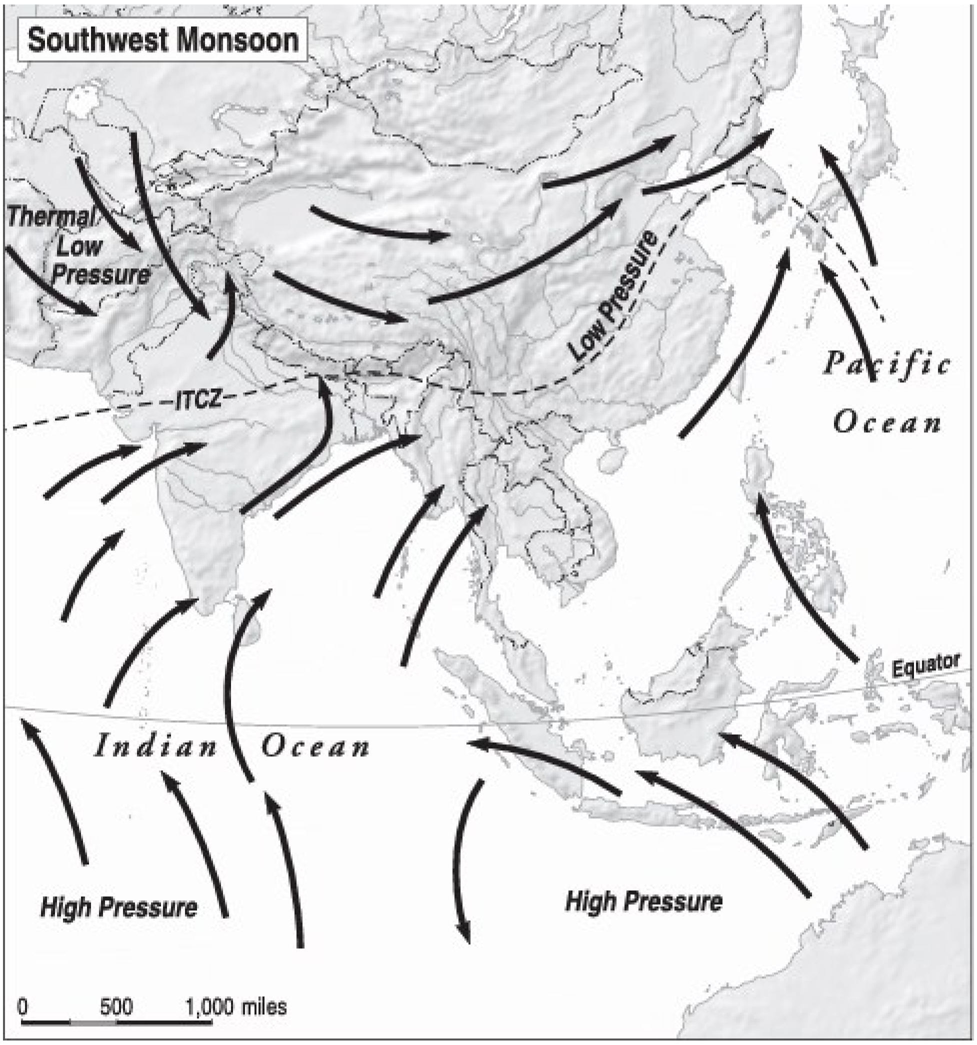
16 Rajasri Sen Jaiswal, Siva M., Rasheed M., et., al. 'Characteristics of southwest and Northeast monsoon over a few locations in India', *Proceedings of SPIE*, Vol. 12265, Berlin, 2022, p.1.

Map 2.3

Map showing the winds during the southwest monsoon, from June to September.



Source: Sunil Amrith, *Unruly Waters: How Mountain Rivers and Monsoons Have Shaped South Asia's History,* Penguin Books, UK, 2020.

The Indian Monsoon is a serious climatic phenomenon characterized by seasonal wind shifts that bring heavy rains to the Indian subcontinent. It influences a large part of Indian weather and the agricultural development of the Indian subcontinent. The differential heating of the Indian subcontinent and the surrounding oceans leads to low pressure over land, drawing in moist air from the oceans to result in heavy rainfall during the monsoon season. Scholars have defined monsoons from different angles. Some of the commonly used definitions have been given below to explain the wider context of monsoon. According to Miller, "Whereas monsoon climates appear to be very complex in detail, their fundamental principle, that of land and sea breezes on a large scale, remains simple and straightforward." According to Nieuwolt, "The word monsoon is used only for wind systems where the seasonal reversal is pronounced and exceeds a minimum number of degrees." The term has been applied to a wind system that shows at least 120 degrees of change of wind direction with the change of a season. These winds are characterized by consistency higher than 40 per cent and a mean resultant speed of more than 3 meters /second. According to Rama Shastry, "Monsoons are large-scale seasonal wind systems blowing over vast areas of the globe persistently in the same direction, only to be reversed with the change of season.[17]

Seasonal variations in India

The climate of India is always heavily dependent on monsoon winds. It would not be an exaggeration to say that monsoons have been a defining feature of Indian culture and history. The monsoon plays a significant role in the daily lives of people in South Asia. In ancient times onwards, sailors often used the monsoon winds in the Indian Ocean to reach their destinations. In a general sense, the wind over the northern Indian Ocean, which reverses semi-annually, is called a monsoon; such winds blow from the southwest between June and November and the northeast during the rest of the year (December-May). Monsoon winds are strong in the summer season from June to August in the northern hemisphere and from January to February in the southern hemisphere. The wind that originates in the southern hemisphere in June enters the northern hemisphere and moves towards India and Southeast Asia and, to a smaller

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[17] Dr. Kanchan Singh, *Monsoon: Definition, Theories and Controlling Factors*, Department of Geography, Chaudhary Charan Singh University, Meerut, p.4.

extent, towards Africa.[18] In the Bengal delta, the summer monsoon brings with it torrential rain. The northeast trade wind blows across the Bay of Bengal's southern shore in January, bringing with it torrential rain to southern India.[19]

Table 2.1

Traditional Indian Seasons

Seasons	Months (Indian Calendar)	Months (English Calendar)
Vasant	Chaitra-Baisakh	March-April
Grishma	Jyeshtha	May-June
Varsha	Sravan-Bhadra	September-October
Sharada	Aswin-Kartik	November-December
Hementa	Margshirsha-Pausa	November-December
Shishira	Magha-Phalgun	January-February

Source: K Siddartha*, India the Physical Aspects,* Kisalaya Publications, Delhi, 2004, p.89.

Table 2.1 shows traditional Indian seasons and its months in Indian calendar and English calendar. These are six Indian traditional seasons Vasant, Grishma, Varsha, Sharada, Hementa and shishira. The climate of India can broadly be classified as a tropical monsoon one. The important way to define India’s climate is in terms of a yearly seasonal cycle. A precise definition of the monsoon is difficult to agree upon because there is no set of fixed rules to explain its different facets. By one definition, the deserts of the Sahara might be a part of the monsoon regime of Africa, though the rainfall in Africa was negligible compared to northeast India. Opinions differ on the question of whether the monsoon should be defined by its rain-producing capacity or

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18 Sila Tripati and L.N Raut, ‘Monsoon Wind and Maritime Trade A Case Study of Historical Evidence from Orissa India’*, Current Science*, Vol. 90, March 2006, pp. 864-71.

19 *Ibid.*

by changes in global winds.[20] Total 70 per cent of annual rainfall in India is recorded during the southwest monsoon. The Bengal Delta and the states of north-eastern India receive the highest rainfall in the Indian subcontinent.[21] In an otherwise inhospitable climate in South Asia, the music of the monsoons happens to provide a relaxing experience, a feeling of happiness and interval. To farmers, this always implies productivity, happiness and prosperity. Folk songs were welcomed during the first downpour and were sung everywhere in South Asia. All the major ancient cities of India looked to the monsoon for survival. Even the Mughals were obsessed with water as they came from a desiccated region. Canals, ponds, lakes and fountains were integral to the engineered landscapes of their regime. Monsoon rains were popular during the medieval period as well. Hundreds of monsoons have gone by since the poet Kalidasa authored the Megha Duta ('The Cloud Messenger") or since Tansen is said to have produced the remarkable "Raag Miyan ki Malhar", but even today music continues to be essential in understanding the monsoon. A grand narrative of the Indian monsoon has been left behind by a host of foreign travelers, providing an interesting fusion of admiration, appreciation, horror and longing.[22]

How did the seasonal winds occur in the Indian subcontinent? In R.S Sharma's work, India's past describes the Indian subcontinent as a well-defined geographical unit and is largely situated in the tropical zone. The monsoon plays an important role in India's history. The southwest monsoon lasts between June and October and brings rain in varying degrees to major parts of the country. In ancient times, irrigation was not an important factor, and rain played a crucial role in agriculture.[23] How and why did irrigation become an important factor in ancient times? R S Sharma again

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20 Dr. P. K. Das, *Op.cit*., p.5.

21 *Ibid,* p.5; Ranjan Chakrabarty, *Climate, Calamity and the Wild an Environmental History of the Bengal Delta, c.* 1737-1947, Primus Books, Delhi, 2022, p.40.

22 Ranjan Chakrabarthy, *Op.cit*., p.42.

23 R.S. Sharma, *India's Ancient Past,* Oxford University Press, New Delhi, 2005, p.32.

explained that the kharif crop in north India depended primarily in ancient times on the southwest monsoon. A part of peninsular India, particularly the coastal areas of Tamil Nadu, gets its major rainfall from the northeast monsoon from mid-October to mid-December. Once the direction of the monsoon was discovered sometime around A.D. first century, traders sailed with the southwest monsoon from Western Asia and the Mediterranean area and came to India and South east Asia. They returned westward with the arrival of the northeast monsoon. The discovery of the monsoon enabled India to carry on trade and establish cultural contacts with western Asia and the Mediterranean area, as well as with Southeast Asia.[24] The Harrapans were the earliest Indian Mariners who had overseas trade relations with outside countries. They used monsoon winds and currents for their trade activities to sail up to the coasts of Bahrain, Meluhha, the Oman Peninsula, and Mesopotamia.[25] So this overseas trade proved that monsoon wind also played a crucial role for the India's economic prosperity.

The monsoon wind also helped to open many trade routes all over the world. One of the most important works on monsoon winds was described in the *Periplus of the Erythraean Sea*[26], written by an unknown Greek sailor around 60 A.D. *The Periplus of the Erythraean Sea* is one of the important human documents, like the journals of Marco Polo and Columbus and Vespucci, which express not only individual enterprise, but the awakening new fields of geographical discovery and commercial achievement. It is the first record of organized trading with the nations of the East, in vessels built and commanded by subjects of the Western World. It marks the turning of a tide of commerce which had set in one direction, without interruption,

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24 *Ibid.*

25 Sila Tripati and L. N. Raut, *Op.cit.*, p.865.

26 It was the name given by the ancient Greeks to the Red Sea, the Persian Gulf, and adjoining parts of the Arabian Sea.

from the dawn of history.[27] Hippalus, great navigator whose name labelled much honor in roman annals as that of Columbus in modern history, observed the periodic change of the Indian monsoon.[28] The author of the work *Periplus of Erythraean Sea* made many commercial voyages which carried him to the seaports of Eastern Africa as far as Azania, and to those of Arabia as far as Kane, taking advantage of the south-west monsoon, he crossed over to the ports lying on the western shores of India.[29] There was another description of this work follows a passage from the straits to India by three different routes: the first is the coasts of Arabia, Karmania, Gedrosia, and Indo-Skythia, which terminated at Barugaza (Bharuch) a great emporium on the river Nammadios(the Narmada), at a distance of thirty miles from its mouth; the second from Kane, a port to the west of Suagros, a great factor on the south coast of Arabia, now Cape Fartaque; and the third from Cape Guardafui, on the African side-both across the ocean by the monsoon to Mouziris and Nelkinda, great commercial cities on the coast of Malabar.[30] Then the author describes an incidental knowledge of a voyage conducted from ports on the east coast of Africa over to India by the monsoon, long before Hippalus introduced the knowledge of that wind to the Roman World.[31]

Kerala has four main seasons. These are classified based on the amount and nature of rainfall, wind direction, temperature fluctuations, etc. The first season is winter which lasts from the last quarter of December to February, the second season is pre-monsoon which lasts from March to May, with intense heat and occasional thunder and lightning showers; the third season is South-west monsoon, with almost rainfall from June to September; and North-east monsoon/post-monsoon, with

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27 Wilfred H. Schoff, *The Periplus of The Erythran Sea Travel and Trade in The Indian Ocean*, Longmans, Green, and Co, Newyork, 1912, p.3.

28 *Ibid.,* p.6.

29 J.W. McCrindle*, The Commerce and Navigation of the Erythraean Sea,* Philo Press, Amsterdam,1879, p.1.

30 *Ibid*., p.10.

31 *Ibid*.

intermittent rainfall from October to December.[32] In Kerala, the Southwest Monsoon occurs from June to September, it is called *Edavapathi*, and the North East Monsoon is called *Tulavarsham* according to the Malayalam calendar. The monsoon enters Kerala through the Arabian Sea by the first week of June. Kerala is called the "Gateway of the Monsoon" as the winds enter through Southern Kerala and spread across the country.

Representations of Monsoon in Literature

The term monsoon appears in the early writings of Greek, Indian, Buddhist, and Arab scholars. However, the first scientific study of monsoon winds was credited to the Arabs. Al Masudi, a Baghdad-based Arab Scholar, explained the reversal of ocean currents and the monsoon winds over the North Indian Ocean. Sidi Ali, another Arab scholar, could calculate the precise dates of the commencement of monsoons in several places. Sir Edmond Halley, an English scholar, opined in 1686 that monsoons result from thermal contrasts between continents and oceanic areas due to differential heating. Accordingly, Halley conceived the idea of summer and winter monsoons depending upon the season. The idea of Halley prevailed for about three centuries. Although Hailey's idea is not outright rejected, recent studies after 1950 have shed significant light on the monsoon's genesis. During these years help of Flohn, Thompson, Stephenson, Frost, Yin, Hwang, Takahashi, Palmen, Newton, and Indian meteorologists, including Koteshwaram, Krishnan, Raman, Ramanathan, Krishnamurti, Rama Rattan, Ramaswami, Anant Krishnan, etc., have contributed significantly to the study of monsoon winds.[33]

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32 M.G. Manoj, 'Keralathinte Kalavastha: Shastravum Bhaviyum', *Sadthrarangam*, Vol.1, issue 1, 30th August 2021, p.8.

33 Dr. Kanchan Singh, *op.cit*., pp. 3-4.

Ancient Indian literature gives a detailed description of the phenomena of winds and oceanic circulations. Many authors have different opinions about the classification of winds in early Indian literature. Rigveda is an important text mentioned among the Vedic texts. Rig Vedic hymns like 4,36 and 37 have referred to the wind, waves, tides, water, thunder and rain, rivers, sea, etc. Similarly, many verses praise Parjanya (The thunder and rain), which shows that the Rig Vedic people were conscious of the rainy season, which comes in a certain period every year. Monsoon winds are termed as 'Maruts' in the Rig Veda.[34]

Rigveda covers many meteorological descriptions of Northwest India, including classification of seasons, bursts of monsoon, rain-producing weather systems, cloud formation and their classification. The text also describes natural phenomena like drought, epochs of good rainfall, at times leading to floods, and vagaries of meteorological phenomena in general. In the Rigvedic time, people were fearful of natural phenomena like rain, thunder, lightning, etc. So, they mainly worshipped several deities that were associated with weather events. The principle among them are Varuna-sky, Marut-wind, Parjanya-rain cloud and Indra-lightning. The pleasure or displeasure of these deities was considered to be responsible for favorable or disastrous weather events. Prayers to these deities are found in the ancient texts invoking their blessings for good weather and for protecting against weather hazards. The prayers were combined with several rituals. The "Fire God" was supposed to be the carrier through whom various deities received what man had offered by way of burning in sacred fires known as 'Home Havan' and 'Yagnas' for inducing rain. These Yagnas are similar to the present-day technique of cloud seeding from ground-based generators. Ancient literatures provided detailed descriptions of

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34 Sila Tripati, 'Early Users of Monsoon Winds for Navigation', *Current Science*, Vol.113, No. 16188, 25 October 2017, p.1619.

the control of weather.[35] Rigveda mentioned six major seasons, of which the three most important seasons are the hot, wet, and cold. The connection of the winds to the causation of rainfall was also known, and it was referred to in several Vedic hymns. The Rigveda speaks for the first time of 49 and 63 kinds of winds, but all these were vague.

The first recorded information on the circulation of oceanic water is in the *Satapatha Brahmana.* It mentioned oceanic water like the ocean flows round this world on all sides. Eggeling's commentary on *Satapatha Brahmana* refers to the southwest monsoon, which lasts from May to September.[36] According to Eggeling in his translated work of the *Sathapatha-brahmanas'* IInd Kanda, Ist Adhyaya, 3rd Brahmana, gives a detailed description of the spring, the summer, the rain, and these seasons are represented by the gods. It also mentioned the seasons, such as Autumn and Winter.

Varahmihira's classical work, the *'Brihat Samhita'*, written in the 6th century A.D., provides clear evidence that a deep knowledge of atmospheric processes existed even in ancient times. It was understood that rains came from the sun (Adityat Jayate Vrishthi) and that good rainfall in the rainy season was the key to bountiful agriculture and food for the people. *Brihat Samhita* mentioned five chapters on meteorology, one each dealing with clouds, air, rainfall, signs of immediate rainfall, and atmospheric optics. In addition, at several other places, weather phenomena were described in association with omens, planetary positions and astrological beliefs. These, together with observations on crop yield under varying climatic conditions, have led the ancient Hindus to formulate generalizations aimed at making long-range or seasonal weather prediction. From ancient times onwards, the importance of seasonal forecasts

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[35] *Report of the 125 years of service to the nation*, The Meteorological Office Press, Pune, p.1.

[36] Sila Tripati, *op.cit.,* p.1618.

for agricultural and economic planning was recognised.[37] The meteorological and seasonal data of Varahamihira also helped to organise the agricultural calendar. The advancement of mathematics in India was encouraged by the need to comprehend and forecast climate behaviour of interest to the agrarian sector.[38] Varahamihira made great contributions to the fields of hydrology, geology and ecology. The thirty-first sloka of Varahamihira's work titled *Brihatsamhita* discusses five phenomena: wind, water, lightning, thunder, and cloud.[39]

Arthashastra of Kaudilya is another important ancient text mentioned about wind systems, navigation, different types of ports, etc. The people in the Mauryan period set up a rain–gauge called Varshamana.[40] During the rainy season, villagers living on the banks of rivers helped each other. They provide themselves with wooden planks, bamboo, and boats.[41] The *Meghdoot* of Kalidas (4th century CE) has beautifully elaborated on the arrival of monsoons in India. *Meghdoot* is full of references to ecology. Lines 8 and 49 of *Meghdoot* have references to the rainy season. The beginning of rains is that magical time in a tropical country, of the greening of the earth after the burning summer and devastating drought, of hope springing up in the hearts of grieving women waiting anxiously for the return of their husbands who have travelled to far places on the business of various kinds.[42]

Yajurveda is another ancient Vedic literature, where the monsoons was designated the Salilavataa, but even then, it will perhaps be difficult to link it up with

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37 125 years of service to the nation, *op.cit.,* p.2.

38 R.S. Sharma, *op.cit.,* p.293.

39 Panditbhushan V. SubrahmanyaShastri, and M.Ramkrishna Bhat (trans.), *Brihat Samhita of Varaha Mihira*, Internet Archive, 19946, p.236.

40 Dr. J.F.Fleet (trans.), *Kaudilyas Arthasastra,* Raguveer Printing Press, Mysore, 1951, p.56.

41 *Ibid.,* p.235.

42 Dr. Bhagwat S. Goyal, *Kalidasa's Meghaduta: A Critical Study*, Surjeet Publications, Delhi, 2019, p.230.

the NE (Northeast) or SW (Southwest) monsoon. The *Taittiriya Samhita* refers to five kinds of winds, while the *Taittiriya Aranyaka* refers to seven. The Mahabharata designates them as Pravah, Pvaha, udvaha, vivaha, parivaha. The Jaina Prajnapani describes 19 kinds of winds.[43]

Tamil literature, mainly the Sangam texts, is replete with references to weather and climate. The Sangam period (circa 300 BCE to 300 CE) is known for its rich collection of poetry and prose, which mentions detailed observations of the natural world. Works such as the *Tolkappiyam, Akananuru, Purananuru, Mathuraikanchi* and *Kuruntokai* provide insights into how ancient Tamil people understood and predicted weather conditions.[44] These Sangam texts also mentioned that Tamil seafarers navigated with the help of wind and sails. It gives descriptions of four types of wind blowing from different directions, termed *Kontal* (East wind), *Kotal* (West wind), *Vatai* (North wind) and *Tenral* (South wind) and the movement of various sizes of vessels with the help of wind in the mid-sea and landing at the shore.[45] The north and west winds blow with great force, the former bringing intense rain, and the latter radiating unusual heat. The south wind drifts in as a gentle breeze, hesitant in its approach, while the east wind is a moderate gust, lacking strength or violence. These winds are portrayed through their effects on the leaves of plants, on the surfaces of ponds, tanks, or the sea, and in the case of the stronger winds, also on birds, animals, crevices in rocks, and hollows in trees. The diverse sounds they produce are frequently described: murmuring through trees, rustling softly over shrubs, blending with the symphony of woods and waters, or thundering in grand harmonies through forests and

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43 H.B. Sarkar, *Trade and Commercial Activities of Southern India in the Malay-Indonesian World (up to A.D. 1511) Vol 1*, Firma KLM Private Limited, Calcutta, 1986, p.294.

44 Dr. R. Prabakaran and A. Nirmala, 'Weather Prediction in Tamil Literature: Integrating Ancient Knowledge with Modern Mathematical Modelling', *IOSR Journal of Mathematics,* Vol. 20, Issue 3, May-June, 2024, p.1.

45 Sila Tripati *op.cit*., p.1618.

hills.[46] In the Sangam literature, the south wind is very rarely mentioned, but the descriptions of the north wind are most frequent.[47] The east wind is mostly mentioned in the verses describing the seashore.[48] The west wind blows more often than the east and south winds, and in literary significance, it ranks just after the north wind.[49]

Tolkäppiyam is another treatise of linguistics and poetics in Tamil, written by Tolkäppiyar, and dates back to a few centuries before the dawn of the Christian era. It primarily explores grammar, poetics, and elements of nature, classifying the land into five types, or *Tinai*, based on ecological and geographical features.[50] The five *Tinai* are Kurinji (mountains, rainy season), Mullai (forests, late summer), Marutham (agricultural lands, autumn), Neythal (coastal regions, monsoon), and Palai (desert-like areas, dry season).[51]

Akananuru and *Purananuru* contain numerous poems that describe the monsoon winds and their impacts on daily life. In *Akananuru*, the poets often portray the southwest monsoon carrying rain-laden clouds over the Kurinji mountains, energizing the earth and symbolizing the emotional state of separated lovers expecting meeting. These poetic images link the natural rhythm of monsoon winds with human experiences.

Like ancient Indian texts, the vagaries of weather can be traced in all other ancient civilisations. Yuan Chwang, who travelled through India in the 7th century A.D., recorded his impression of the climate of some parts of India. Beginning in the

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46 M Varadarajan, *The Treatment of Nature in Sangam Literature*, The South India Saiva Siddhanta Works Publishing Society, Tinnevelly, 1969, p.240.

47 *Ibid*., p.235.

48 *Ibid*., p.237.

49 *Ibid*.

50 Dr. V. Murugan, *Tolkappiyam in English*, Institute of Asian Studies, Chennai, 2000, p.9.

51 Dr. R. Prabakaran and A. Nirmala, *op.cit.,* p.1.

6th century B.C., the Greeks made significant contributions to science. They gathered and compiled the Egyptian and Phoenician knowledge into several treatises. Aristotle in the 4th century BC knew that the water surrounding the earth was vaporised by the sun's rays, only to be lifted as clouds which eventually came back to the earth as rain. He also knew the process of hail formation. He noted that hailstorms were more frequent in summer. By the and second centuries BC, there was a great decline in the science of the Greeks and Romans. Greek scientific advancement made many severe setbacks for several centuries after the fall of the Roman Empire. Distinct civilisations emerged in the Arab land, Persia and India. They began taking a keen interest in fostering the scientific ideas of the Greeks and the Romans, while at the same time independently developing their scientific thoughts. The Arabs had to give them back the knowledge of their scientific achievements, including translations of Aristotle's meteorological treatise entitled *Meteorologica*. European travellers in the 16th and 17th centuries AD have recorded their impressions of the climate or events affected by severe weather. Till the 17th century AD, Aristotle's theories were the main tools of weather prediction. Stoffler, a 16th-century publisher of an astrological calendar, predicted a worldwide deluge to occur in 1524, due to the configuration of Saturn, Jupiter, and Mars in the house of Pisces.[52]

Documentation of Monsoon by Travelers

The travelers who arrived in Kerala mentioned the impact of monsoon winds on the region. Kerala is a coastal state in India that was affected by monsoon winds throughout its history. The monsoon winds had an important role in the state's trade, agriculture, and culture. Prominent historical travellers like Marco Polo, Ibn Battuta, and *Francis Buckan* documented Kerala in their travel accounts of the monsoon winds (southwest and northeast monsoons) in promoting trade across the Arabian Sea and

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52 *125 years of service to the nation*, *op.cit.,* p. 2.

the Indian Ocean. Al-Biruni (Abu al-Rayhan Muhammad ibn Ahmad al-Biruni, 973–1048 CE) was among the earliest Muslim scholars to exhibit a modern scientific perspective. Living a vibrant 75 years, he conducted pioneering research across nearly all the natural sciences known at the time. *The Kitāb al-āṯār al-bāqiya* contains some elements of meteorological forecasting. Al-Bīrūnī explains that the 'anwāʾ, or 'weather predictions' of the Arabs are based on the movements of the fixed stars. This means that the weather for a particular day was determined by the positions of the stars.[53]

Abu Abdullah Muhammad Ibn Battuta was a Moroccan Muslim scholar and traveler. His journeys lasted for almost thirty years. This covered nearly the whole of the known Islamic world and beyond, extending from North Africa, West Africa, Southern Europe, and Eastern Europe in the west, to the middle east, Indian subcontinent, Central Asia, Southeast Asia and China in the East, a distance readily outstanding that of his predecessors.[54] Ibn Battuta mentioned the monsoon in his *Travelogues*. Yemen consists of a highland region that drops abruptly to the coastal plain in the southwest. These mountains intercept the summer monsoon rains.[55]Another description of the monsoon was 'Dhofar', a mountain which receives a high amount of summer monsoon rains, so that the place is covered in consequence with tropical vegetation.[56] He also described climatic fluctuations in Kerala through his journey. The great flood of Periyar "The Port (Muziris) silted up as a result of unusual flooding by the Periyar River in 1341. Another Scholar mentioned that Battuta

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53 Massimiliano Borroni, 'Al-Bīrūnī's Thought on Water and the Influence of Ṯābit', *Environmental Views in Premodern Arabic Writings*, March 2024, p.46. https://www.rarebooksocietyofindia.org/book_archive/196174216674_10152986941766675.

54 Dr. Sartaj Shabbar Rizvi, 'Ibn Battuta: A Historical Overview', *Journal of Advance Research in Science and Social Science (JARSSC),* Vol.04, Issue 01, 2021, p.161.

55 E. Denison Ross and Eileen Power, *The Broadway Travellers: Ibn Battuta Travels in Asia and Africa 1325-1354,* Routledge and Kegan Paul Ltd, London, 1953, p.376.

56 *Ibid*., p.377.

observed a Tsunami in Malabar while he was in Calicut. While they were waiting for the good season to travel to China, just before the appointed day of departure, a storm raged over the coast, sinking most of the ships in the harbour at Calicut.[57] Ibn Battuta reached the town called Hinnaur (now in Ezhimala) in the Kannur district. The city was on the shore of a bay. The bay that stretches into the city's heart was so deep that large ships could come up to half an hour from the city. He and his team reached there during the rainy season. It was a time when the sea got angry and shook due to strong winds and rain. This period will last for four months. Voyage and fishing were very rare on those days.[58]

Another description of the vagaries of wind in Battuta's travelogue is that,

> *"We entered the great desert, which extends for a space of fifteen nights' march, it cannot be entered except in one season of the year, namely after the rains have fallen in the land of Sind and India, which is in the first days of July. There blows in this desert the deadly 'samum' wind, which causes bodies to crumble through putrefaction so that when a man dies, his limbs fall apart."*[59]

By the late eighteenth century, European explorers re-established contact between the long-isolated ecosystems and peoples of the Americas, Eurasia, Australia, and the Pacific Islands. European expansion overseas brought about a fundamental reorganization of the world's ecology, an environmental revolution, which affected the everyday lives of most of its inhabitants.[60] Foreign writers who visited India

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57 Sukesh Kumaradas, 'Description of Ibn Battuta on Malabar', *JETIR* September, Vol. 4, Issue 9,2017, p.750.

58 Velayudhan Panikkassery, *Ibnu Batuta Kanda India,* Current Books, Kottayam,2002, p.215.

59 H.A.R. Gibb (ed.), *The Travels of Ibn Battuta, A.D.1325-1354, Vol. III,* The syndics of the Cambridge University Press, New York,1971, pp. 591-592.

60 Stephen Mosley, *The Environment in World History*, Routledge, London, 2010, p.55.

mentioned the importance of rainfall for agriculture and the significance of rain forecasting. Megasthenese, a Greek historian and envoy to India in the 4th Century BCE, wrote in his *Indica* about India's prosperity and attributed it to the monsoons. Since there was double rainfall each year–one in the winter and the other in the summer–Indians virtually always received two harvests every year. Many western travellers left behind a great story about the Indian monsoon that offered an interesting blend of awe, respect, fear, and longing. Jean-Baptiste Tavernier, the French traveler and merchant who visited India in the seventeenth century, James Tod, an officer of the British East India Company, and many others described their interesting face-offs with the tropical monsoons. Francois Bernier, the French physician and traveler, visited India and Bengal during the reign of Shah Jahan. In the second volume of *Travels in the Mughal Empire, AD 1656-1668*, he included a special section on the rains in India.[61] James Tod, in his work *Travels in Western India*, mentioned some obstacles faced during his journey because of the monsoon wind. He writes, "*On 16th June , thick clouds gathering from the direction of the rains signal the arrival of the monsoon, urging me to move quickly before the rising streams block my way to Baroda.*"[62] There was another incident is that "*In the spring of 1821, he determined to proceed to his native land, and only waited for the end of the monsoon to execute this design; but in July, he received an express from Boondi, announcing the sudden death, by cholera of his estimable friend the Rao Raja, so he can't be reached in the apt time to his native land.*"

Francis Buchanan explains monsoon winds in his work and many parts India, strong winds were blowing directly from the sea during March and April. As a result, in Bengal during March and April, there were extremely strong southerly winds, yet until May or June, calms prevailed in the bay. Malabar coast, the southwest monsoon

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61 Ranjan Chakrabarti, *op.cit.*, p.42.

62 James Tod, *Travels in Western India*, Munshiram Manoharlal, New Delhi, 1839, p.42.

did not commence raging with strong until the starting of rainfall, but on shore, there were huge westerly winds from about the vernal equinox.[63] The only account of seasons that he could procure here was as follow. The weather was clear and hot for two months leading up to and following the vernal equinox.

Jean Baptiste Tavernier was a French traveller and merchant. During the 17th century, he made many voyages to the East, between Persia and India. Tavernier published his account of journeys in the form of travelogues.In his famous work, *"The Travels in India,"* Tavernier described tropical monsoons on several occasions throughout the book. At the start of this work, he wrote about how the climatic conditions of the Indian seas are not good for all seasons. He writes, *"Navigation in the Indian seas is not carried out at all seasons as it is in our European seas; it is necessary to take the proper season, outside which no one ventures to put to sea. The months of November, December, January, February and March are the only months in the year in which you embark at Hormuz for Surat, and at Surat for Hormuz."*[64]

Through this work, Tavernier tried to explain how social and geographical implications of rains in India. He writes, *"When it rains in India, the waterfalls like a deluge, and in less than an hour or two, small streams rise 2 or 3 feet in depth* ".[65] In this work, he describes the city of Lahore. Tavernier writes that "*The town is large and extends more than a coss in length, but the greater part of the houses, which are higher than those of Agra and Delhi, are falling into ruins, the excessive rains having overthrown a large number"*[66]

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63 Francis Buchanan, *A Journey from Madras Through the Countries of Mysore, Canara, and Malabar,* The Honorable Directors of The East India Company, Vol. III,1807, p.271.

64 Jean Baptiste Tavernier, *Travels in India*, V. Ball, (trans.), Macmillan and Co, New York, Vol.1, 1889, p.4.

65 *Ibid*., p.297.

66 *Ibid*., pp.94-95.

Francois Bernier was a famous French physician and traveler wrote his master piece, *"Travels in the Mogul Empire AD 1656-1668*. This work not only gives descriptions of politics but also explains, geographical and human landscape of India during the Mughal period. In this work, he wrote about the periodical rains in India. *"The sun is so strong and violent in India during the whole year, particularly during eight months, that the ground would be completely burnt and rendered sterile and uninhabitable, if Providence did not kindly provide a remedy, and wisely ordained that in July, when the heat is most intense, rains begin to fall, which continue three successive months."*[67]

There are so many works that deal with the contemporary times of the Indian monsoon season. The most notable among them was Alexander Frater's account of monsoons in India titled *"Chasing the Monsoon: A Modern Pilgrimage through India.* "This work is considered one of the modern-day classics. Alexander Frater was a British travel writer and journalist. In his childhood, his father taught him how to observe and analyze the weather. Frater's family employed the services of a native Gardner, Moses, who believed the young Alexander was the reincarnation of a rain god.[68]Another important work was *Monsoon Islam: Trade and Faith on the Medieval Malabar Coast* by Sebastian R. Prange. Through this work, he explained that during medieval times, travelers reached Malabar depending on the monsoon. It caused the Malabar region to undergo various social, economic and religious changes.

Monsoon Winds: Trade, Architecture and Shipping

This session highlights how monsoon winds facilitated trade across regions and shaped architecture in tropical coastal areas. Monsoon winds brought traders from

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67 Francois Bernier, *Travels in the Mogul Empire A.D.1656-1668,* Archibald Constable (trans.), Humphrey Milford, Oxford University Press, New York,1916, p.431.

68 Alexander Frater, *Chasing the Monsoon: A Modern Pilgrimage Through India,* Penguin, 1990, pp.1-9.

the Middle East, India and onward to Malaysia and the Indonesian archipelago for centuries.[69] The Malabar Coast and Straits of Malacca became vital trade nodes for spices. The local climate, with its intense heat and seasonal rains, influenced unique architectural styles designed for comfort. Monsoon winds facilitated trade between the Middle East, India, Malaysia and Indonesia, spreading Islam throughout the Indian Ocean region.

Sebastian Prange's contribution to the Islamic connections specifically pinpoints the numerous connections between Malabar and Southeast Asian spice ports. The various spices that brought such great wealth were the native plants of these regions. Besides, being the origins of the spices, the Malabar Coast and the Straits of Malacca are geographic nodes between the different monsoon winds. Since the dependence on seasonal winds, the ports became forced resting points in the movement between continents.[70] Before the arrival of Islam, a very particular way of building had developed in the coastal tropics of Asia, an area of penetrating heat and intense rains. Long shorelines backed by mountains and hills received ample rain from semi-annual monsoons.[71] Spices such as pepper and cardamom originated in Malabar, cloves and nutmeg in Indonesia, and ginger in Southeast Asia. The region’s heavy rainfall, densely forested hills, intense heat, and high humidity influenced both the vegetation and the development of architectural forms. Mosques built in regions like China, Northern India, the eastern coast of India, and the East African coast reflected the unique vernacular traditions, climates, and available resources of those areas. While trade impacted these regions, their mosques evolved using varied materials and

69 Patricia Tusa Fels, *Monsoon Mosques: Arrival of Islam and the Development of a Mosque Vernacular,* Mapin Publishing, North America, 2020, p.1.

70 *Ibid*., p.11.

71 *Ibid*.

architectural styles. Overseas trade became a most important cause for the spread of Islam in India, and also caused different styles of building practices.[72]

How did seasonal winds impact trade and architecture in monsoon regions? Malabar was famous throughout the medieval world for its spices and open trading ports. The unique Malabar culture's identity was the melding of influences from the West, the Mediterranean, Arabia, the East, China, and India. Trade in Malabar was instrumental in communicating ideas, cultures, technologies, and religions.[73] The vernacular architecture of Kerala embodies the region's geography, climate, and the rich cultural history of Malabar. Influenced by two annual monsoons, the lush rainforest-covered mountains provide an ample supply of tropical timber. As traders arrived and settled, they modified the local building styles to serve new purposes.[74]

The most important features of Malabar mosques were constructed to protect them from heavy monsoon rain. The town's standout characteristic is its tiered, sloping roofs, crafted to shield facades and endure the intense monsoon rains.[75] The architectural features of mosques in Kuttichira (Kozhikode) and Ponnani adapted to the region's heavy monsoon rains and humid tropical climate. These images of mosques in Kuttichira and Ponnani are the instances that we can refer to our understanding on the architectural remains in the olden days of wind and monsoon in Kerala.[76] These features reflect the fusion of traditional Kerala and Islamic architectural styles. The vernacular architecture of Ponnani reflects the unique coastal

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72 *Ibid*., pp.16-17.

73 Patricia Tusa Fels, 'Saving the History of Malabar Mosques and Their Communities', *Accademia,* 2020, p.187.

74 *Ibid.*

75 Swathy V Subramanian, 'The Architectural Tradition of Ponnani, Kerala: A Historic Malabar Port Town'*, Journal of Traditional Building, Architecture and Urbanism*, 2021, p.389*,* accessed on 11/02/2025,12.00pm.

76 The pictures of the mosques in Kuttichira and Ponnani see in Appendix I.A and Appendix I.B.

environment, its community, and the natural resources of the region. Ponnani is home to a distinct ecosystem, including mangroves that support water quality and provide a habitat for numerous species. This delicate ecological balance requires preservation. The tidal mouth of the Bharathappuzha River in Ponnani serves as a seasonal refuge for various migratory birds, with some species being identified. Natural features like mud banks, which enable the launching of canoes during the southwest monsoon, contributed to the area's reputation as a thriving fishing ground.[77] Houses were made of mud walls and roofs made of dried coconut leaves, while some featured timber planks with coconut and bamboo as common materials. Over time, mud walls were replaced with laterite, and sloping roofs remained popular due to their climate adaptability.[78]

The Mishkal Mosque is among the oldest and largest examples of Kerala-style mosques and is situated in the heart of the historic Mappila Muslim neighbourhood of Kuttichira in Calicut. No other example on the Indian subcontinent blends elements so uniquely suited to the local tropical climate and context as this architectural work does. The building's measurements accentuate its roof rather than its facade, forming a series of stepped forms topped by umbrella-like rafter timbers and clay tile shingles, with each step overhanging the next. The design focuses on shading: even on the second-floor veranda, one has to almost recline to catch a glimpse of the outside, for the roof juts way beyond the masonry walls to again limit the construction of the narrow balcony. These upper tiers also address the tropical monsoon climate through horizontal latticed screen walls that allow views while minimising glare from sunlight. The most distinctive feature of the structure is the timber framing of the fourth-level hip roof, which relies on a single timber drum to support the rafters. As far as local building traditions and

77 *Ibid.*

78 *Ibid.*, p. 391.

insight from regional carpenters are concerned, securing the joint in this roof structure is said to be a hallmark of a true master builder. Traditional buildings in coastal Asian tropics featured designs suited for heat and rain, including venting roofs, open floors, and porous walls to promote air circulation.

The people who lived in the megalithic period were aware of seasonal changes. The shape of megaliths like umbrellas, caps, and doorjambs of the rock-cut caves, which are mainly distributed in the northern part of Kerala, underlined that the megalithic people were considerably aware of the incessant monsoon seasons of the region. As the megalithic people used both granite and laterite slabs for the top portion of the Kodakkal, it can be said that the megalithic builders seem to have conceived the shape of the upper part of the monument (Kodakkal) as an umbrella to solve the weathering problem of laterite due to incessant rain. These kinds of Kodakkalu are seen in Kudakkallu Parambu, is burial site located in Chermanangad of Thrissur District of Kerala. The site has 69 megalithic monuments spread over a small area. Different types of burials in this area include Topikkal, Kudakkal, multiple hood stones and stone circles.[79] The semi-circle umbrella shape will protect the stone from its weathering. An 'umbrella stone' with four laterite slabs at the bottom as orthostat and a single dressed flat granite at the top was found at Patterkulam near Manjeri in Malappuram district. These examples proved that the megalithic builders were aware of the quality variations of the granite and laterite stones. This also makes them believe to be the region's climate condition while determining the monument's shape.[80]

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[79] Kerala is rich in Megalithic burial sites, with notable example in Kudakkallu Parambu, see in Appendix II.

[80] K. P. Rajesh, 'Megaliths of North Kerala: Formation of Technologically Advanced Agro-Pastoral Iron Age and Early Historic Society', *Heritage: Journal of Multidisciplinary Studies in Archaeology*, Vol. 5, 2017, p.490.

The Indian Ocean was the scene of varied activities of ancient explorers and Maritime traders from the beginning of recorded history. The experience of early pioneers provided a lot of knowledge about weather, winds, currents, waves and tides. Although their observations are often correct, the ideas derived from them lack precision and clarity, but they succeeded in forming a good general picture of the physical condition prevailing in the Northern Indian Ocean.[81]

The South Asian monsoon played an important role in the everyday life of the people. Maritime trade flourished in the Indian Ocean due to the use of monsoon winds, and it reached overseas countries. Indian mariners would go to South Asian nations during the northeast monsoon and return from the southwest monsoon. Both their onward and returning journeys wind and current were very favourable. Similarly, the Arabs sailed in the Indian Ocean with the help of monsoon winds, and Europeans, particularly the Portuguese, sailed their vessels in such a manner that they could reach the shores of India before the southwest monsoon and return only after the beginning of the northeast monsoon.[82]

The vagaries of the monsoon determined trade in the Indian Ocean. The merchants had to cross the monsoon by moving from region to region while properly arranging their sails. The establishment of ports in the Indian Ocean occurred along the monsoon track. Due to its location as an island in the Indian Ocean trade route, Sri Lanka was a suitable port for ships heading into the monsoon season.[83] Monsoon

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[81] N.K Panikkar and T.M Srinivasan, 'Early Concepts of Oceanographic Phenomena of The Indian Ocean', History of Science Unit of the Indian National Science Academy, National Institute of Oceanography, *Proceedings of the Royal Society Edinburgh,* Vol.72(24), 1971, p.263.

[82] Sila Tripati and L. N. Raut, 'Monsoon Wind, and Maritime Trade: A Case Study of Historical Evidence from Orissa India', *Current Science*, Vol. 90, No. 6, 25 March 2006, p.864.

[83] Nayomi Kekulawala, 'Monsoon and Navigation of the Indian Ocean: During the Period from 11th to 15th Century AD', *International Journal of Science and Research*, ISSN: 2319-7064, 2018, p.280.

winds were the reasons in the Indian Ocean that restricted human movement. Felipe Fernadez-Armesto claims that what matters in maritime history is wind systems, and especially the difference between monsoonal systems and those with year-long prevailing winds. The monsoons follow a quite regular pattern, in the Arabian Sea essentially southwest from May to September, and Northeast from November to March.[84] 'The predictability of a homeward wind made the Indian Ocean the most benign environment in the world for long-range voyaging.'[85] Through the monsoon winds, people determined when they could sail and where. The monsoon winds were vital, even if Felipe Fernandez-Armesto was putting it a bit strongly when he wrote that" *Throughout the age of sail – that is, for almost the whole of history determined that man could do at sea: by comparison, culture, ideas, individual genius or charisma, economic forces and all other motors of history meant little. In most of our traditional explanations of what has happened in history, there is too much hot air and not enough wind*."[86]

Even today within the Red Sea the monsoon played an important role for traditional navigators, as a modern account of the sea's routes, winds, and sailing times make clear. This situation of course pertained even more strongly concerning the traffic between the Red Sea and Western India. In the great fifteenth-century trade between Calicut and the Red Sea, Ships left Calicut in January, and vessels from the red sea arrived there between August and November. The Portuguese described the military significance of this on the Malabar Coast. The West Coast of India was unnavigable for sailing ships between roughly June and September. In the 1530 the Portuguese were concerned at the way ships from the hostile port of Calicut could sail just before or just after this, before their blockading fleets could arrive. The solution

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84 Michael Pearson, *The Indian Ocean,* Routledge, London, 2003, p.19.

85 *Ibid*.

86 *Ibid*., p.20

seemed to be to build a fort very near to Calicut. Then they could patrol right up to the end of May, just before navigation became impossible, and resume the blockade early in September as soon as the slackening of the southwest monsoon made navigation possible again.[87]

Even today the economy of South and Southeast Asia is largely dependent on the arrival of the monsoon winds, and the amount of rain they bring with them. These Monsoons were, and to a large extent are, the governing factor controlling shipping in the surrounding seas. They largely determined when a particular route could be sailed, when the markets would be high or low, and when a punitive naval expedition could be undertaken. From East Africa to Indonesia the northeast monsoon prevails from about October to March and the southwest from May or June to September. Trade was regulated by these winds: for example, the season for trade from Gujarat to Aden was from September to May, and for Aden to Malabar from October to February. Further refinement may be noted, which is of particular importance to western Indian trade.[88]

All the time sea voyages are full of dangers. Those who ignored the monsoons, or were ignorant of them, came to grief. Monsoons make some crucial situations in history. It has lots of examples. The ancient period of maritime transport also seems to have been quite developed, though the sea- voyages were full of dangers. The ship (pavaham) of certain merchants bound for Vibhaya which rambled in the sea for six months. The shipwrecks were the most common. There were serious disturbances from the goblins and terrible cyclones (Sliyavaya) when the life of the traders was put in great danger. Then we come across another description of a shipwreck when the vessel was tossed in the sea due to a terrible cyclone. The sailors and crew were

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87 *Ibid*., p.21

88 M.N. Pearson, *Merchants and Rulers in Gujarat*, University of California Press, 2021, p.7.

puzzled, forgot the right direction, and did not know what to do. Everybody felt very sad, and all began to propitiate various deities, such as Indra, Skanda, etc., losing all hope of life.[89]

Rain Narratives in Malayalam Literature

This session explores various themes and representations of rain in Malayalam literature, particularly in the works of authors such as P. Vatsala, M.T. Vasudevan Nair, and Takazhi Sivasankara Pillai. Rain is depicted not merely as a natural phenomenon but as a powerful symbol interwoven with nature, social issues, personal experiences and cultural contexts. The novel *Nellu*, the exploitation of tribal life in Wayanad is sadly portrayed with a deep focus on the relationship between the forest and its indigenous inhabitants. Nature including the soil, rivers, and especially rain plays a central role, reflecting the symbiotic relationship between the tribal communities and their environment. The novel also sheds light on climate change and its impact on these communities, whose lives are intimately tied to the weather and seasonal patterns. The natural calamities witnessed in recent times serve as warnings and glimpses of the damage caused by this ecological imbalance.

The novel is marked by its unceasing rain, which becomes a defining feature and a constant presence throughout the narrative. The natural wealth of Wayanad, its forests, rivers, and landscape, is slowly being destroyed due to human interference. The natural calamities we witnessed in recent years are glimpses of this ecological imbalance and the consequences of environmental degradation Over time; however, the tribal communities began cultivating other crops, adapting to changing conditions. Despite their relentless labour in the soil, hunger remains the central issue for these communities. Their way of life is intricately connected to nature; they live through the cycles of seasons, enduring winters, harvests, and summers with resilience. As such,

89 *Ibid.*, pp.21-22.

climate change becomes a significant theme in the novel, reflecting how environmental shifts directly impact their existence.

The tribal people live in huts without any work in the rain and the scorching sun for days of starvation. Adivasis get work only when the weather is favorable. *Malangari* is an important worship idol of the tribal community. Many instances can be seen throughout the novel where *Malangari* pleases when it rains heavily. In this novel, it is mentioned that the elephants went to the Mysore forests to seek refuge in a group to understand the warnings of monsoons. In the July 2024 Mundakkayam landslide, the residents said that elephants came to the forest earlier after realizing such a danger. The community used various devices like *'Koramba* 'to survive the rain. The monsoon made this black soil more fertile. The charcoal leaves in the forests are dried and crumbled, and washed away by heavy rain. They cultivate and live on the same soil. Here again, the seasons can be seen as an important factor throughout the novel. The daily lives of the people of Tirunelli were profoundly impacted by both the relentless downpours and prolonged dry spells.

The month of *Karkidakam,* often referred to as the "month of scarcity" in Kerala, is historically associated with hardship, vulnerability, and hunger. In M.T. Vasudevan Nair's short story *Karkidakam*, rain is imbued with ambivalent meanings, symbolising both maternal care and existential despair. The narrative articulates rain through the vernacular concepts of *Aruthi* (fulfilment) and *Varuti* (suffering), capturing the deeply paradoxical relationship between nature and human life. The narrative unfolds through the consciousness of a child, revealing the intimate effects of seasonal change on everyday life. M.T. Vasudevan Nair, in his characteristic style, subtly critiques the growing human alienation from nature. His work reflects a quiet yet powerful indictment of modernity's insensitivity and the anthropocentric actions that contributed to ecological crises. *Karkidakam,* thus, transcends a mere seasonal narrative, becoming a profound meditation on environmental vulnerability, social marginalisation, and the silent endurance of those most affected.

In a modern reinterpretation of Thakazhi Sivasankara Pillai's renowned short story *Vellapokkathil*, author S.V. Venugopan Nair offers a strikingly optimistic vision of rain through his narrative. Departing from the pervasive anxiety and dread evoked by the flood in Thakazhi's original, Gopannair anthropomorphises the rain as *VedaManikya*, a vibrant, almost divine figure symbolising abundance and renewal. Rather than portraying the monsoon as a destructive force, the story frames the rain as a harbinger of prosperity and ecological harmony. This transformation is most poignantly captured in the depiction of an elderly man, who, despite his physical frailty, finds ecstatic joy in the rain. Enchanted by its cascading rhythm and immersed in its symphonic presence, he dances with youthful exuberance, embodying the intimate connection between nature's cycles and human vitality. Thus, Gopannair's narrative reframes the cultural discourse surrounding rain, shifting it from existential threat to life-affirming celebration.

Among contemporary Malayalam writers, T. Padmanabhan, Nandanar, and Vaishakh stand out as storytellers who have intricately woven the motif of rain into their narratives. The presence of rain permeates not only the Kerala-centric settings of Padmanabhan's stories but also extends beyond regional boundaries, serving as a recurring atmospheric and symbolic element. Notable works such as *Vanjana*, *Pazhaya Kuthirakal*, *Oru Kathakrit Krushil*, *Pazhaya Thoppikal*, *Mazha Oduvilathe Mazha*, and *Vanavasam* commence with vivid depictions of rainfall, using it as both a literal and metaphorical device to frame the emotional and psychological landscapes of the characters. In Anand's story *Keetakosam*, the symbolism of rain undergoes a nuanced transformation from representing personal liberation and individual awakening to embodying broader themes of societal progress and collective emancipation. The narrative meticulously captures the subtle transformations in soil and fauna that precede rainfall, offering a layered ecological and existential reading of monsoon as a force that transcends personal experience to signal communal renewal.

The monsoon, as both a climatic and cultural phenomenon, deeply forms the ecologies of the Indian subcontinent and the broader Monsoon Asia region. Its seasonal variations influence agriculture, livelihoods, and societal rhythms across India. Representations of the monsoon in literature, from classical to contemporary, reveal emotional and symbolic dimensions that exceed meteorology. Historical records by travellers document the admiration and significance of the monsoon in shaping insights of the East. Moreover, the monsoon winds facilitated maritime trade and influenced architectural styles along coastal regions. In Malayalam literature, rain narratives capture local ecological consciousness and spiritual resonance. Together, these perspectives illustrate how the monsoon is not merely a weather system but a vital force embedded in the trade, art, architecture, economy and imagination.

CHAPTER 3

RAIN MEMORIES AND THE AGRARIAN PAST: STORIES FROM MALABAR

"Historical facts are, in essence, psychological facts". Marc Bloch, *The Historian's Craft* (1941)

Introduction

The previous chapter discovered the different dimensions of the monsoon with its ecological influence across the Indian land and the Monsoon Asian region, trade, architecture and documentation of travellers tracked by an examination of seasonal patterns exclusive to India. The present chapter examines how oral histories, memories, proverbs, folklore and Arabi - Malayalam literature mention the issue of climate change due to rainfall. The first part of this chapter examines the practice of rain rituals and social memories in Kerala. The other sub-chapters analyse the rain proverbs and Agrarian past, rain and popular cultures like *Njattuvela,* rain songs, *Krishigeetha*, 'Monsoon *theyyam*', and finally flood songs in Arabi Malayalam literature. The chapter draws theoretical insights from oral history that have grown in importance since the late 1960s. In addition, memory studies emerged from the 1980s as a major subfield of historical and social science studies.[1] Historical studies have appropriated and contributed to the development of oral history as an interdisciplinary field of research.[2] Thomson and many other oral historians, like Summerfield, Hamilton, and Nguyen, have drawn on subjectivity when analyzing their interviews

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1 Emily Keightely and Michael Pickering (eds.), *Research Methods for Memory Studies*, Edinburgh University Press, UK, 2013, p.4.

2 *Ibid.,* p.31.

and interview relationships, exploring ways in which memory is shaped and informed through Encounters, gender, ethnicity, National myths, emotional experience and sensations generated through materiality and sensory experience.[3]

Oral tradition and oral lore are cultural; material and traditions transmitted orally from generation to generation. The oral traditions that are traditionally transferred are classified into folk songs, myths, ballads, proverbs, riddles, etc. These kinds of literature also provide details about the importance of collective memorialization and the commemoration strategies adopted in seasonal variations. Memory studies is a multidisciplinary field that combines intellectual strands from anthropology, education, literature, history, philosophy, psychology and sociology. Historians who study collective memory use the work of French sociologist Maurice Halbwachs as a primary theoretical reference point. He published his landmark *Social Frameworks of Memory* in 1925 and showed that memories are social and passed from generation to generation.[4] Eric Hobsbawm and Terence Ranger's *the Invention of tradition* have also inspired much research in memory studies. Paul Ricoeur's: *Memory, History, and Forgetting* examine the reciprocal relationship between remembering and forgetting showing how it affects both the perception of historical experience and the production of historical narrative.

The work, *Introduction: Mapping Memory,* by Susannah Radstone and Bill Schwarz deals Memory and forgetting are often used in public discourse to recognize and condemn various acts of violence, both past and present committed by states, groups, and individuals.[5] Marc Bloch was another important historian who made

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3 *Ibid*., p.34.

4 T.E. Bosche, 'Memory Studies, A brief Concept Paper', working Paper, MeCoDEM, unpublished, *White Rose Research Online*, January 2016, URL for this Paper: http://eprints.whiterose. ac.uk/117289.

5 The political significance of memory is, to some extent, shaped by the suffering that has accompanied the formation of the modern, globalised world, highlighting instances where memory, as a social practice, has gained prominence. In the aftermath of collectively

many contributions to memory history. He quotes "Historical facts are, in essence, psychological facts." For him, human consciousness is ''the subject matter of history, reality itself.''[6] Memory is deeply connected with folklore, especially in its oral forms, and it is a special form of verbal art. The primary force of history is the people themselves; each person is a product of history, not its impetus. From this point of view, everything that happens to a people belongs to history in one way or another. In the study of folklore, special attention should be directed to the basis, the forms of production, and the folklore of the feudal period. The basis is mainly the forms of peasant labour.[7] Most of the places of this chapter used traditional ecological knowledge in the form of proverbs, rain songs, rain rituals etc. Traditional ecological knowledge[8] is a potential source of ecological information. The term Traditional ecological knowledge is a body of ecological knowledge and insights accumulated empirically over generations. TEK is the knowledge developed by indigenous and local peoples over several hundred years through direct or indirect contact with the environment. The detailed knowledge of plants, animals, and natural phenomena, the development and use of appropriate technologies for hunting, fishing, trapping,

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endured catastrophes such as slavery, the Holocaust, genocides, wars, ecological crises, forced migrations and the experience of becoming a refugee or being deemed "illegal" as well as personal traumas like sexual violence and torture, memory has emerged as a means not only for individuals to reclaim aspects of their identity but also for shaping a public and political discourse that allows these and similar experiences to be shared and understood by others. The idea of theoretical contexts refers more precisely to the conceptual representations of memory. Memory has signified, and continues to signify, different phenomena in different historical situations, and within different theoretical or disciplinary contexts. Walter Benjamin is an important scholar in memory studies and various other fields of critical inquiry, but he had a very limited understanding of the specific meaning of his concepts and broader epistemological framework. See., in. Susannah Radstone and Bill Schwarz (eds.), *Introduction: Mapping Memory,* Fordham University Press, 2010, pp. 3-6.

6 Sally Alexander, 'Memory-Talk: London Childhoods', Susannah Radstone and Bill Schwarz, (eds.), *Histories, Theories, Debates,* Fordham University Press, 2010, p.235.

7 Vladimir Propp, *Theory and History of Folklore,* Ariadna Y. Martin and Richard P. Martin (trans.), University of Minnesota Press, Minneapolis, 1997, p.48.

8 The term traditional ecological knowledge used in certain anthropological and sociological work.

agriculture, forestry and holistic knowledge are included.[9] It has the potential to forecast the near long-term climate conditions that affect the local communities. This potential of TEK enables us to conserve the natural resources which is important for the survival of indigenous people. For instance, these TEK have contributed to water harvesting, watershed management, forest resource management, wetland protection, and other natural resources that are important for the persistence of humans across the world. The Indigenous people have historically depended on TEK resources for using natural resources.[10] It has been an advantage that humans have settled around the world and can predict the weather conditions. Such knowledge could be used in determining the timing of important agricultural activities and in predicting disasters.[11] Before the advent of modern scientific methods, the indigenous people realized that some animals, birds, insects and plants could notice and respond to changes in atmospheric conditions. The level of human cultural development also corresponds to suffering when a disaster strikes. They also mastered the positions of stars, the sun and associated shadows and the moon, the wind strength and direction and the cloud position and movement, and the lightning patterns, animal and vegetation physiological changes.[12]

Indigenous knowledge is used to describe the knowledge systems developed over a long period by a community as opposed to the scientific knowledge that is generally referred to as 'modern' knowledge. It is the wisdom, knowledge, and practices of indigenous people gained over time through experience and orally passed

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9 Tamiru Lemi, 'The Role of Traditional Ecological Knowledge (TEK) for Climate Change Adaptation', *International Journal of Environmental Sciences Natural Resources*, Juniper, March 28, 2019, p.29.

10 *Ibid*.

11 Manyanhaire Itai Offat and Chitura Miriam, 'Integrating Indigenous Knowledge Systems into Climate Change Interpretation: Perspectives Relevant to Zimbabwe', *Greener Journal of Education Research*, ISSN: 2276-7789, 25th March 2015, p.27.

12 *Ibid.*

on from generation to generation and has over the years played a significant part in solving problems, including problems related to climate change and variability. Indigenous people who live close to natural resources often observe the activities around them and are the first to identify and adapt to any changes. The appearance of certain birds, the mating of certain animals and the flowering of certain plants are all important signals of changes in time and seasons that are well understood in traditional knowledge systems. Indigenous people have used biodiversity as a buffer against variation, change, and catastrophe; in the face of the plague, if one crop fails, another will survive. In coping with risk due to excessive or low rainfall, drought, and crop failure, some traditional people grow many different crops and varieties with different susceptibility to drought and floods, and supplement these by hunting, fishing, and gathering wild food plants. The diversity of crops and food resources is often matched by a similar diversity in the location of fields, as a safety measure to ensure that, in the face of extreme weather, some fields will survive to produce harvestable crops.[13]

The natural boundaries of Malabar played a significant role in shaping the history of this region. It subscribes to the dictum that 'Geography plays a pivotal role in determining the human life pattern in a locality'. In Malabar, the Western Ghats, which run parallel to the coast from the extreme north, are crucial in determining the historical destinies of Malabar. The Western Ghats have several specificities that include biodiversity and geographical distinctiveness. Western Ghats are rich in biodiversity as they house various flora and fauna. The Arabian Sea littoral and the life around it is integral to the history of Malabar. Likewise, Malabar is blessed with an extensive western coastal littoral. In the past, the Arabian Sea served as the entry

[13] *Ibid.*

and exit of aliens. Historians noted that it became an 'instrument to ensure isolation of the mainland'.[14]

The people of Malabar formerly forecasted the weather through applications of long-standing Traditional Ecological Knowledge. They have to recognize the unique situations, the behavior of insects, birds, and mammals, the characteristics of plants, and the location, timing, and patterns of clouds, lightning, wind, moon, sun, and stars. The successful application of forecasting knowledge is based on comparing past events, good prognosis, close observation, and a thorough understanding of the local environment. Community members, cultural leaders, and local elders have observed recent anomalies in the weather, with unusual rains and abrupt temperature changes.[15] This type of Traditional Knowledge has excellent potential for wider application in Malabar. Today, more than ever, there is an urgent need to document all traditional knowledge and folklore among the diverse ethnic communities before the traditional cultures are completely lost. The common man's view of seasons has developed based on his practical experience and his age-old perception of the weather phenomena. Seasons were very important in traditional agriculture. Rainfall is the most important of the climatic factors.[16] There has been a recent trend in climate science literature toward seeking out and acknowledging the value of Indigenous and local people's climate-related knowledge. Within this literature, there has been a tendency to make two interrelated assumptions, both of which historians of climate science and empire have started to problematize.[17]

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[14] A map of the Malabar District from statistical atlas in 1918, see in the appendix III.

[15] M. Chinlampianga, 'Traditional Knowledge, Weather Prediction and Bioindicators: A Case Study in Mizoram, Northeastern India', January 2011. *https://www.researchgate.net/publication/ 294817705a*

[16] Kuldeep Sharma (ed.), *Handbook of Agriculture*, Indian Council of Agricultural Research, New Delhi, 2005, p. 2.

[17] One is that scientific interest in Indigenous and local climate knowledge is a relatively new, 21st-century development. The other is that it is always and, in all contexts, possible

Rain Rituals and Social Memory

Over the last two decades, ritual has become an ever more central subject of analysis in many fields. Different disciplines like anthropologists, sociologists, and historians of religion, fields such as sociobiology, philosophy, and intellectual history have approached ritual as a vehicle for insights into cultural processes by which human beings transform and refigure their words. This interdisciplinary contact has produced a large field of ritual studies.[18]

This session examines the history of rain rituals, focusing on northern and southern Kerala regions, especially those of the present-day districts of Wayanad, Kannur, Thrissur, and Palakkad. Agriculture plays an important role in man's everyday life. The shortage of rain has badly affected the quantity and quality of crops and the everyday life of the people. The people who lived in rural areas believed that droughts are caused by injustice and ingratitude to God and that people make an apology for their sins, god may send them rain.[19] To praise the Rain Gods for good showers, many rituals are performed locally. The Kole land is part of the land ecosystem; it is in the central part of Kerala. Paddy cultivation is the main agricultural activity of the Kole Areas.[20] The Kole wetland in Kerala has gained renown for its

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to separate what counts as "Indigenous," "local," and "scientific" climate knowledge. In theory, Indigenous and local knowledge, often also referred to as Traditional Ecological Knowledge (TEK), is broadly defined as "a complex knowledge system grounded in generations of place-based observations and experiences". In practice, historians of climate science and empire are showing that the distinction between different climate knowledge can at times become muddied given their overlapping histories See., in. Harriet Mercer and Thomas Simpson, 'Imperialism, Colonialism, and Climate Change Science'*, Wiley*,1st June 2023, p.4.

18 Catherine Bell, *Ritual Theory Ritual Practice*, Oxford University Press, New York, 2009, p.3.

19 Nadia Abu-Zahra, 'The Rain Rituals as Rites of Spiritual Passage', *International Journal of Middle East Studies*, Vol. 20, No.4, 1988, p.507.

20 Leema, TG, *An Economic Analysis of Kole Cultivation in Kerala with Special Reference to Thrissur District,* Unpublished PhD thesis, MG University, 2015, p.64.

rice cultivation practices, with a history spanning 300 years. The term *'Kole'* directly translates to 'bumper crop' in Malayalam, highlighting the wetland's remarkable productivity. The Kole wetlands are situated between the Chalakudy River in Thrissur District and the Bharathapuzha River in Malappuram District.[21] Only one crop, known as the kole *Puncha* is raised in the kole areas. These wetlands become flooded during the monsoon season, and agricultural activities take place in the summer months when water levels are lower.[22]

In the olden days, the Kole lands were cultivated from the *kayal* area by putting up temporary earthen bunds, and cultivation of rice was done by enterprising farmers during the summer period from December to May. The water pumped out from the fields was stored in a network of canals interspersed throughout the area. This water and the timely showers were used to produce bumper crops if other conditions were favorable. The crop had the risk of flood damage, and success was often a chance.[23] The cultivation of the Kole area is even now associated with several constraints that can cause complete loss of the crop. Efforts by governmental agencies like KLDC and the Irrigation Department in the construction of permanent bunds, drainage channels, regulators, etc. have minimized the risks and, in some areas, have facilitated the cultivation of an additional crop during the *Mundakan* season.[24] During the rains, the

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[21] The area lies between 10°20' and 10°40' north latitudes and 75°58' and 76°11' east longitudes. The fields are geographically distributed in Mukundapuram, Chavakkad, and Thrissur taluks of Thrissur district and Ponnani taluk of Malappuram district. The area from Velukkara in the south on the Chalakudy riverbank in Mukundapuram taluk to Mullassery of Chavakkad taluk and Tholur-Kaiparampa areas of Thrissur taluk is designated as Thrissur Kole, and the contiguous area from Chavakkad and Choondal to Thavannur, covering Chavakkad and Thalappally taluks of Thrissur district and Ponnani taluk of Malappuram district, forms the Ponnani Kole. See.,in. V.K. Venugopal and I. John Kutty*, Kole lands of Kerala,* Kerala Agricultural University, Thrissur, 1993, p.3.

[22] S Vivek and Binoo P Bonny, 'Constraints Affecting Innovations of Rice Farmers in the Kole Wetland System', *International Journal of Agriculture Extension and Social Development,* Vol.7, Issue 3, March 2024, p.117.

[23] V. Venugopal and I. John Kutty, *op. cit.,* p.1.

[24] *Ibid.*

inflow into the basin submerges all the Kole areas. Since the natural slope of the streams is less, the water spreads out in the valley and submerges *Mundakan* fields on the periphery. The area normally is flooded from June to January. In cropped areas, bunds are formed around *Padasekarams,* which protect the crop from floods.

They had a special worship system called *Kshetrapala* (The guardian figure of the temple), which offered cooked rice and water in an especially well-defined place where water from the drainage channel of the temple was collected. This encodes the relation between water and paddy/rice. Similar rituals are carried out before *Varunakkallu* (The stone considered the idol of the rain god) too. Mari goddess is worshipped in Adi to praise the rain god/goddess by the tribals of Attappady in Kerala. The Umbrella dance and hair dance in *Velavaravu* are expressions for rain.[25]

Vela is an active agro-social festival found in different areas of Kerala; it is celebrated during the harvest season. These festivals are deeply connected with agrarian traditions, elaborate rituals, processions, folk music, dance performances, community feasts, etc. This festival had a deep connection between agriculture and social life in Kerala. The most famous Vela festival is the Nenmara Vallangi Vela, celebrated yearly on the 20th day of the Malayalam month of *Meenam* at the Nellikulangara Bhagavathy Temple in Palakkad district. Another Vela festival is the Vairankode Vela, which is celebrated on the first Sunday of the Malayalam month of *Kumbham* at the Vairankode Bhagavathy Temple. The Puthur Vela is a significant event held during the month of *Meenam* in Malayalam at the Puthur Thirupuraikkal Bhagavathy Temple in Calicut. Kodungallur Vela ends, the most important temple of the mother goddess Kali, it is believed that the region will receive rains. On Vela days in Perurkkavu near Mala and Mulayankavu in Valluvanadu, rains are expected every

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25 C.R. Rajagopalan, *Summer Rain Harvesting and Indigenous Knowledge of Kerala*, DC Books, 2005, p.49.

year.[26] To bring down rain, brahmans and these non-brahmans who copy their ceremonial rites, have their *Varuna japam,* or prayers to Varuna Some of the lower classes, instead of addressing their prayers to the rain God Varuna, try to induce a spirit or devatha named *kodumpavi* (wicked one) to send her paramour *sukra,* to the affected area. The belief seems to be that Sukra goes away to his concubine for about six months, and if he does not then return, drought ensures.

Kodumpavi and *Koppiyala* are a rain ritual that exists in the Palakkad district. The ceremony consists of making a huge figure of *kodumpavi* in clay, which is placed on the earth and pulled through the streets for seven to ten days. On the last day, the final death ceremonies for the figure are celebrated. It is disfigured especially in those parts which are usually concealed. *vettiyans* (Paraiyan gravediggers), who have been shaved, accompany the figure and perform the funeral ceremonies. This procedure is believed to put *Kodumpavi* to shame and to get her to include Sukra to return and stay in the drought.[27] Another ritual and celebration of the rain is *Koppiyala*. Eight or ten women gathered together and they hold 'cup' and 'neem' in their hands then they stand in a circle in the courtyard of the houses and sing songs. The family members give them rice/paddy/money. It is believed that if the Koppiyala is buried, it will rain in the evening. This is the song sung (in a circle) in the Koppiyala.[28]

Shining like an oozi
Urenkum mala Koppiyala
Shining like a coin
The whole forest will rain, Koppiyala
The thunder will rain, the rain will rain

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26 *Ibid.*

27 Edgar Thurston, *Ethnographic Notes in Southern India*, The Superintendent, Government Press, Madras,1906, p.22.

28 Varky Edakkalathoor, *Kodumpapiyum Koppiyalayum*, A. Nujoom (ed.), *Neerarivukal,* DC Press, Kottayam, 2009, p.105.

Till the rain will rain, Koppiyala
Thunder will thunder along the road
The sword will flash near the forest
The rain will rain, Koppiyala
Thunder will thunder rain, Koppiyala
Can't the thunder rain, Koppiyala
O king of honour, Can't the rain, Koppiyala, both sides will rain, Koppiyala[29]

There is another ritual in the Koodalmanikyam temple of Irinjalakkuda to block the rain god from showering by offering lotus garlands. In Ayyappan Kavu of Chamravettam near Bharatappuzha, there are several such rituals. paddy and coconut are offered in the river to propitiate lord Ayyappa to give moderate rain. Thanneer Bhagavathy (water goddess) is the deity of a place in Vettathunadu. Thirumaniyoor in Thrissur is inundated during monsoon and the myth of Parappuzha Nettan is very popular in this region.[30]

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29 Original exact version of koppiyala,
ഊസിപോലെ മിന്നിമിന്നി
ഊരെങ്കും മളെ കൊപ്പിയാള
കാസുപോലെ മിന്നി മിന്നി
കാടേങ്കം പെയ്യും മളൈ കൊപ്പിയാള
ഇടി ഇടിയെ മള പെയ്യേ
ഊരെല്ലാം പെയ്യുവരെ കൊപ്പിയാള
വഴിയരികെ ഇടിമിന്നി
കാടരികെ വാൾമിന്നി
ഊരാളാം പ്പെയ്യും മളൈ കൊപ്പിയാള
ഇടി ഇടിയെ മളപെയ്യാൻ
ആകാതോ കൊപ്പിയാള
മാനത്തെ രാജാവേ
മളപെയ്യാൻ ആകാതോ കൊപ്പിയാള,
ഇരുകരയും പെയ്തുവാര കൊപ്പിയാള,

See: Varky Edakkalathoor, 'Kodumpapiyum Koppiyalayum', in A. Nujoom (ed.), *Neerarivukal*, DC Press, Kottayam, 2009, p.105.

30 C.R. Rajagopalan, *Op.cit.,* p.490.

The available documents or oral history sources suggest that the highland region of the Sahyadris, especially in Wayanad had a rich ecosystem of rain. The region is known for a soft drizzle, fondly called by the local popular *noolmazha* ('Thread rain') since it was suitable for crops. The European tea and coffee planters since the nineteenth century tapped the ecology of *Noolmazha* since it provided a temperature climate conducive to the plantation crops. Cheruvayal Raman recollects that Wayanad's ecosystem, had six different types of rain and each came with a distinct sound, pace colour fragrance.[31] Kurichya's among Wayanad worshipped *Vashyon*, their clan god, during the drought period. There was an important custom called *Motharakoda*,[32] which was practised among Kurichya tribals in Wayanadu for bringing rain.[33] Manuel a farmer, Meenanghadi (Wayanadu) recollects that in rain Wayanadu used to fall in pots. So, soil erosion in Wayanad was very slow. But today the rains in Wayanad fall straight and the soil erosion is very fast.[34] Karuvellayan Kolumban was an ancient tribal leader who had Traditional Ecological knowledge about rain. Kolumban was a person who, knowingly or unknowingly, accepted modern science from the ancient tribes. He was a person who memorized a lot of forest knowledge and rain knowledge. He memorised there are several kinds seasonal

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31 These showers were named after the Malayalam months. The cycle began with Kumba Mazha in February—light summer rains that cleansed the atmosphere. Next came Meda Mazha, also known as Vishu Mazha, in April. Though brief and sharp, this rainfall prepared the parched soil for cultivation, after which farmers sowed tuber crops like elephant yam and colocasia. With the arrival of Edavapathi during May–June, the southwest monsoon set in, ensuring irrigation for the paddy fields. In August, Midhuna Mazha brought heavy downpours that replenished groundwater while flooding the plains. By September, Chinga Mazha arrived with a gentle, playful drizzle, often appearing between bursts of sunshine. Finally, Tula Mazha in October came with thunderstorms, marking the close of the southwest monsoon season. Interview with Padmasree Cheruvayal Raman, (70), Cheruvayal, 2/01/2022 and Viju B, *Flood and Fury: Ecological Devastation in the Western Ghats*, Penguin Random House India, 2019, p.165-166.

32 *Motharakoda* is an important ritual of the Kurichya community. This ritual involves placing a tuber known as *Motharakoda* in mud and pressing it with the feet. This ritual should be performed by a mother who has given birth to a child in the month of Karkidaka.

33 Interview with Chathan (75), Cheruvayal, 5.02.2022.

34 Interview with Manual (70), Meenangadi,12.12.2023.

rains among them important seasonal rains are the "40-number rain" and the "100-number rain." These names differ from those like *Edavapathi* or *Thulamazha*, as they are based on the pattern and signs of the rainfall rather than the season itself. When the 40-number rain occurs, it is believed to bring prosperity to the land. In contrast, the 100-number rain is associated with dryness and scarcity. During the 40-number rain, the weather alternates between heat, cold, snow, and rain, ensuring sufficient rainfall for the country.

When the water will rise, in the rural dialect, it is also called *Erichil Adikkuka* or *Poothan Adikkuka.* Or, when the last drops are falling from the field, if a light breeze blows, the water particles will fly towards the sky. This is number 40 rain.[35] The rainwater that falls in this way will scientifically fall at a 40-degree angle to the ground and continue to fall for 24 hours continuously. It will never dry up Coffee, cardamom, pepper, ginger, and forest resources are abundant. Number 100 rain will feel colder. If it falls directly for more than two hours, the body will shiver. There will also be flooding. If it rains for a long time at number 100, snow will accumulate. Heavy snow that we can't see anything. During this time, coffee will bloom and fall, and the fruit will be reduced. Cardamom will stand strong, but the yield will be reduced. Chillies will burn. Ginger is strong, but the fruit will be reduced.[36]

Rain Proverbs and Agrarian Past

The increase in the number of agrarian villages was the direct result of the expansion of agriculture. The expansion of agriculture was required by the increase in population and the consequent demand for food grains. In the early period, there were two to three crops of paddy fully-fledged, considering water and fertility of

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35 Karighunnam Ramachandran Nair, '40- tham number Mazhayum 100-aam number Mazhayum', in Nujoom (ed.), *Neerarivukal*, DC Press, Kottayam,2009, p.106.

36 *Ibid.,* p.107.

soil.[37] Kilimanoor records mention there are three types of lands*:Nilam, Purayiṭam*, and *kadu*(forest). There are references in inscriptions about forests attached to paddy fields, possibly for manuring. These developments notwithstanding, agriculture was largely dependent on the monsoon. In such a system, knowledge of seasons was important. An agricultural calendar gradually evolved. All this was dependent on astrology. We, therefore, find the families of astrologers becoming an integral part of the village.

The Sahyadris and their lower plains are known for diverse agricultural traditions. The agrarian societies had a multiplicity of ways to preserve and transmit their ecologically specific knowledge to the next generations. Among them, Proverbs are important idioms that preserved the vernacular style of agriculture. The proverbs collected from *Malanadu* are good examples of the relationship between man and nature. Each proverb was culturally significant. Such proverbs, which rhythmically present the ideas of a society, once performed many social functions in society. Many proverbs become irrelevant when such social duties cannot be fulfilled. But proverbs about agriculture, weather, and food still exist in villages and are good source material for historians to study the past environmental contexts of social life. Agricultural proverbs are rich with natural knowledge, practical wisdom, and worldview. Most of them are connected to the nature of rain, soil, wind, and tides through their local knowledge and utilized them appropriately for agriculture. Their kind of knowledge is purely scientific. Such proverbs are also signs of environmental awareness. They have useful ingredients for any literary work and at the same time provide the needed signals in a man's daily life.[38]

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37 T.R. Venugopal, *Processes and Structures: A History of Medieval Kerala,* Current Books, Thrissur, 2022, p.48.

38 Dr. Sudeshna Basak, *Cultural History of Bengali Proverbs*, Gyan Publishing House, New Delhi, 2000, p. 2.

There have been many proverbs related to rain and agriculture. Some sayings are relevant only in the context of Kerala. For example, *'Kumbhathil Mazha Paithal Kuppayilum Manikyam'*[39] ,this proverb indicates how rain can fertilise even barren land. Through these proverbs, farmers understood that the timely arrival of pre-monsoon rain during the month of *Kumbham* revived the soil and more yielding. Symbolically these proverbs highlight how even low-fertility lands could produce good yields if graced by timely rain. From an environmental history perspective, this proverb explains rainfall is not merely an economic contribution, for agrarian communities but also experimentation that turns loss into wealth.

Another proverb "*Makarathil Mazha Peythal Malayalam Mudiyum*[40] suggests that sometimes rain is very crucial for crops.[41] Rain in *Makaram* during the harvest season is detrimental to the agricultural economy. Traditionally, the month of *Makaram* is a drier season following the northeast monsoon and this period was used for storing grains and performing rituals etc. So, the rain in the month of *Makaram* badly affects the environmental and social order of Kerala. If it rains in the month of *Meenam*, it is like *Meenkunnu* [42] *Meenam* is a month in the solar calendar literary means fish. *Meenam* corresponds to the English month latter half of March and about the early half of April.

Vrishika kaattoothiyal mazha illa,[43] this proverb highlights the complicated connection between wind patterns and rain expectations. The month *Vrishchikam* connects with the northeast monsoon. In old maritime and agrarian knowledge systems, wind direction and quality were used as predictive tools. An unexpected wind

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39 'If it rains in the month of *Kumbham,* even a garbage heap has jewels.

40 'If it rains in Makaram [January-February], the land will collapse'.

41 P. C. Kartha, *Pazhancholprapancham*, National Book Stall, Kottayam, 1966, p. 562.

42 Interview with, Velayudhan (68), Manandhavadi,2/01/2022.

43 'If the wind changes in Vrishchikam, no rain will follow'.

pattern could affect rains and change winter crop planning. This reflects an embedded understanding of microclimates and seasonal variability,*Vishu Kazhinjal Varshamilla.*[44] this proverb reflects lunar agricultural traditions, where phases of the moon were used as substitutes for moisture levels, tidal effects, and seed propagation patterns. This saying draws on the observation that, post-*Amavasya,* the monsoon phases weaken, making it an inappropriate time for sowing. *Vishu Kazhinjal Venalilla*[45]- this proverb is related to weather observation. The signs of rain were familiar to old farmers by observing the wind.

In Kerala, agricultural proverbs played a crucial role in farming practices and shaping the agrarian society's cultural and economic landscape during the 19th and 20th centuries. All these proverbs helped Kerala's agrarian knowledge and served as repositories of TEK, controlling farmers in decision-making related to crop selection, planting seasons, harvesting techniques, and weather predictions. proverbs related to seasonal variations and soil fertility helped farmers blend their agricultural activities with the region's unique climatic rhythms, which helped good yields and economic prosperity. Furthermore, these proverbs helped structure social norms, labour ethics, and farmers cooperation in activities such as paddy transplantation and harvest festivals.

This section presents a collection of Season-related proverbs from a collection of Malayalam sayings and Proverbs bearing on agriculture, sourced from regional Archives in Calicut. These records give valuable insights into how indigenous people historically perceived climatic variations. These proverbs are passed from generation to generation and formally recorded in terms of traditional ecological knowledge.

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44 'No rain after the new moon day'.

45 Dr. C. K. Rajagopalan, *Krishiyude Nattarivukal,* D. C. Books, 2004, p.73.

- If the star-day ‘Atham’ is dark (cloudy), the star day ‘Onam’ will be bright.

  അത്തം കറുത്താൽ ഓണം വെളുക്കും.

- Monsoon breaks out by the middle of Edavam (beginning of June).

  എടവത്തിൽ പാതിവർഷം.

- One summer alternated with one winter.

  ഒരു വേനലക്ക് ഒരു മഴ.

- Kanni” Sun will break even rocks.

  കന്നി മാസത്തിലെ വെയിൽ പാറ പൊളിക്കും.

- Even robbers cannot stand the sun in the month of “Kanni”

  കന്നി മാസത്തിലെ വെയിൽ കള്ളനും കൊള്ളില്ല.

- If Kallikodam (mountain) is cloudy, the Karuba River will become (see clouds on the beaks of the Western Ghats, and you can be inundated in the Karuba River between Kuttipuram and Pattambi).

  കല്ലിക്കോടൻ കറുത്താൽ കറുകപ്പുഴ നിറഞ്ഞു.

- No rains after Karthiga Nattuvela, no war after Karnan’s fall.

  കാർത്തിക കഴിഞ്ഞാൽ മഴയില്ല, കർണ്ണൻ പെട്ടാൻ പടയില്ല.

- If there are rains in Kumbham,” even waste lands will yield paddy, (you can get crops even in compost pits, if there are rains in Kumbham).

  കുംഭത്തിൽ മഴ പെയ്താൽ കുപ്പയിലും ചോറ്.

- If cloudy in the north, have the house on the hill (When clouds move northward, it is time to quit your place and repair to the hill top probably for fear of inundation). If cloudy in the south, have the house in the valley.

  കാറെടുത്തു വടക്കോടെങ്കിൽ, കുടെടുത്തു കുന്നത്തു, കാറെടുത്തു തെക്കോട്ടെങ്കിൽ, കുടെടുത്തു കുണ്ടില്.

- Like Malabar spoiled by "Chingam" rains, (If "Chingam" is bad everything is bad for Malabar.)

  ചിങ്ങം കെട്ട മലയാളനെ പോലെ.

- In "Chingam" nattuvela, it will always be drizzling.

  ചിങ്ങം ഞാറ്റിൽ ചിനിങ്ങി ചിനിങ്ങി

- After the 10th of Thulam, shade under Jack will do; no rains. (After the 10th of Thulam, you get anything in plenty.)

  തുലാപ്പത്തു കഴിഞ്ഞാൽ പിലാപൊത്തു മതി പിലാപൊത്തിലും പാർക്കാം.

- Like clouds moving in the south or like the (pilgrim) man who proceeded north.

  തെക്കോട്ടു പോയകാറുപോലെ, വടക്കോട്ടുപോയ ആളെ പോലെ.

- After the 10th of Dhanu (end of December) clearing of jungles for Punam can be commenced.

  ധനുപത്തു കഴിഞ്ഞാൽ കൊത്തൽ തുടങ്ങാം (പുനം കൃഷി).

- Water must overflow in Thiruvathira njathuvela (There must be rains to overflowing, after 1st crop transplantation.)

  തിരുവാതിര ഞാറ്റുവേലയിൽ തിരിമറിഞ്ഞൊഴുകണം

- Malabar will suffer if it rains in *Makaram* (January-February.)

  മകരത്തിൽ മഴ പെയ്താൽ മലയാളം (കേരളം) മുടിഞ്ഞുപോവും.

- Evening rain and evening guests will? not soon depart.

  വൈകുന്നേരത്തു മഴയും വിരുന്നും പോവില്ല.

- As useless as rain in sandy soil.

  മണലിൽ പെയ്ത മഴപോലെ.

- Rains and guests in the morning cannot be depended upon to stay long.

  രാവിലത്തെ മഴയും രാവിലത്തെ വിരുന്നും വിശ്വസിക്കേണ്ട

- Thunder in the afternoon indicates sure rain.

  തിരിഞ്ഞു അഞ്ചടിക്ക ഇടിവെട്ടിയാൽ തിരുമിറ്റത്തു വെള്ളം

- Like Mushrooms springing up at the time of lightning.

  ഇടിക്ക കുമിൽ മുളച്ചപോലെ

- If it rains in chothi, there is no food scarcity.

  ചോതിവർഷിച്ചാൽ ചോറ്റിനു പഞ്ചമില്ല.

- If there is no rain in “Ayilliyam” njattuvela, the Mundakam (2nd) crop will fail.

  ആയില്യക്കള്ളൻ അകത്താണെങ്കിൽ മുണ്ടക പഞ്ചപുറത്തു.

- There will be nothing if it rains in Makaram.

  മകരത്തിൽ മഴപെയ്താൽ മരുന്നുകൂടി ഇല്ല.

- If it rains in Kumbham, there will be bumper paddy.

കുംഭത്തിൽ മഴപെയ്താൽ കുപ്പയിലും നെല്ലാണ്.

- As useless as rain in sandy soil.

  മണലിൽ പെയ്ത മഴപോലെ

- If there is rain in Puyyam, even grass will yield grains.

  പൂയ്യത്തിന്ന മഴപെയ്യാൽ, പുല്ലും നെല്ല്.

- Do not trust in 'Aswathi Nattuvela, better sow in Bharani Nattuvela.

  അശ്വതി ഞാറ്റുവേല കള്ളനാണ്; ഭരണി ഞാറ്റുവേലയിൽ വിതക്കാൻ നല്ലതാണ്

- cultivation according to season and dancing according to timing.

  കാലം നോക്കി കൃഷി, മേളം നോക്കി ചാട്ടം.

- If sowing is not done in Medam, the Modan crop will fail.

  മേടം തെറ്റിയാൽ മോടൻ തെറ്റി.

- Do not wait for an auspicious day, but sow at the proper season.

  നാളും പക്കവും നോക്കിയവനെ വെച്ചോ വട്ടി.

- Transplanting, if done in Atham nattuvela, may be done with wider spacing.

  അത്തം ഞാറ്റുവേലയിൽ അകലെകൊണ്ട വടിച്ച നട്ടാൽ മതി.

- Cultivation according to rains,

  വർഷം പോലെ കൃഷി.

- If the wind comes from Calicut direction (meaning north) the animals you have purchased for work may be sold.

കോഴിക്കോടൻ കാറ്റടിച്ചാൽ കൊണ്ട കാളയെ വില്ക്കാം

- Eat of the roots from elephant foot yam in Karkitakam (The roots are very sweet then).

  കർക്കിടമാസത്തിൽ ചേനകട്ടിട്ടും കൂട്ടണം

- All the Colocasia stems may be cut in the month of Chingam. The crop matures by then and if necessary, you may harvest the same.

  ചിങ്ങത്തിൽ ചേമ്പ് ചെന്നരിയാം.

- Cloudy in the north, have the house on the hill. (When clouds move northward, it is time to quit your place and repair to the hill top probably for fear of inundation.) If cloudy in the south, have the house in the valley.

  കാറെടുത്തു വടക്കോടെങ്കിൽ, കുടെടുത്തു കുന്നത്തു, കാറെടുത്തു തെക്കോട്ടെങ്കിൽ, കുടെടുത്തു കുണ്ടില്

- Like Malabar spoiled by “Chingam” rains, (If “Chingam” is bad everything is bad for Malabar.)[46]

  ചിങ്ങം കെട്ട മലയാളനെ പോലെ.

Traditional Ecological Knowledge is the important sayings connected with rain and encoded with various aspects of life. William Bothums, the collector of Malabar, issued an order in 1888 that the following information should officially be collected by Revenue officials and Tahasildars. Thus, collected material numbering about 450 sayings was used as a preamble to bring reforms in the field of agriculture.[47]

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46 *A Collection of Malayalam Sayings and Proverbs Bearing on Agriculture*, The Superintendent, Government Press, Madras,1934, p.4, RAK.

47 C. R. Rajagopalan, *op.cit.,* p.50

- No rain, no yields.
- The trees would rain even after the rain stops.
- The river will know if it rains.
- The tree would rain seven times if it rains once.
- One can understand if the rain falls; but if the sky itself falls.
- The rain grandpa does not have peace of mind.
- Without getting wet in rain jumping into the river.
- If it rains in the month of Kumbham, jewels will be found even in the garbage bin.
- Half a rain can compensate one hundred summers.
- The rain in between two main monsoons will double the yield.
- If the sand is wet footprints can be seen.
- Wild rain is a ‘Pandal Settling’ one.
- Without an umbrella one can’t walk from *Edavam* to *Thulam.*
- The first new rain is forest nurturing.
- The visitor and the rain reached late in the evening and won’t return that night.
- Those who hesitated to see *Thulavarsham* and ventured to seeing *Edavappathi.*

- The water will be sustained only if the rain is accompanied by thunder.[48]
- Horsegram needs only three rains.
- Seeds should be sown in the very first rain.
- Number of drops make the flood.
- Ladyfinger and Brinjal should be sown before frogs begin their singing.

Traditional Knowledge: How Plants and Animals Signal Approaching Rain

- If an iyyal (a kind of butterfly) flies, it will rain again. If it is white, it will rain.

  ഈയ്യൽ പാറിയാൽ മഴ വീണ്ടും വരും, വെളുത്തതാണെങ്കിൽ മഴ പോകും.

- If the dragonfly falls low, it will rain. If you fly high, it will rain.

  തുമ്പി താഴ്ന്നപറന്നാൽ മഴ വരും. ഉയർന്ന പറന്നാൽ മഴ പോകും

- At night, if the quill chirps incessantly, seeing the sign of rain in it, the hornet cries for rain to come.

  രാത്രിയിൽകുയിൽ ഇടതടവില്ലാതെ ചിലച്ചാൽ അതിൽ മഴയുടെ സൂചന.

- When the waterhen cries, it will rain.

  കുളക്കോഴി കരയുന്നതും മഴ വരാൻ തന്നെ.

- If a flower blooms, its petals should fall into the rainwater. When it blooms for a week, rain is certain.

48 *Ibid.* also see.in, Febin Sithara. C, 'Geo Environmental Specificities of Monsoon: A Study About Rain lore', *Proceedings South Indian History Congress*, ISSN No.:2229-3671, 2023.p.8. http://journal.southindianhistorycongress.org/show_article.php?atl_id=MzQ4

പുഷ്ക്കരമരം പൂത്താൽ അതിന്റെ പൂവ് മഴവെള്ളത്തിൽ വീഴണമെന്നാണ്. അതു പൂത്ത് ഒരാഴ്ചയാകുമ്പോൾ മഴ നിശ്ചയം

- The tribals of Wayanad predict rain by breaking the fruit of the Pulachi tree. If there is one seed in the pulakaya, it will rain once; if there are two or three seeds, it will rain twice or thrice.

  പുലച്ചിമരത്തിന്റെ കായ പൊളിച്ചുനോക്കിയാണ് വയനാടൻ ആദിവാസികൾ മഴ പ്രവചിക്കുന്നത്. പുലച്ചിക്കായയിൽ ഒരു വിത്തുണ്ടെങ്കിൽ ഒരുപറ മഴയും രണ്ടും മൂന്നും വിത്തുകളാണെങ്കിൽ രണ്ടോ മൂന്നോ പറ മഴയും പെയ്യും.

- The flowering of the cactus is a sign of the approaching monsoon.

  കള്ളിച്ചെടി പൂക്കുന്നത മഴക്കാലം അടുത്തതിന്റെ ലക്ഷണമാണ്.

There is a connection between seed storage and rain. The tribal people Kurichyas, used to do everything from sowing to harvesting according to the weather. Each seed has its place and time for sowing. The *Kattappattu* of the *Pulluvas* of North Kerala exemplifies this.

The tribal people of paniyas[49] also had some traditional ecological knowledge and they have certain kinds of songs related to rain. some of these are follows;

"തുവരും തുവരും മയെയെ
അണ്ണനും അച്ചിയു വഞ്ചെരു
പുയെയു കടന്നു വഞ്ചെരു
നനെഞ്ചു വുറെച്ചു വഞ്ചെരു
തുവരും തുവരും മയെയെ" [50]

[49] Paniya is a tribal community in the state of Kerala. Their language is also known as Paniya, Paniyan and Panyah. It belongs to the Dravidian family of languages.

[50] Vasudevan Chekkallur, *Meliyattu,* Neermathalam Books, Manathavady, 2020, p.10.

The above-mentioned poem depicts that the unavailability of rain created a pathetic condition for the paniya community, and most of their daily life condition were very severe.

Proverbs also help the traditional fish-workers in Kerala to forecast and cope with coastal hazards. Various proverbs that prevail among fishing communities are used in monitoring and predicting coastal hazards and related weather events. These proverbs are the primary tool for fishing communities to understand their day-to-day lives.[51]

Suryan pozhutherinjal mazha

സൂര്യൻ പൊഴുതെറിഞ്ഞാൽ മഴ.

This proverb indicates that if the sun burns and sets, then it will rain. Fishermen observe that this proverb is considered real during June–July, when the monsoon sets in or when there is low pressure developed in the ocean.

Kadalu shantamayal karaykku varanam

കടലു ശാന്തമായാൽ കരക്കു വരണം.

During the monsoon season, if fishermen observe that the sea has become calm, then this proverb cautions them to return to the shore immediately. A calm sea is the sign arrival of a severe storm within a few hours. The utility of this proverb is mostly functional during the monsoons.[52]

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51 Sunil D. Santha and Gahana Aswin V.S. ‘Proverbs on Coastal Hazards: Exploring Community Capacities for People-centred Disaster Risk Reduction in Kerala’, *Research Gate*, January 2014, p.29.

52 *Ibid.,* p.32.

Mulakkammeen nakshatram vannu kadalil veenal kollu undakum

മുലക്കമീൻ നക്ഷത്രം വന്ന് കടലിൽ വീണാൽ കൊല്ലുണ്ടാകും

Fishermen in Kozhikode, unlike fish-workers in other districts of Kerala, rely on the movement of stars as a sign of natural hazards. Accordingly, Sunil, a fisherman in Kozhikode, has certain proverbs that are interconnected to stars and natural hazards. One such proverb is mentioned above, which states that if the star 'mulakkameen' sets into the sea, there will be huge wind, heavy rain and surge within a day.[53]

Thekku thelinjaal dhikku theliyum; thekku kalangiyal dhikku kalangum

തെക്കു തെളിഞ്ഞാൽ ദിക്കു തെളിയും: തെക്ക് കലങ്ങിയാൽ ദിക്കു കലങ്ങും.

The direction and location of rain clouds and the direction of wind and water flow are important aspects in understanding natural hazards. Accordingly, Chandran, a fisherman in Kozhikode, said the above-mentioned proverb, which refers to the saying that if the sky in the south is dark and cloudy, it indicates an upcoming storm, and if the southern sky is clear, it indicates the end of the storm.[54]

Kaala villu kaattinum maari villu mazhaikkum

കാലവില്ല് കാറ്റിനും മാരി വില്ല് മഴക്കും

This proverb is related to rainbows. The *kaalla villu* is the rainbow that comes in the morning. A rainbow appears in the morning, which is a sign of a windy day. The *maari villu* is also the rainbow that comes during evening time. The presence of a rainbow in the evening indicates that it is going to rain.[55]

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53 Interview with Sunil (70), Puthiyappa, 20/04/2023.

54 Interview with Chandran (75), Puthiyappa, 20/04/2023.

55 Sunil D. Santha and Gahana Aswin V.S. *op.cit.,* pp.32-33.

Edavathile pournamikku kadal kshobham

ഇടവത്തിലെപൗർണമിക്ക് കടൽ ക്ഷോഭം

As per the traditional Malayalam calendar, *Edavam* is the tenth month, which begins mid-May and ends mid-June. In the month of *Edavam,* on the new moon day, there will be a severe surge.

Aadi patinettinu aadi ulayum

ആടി പതിനെട്ടിനു ആടി ഉലയും.

As per the traditional Tamil calendar, *Aadi* is the fourth month, which begins mid-July and ends on mid-August. This proverb shows that there will be strong winds blowing on the 18th day of the month Aadi. The wind will sway the coconut trees along the coast very severely, such that they seem to hug and kiss one another.[56]

Kanni pathinnu kaatu kappalu karanum pedikkum

കന്നി പത്തിന്നു കാട്ടുകപ്പലു കാരനും പേടിക്കും

As per the traditional Malayalam calendar, Kanni is the second month, which begins mid-September and ends mid-October. The peculiarity of this month is the blowing of strong winds. The proverb indicates that very strong winds will blow on the 10th day of this month, such that even sailors in a ship will fear.

Uchikku meethe idi vettiyal, uchi velukkum or
Uchiyil idipottyal uchi thanukke mazha peyyum

ഉച്ചിക്ക് മീതെ ഇടി വെട്ടിയാൽ ഉച്ചി വെളുക്കും.

ഉച്ചിയിൽ ഇടി പൊട്ടിയാൽ ഉച്ചി തണുക്കെ മഴ പെയ്യും.

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[56] *Ibid.*, p.33.

The above-mentioned proverbs have almost the same meaning. The first proverb describes that if there is lightning and thunder directly above one's head, then there will be very severe rains of the intensity that can wash away all the hair on one's head. In a similar vein, the second proverb indicates that lightning and thunder directly above one's head could lead to severe, continuous rains, such that it will lead to the instant cooling of one's head.[57]

Some proverbs indicate that the intensity of hazards, the primary indicator for the duration and seasonality of hazards, is also related to months and stars followed as per traditional calendars. Some of the proverbs related to the duration and seasonality of hazards are detailed below.

Medam thottu Edavam pakuthi vare kizhakkan varsham

മേടം തൊട്ട് ഇടവം പകുതി വരെ കിഴക്കൻ വർഷം

As per the traditional Malayalam calendar, *Medam* is the 9th month, which begins from mid-April and ends on mid-May. This particular proverb describes summer rains that come from the south. After this, nature prepares itself for the arrival of the south-west monsoons.

Thiruvathira njaatuvelakku kadal koodiyal, thiruvonam vare kadalkshobham nilkum

തിരുവാതിര ഞാറ്റുവേലക്ക് കടൽകൂടിയാൽ തിരുവോണം വരെ കടൽ ക്ഷോഭം നിൽക്കും.

On *Thiruvathira njatuvela*, if it rains, it will rain very heavily and without any break till the day of Onam. This *njatuvela* occurs around the 7th or 8th of *Mithunam*

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[57] *Ibid.,* p.34.

month according to the Malayalam calendar. If it rains, it will remain till the day of Onam, which usually falls around the end of August or the beginning of September.[58]

Karkidaka vavinu kadal kshobham

കർക്കടക വാവിന് കടൽ ക്ഷോഭം

Karkidakam is the last month of the traditional Malayalam calendar, which runs from mid-July to mid-August. On the new moon day or *Amavasi* in the month of *Karkidakom*, Hindus in Kerala perform the sacrificial ritual in memory of the departed ancestral souls. If there are storms on this particular day, the sea surge will be very severe. However, a storm on this particular day also depicted that the season of the storms or the monsoon season, is coming to an end.

Thulavarsham kandu Irikkunnavan mandan

തുലാവർഷം കണ്ടിരിക്കുന്നവൻ മണ്ടൻ

Thulam is the third month in the traditional Malayalam calendar that begins mid-October and ends on mid-November. *Thulavarsham* refers to the North-East monsoon. This month, heavy rain has been persisting with lightning and thunder. The above-mentioned proverb cautions the fish-worker that he will be a fool if he thinks that he will go fishing after that spout of rain is over. Usually, the rain does not stop.

Toraanaykku aaraana ozhuki varum

തോറാനയ്ക്ക് ആറാന ഒഴുകി വരും

This proverb indicates the intensity of rain. If it rains continuously for one week, then six elephants will float and come from the hills. This is a proverb that

[58] *Ibid.*

indicates that as the duration and intensity of rains increase, they will bring destruction throughout the land.

Atham karuthaal, Onam velukkum

അത്തം കറുത്താൽ ഓണം വെളുക്കും

If it rains on Atham (another star as per the Malayalam calendar), which is the beginning of Onam festivities, then the day of Onam will be sunny.[59] Some proverbs that indicate the livelihood struggles of fishermen, which are reflected through the scarcity or availability of resources.

Kuttiye vittaal Aani Aadi

കുട്ടിയെ വിട്ടാൽ ആണി ആടി

As per the Tamil traditional calendar, months of Aani and *Aadi,* which coincide with the beginning of mid-June and mid-July respectively, are considered to be the season of strong winds, storms and hazards. The south-west monsoon will be very active during this time, and fishermen will not be able to go fishing in the sea. So, the daily life of the fisherman communities is in very poor conditions. Many times, fish-workers have survived by selling their canoes and fishing gear at very low prices.[60]

Aani Aadi aana Purattassi thedi irikkathavar theruvu vazhi nadakkum

ആണി ആടി ആയ പുരട്ടാസി തേടി ഇരിക്കാത്തവർ തെരുവ് വഴി നടക്കും.

This is a proverb that has some similarities to the previous one. If a fish-worker did not save enough resources in advance for dealing with months of scarcity, such as

[59] *Ibid*., p.35.

[60] *Ibid.*

in June, July and August, he might end up begging in the streets. Many times, fisherman were forced to migrate to other places for their survival.

Edava masathil edavazhi throum vellavum ilayil pothinja meenum

ഇടവ മാസത്തിൽ ഇടവഴി തോറും വെള്ളവും ഇലയിൽ പൊതിഞ്ഞ മീനും.

Edavom is considered to be the season of storms and surges. It will be flooded everywhere, and people used to get fish of such a small quantity that they can be wrapped in a leaf.

Thekkan neerum thekkan kaattum undakumbol curry chattiyile meen koodi parannu pokum

തെക്കൻനീരും തെക്കൻകാറ്റും ഉണ്ടാകുമ്പോൾ കറിച്ചട്ടിയിലെ മീൻകൂടി പറന്നു പോകും.

This particular proverb indicates the changes in nature, which can worsen resource scarcity. It states that when the wind and water flow from the south happen together, the fish that is kept in the frying pan will also fly away. It means that when there is water flow and wind from the south, fish-workers will not be able to capture any fish. There will be very little catch that it will not be sufficient for even their household use.

Medathil kondakkaattu veenaal konda kadam ellam theerum

മേടത്തിൽ കൊണ്ട കാറ്റു വീണാൽ കൊണ്ടകടം എല്ലാം തീരും.

This proverb indicates that the wind blowing during *Medam* (mid-April to mid-May) can end the debts incurred by the fisher-folk. This is because it is widely believed that the wind blowing during that time will bring lot of fish with it. Fish-workers usually get a good catch during this time.

Oochira kaattu adichal kadallu chayyum

ഓച്ചിറ കാറ്റടിച്ചാൽ കടൽചായും

Oachira is situated in Allappad, a fishing village in Kollam district. It is a famous pilgrimage centre for its spiritual presence and learning. It is widely believed that when the wind blows during the time of the annual festival at Oachira, in the month of *Mithunum Karkidakom,* then the sea will calm down and fishermen will get a lot of fish.

Arayante kadam aranaazhikayke ullu

അരയന്റെ കടം അരനാഴികക്കെ ഉള്ളൂ.

The hard times of Fishman were of very short duration. They believe that with the blessings of Sea, they will get a lot of fish and their debt will be paid off soon.[61]

Njattuvela

Seasons were very important in traditional agriculture. The concept of *Njattuvela* is a clear and good example of the scientific approach of traditional farmers.[62] *Njatuvela* is the agricultural calendar of the farmers who calculated the weather based on the movement of the sun. The term *Njattuvela* is the combination of two Malayalam words, *Njar* (seeding) and vela (time). *Njattuvela* means daytime approach for transplanting seeds.[63] Another pronunciation is *Njattuvela*, which is asserted to be Njayar vela, and Njaya ('Sun' day) is Sun. Thirteen and a half days constitute one *Njattuvela.* Based on weather patterns, an agricultural year in Kerala

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[61] *Ibid.*, p.36.

[62] This concept is based on the calculation of the availability of rain (based on the day that Vishu falls). It is also known as *njattuvila* and *njattila.*

[63] Muralidharan Thayekkara, *Krishiyile Nattarivukal,* Kerala Basha Institute, Thiruvanadhapuram, p.23, 2012.

begins on April 14th or 15th of one year and ends on April 13th or 14th of the next year, covering 27 *Njattuvelas*.[64] when the sun moves from one star to another, *Njattuvela* also changes.[65] *Njattuvela* is arranged according to the names of 27 Nakshatras from *Ashwathi* to *Revathi*. Njattuvela/ *Njattunila* is a fortnightly weather unit. The 365 days of the year are divided into sets of 14 days called *Njattuvela,* each one bearing the name of a lunar asterism or star. For example, when the sun comes to the Bharani star, it is called *Bharani Njattuvela*.[66]

Many proverbs related to *Njattuvela* existed in Kerala, and these proverbs contain a perfect ecological sense. *Makeerathil Mathimarannu Peyyum,*[67] this means that the rains in *Makiram Njattuvela* will be very strong. This month, people have alert pre-planning and structured daily life, deeply aligned with nature and agrarian rhythms. This month, coming after the harvest season, people are preparing for social, economic, and religious activities.[68]

Thiruvathira njattuvelayil thiri muriyaathe peyyanam[69], Thiruvathira Njattuvela is the heavy rainy season in Kerala. *Midhunam* 7th to the 21st is the period of this *Njattuvela*. It means that the rain should continue to fall without any interruption, and the nature of rain in each season. The timing of agriculture operations is based on the nature of each crop and season in the *Njattuvela. Pooyathil mazhapeythaal pullum nellu*[70]. Pooyam njattuvela is the period between *Karkidakam's*

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64 Twenty-seven *Njattuvela* see in Appendix IV.

65 C.K. Sujith Kumar, *Karshika Parambryam Keralathil,* State Institute of Languages, 2014, pp.240-241.

66 B. Mohan Kumar, *Commentary on Krishi Gita: Agricultural Verses,* Agriculture History Bulletin No.7 Asian Agri-history Foundation, Andhra Pradesh, 2008, p.56.

67 *മകീരത്തിൽ മതിമറന്നു പെയ്യും.*

68 Interview with, Appunni (75), Palakkad, 27/02/2023.

69 *തിരുവാതിര ഞാറുവേലയിൽ തിരി മുറിയാതെ പെയ്യണം*

70 *പൂയ്യത്തിൽ മഴപെയ്താൽ പുല്ലും നെല്ല്*

3rd to 17th. It is believed that if it rains during this time, grass and rice will grow. So, the *pooyam Njattuvela* is very favourable to crops.[71] *poora vellam punyaaham*[72]**,** The pooram *Njattuvela* is the period between *Chingam* 16th to 28th and is considered a period without rain. During this time very little shower of rain. However, it provides a positive environment for growing sesame and *Muthira. Atha vellam pitha vellam*[73]**.** Atham Njattuvela is a good time to plant crops. But since it is the time of *kanjikkoythu, Atham njattuvela* is not good. It badly affects the harvesting of crops.[74] *Chothi varshichal chottinu panjamilla***,**[75] This is the proverb about the *Mundakan* crop. If there is good rain during the second and third week of *Chothi Njattuvela*, the *Mundakan* crop will not dry up and will yield well. The rain during this *Njattuvela* creates a good situation for both agriculture and life. *Thiruvaathirayil mazha vannal thiruvonam kande pokoo*[76], *Thiruvathirayil Thirumuriyathe Peyyanam*[77], among all *Njattuvelas,* Thiruvathira njattuvela is very important. When any seed is planted, it will take root. There were some years when there was no rain at all during *Thiruvathira Njattuvela*. *Thiruvathirayil Theekattapole*[78]*,* this proverb is connected to traditional ecological knowledge of the farmers about this period and has given rise to the sayings.[79]

The farming system in Kerala is generally dependent on the *njattuvela* system. Irrigation systems were very rare in the agriculture of Kerala. The people mainly

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71 Interview with, Chathu Kutty (80), Palakkad,25/02/2023.

72 *പൂരവെള്ളം പുണ്യാഹം*

73 *അത്തവെള്ളം പിത്തവെള്ളം*

74 Interview with, Krishnan (78), Palakkad, 25/02/2023.

75 ചോതി വർഷിച്ചാൽ ചോറ്റിന് പഞ്ഞമില്ല

76 തിരുവാതിരയിൽ മഴ വന്നാൽ തിരുവോണം കണ്ടേ പോകൂ

77 തിരുവാതിരയിൽ തിരുമുറിയാതെ പെയ്യണം

78 തിരുവാതിരയിൽ തീകട്ട പോലെ.

79 Interview with, Appu Chettiar (81), Manathavady,16/03/2023.

depend on rain for their cultivation. There are many popular sayings related to rain, wind, snow, climate change, and its consequences. There are so many examples in this kind of saying, *Aadi kaattil ammi parakkum*, it refers to the power of the wind in *Karkkidakam. Karkidakam* is a very crucial month in Kerala. Heavy rains, damp weather, and famine due to climate change will be severe this month. During the *Karkkidakam* month, heavy rains are often accompanied by strong winds. Windy and rainy weather not only affects the fishing industry but also the lives of common people.[80]

Rain Songs

The folk stream (Natan Pattu or Natodi Pattu) contains a large variety of work that comes from various social groups and communities. They were usually classified in one of two ways, either by activity or by the community, and the two categories overlap prominently among them were agricultural songs (*krisi pattu*), wedding songs (*kalyana pattu*), songs sung on the festival day of Onam (*Onappattu),* boat songs (*Vanci pattu*) and lullabies.[81]

Several songs have rain as a theme, and they range from lullaby to satire. While on the fields irrigating the crops, songs are sung even about how to measure the quantity of water utilised.

- It rains; the local drum is played
  someone's mother feels the urgency to defecate.

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80 Interview with, Gopi (78), Ambhalavayal,17/03/2023.

81 Maude Keely Sutton, *In the Forest of Sand: History, Devotion, and Memory in South Asian Muslim Poetry,* an unpublished PhD thesis at the University of Texas at Austin, May 2015, pp.32.

- Rain, rain comes in dancing steps Rain,
  Rain, rain, go dancing on the white stones.

- Rain, rain, abundance of rain –
  But no water for the elephant and the mahout
  To take a dip.

- This rain is good
  But not good to be exposed to it
  Good, good, let it rain.

- Thunder, thunder, thunder
  Rain, rain, it rains
  Terminator is in another house
  little sweet baby, va va vo.

- Rain, rain, please don’t rain
  Cow and calf are in the field
  Paddy and seeds are spread in the sunshine
  None but Mother and me are here.

- Why doesn’t the great sinner die
  Whose presence bars the monsoon
  Why doesn’t the great sinner die
  And let's bring the Adi rain

- With lightning-like sparking needles
  Come rain, come, and sprinkle across the land

- The rain that lashed around kodakkadu
  Won’t it come in Chambakkadu

- The rain that poured in that forest
  won't it come to this forest[82]

Rain songs are included in cultural memory, which serve through societies to articulate their ecological consciousness, agricultural rhythms, and collective emotions. The analysis of these songs requires an interlinked approach, connecting them to their historical, environmental, and socio-economic contexts. In agrarian societies, the rain was not merely a meteorological event but a determinant of survival, influencing crop cycles, labour patterns, and social structures. Songs like *Koythu Pattu* (harvest songs) and *Onappattu* (Onam songs) reflect these relationships, offering insight into how communities perceived and ritualised the Seasons. *Koythu Pattu*, often sung during paddy harvest, embodies the agrarian ethos of Kerala, where rice cultivation is inextricably tied to seasonal rains. These songs are not just harvesting songs but also celebrations of abundance, communal solidarity and togetherness of people.

Rain with monsoon has historically understood not only as a climatic variation but also as a deeply embedded traditional Ecological Knowledge across South and Southeast Asia. People used agriculture calendars, rituals, Songs and land-use practices that harmonized with the rhythms of seasonal rains. These kinds of *TEK* helpful for socio-environmental variation, empowering resilience in agrarian systems long before the advent of modern meteorology. Moreover, the cultural aspects of monsoon rains—expressed through festivals, songs, proverbs and religious practices, which explains how rainfall patterns were conceptualized not merely as physical occurrences but as repeated forces binding human survival to the environment.

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[82] C. R. Rajagopalan, *op.cit.*, p. 5, also see: Febin Sithara., *op.cit.,* p.6.0

Krishigeeta/Krishipattu

Kerala is an agroclimatic zone with comparatively high rainfall because of the southwest and northeast monsoon winds.[83] During the seventh and eighth centuries CE, human adaptation to the water-saturated and waterlogged landscape occurred through the making of the paddy fields by demanding water and reclaiming the productive soil.[84] Krishi Gita also mirrors the value system and cultural moorings of the people who lived in Kerala in a bygone era, in many ways, the history of Kerala is the history of its agriculture.[85] Lines 59−109, Part 3 of Krishi Gita also mentioned that the best way to understand the periodicity of rains is to monitor the prevailing atmospheric conditions and wind patterns, which is precisely how modern-day meteorologists predict weather. Amazingly, the early inhabitants of Kerala deduced considerable information about rainfall availability by evaluating the prevailing atmospheric conditions.[86]

Earlier, the rhythm of seasons was apprehended by the local people who watched the path of the sun, the waxing and waning of the moon, rising and setting of the stars articulated their lives in tune with nature. Collecting and compiling the local knowledge of the people, *Krishigeeta*, an oral text was composed in the 18th century in the indigenous metre *Pana* of the Malayalam song tradition. This text elaborately describes the rain lore/water lore of the folk, along with a detailed account of the seeds, paddy cultivation and other things connected with agrarian life. The seeds and varieties of farm practices are indigenous, such as Mundakan, Punam, Pokkali, Patuvam, Puthayal, Karappuram, Pandinilam, Kolnilam, Kuttadan, Pallyal, Kolambu,

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[83] Rajan Gurukal and Raghva warrior, *History of Kerala, Pre-historic to the Present*, Orient Black Swan. Pt. Ltd, 2020, p.2.

[84] *Ibid.*

[85] B.Mohan Kumar, *op.cit.,* p.35.

[86] *Ibid.,* p.12.

Athi, Kaipadu, Thatil Nilam, and Kolakke are elaborately described with their minute details. More than a hundred varieties of paddy seeds were there in Kerala, and all the varieties were sown observing the *Njattuvela* (days suitable for transplanting paddy/seedlings and sowing). About water, it is mentioned.

> "All should know water
> As the most important one
> No doubt, studying the rain pattern
> One should do the farm works
> Paddy planted during torrential rain won't stand it"

The farmers who lived and enjoyed the agrarian life/culture were fully fascinated by the myths/ legends/rituals/customs/beliefs. The local myth says that it is *Nettan* riding on clouds bringing the rain, and it is called the 'prescription of Nettan' (Nettante Kuri). In the summer, during the *Uttarayanam* (the sun's progress to the north of the equator from the Tropic of Capricorn to the Tropic of Cancer. The time from the beginning of the Malayalam month *Makaram* to *Karkitakam*, (January to June), the village folk perform *Vela, Pooram, Theyyyam, Thira, Mariyamman*, procession of *Kodumpavi,* etc. The circular dances of many kinds in different parts of Kerala encode the wish and concept of making the moon disc larger and larger to enhance soil fertility. *Puthari, Illam Nira, Irupathettucharal, Makam Pooja, Kathiru,* etc. are agrarian rituals/ceremonies to propitiate the mother goddess and other deities to get a good crop.[87] During this season, all eyes are eagerly searching for rain clouds, and this attitude is encoded in the local myths/songs/performances. In Krishigeeta, it is said that once upon a time, it was raining indiscriminately, and the world suffered a lot.

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87 C. R. Rajagopalan, *op.cit.,* p.39.

“The world became dry and weak
Since there was no rain.
The world became bereft of righteousness
There are no rules even for rain
The prices fell and didn’t rise
The farmers fell into starvation.”

The description of the North-Eastern monsoon is as follows:

“Clouds from the east rush up
With thunder roaring before the showers
Winds too from the east blows
Lightning flashes accompany.”

This monsoon (the Northeastern) was a gift to the land of Kerala from the Chola King, whose birth star was Swati, according to the myth in *Krishigeeta.* When the sun is along with the star Swati, heavy downpours can be expected. The nature of the rain gifted by the Pandyan King is narrated thus.

“The signs of the rains I give
It is great with tiny drops,
Water bubbles and hailstones.
Rohini Nattuvela gives
Water bubbles in plenty.
Alas, this shower resembles
Almost the eastern rain
But only the time differs.”

During the Rohini *Nattuvela* in the month of *Edavam*, Kerala gets good rain.

"As it rained without a break

We got the rain Anali

Our star is *Thiruvathira*

Torrential rain lashes the land

Day and night, enhancing the yield."

This is the description of the rain of the legendary *Thiruvathira Nattuvela* of this land. At the tips of tongues and fingers of the villagers and farmers, they had this knowledge. By tasting the banana, the farmers could tell the deficiency in watering the plant. As colonial people took away the saplings of pepper to their countries, the ruler of Malabar, Zamoodiri, is mockingly said to have commented that they could not take away *Thiruvathira Nattuvela.* The indigenous traditional knowledge of the people about meteorology, hydrology and the water cycle has been narrated not only in *Krishigeeta,* but in many local songs and ballads.[88] *Krishigeeta* also implies that the best way to understand the periodicity of rains is to monitor the prevailing atmospheric conditions and wind pattern (lines 59 to 109, part 3), which is precisely how the modern-day meteorologist predicts weather.[89] Lines 173 to 180 of Krishi Geetha mention rains occur outside of Kerala when the sun's position is in the constellations of *Vrischikam* and *Thulam* (mid-November to mid-January). If there is precipitation for 5 to 8 days over two months, then it is regarded as adequate. Even if only one or two rains are received on those days, it is still considered satisfactory.[90]

88 *Ibid.,* p.40-41.

89 B.Mohan Kumar, *op.cit.,* p.88.

90 *Ibid*., p.51.

Monsoon Theyyam

Malabar is situated in the northern part of Kerala and is culturally different from other parts of the state. The North Malabar, consisting of the districts of Kannur and Kasaragod, and South Malabar are different from each other. This difference is shown in the customs, rituals and the everyday life of the people. The most significant ritualistic performing folk art in Northern Kerala is known as "*Theyyam*" or *"Thira*". It is the creation of a synthesis of ritual, vocal and instrumental music, dance, painting, sculpture and also literature. There are more than four hundred *Theyyams*, still alive and they carry the traditions that originated in the past to the living present.[91]

Theyyam is a ritual that substantiates the socio-cultural environment that forms and is perpetuated in North Malabar alone.[92] *Theyyam* is a general term for gods and goddesses who are worshipped only in North Kerala (Malabar), mainly in the Kasaragod and Kannur districts during the dry season.[93]*Theyyam* or *Theyyattam* has different meanings depending on the territory. Herman Gundart a great grammarian and scholar, opined that *Theyyam* is derived from the word Daivam.[94] C. M. S. Chandera opined that *Theyyam* is a dance of the goddess Kali[95] and some defined *Kaliyattam* as the dance of Kali. The *Theyyams* performed in different forms as gods

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91 K.K. Marar, *The Magic of Theyyam,* District Tourism Promotion Council, Kannur,2000, p.13.

92 T.V. Prakash, *Methodology for Folkloristics*, Centre for Advanced Studies and Research in English Language and Literature, Farook College, 2013, p.37.

93 Mayuri Konga, 'The Politics of Ritual and Art in Kerala: Controversies Concerning the Staging of Theyyam'*, Journal of The Japanese Association for South Asian Studies*,15, 2003, p.56.

94 Herman Gundert, *Malayalam-English dictionary*, Stolz, Basel Mission Book, London,1872, p.480.

95 C.M.S. Chanthera*, Kaliyattam: Pathanavum Pattukalum*, National Book Stall, Kottayam,1978, p.25.

and goddesses, good and evil spirits, heroes, animals, and so forth. It is believed that the ritual art of Karnataka, Bhothakola, influenced Theyyam very much.[96]

The climate of North Kerala is almost the same as the other parts of Kerala. Though it is mainly classified into the summer and rainy seasons, *Uchcharkalam* (the popular name for winter) comes in between. The rainy season is from *Edavappathi* to the end of *Thulam*. South-west monsoon commences from the beginning of June and the North-East monsoon from mid-September, *Ucharkalam* commences from the beginning of *Vrischikam* and extends up to the middle of *Makaram*. From mid-*makaram* to mid-*edavam* (the end of May) is the summer season. The North-East monsoon commences after a short interval following the South-West monsoon and it lasts only for a few days.[97] During the winter season, it is mild during the day and cold at night. North Kerala, being near the equator and on the seacoast, and not so high above the sea level, the air is humid.

Table 3.1

Seasons in Kerala

Season	Beginning	End	Total months
Rainy Season	Mid-Idavam (Beginning of June)	Mid-Thulam (End of October)	5
Winter	Mid-Thulam (Beginning of November)	Mid-Makaram (End of January)	3
Summer	Mid-Makaram (Beginning of February)	Mid-Idavam (End of May)	4

Source: T.V. Prakash, *Methodology for Folkloristics,* Centre for Advanced Studies and Research in English Language and Literature, Farook College, 2013, p.44**.**

96 *Ibid.,* p.25.

97 T.V. Prakash, *op.cit.,* p.44.

The table shows the seasons in Kerala and all the seasons *theyyam* is performed. The main season of theyyam is from the 10th of *Thulam* to mid-*Edavam.* The 10th of *Thulam* is the end of the rainy season, and mid-Edavam is the onset of the rainy season. *Theyyam* is performed during the seventh months from the beginning of November to the end of May. This period is the cold season (winter) followed by the summer season. Theyyam begins at the start of the cold season and by the end of the summer season slowly spreads to the inside of the villages. The ritual named Kolatthiri’s *kalarivathukkal kalasam* is performed in *Kolatthunadu* the closing ceremony of theyyam during mid-*Edavam* (njattuvela).[98] In the months of *Chingam* and *Kanni* (mid-August to mid-October) which fall between the South-west monsoon and the North-east monsoon, there is scarcely any rainfall. This means that the reason for not performing *theyyam* between Mid-Edavam to the 10th of Thulam is not merely heavy rain.

For human beings, worldly life is highly significant. It is for the sake of this life that man creates and worships God. The concept that the ultimate aim of life is to attain salvation is entirely a novel one. Early man passionately wished to render his life prosperous and free from all dangers. Hence, his aim in life was agricultural prosperity, to have enough field hands and relief from devastating epidemics. It is this aim that man activities are to realize through theyyam worship. Theyyam's pronouncement, "I shall protect and bring good to cattle and children," may be understood in the light of this.[99]

Seeds are propagated at the beginning of the rainy season and tended to properly and the crops gained at the end of the monsoon season. In the case of even plots, the usual practice of cultivation in North Kerala is to sow seeds once again

98 *Ibid*., p.45.

99 *Ibid*., p.46.

before the rainy days of *Thulam.* Coconut trees are manured and properly cared for either at the end of the monsoon or before the rainy days in *Thulam*. The cycle of life for one year is brought to a close in this manner. Since life has to go on preparations for the next year begin soon. The *devathas* in their distant abodes are invoked for the performance of the excited dance of possession in an attempt to seek the fulfilment of wishes. After the season of cultivation is a period of respite. This is also the time for preparation. It is during this recess that theyyam is enacted in *Kavus* and domestic premises. This makes it clear how climate, topography, livelihood, and theyyam season are all related.[100]

Theyyam also performed in the monsoon season is known as 'karkidaka Theyyam'. Karkidakam is a month of heavy rain and therefore most of the people are jobless. so, the people meet their daily life by performing theyyam, especially *vedan pattu*. Vedanpaattu is a ritual form where the members of the theyyam dancing caste went from house to house ridding the homes of evil spirits. The father and children with a *thudi* (drum)and one of them dressed as a vedan would perform the task. In return, they would be given rice, chillies, salt, cucumber and other goods. This practice helped alleviate the shortages that were experienced during the lean season, the month of *Karikidakkam*.[101]

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100 *Ibid*.

101 Rajesh Komath, *Political Economy of the Theyyam: A Study of the Time-space Homology,* Unpublished PhD thesis, MG University, 2013, p. 68-69.

Figure 3.1

Adi Vedan Theyyam

Source: https://medialit.in/thevoices/pitch-for-photo-feature-aadhi-vedan-keralas-monsoon-theyyam/

Aadi Vedan and *Karkidothi* are one of the Theyangal tied in the *Karkidakam* month in some areas of *Uttaramalabar.*[102] Unlike normal weaves, these weaves are tied by small children. Similarly, instead of tying it in temples or caves, this theyam enters and descends into every house. *Aadivedan* is tied to the *Malayan* community and *Karkidothi* is tied to the *Vannan* community.[103] The days of arrival and commencement of *karkitaka theyam* vary on a regional basis. On the north side of the Chandragiri River, the areas of Karatukka, Muliyar, Mulleria, Adoor, Manya, Cherkal and Mallam, the Theyyam started in the first Karkidakam. These areas are within the boundaries of temples like Adoor Pancha Lingeshwara Temple, Kundar Mahavishnu Temple, Mottathinkal Narasimhamoorthy Temple, etc. Theyyam is tied to the younger

[102] Y.V. Kannan, *Theyyangalum Anushtanangalum Oru Padanam*, State Institute of Languages, Thiruvananthapuram, 2011, p.46.

[103] *Ibid.*

generation of the community. Children go out dressed at 6:30 in the morning and return before evening. Due to the heavy rains in the month of *Karkidakam*, the people will suffer from various epidemics and diseases throughout the days. The poor section of society was struggling with their everyday lives. Therefore, their only source of income is the money they get from their homes for food, rice, vegetables, etc.[104]

Venugopal (The theyyam artist) says, the ceremonies of Karkidaka Theyyam start Malayan's Vedan from Karkidakam 7th and Vannan's Adivettan from 16th are doing house visits. The Janmari family have the right to perform Vedan *Theyyam.* The house and surroundings will be cleaned by spraying dung before the coming of the adivasi. For welcoming Aadivetans, there will be a lot of dakshina in the form of rice, vegetables, grains, and salted items kept in front of every home. These things are for *Vedan* and his team. The list of items to be seen will be in the song. The *Vedan* will visit the next house after putting all these items into their baggage. In this way, people meet their daily lives during the month of Karkidakam.[105]

Lakshmi, the mother of theyyam artist Venugopal, says, 'Vedanum Aadiyum' are the ones who enter and leave houses in the month of *Karkkidakam.* Even though they are saying 'Aadivedan' together, the *Vedan* Malayala community and the *Aadi* Vannan community are tied on different days in *Karkkidakam.* Similarly, traditional art forms like '*Kothammuri, Ucharapottan'* were there in North Kerala in the olden days.[106]

The descriptions of 'Karkidaka Theyyam' mentioned in are follows.

"വേടയുദ്ധം കഴിഞ്ഞുള്ള കർക്കിടകമാസം തന്നിൽ

ഇടയിലോകിങ്കലിഴിഞ്ഞുള്ള മാനുഷർ പിണിയെത്തീർപ്പാൻ

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[104] Mathrubhumi, *Varavelkkam Karkidaka Theyyangale*,16th July, 2019.

[105] Interview with, *Theyyam Artist, Venugopal* (52), Payyannur, 27/02/2024.

[106] Interview with *Lakshmi* (70), Payyannur, 27/02/2024.

സൂര്യ ഭഗവാനോ കിഴക്കാലേ ഉദിക്കുന്നേരം

പുര ചുറ്റുപുറമെല്ലാം അടിച്ചു തളിക്കവേണം

പാലപ്പലകയും വടിച്ചിട്ട് വലത്തുവെക്ക

നന്താർ വിളക്കിൽ നെയ്പാർന്ന് തിരികത്തിക്ക

ബാല ജനങ്ങളെ കുളിപ്പിച്ചിട്ടരിനരിക്ക”[107]

The translation is given below

In the month of Karkidaka after the hunting war,

In the middle of the day, people who are free from the jinkalai should break the rope

When the sun rises in the east

The entire area around the house should be sprinkled with it

The *palapalak* should also be placed on the right

Pour ghee into the lamp and turn it on

Bath the children and get them ready.

These songs describe the importance of environmental and personal hygiene. It is also noteworthy that the song emphasizes the special attention that should be given to children.

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[107] *"vetayudham kazhinjulla karkkidakamaasam thannil*
Edayilokinkalizhinjulla maanushar piniyettheerppaan
Surya bhagavaano kizhakkaale udikkunneram
pura chuttupuramellam adichu thalichuvenam
paalappalakayum vadichittu valathuvekka
nanthaar vilakkil neyparnnu thirikkathikka
baalajanangale kulippichittarinurikka"

See., in. Y.V. Kannan, *Theyyangalum Anushtanangalum Oru Padanam*,State Institute of Languages, Thiruvananthapuram, 2011, p.48-49.

കർക്കിടകം ഞാറ് ചിങ്ങഞ്ഞാറ്റില്

വാരിപ്പിടിച്ചമാരിയും മഹാവ്യാധിയും

പുറങ്കഴിഞ്ഞ് വാണാളും വർധനവുണ്ടായിരിക്ക[108]

The translation is given below

The crop in Karkidakam is the month of Chingam.
The heavy rain, malaria, and the epidemic
have also increased in the past.

This song also serves the purpose of creating awareness in society about the need for personal and environmental hygiene during the month of Karkidakam. This month faced extreme poverty, heavy rain, and epidemics. This ritual is the only source of people during the month of Karkidaka when they are unemployed.

The theyyam performances in the villages of North Malabar continue to attract large crowds from the local community, regardless of caste or religion. Theyyams are performed even to sit in judgment on commercial disputes and even civil and petty criminal cases. Quite often it is performed ritualistically as an agrarian festival. It is arranged in the paddy fields after the harvest. Certain codes of conduct are observed by the participants who perch themselves on the shoulders of the supporters. It is a contest of youthful valour. Apart from the yearly ritualistic theyyams, there are super festivals of "Perungaliyattams" held once in every decade or two decades. In short, the Theyyam of North Malabar is a part of the psyche of the tradition-conscious simple people of this land.[109]

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108 "karkkidakam njaat chinganjaattilu
vaarippidichamaariyum mahaavyaadhiyum
purankazhinju vaanalum vardhanavundayirikka, See: *Ibid*., p.49.

109 Y.V. Kannan, *op.cit.,* p.16.

Flood songs in Arabi- Malayalam literature

Arabic Malayalam flood songs represent disasters as perceived and managed by flood-affected people in the Malabar district. Centuries of cross-cultural exchange and language contact between Arabic and Malayalam gave rise to Arabic-Malayalam literature sometime around the early seventeenth century. The corpus of Arabic Malayalam literature is a merger of oral and written transmission; the Arabic script is slightly revised to represent Malayalam phonemes.[110] Most scholars date the emergence of Arabic-Malayalam to approximately 500 years ago, although some date the emergence as far back as the ninth or tenth centuries.[111] Arabi-Malayalam is a language or style developed for writing Kēraḷa Bhāsa (the Malabari version of Tamil) using hybrid letters from the Arabic and Persian script. Many aspects of the terrestrial biological and social life of Kerala were changed by the flood of 1924. The literary works written in Arabic-Malayalam happen to be quite helpful to learn about this flood, which attracted both political and literary attention in Kerala. They help to understand the impact of the flood and the terror and devastation caused by it in Malabar. Many aspects of the terrestrial, biological, and social life of Kerala were changed by the flood of 1924. The literary works written in Arabic-Malayalam happen to be quite helpful to learn about this flood, which attracted both political and literary attention in Kerala. They help to understand the impact of the flood and the terror and devastation caused by it in Malabar.

Tufan Mala, Kerala Jala Khora Vruthandam, Malabar Vadam, Jalayoga Geetham, (Ponnani Ahmed Kutty), *Vellappokka Mala* etc., are the prominent Arabic-

[110] Ophira Gamliel, 'Kerala Floods in 1909, 1924, and 1961 as Narrated in Arabic Malayalam Ballads', *SSRN Electronic Journal*, January 2022, p.3.

[111] Maude Keely Sutton, *In the Forest of Sand: History, Devotion, and Memory in South Asian Muslim Poetry,* The University of Texas at Austin, 2015, p.43.

Malayalam literary works that mark an epoch in the study of environmental history in Kerala.

This thesis mainly examines the ‘flood songs like *Veḷḷappokka Malas, Tufan Malas, The Loukik Mahatbbhutha Mala* of Malabari Muslims, a community on the Southern Indian coast of the Western Indian Ocean, written in the traditional Arabi-Malayalam language/script. Through these Arabi-Malayalam flood songs, environmental crises are recorded. Flood songs as a genre offer a combined understanding of the ecology, religion and music of the recurrent floods that occurred in twentieth-century Malabar and provide details about the collective memorialisation and commemoration of the disastrous seasonal floods that still afflict the various coastal and riverine populations of the Indian Ocean world.[112] Here is one question concerning flood songs, how did flood songs help to mediate both present and future environmental concerns born of flood-disaster events?

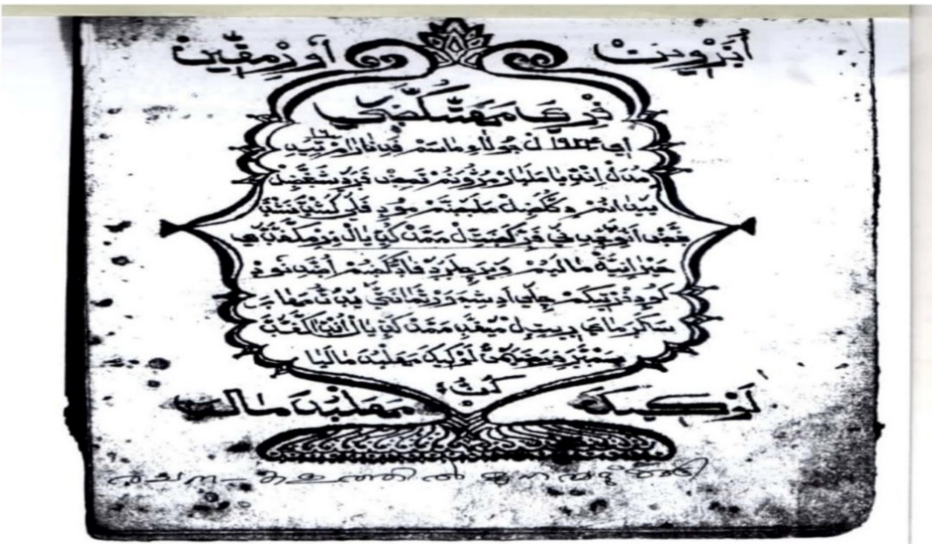
The Loukik Mahatbbhutha Mala

The *Loukik Mahatbbhutha Mala*, written by Kalathil Mammad Kutty, son of Kalathil Pari Haji from Thirurangadi, is about the flood happened in 1924.

[112] Ihsan Ul-Ihthisam and Rohini Menon, ‘Is There Singing in the Time of Crisis? Sounding Flood Songs of Coastal and Riverine Malabar in the Indian Ocean, South Asia’, *Journal of South Asian Studies*, 2022, Vol. 45, p.1038.

Figure 3.2

The Loukik Mahatbbhutha Mala



Source: *Mahakavi Moyinkutty Vaidyar Mappila kala Academy, Kondotty.*

> *The poet wrote the lines "awake and remember the Loukik Mahatbbhutha Mala" on the cover. "Dear dignitaries, the Loukik Mahatbhutha Mala is a song interestingly written by Kalathil Mammad Kutti taking portions from his own Heiraniat Mala written on the great flood that happened in the whole Malabar region during 16th July 1924 about the amount of loss and trouble faced by the people as the mountain flood covered certain areas."*[113]

Tuphan Mala

Tuphan Mala takes as its subject the storm surge that struck the port of Calicut in 1909. It portrays the consequences and loss that resulted from the storm and the ensuing flood, which inundated and ruined several boats, dhows and goods stored in the harbour. Judging from the available corpora of sources, Tuphan Mala is the first

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113 Ashraf Punnathu, *The Loukik Mahatbbhutha Mala*, Risala Magazine, December 04, 2019, p.40.

literary endeavour in Malabar that problematizes storms and water (i.e. floods) with empirical and anthropological zeal. Rather than focusing on the fictional aspects of such an environmental phenomenon, Tuphan Mala strictly focuses on factual details along with mentions of the reporters. The title page of Tuphan Mala says

> *'This is Tuphan mala or a 'New song on Boat-wreck'; a garland song (mala) written by the grandson of Ko̱likkot: Abubakkar Kunni Qazi, namely Kattil Vītil Ahammad Koya, published and registered by Cempakasseri Pa̱rampil Valiyatotika Alikkutti. It is an astounding and marvellous ode about the sorrow and loss caused to people due to a severe storm surge that hit Calicut Bandar (port) and nearby regions in 1909 (AH.1327), which destroyed many boats and dhows and swept away goods and materials kept in it.*[114]*'*

Flood songs locate the primary reason behind environmental disasters in an imbalance between the visible (human) and invisible (spiritual)worlds. Thus, their management and mitigation mechanisms are also based on spiritual techniques and strategies.

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[114] Kattil Veetil Ahmed Koya, *Tuphan Mala*, p. 1.

Figure 3.3

Tuphan Mala

Source: *Mappila Heritage Library, Malappuram.*

For reconstructing the agrarian world of Malabar through collective memories which give an insight into the socio-economic transformations that occurred during the 19th and 20th centuries. Oral histories, folklore, and personal narratives provide an invaluable resource, capturing the lived experiences of agrarian communities. These memories provide how people planned their everyday activities in pre monsoon season. These collective memories, helped to the historians for re-construct a more comprehensive and empathetic understanding of Malabar's agrarian past. Traditional Ecological Knowledge helped to constructing different strategies that can guide communities in adapting to the challenges of climate change. Identifying and integrating this traditional ecological knowledge is essential for ecological harmony and ensuring the sustainable development of Malabar. Colonial administers were utilized these kinds of knowledge in all the colonial projects, including road construction, building construction and expansion of the empire in the form of battles. Through this traditional ecological knowledge, we can understand how rain became a weapon for resistance against colonialism.

CHAPTER 4

MEASURING RAINFALL: COLONIALISM AND THE HISTORY OF METEOROLOGY IN INDIA

Introduction

The previous chapter analysed how oral histories, memories, proverbs, folklore, and Arabi Malayalam literature discussed the issue of climate change due to rainfall. This chapter discovers the relationship between colonialism, scientific knowledge, and evolving human-nature interactions in modern South Asia, focusing on the Malabar region. Existing studies linking ecology and imperialism primarily emphasise botanical knowledge and scientific forestry. However, this chapter offers a fresh perspective by examining the connections between the development of meteorological departments and colonial environmental governance. By highlighting the interplay between indigenous rain knowledge and the evolution of meteorological practices in colonial India, it challenges Eurocentric narratives and broadens our understanding of science of climate in the colonial context. The expansion of science and technology was greatly aided by colonialism, but it also sparked the development of new ideas and organisations. Social, economic and political issues impacted how contemporary Western science and technology were introduced and institutionalised in colonial India. This approach was heavily affected by British administrators' perspectives and colonial imperatives. Physical observatories emerged in Canada, South Africa, Saint Helena, India, Australia, and Singapore. Some of these countries keep large continuous meteorological records.[1] British colonizer's attempts to control and regulate nature in its colonies all over the world. Colonial policies directly and

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[1] Martin Mahony, *Meteorology and Empire*, in, Andrew Goss(ed.), *The Routledge Handbook of Science and Empire,* Routledge, London, 2021, p.49.

indirectly transformed landscapes, ecologies, and indigenous human populations, as well as native flora and fauna. This transformation led to certain changes were manifested in different regions. British colonial attempts to regulate and exploit nature extended across their empire, and in India this often-meant reshaping landscapes that had long been tied to the rhythms of the monsoon.[2]

During the eighteenth and nineteenth centuries, many debates existed about human and climate interactions. The new patterns of imperial mobility drew attention not only to the climate but also to the weather. In the mid-nineteenth century, the production of weather data happened with a new intensity and regularity. Around the same time, land-based geographical observation expanded greatly. This included meteorology, astronomy and terrestrial magnetism. Richard Grove's argument towards the evolution of climatic science in small islands began during the early modern period and is deeply caused by colonial expansion, environmental history, and the emergence of systematic climate observation. Colonial expansion also affected the sudden diffusion of new scientific ideas between colonies, over a large area of the world. The continuity and survival of the kind of critique of the ecological impact of colonial 'development' that had been established by the early eighteenth century were enabled by, committed professional scientists and environmental commentators.[3] Grove comments that the small islands, situated in the tropical region, played an important role in the early development of climatic and their weakness to environmental change. Colonial powers, like the British and the Dutch, established scientific observatories and botanical gardens on these islands, enabling systematic data collection on temperature, rainfall, and atmospheric patterns. The medical

2 William Beinart and Lotte Hughes (eds.), *Environment and empire,* Oxford University Press, 2007, p. 561.

3 Richard H. Grove*, Green Imperialism: Colonial Expansion, Tropical Island Edens and the Origins of Environmentalism, 1600-1860,* Cambridge University Press, 1994, pp.7-8.

surgeons and custodians of the early colonial botanical gardens were already an essential part of the administrative and hierarchical machinery of the new trading companies.[4] By the end of the eighteenth century, their new environmental theories, with the natural history and ethnology of the newly colonised lands, were quickly diffused over the meetings and publications of a whole set of academies and scientific societies based throughout the colonial world.[5]

A key aspect of Grove's argument is that colonial administrators and naturalists stationed on small islands became some of the first to recognise long-term climate variability and the impact of deforestation on regional weather patterns. He highlights that deforestation, also caused by plantation agriculture, led to noticeable rainfall and soil erosion changes. Rainfall is the main source of fresh water on earth. The southwest monsoon is the foremost rainy season of India and 75% of the annual rainfall is received in a major part of the country. The amount and distribution of rain will be the crucial environmental factor in this changing world. Semi-arid regions like Northeast Brazil, North Africa, and Rajasthan already approaching the brink of sustainability because these places are very crucial in declining freshwater availability. The rainfall is an important source for growing crops, which is provided by artificial means of irrigation channels. A major portion of the area is sown depending upon rainfed conditions. To study the trend of rains during each crop season, the British government established rainfall recording stations in plantation estates. They placed rain gauges at meteorological stations, agricultural sectors, forest areas, dam reservoir catchments, etc. The study of rain records is only a tool for environmental studies, meteorology, and pure science. Using rain records as a historical source is very rare in social science. So, this chapter mainly uses rain records as an important tool in historical research. These rainfall records are the major tool to

4 *Ibid.*

5 *Ibid.*

study the environmental and topographical changes in the Malabar region. Through the rain records, it is possible to see the changes in the everyday lives of common people due to the intense rain. Rain records enable us to understand weather, social relations and agricultural practices, natural calamities like floods and droughts, analyses of how rain affected wars, and how British colonizers planned cities through rain records.

Evolution of Meteorology in India

Meteorology is the division of science related with the processes and phenomena of the atmosphere, particularly as a tool of predicting the weather. It includes phenomena such as wind and rain. Meteorology began as a field with the scientific invention of the barometer[6] in the 17th century, the mercury thermometer in 1709 and the formulation of laws governing the behaviour of atmospheric gases. *Meteorologica* is written by Aristotle, is a discourse on atmospheric phenomena. In his memory, the science of the atmosphere came to be known as Meteorology.[7] The history of meteorology dates to ancient civilisations, where primitive humans observed and adapted to changing weather patterns and characteristics. The history of meteorology in India begins with the monsoon, which originated in India. The early stages of meteorology in India can be traced to ancient times. Post-Vedic scholars made many contributions to the collection of meteorological data to understand the performance and vagaries of the monsoon. The Sanskrit literature produced by several scholars and poets in the period extending from the 5th century BC to the 2nd century AD makes profuse references to weather and climate and throws light on the

[6] A barometer is a scientific instrument used to measure atmospheric pressure.

[7] *125 years of service to the nation*, The Meteorological Office Press, Pune,2001, p.1.

meteorological knowledge of early historical times. Varahamihira,[8] who compiled *Brihatsamhita*, deals with subjects like meteorology, hydrology and seismology. This work contains several chapters relating to weather phenomena like clouds and rain. They had developed instruments and units for the measurement of rainfall.[9] *Brihatsamhita* of Varāhamihira mentioned weather science in the following verse:

> *Annam jagatah prānah prāvrt kalasya cannamayattam;*
> *Yasmadatah pariksyah prāvrt kālah prayatnena.*

> (Translation) 'The living beings depend on food for their existence. The availability of food depends on the monsoon. Therefore, the rainy season deserves careful investigation.

From the above verse, the post-Vedic scholars were enormously result-oriented when they investigated the monsoon and its vagaries. They also collected many observations on things, which were not strictly meteorological and used them for forecasting rainfall.[10] Wind observations were growing during the post-Vedic period. The scholars of the post-Vedic period classified the wind into three types.[11] The post-Vedic scholars were very familiar with the observation and direction of the wind by the movement of clouds. They also used the surer method of measuring wind direction with the help of equipment a pole of 12 cubits in length, at the top of which

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8 Varahamihira is regarded as one of the greatest astronomer, astrologer, and mathematician of ancient India, and his writings are related to subjects like exuberant life, spirit and culture of the Gupta age.

9 Dr. H. Kern, (ed.), *The Brhat Sanhita of Varahamihira*, The Asiatic Society of Bengal, Calcutta,1865, p.11.

10 A.S. Ramanathan*, Contribution to Weather Science in Ancient India,* Indian Journal of History of Science. 22(4),1987, p.227.

11 The three types of wind classifications are Bhāvaka, Sthāpaka, and Jhāpaka. The Bhāvaka wind produces clouds, and it produces rain immediately or a few days later. Sthāpaka wind is one that was believed to favour the formation and nourishment of rain, and its direction is characterised according to the season in which it is observed. See., in, A.S. Ramanathan, *Contribution to Weather Science in Ancient India*, Indian Journal of History of Science. 22(4),1987, p.278.

a flag of black colour 4 cubits in length was attached. When the wind was not stable, the wind direction was taken as the one from which the wind was strongest.[12] The famous *Arthasastra* of Kautilya gives a glimpse of the measurement, even a description of rainfall climatology. Several meteorological references are also found in *Manu-Smriti*, an ancient Sanskrit work of the 2nd century A.D. The motto of the India Meteorological Department is "*Adityat* Jayate *Vrishtih*" which translates as "From the Sun, rain is born".

During the past few centuries, India has been the leader in scientific knowledge concerning meteorology and allied subjects. It is also seen during the Medieval Era as mentioned in Kalidasa"s *Meghdoot* and Chanakya's *Artha Shastra*, and Varahamihira's *Brihatsamhita,* highlighting the importance of weather and climate and the attempt for the prediction. Mughals were the pioneers of the study of natural history in medieval India. Despite their busy administrative and military duties, most of the Mughal emperors took a keen interest in observing their empire's variegated flora and fauna. They appointed artists and scientists to chronicle the same for posterity. By doing so, they left a rich legacy of scientific knowledge for succeeding generations.[13] During the medieval period, we can observe a decrease in rainfall, which caused various levels of famine and epidemics. Environmental degradation in the form of urbanization, deforestation, water wastage, and poor sanitation continued during the medieval era, which made it more vulnerable to famines and epidemics. Climate change was a dominant factor in the recurrence of famines and epidemics during the medieval era. These climate variations were witnessed worldwide and impacted India.[14]

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12 *Ibid.*

13 M. Amirthalingam, *Perspectives of Environmental Studies During the Mughal Period*, Journal of Indian History and Culture, September 2016, p.184.

14 Muqaddisa Malik and Fouzia Farooq Ahmed, *Famines and Epidemics in Medieval India: Climatic Change or a Policy Failure?* JRSP, Vol. 59, No. 2, April-June 2022, p.117.

In 1636 that Halley, a British scientist, published his treatise on the Indian summer monsoon, which he attributed to a seasonal reversal of winds due to the differential heating of the Asian land mass and the Indian Ocean.[15] During the 18th century, European scientists were concerned with astronomical and magnetic observations. Gradually, the economic importance of meteorology began to emerge as the maritime trade and commerce, along with colonization by European countries expanded.[16]The first scientific activity in India began through surveying by triangulation after the Mysore War. Before that, conventional methods were followed. In 1802, the great Trigonometrical Survey of India commenced its work to understand the longitude of Madras. In 1774, an astronomical observatory was also set up in Fort William, Calcutta, near Treasury Gate for measuring the longitudes along the eastern coast from Calcutta to Madras.[17]

Colonel T.D. Pearse of the Bengal Artillery started a series of astronomical observations from 1774 to 1782, and his meteorological journal covers a period from 6th March 1785 to 28th February 1788. His meteorological journal indicates daily observations of the barometer, thermometer[18], hygrometer[19], direction and force of wind and rainfall taken generally at about 7 a.m. and 2.15 p.m.[20] India is famous for having some of the oldest meteorological observatories in the world. The earliest Meteorological observation at the Madras observatory was conducted in September 1793 by J. Goldingham. The second observatory in India, started by the East India

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[15] Prasann Kore, Rajesh Mali, D.K. Malik et al., *Weather Observations during Ancient Indian Times and Technological Development in the 20th Century*, Review Article, India Meteorological Department, Ministry of Earth Sciences, June 2015, p.3.

[16] *125 years of service to the nation, op.cit.*, p.4.

[17] *Ibid*.

[18] Thermometer is a device used to measure temperature.

[19] Hygrometer is an instrument that measures humidity.

[20] *125 years of service to the nation, op.cit.*, p.4.

Company, was at Colaba, Bombay, in 1823. The third observatory in India was established at Trivandrum.[21]

The first observatory was set up in Calcutta, at the Surveyor General's Office at Park Street in 1829. V.N. Rees was the first European Superintendent of this observatory, who recorded meteorological observations from 1829 to 1852. After his retirement in October 1852, Radhanath Sikdar took charge of the Calcutta observatory. Radhanath was the first Indian to enter the Trigonometrical Survey[22] in December 1831 and the first Indian Superintendent of the Government observatory.[23]

The Asiatic Society of Bengal gave substantial encouragement for the meteorological observation. Captain Harry Piddington, Calcutta, published 40 papers during 1835 in the journal of the Asiatic Society, dealing with tropical storms and coined the word cyclone, meaning the coil of a snake. In 1842, he published his monumental work on the *Laws of the Storms*[24]. In 1875, the Government of India decided to set up the Meteorological Department, bringing all meteorological work in the country under a central authority. H.F. Blanford was appointed as the first Imperial Meteorological reporter to the Government of India. In 1875, Blanford opened a temporary branch office at Simla. Thereafter, four Provincial Meteorological Reporters to the Government of Bengal, Punjab, Madras, and United Provinces based at Calcutta, Lahore, Madras, and Allahabad, respectively. [25]

After India experienced the Great Famine of 1876-1878, Indian Meteorological Department (IMD) was asked to prepare a seasonal forecast of the

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21 *Ibid.*

22 Trigonometrical Survey of India was a project it aimed to conduct a survey across the Indian subcontinent with scientific precision.

23 *125 years of service to the nation, op.cit.*, p.5.

24 *Ibid.*

25 *Ibid.*

South West Monsoon rains. The first operational long-range forecast for south-west monsoon rains was issued by the IMD on 4th June 1886. This was based on an observed inverse relationship between the seasonal monsoon rainfall in India and the preceding snow cover over the Himalayas. Thus, India became the first country to start systematic development in long-range forecasting.[26]

From 1875 to 1905, the headquarters of the India Meteorological Department were located at Calcutta. In 1875, the network of observatories in India and its dependencies consisted of 198 rainfall stations and 87 observatories measuring temperature and other meteorological observations. In 1900, the number increased to 200.[27]

The 20th century dawned with the main headquarters of the department remaining in Calcutta with a branch in Simla, but during the last decade of the 19th century, most of the work of the India Meteorological Department was attended from Simla. In 1905, the headquarters of the India Meteorological Department was shifted to Simla, and the Calcutta office was changed the status of a branch office.[28] The India Daily Weather Report made its first appearance in 1878 from Simla during the monsoon season. The office at Simla not only took up the work of preparing and issuing India daily weather Reports but also carried out an increasing amount of ordinary and special work of the Head Office, such as preparing data for Monthly Weather Review, Annual Summary, Seasonal Forecasts, and flood.[29] Blanford introduced the publication of the *Memoirs of the IMD,* and "Rainfall of India is unsurpassable in clarity of thought and content. Given the importance of

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[26] *Ibid.,* pp.5-6.

[27] *Ibid.,* p.6.

[28] *Ibid.*

[29] *Ibid.*

foreshadowing the monsoon season for the agricultural economy of the country, Blanford initiated the system of Long-Range Forecasting (LRF). [30]

The credit goes to Sir Gilbert Walker for linking the monsoon with global meteorological parameters and his discovery of the so-called Southern Oscillation phenomenon. The outbreak of World War I in 1914 had its adverse effects on the department as many of the officers were drafted for military service. During the war, special forecasts were prepared in Simla on many days for military operations in the Middle East. After World War I there was much dissatisfaction in India and the Government decided that it should induct more Indians in the All-India Services. Blanford had also recognized the need for inducing young Indians in IMD and the recruited Indians as office bearers for IMD. The Indianization of IMD was accelerated under Walker soon after World War I, and was further boosted by Sir CWB Normand (Director General from 1928 to 1944). Normand was succeeded by Dr. S.K. Banerji was the first Indian DGO in 1944. During these years, many Indian scientists joined IMD. It became one of the few government agencies having many senior posts occupied. After independence, IMD reached its heights and made many achievements.[31]

The Department had decided changing headquarters from Simla to the plains, to some place where officers of the department could undertake research of monsoon with better facilities. For this purpose, Poona was suggested to the Government as a suitable place by Walker in 1924 and was approved by the Government in early 1926. The new headquarters building of the India Meteorological Department was located on a land of about 10 acres in Shivajinagar, which was then known as Bhamburda. As the building was completed in June 1928, and the opening ceremony of the new

[30] *Ibid.*

[31] *Ibid.*

headquarter building was completed, Governor of Bombay on 20th July 1928. Pune continued to be the headquarters of the organization till the outbreak of the Second World.[32]

During the Second World War, the Government of India felt that the Director General should be in close touch with headquarters and other departments to meet the wartime requirements of the Meteorological Services. Consequently, the administration of the Director General was transferred to New delhi for the war period and continued. Present headquarters building 'Mausam Bha-van' was constructed in 1975 and inaugurated by the Honorable President of India, the late Dr. Fakruddin Ali Ahmed on 25th November 1976.[33]

From the beginning of 1942, rapid expansion of the department took place mainly in the context of war requirements. The workshop at Pune and New Delhi could meet the increased demand for meteorological instruments needed for operational stations. A new hydrogen factory was initiated in Bangalore with equipment supplied by the U.S. Air Force, radiosonde observations using U.S. instruments were in operation at a number of Air force stations. The post-second World War era saw the country gaining independence from the colonial rule of 150 years. With this, the national meteorological service was called upon to play a major role in the all-around nation building activity of the country.[34]

The Indian Forest Department, founded during British rule, it affected even single landlords and ecosystem's people, forest working plans classified 'man' as one of the 'enemies of the forest. Reluctantly, some lands were considered as a wasteland

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32 *Ibid.,* pp.6-7.

33 *Ibid*., p.7.

34 *Ibid.,* p.7.

and people have no right to cultivate and reside these lands.[35]A similar situation can be seen in the establishment of meteorological department in 1875: while it marked the beginnings of scientific monitoring of the monsoon, its primary motive was to safeguard colonial revenue and infrastructure rather than to secure India's farmers life.

History of Meteorological Operations in South India

Early meteorological observations in Southern India conducted by medical officers at stations and hospitals, but much of these early materials were lost. The scientific observation of meteorology in India began with Goldingham's first observation in September 1793 at the Madras observatory. Since 1796, astronomers have registered a comprehensive series of observations at the Madras astronomical observatory. In 1819, the observation hours were sunrise, noon, 2 pm, sunset, and 9 pm, with thermometer readings, rain gauge, wind, and weather entries recorded. Since 1861, daily observations have been registered and published weekly in the Fort St. George Gazette. In 1846, the court of directors ordered that a series of Meteorological observations should be taken at a considerable height above sea level on the Neilgherry Hills. In January 1847, John Decruz, an assistant at Madras observatory, installed instruments at the summit of Dodabetta, 8,640 feet above the sea level.[36]A building was accordingly erected on the summit of the peak of Dodabetta,8,640 feet above the sea and the instruments were there fixed in January 1847, under the charge of John Decruz an assistant at the Madras observatory. The hours of observation were 9-40 a.m. and 3-40 p.m. the hours of barometrical maxima and minima on the 21st and 22nd of each month, horary of 24 consecutive hours.[37] The stations of the Madras

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[35] Madhav Gadgil and Ramachandra Guha, (eds.), *Ecology and Equity*: The *Use and Abuse of Nature in Contemporary India,* Routledge, New York, 2005, p.23.

[36] *Manual of the Administration of the Madras Presidency*: Records of Government and Yearly Administration Reports, Printed by E. Keys, Madras, 1885, p.523, RAK.

[37] *Ibid.*

Presidency were eighteen in number, viz, Amindivy, Bangalore, Bellary, Cochin, Coimbatore, Cuddapah, Kurnool, Madras, Madura, Mangalore, Masulipatam, Mercara, Negapatam, Rajahmundry, Salem, Secunderabad, Trichinopoly and Wellington.

Table 4.1

Stations of the Meteorological Department

Name of station	North Latitude		East Longitude		Height Above Sea Level	Date of Instituting Observutory	Name of Station	North Latitude		East Longitude		Height Above Sea Level	Date of Instituting Observutory
Amindivy ..	11	6	72	48	..	Sep. 1880	Mangalore ..	12	52	74	54	52	Mar. 1880
Bangalore ..	12	59	77	38	2,981	Nov. 1867	Masulipatam ..	16	9	81	12	10	Aug. 1868
Bellary	15	9	76	57	1,455	Dec. 1867	Mercara ..	12	26	75	48	3,695	Mar. 1880
Cochin ..	9	58	76	17	11	Feb. 1868	Negapatam ..	10	46	79	53	15	June. 1868
Coimbatore ..	11	0	77	0	1,348	Nov. 1867	Rajahmundry ..	16	58	81	49	112	May. 1884
Cuddapah ..	14	29	78	53	433	Mar. 1884	Salem	11	39	78	12	910	Nov. 1867
Kurnool ..	15	50	78	6	935	Feb. 1883	Secunderabad ..	17	27	78	33	1,787	Nov. 1867
Madras ..	13	4	80	15	22	Feb. 1796	Trichinopoly ..	10	50	78	44	275	Dec. 1867
Madura ..	9	55	78	10	448	Feb. 1868	Wellington ..	10	22	76	50	6,200	Mar. 1870

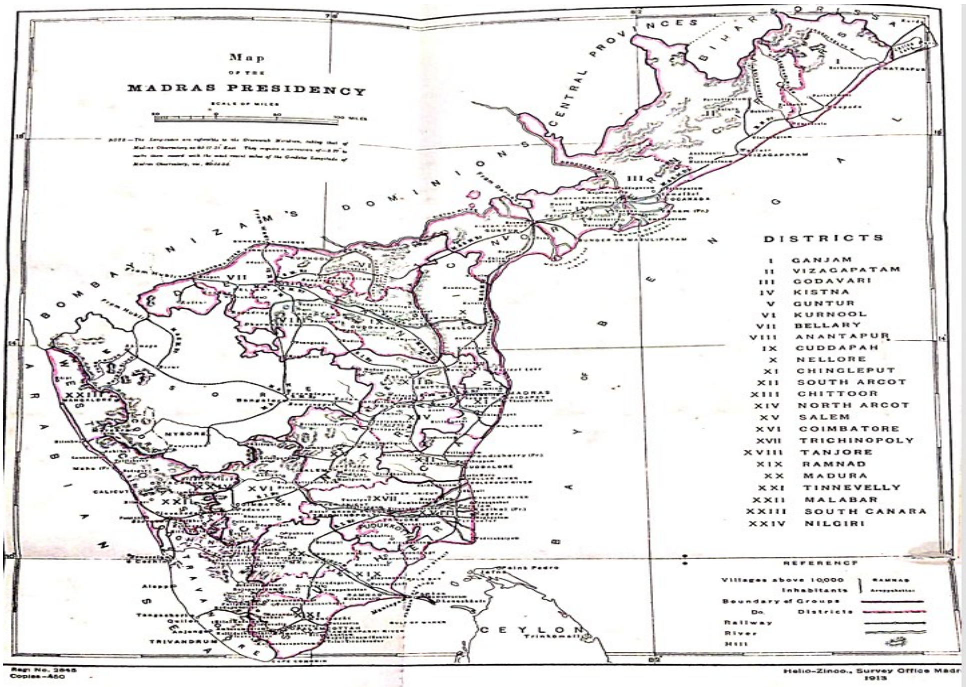
Source: *Manual of the Administration of the Madras Presidency: Records of Government and Yearly Administration Reports,* Printed by E. Keys, Madras,1885, p.524, RAK.

Meteorological Department under the Government of Madras

The Madras presidency is divided into districts for revenue administration. The officers of other departments were generally distributed according to the territorial divisions made for the Revenue department. Each district was divided into two to six divisions; most divisions into taluks; and each taluk into several villages. In 1880, there were 21 districts, including the city of Madras. Subsequently, several districts that were too heavy a charge for a single district officer was reduced in size, and for similar reasons, the number of divisions and taluks was increased. The improvement of administrative facilities benefited the people of the district as well as the officials of the Government.[38]

Map 4.1

Map of the Madras Presidency



Source: *Statistical Atlas of Madras Presidency, 1913, RAK***.**

The Madras Presidency was very familiar with meteorological stations. The rain gauges were maintained under the supervision of the salt department officers. Rainfall had a critical role in the functioning of salt pans, pointedly inducing salt production and the efficiency of salt extraction. Regional climatic patterns also impact salt pans, with variations in rainfall intensity and frequency affecting salt yield across different topographies. Shift of monsoons triggered climate change-induced increasing cases of extreme weather procedures, and rising sea levels pose long-term challenges to salt pan sustainability. Rainfall returns from certain salt stations in

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38 G. T. BOAG, *The Madras Presidency 1881-1931*, Printed by the Superintendent, Government Press, 1933, p.8.

Madras Districts, where rain gauges are maintained under the supervision of salt department officers.

Table 4.2

The Meteorological Department under the Government of Madras

Vizagapatam	Konda Polavaram
Kistana	Manginapudi Nizampatnam Chinna Ganjam
Nellore	Kanuparti Dugarajapatnam
Chingleput	Kattur Vayallur Puldivak Attipat Vallur Vadasamanjeri Covelong Cheyur Chunampet
Madura	Theethansathanam Manakkudi
Tinnavelly	Arasadi Kayalpatnam Kuttanguli

Source: *Proceedings of the Board of Revenue Settlement,* Land Records and Agriculture, 26th September 1890, No.291, RAK.

In 1865, Madras Sanitary Commissioner, Mr. Ellis, submitted a scheme for recording meteorological observations at major civil and military stations, which the government approved. The Medical officer supervises stations, and monthly register copies are kept by the Madras astronomer for reduction. The Secunderabad register was created in July 1863, while the Trichinopoly register was formed in July 1866. The establishment of the other meteorological stations was sanctioned in 1867. Meteorological reporters were appointed in five provinces, Madras, Bombay, Bengal, Central provinces, and North-West, with assistants in the various up-country stations, and registers forwarded to astronomers for reduction.[39] In 1875, the Meteorologist to the Government of India issued the first report on the Meteorology of the Indian empire. They continued to report each year since with tables from 365 stations on the following heads: temperature of solar radiation, temperature of nocturnal radiation, air temperature, atmospheric pressure, anemometry, hygrometry, cloud proportion, and rainfall. In July 1881, the Meteorological office in Madras was transferred, partly at the request of the Astronomer, to a separate reporter. From the 1st of January 1882, the two third-class stations at Mangalore and Mercara were placed under the Madras branch. In February 1883, Kurnool was reopened as a meteorological observatory of the third class, and two others sanctioned some time back, Cuddapah and Rajahmundry, were opened.

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[39] *Ibid.*, p.524

Table 4.3

Stations of the Madras Meteorological Department

Name of station	North Latitude	East Longitude	Height above sea-level (Feet)	Date of Instituting observatory	Name of Station	North latitude	East longitude	height above sea-level (Feet)	Date of Instituting Observatory
Amindivy . .	11 6	72 48	..	Sep . 1880	Mangalore ..	12 52	74 54	52	Mar.1880
Bangalore . .	12 59	77 38	2,981	Nov . 1867	Masulipatam ..	16 9	81 12	10	Aug.1868
Bellary . .	15 9	76 57	1,455	Dec. 1867	Mercara ..	12 26	75 48	3,695	Mar.1880
Cochin . .	9 58	76 17	11	Feb . 1868	Negapatam ..	10 46	79 53	15	June.1868
Coimbatore . .	11 0	77 0	1,348	Nov. 1867	Rajaahmundr ..	16 58	81 49	112	May.1884
Cuddapah . .	14 29	78 53	433	Mar. 1884	Salem ..	11 39	78 12	940	Nov.1867
Kurnool . .	15 50	78 6	935	Feb . 1883	Secunderabad ..	17 27	78 33	1,787	Nov.1867
Madras . .	13 4	80 15	22	Feb . 1796	Trichinopoly ..	10 50	78 44	275	Dec.1867
Madura . . .	9 55	78 10	448	Feb . 1868	Wellington ..	10 22	76 50	6,200	Mar.1870

Source: *Manual of the administration of Madras Presidency,* Records of the Government, and the yearly Administration Report, RAK.

The Table 4.3 gives a list of the meteorological observatories of the presidency under the special department, showing the dates on which they were instituted, with their latitudes, longitudes, and heights above sea level. The principal observatory at Madras is situated in the suburb of Nungum Baukum, about 3 miles from the shore. The barometer, which has been in use since the end of 1876, is a Newman's standard with a large tube, similar to the instruments used at Calcutta and Bombay.[40]

40 *Ibid.*

Table 4.4

The Arbitrary Divisions of the Rainfall in Madras Presidency

Seasons	Month
The hot weather	April and May.
The south-west monsoon	June to September.
The north-east monsoon	October to December.
The dry weather	January to March.

Source: *An Account Normal Distribution of the Rainfall in the Madras Presidency Based on the Records of Twenty-Five Years.*

The table 4.4 presents the rainfall distribution in the Madras Presidency, divided into four different seasons along with their months. These divisions happen very fairly with different parts of the agricultural sector and the rainfall which usually comes in each period has its special importance. Where the hot-weather rains come in reasonable amounts, the arrangement of the dry land was pushed forward early, and hot-weather crops of ginger in some cases, cholam, were planted. The rain of the southwest monsoon manages the bulk of the sowings on the lighter classes of dry land. If they are late, the sowings of these in soils will be late and the ordinary crops bear the aftermath or others of less valuable character must be replaced for them. This untimeliness, if the rains are good towards the end of the period, is not of much consequence on the heavier soils, for from their nature, they are more of moisture and are not usually sown till the latter end of this period or early in October. The south-west monsoon rains are also of great importance to the Presidency even when they fall beyond its limits, for it is on them that the supplies in the great rivers which are used for irrigation depend, viz., in the Godavari, the Kistna, the Cauvery and the Tambraparni.[41] Some parts of the Presidency start to receive rain brought by the south-

[41] C. Benson, *An Account Normal Distribution of the Rainfall in the Madras Presidency Based on the Records of Twenty-Five Years,* Printed by the Superintendent, Government Press, Madras,1899, p.1.

west monsoon before the end of May. Over the greater part of the presidency the hot-weather rainfall, usually known as the "mango showers," is due to the sea winds which blow on the south and east of the Presidency. It often takes the form of thunderstorms. In May, cyclones frequently travel westward across the east coast, often fetching heavy rainfall. It was seen in May 1877 when Madras recorded over twenty inches of rain.[42]

The Hot Weather: During April and May, the west coast has the heaviest rainfall, primarily due to the early showers of the southwest- monsoon that comes in March. Over the southern portion of the Malabar district, the fall exceeds 15 inches. Further north, below the ghats, in that district the rainfall is approximately 12.6 inches, with about three-tenths falling in May; while, in South canara, the average rainfall is not quite 86 inches, over 80 per cent of which falls during that month. Thus, the total that falls during May on the west coast declines from south to north.[43]

The South-West Monsoon. The southwest monsoon usually arrives on the west coast before the end of May. This monsoon fetches rain in considerable amounts to the greater part of the Madras presidency. It is on this rain that the large area of unirrigated crops is dependent. It is this monsoon mainly that escorts their enormous rainfall to the west coast districts.[44]

The North-East Monsoon. The rain that falls from October to December, generally, affects mainly that area of the Madras Presidency that is less affected by the earlier rainfall. The heaviest rainfall comes in the coastline from about thirty miles north of Madras southwards through the Chinglepet, South Arcot and Tanjore, over a narrow strip of country. In the northern parts of the Presidency by far the greater part of the

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42 *Ibid*., p.2.

43 *Ibid*., p. 3.

44 *Ibid*., p. 5.

rainfall of this monsoon is measured during October; about Madras during December and November, but further southwards the proportion that comes in December increases, the recording monsoon bringing rain to these areas later on in the year than in the north.[45]

The Dry Weather. It was noticed in Alipore, and some parts before the close of the calendar year, and during November and January, it extends over the whole Presidency. It falls during the first three months of the year, and, except in Tinscrolly and Madura and on the Coromandel Coast in the Carnatic, the rainfall of this period is very light. In Tinnovelly and on the coast in Madura, there is a rainfall of about 3 inches on average this season. About half of it falls during March; the heaviest rainfall lies around Ambasamudram and Tenkási in the former district where about 55 inches falls, of which rather less than half is received in March. Over the southern half of the same district, the fall of this period is about 36 inches, and over the remainder of the tract mentioned less than 2.6 inches. The meteorologist set up maps of the average northeast monsoon rainfall in the northern and southern sections of Madras Presidency.[46]

Trivandrum observatory

The Trivandrum observatory, established in 1836, was primarily influenced by the late Rajah of Travancore's interest and is situated 190 feet above the sea, the first astronomer being Mr. John Caldecott. General Cullen conducted observations from 1842 to 1846 to determine rainfall at various points on the Travancore coast, including Cochin, Quilon, Alleppey, Cape Comorin and others. The best and most extensive observations in Travancore, however, were made by Mr. John Allan Brown, who became an astronomer to the Rajah of Travancore in January 1852. In 1855 a branch

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45 *Ibid*., p. 7.

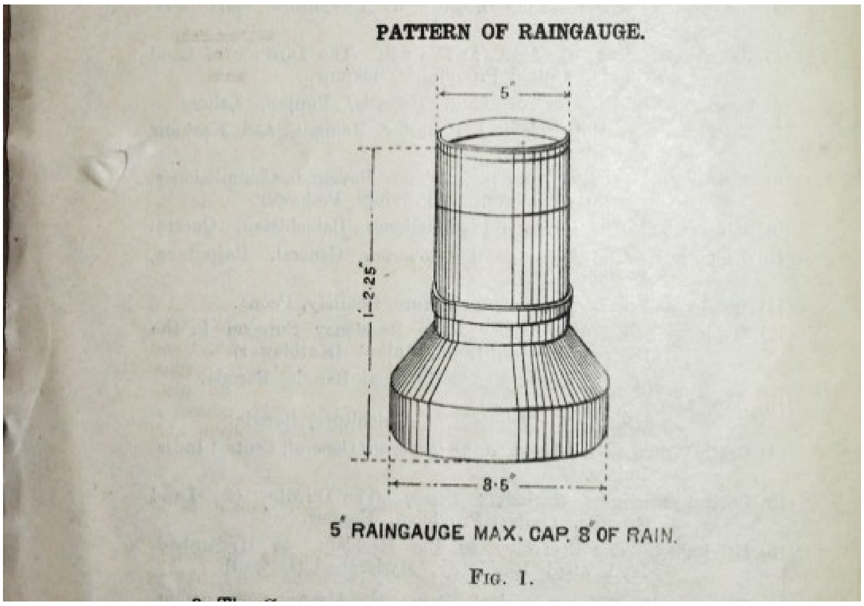
46 See Appendix IV.A and Appendix IV.B.

observatory was established on the peak of Agastya, 6,200 feet above the sea by Mr. John Allan Brown. The journey to the high-altitude site involved crossing wild elephant-occupied jungles and encountering delays due to labourers' fear and cold. The observatory's assistants were divided into three sets, each consisting of Syrian Christians, Brahmins and Shudras, and Roman Catholics, who were rotated every three months. The observations began on 1stJuly1855, but the observatory collapsed during Mr. Brown's absence in England in 1860. In 1863 Brown rebuilt the observatory and conducted a second series of observations. After the Travancore Government abolished observatories in 1865, Brown's two native observers continued the limited series. This principal assistant continued in charge and forwarded reports to Mr. Brown in Europe.

Pattern of Rain Gauge

Figure 4.1

Pattern of Rain Gauge



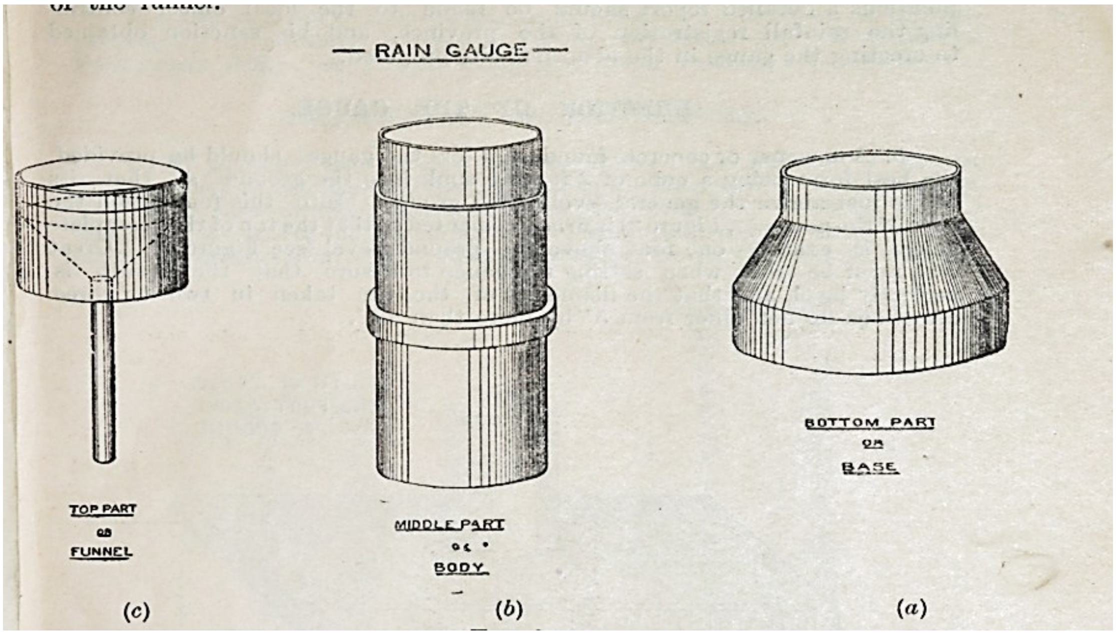
Source: *The Rainfall Organization,* printed by the Manager, Government of India press, Delhi, 1929, p.2, RAK.

The government of India regards it desirable that the Symons rain gauge be the only gauge used in India. This gauge pattern is shown in Figure 4:1 and is called “the Rain gauge 5 “standard pattern”. The gauge is built of three parts: (a) the base, (b) the body, and (c) the funnel. These are shown in Figure 4: 2. Inside the body is placed a glass bottle or zinc receiver into which the rain passes through the tube of the funnel.

Rain Gauge

Figure 4.2

Parts of Rain Gauge



Source: *The Rainfall Organization,* printed by the Manager, Government of India press, Delhi, 1929. p.3, RAK.

Exposure of Rain Gauge

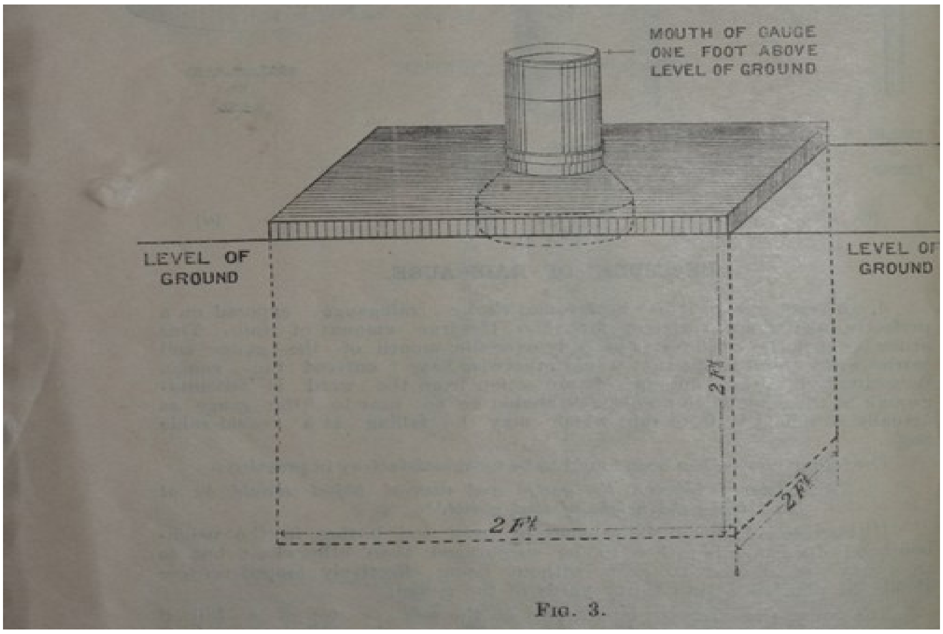
In recent years, it has been found that a rain gauge exposed to a perfectly open space registers less than the true amount of rain. This arises because the wind forms an eddy over the mouth of the gauge and carries away small drops that would otherwise have entered the gauge. Accordingly, a certain amount of protection from the wind is advantageous, but at the same time, no obstacle should be so close to the gauge to shield it from rain, which may be falling at a considerable angle. The gauge should not be placed on the side or top of a hill unless a suitable level ground site is available. The gauge should be chosen in hills with challenging level spaces, shielded from high winds, and free from eddies.

Erection of the Gauge

The gauge should be supported on a 2-foot cube of masonry or concrete. In this foundation, the base of the gauge is firmly cemented so that the top of the complete gauge is exactly one foot above ground level (see Figure 4:3). Great care must be taken when setting the gauge to ensure that the mouth is perfectly level and that the diameters of the rim taken in two or three directions do not differ from 5” by more than.05”.

Figure 4.3

Erection of the Gauge



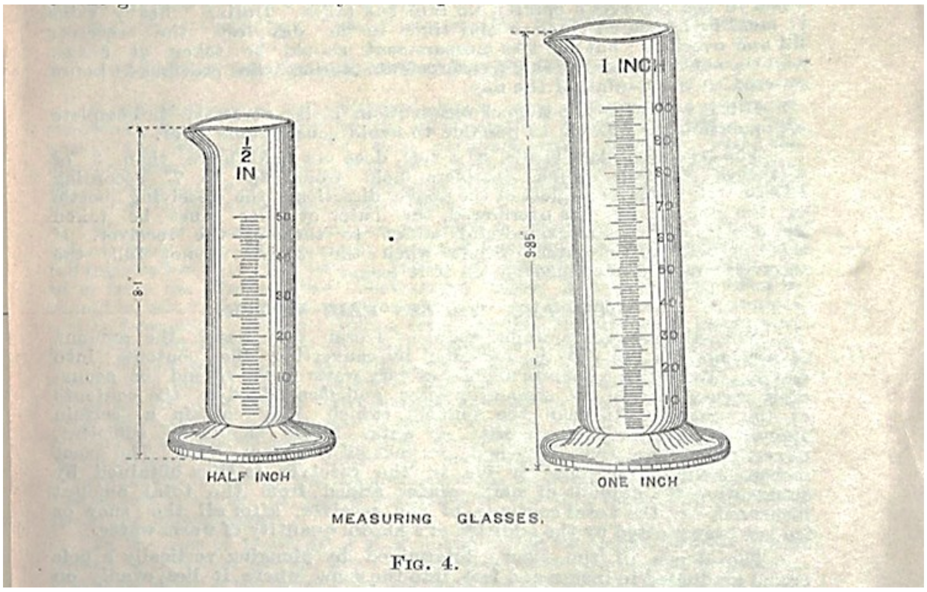
Source: *The Rainfall Organisation,* printed by the Manager, Government of India Press, Delhi, 1929, p.4, RAK.

Protection of Gauge

It is often desirable to protect the gauge from being damaged by Cattle, and for this purpose, a fence may be erected around it. This can be made of any suitable material, but it must be of such a size that the top of the fence is not higher above the mouth of the gauge than half its distance from the gauge.

Figure 4.4

Measurement of the Rainfall



Source: *The Rainfall Organisation,* printed by the Manager, Government of India Press, Delhi, 1929, p,5, RAK.

To measure the rainfall, the water in the receiver is poured into the measuring cylinder, which is to be placed on a level surface. The eye is then brought into a horizontal line with the bottom of the meniscus, the curved surface of the water, and its reading is taken. Each of the graduations on this cylinder represents one-hundredths of an inch, and the observer must count the number of the divisions covered by the water. To facilitate this, numbers are engraved on the glass at 20,30,40, divisions. If the water comes up to the third division above the line marked 20, the rainfall is 23 hundredths of an inch. In writing up the amount recorded the observer has simply to put the number of inches in front of a decimal point, and the number of hundredths, it should be very carefully noted that if the number of hundredths is less than ten, say one-two, three or four, then rainfall must not be written .1, .2, .3, or .4, but .01, .02, .03, or .04.[47]

Supply of Rain gauges and Measure-Glasses

All rain gauges and measuring glasses required at rain gauge stations in India supplied by the mathematical instrument office at Calcutta. In 1890, there were large differences in the hours of rainfall measurement, the form of rain gauge used, and the methods of registering rainfall in the different provinces of India. The need for uniformity in the methods of registering rainfall was because the establishment of rain-gauge stations and the collection of data were commenced many years ago by the revenue departments of the various local governments. Each government naturally established a system that was thought at the time to best suit local conditions and requirements. The disadvantages became increasingly evident from year to year, and at length, the government of India in 1890, after careful consideration of the question, ordered the following changes to be made to secure the uniformity of the system that appeared to be desirable.

47 The rainwater in the gauge should be measured every day at 8 a.m. and the rain gauge should be examined every day at that hour, even when in the observer's opinion no rain has fallen. During heavy rains, it must be measured three or four times in the day, at least the receiver fills and overflows, but the last measurement should be taken at 8 a.m., and the total of all the measurements during the previous hours entered as the rainfall of the day. The receiving glass, as a rule, does not hold more than 3 or 4 inches of rain. Zinc receivers hold from 3 ½ to 7 according to size. If owing to neglect of the above directions the receiving bottle or the zinc receiver has overflowed, the outer cylinder must be taken up, and its contents measured and added to those of the receiver. If there is water in the outer cylinder when the receiver does not fall, the receiver must be examined to see if it leaks.See.in., *The Rainfall Organisation,* printed by the Manager, Government of India Press, Delhi, 1929, p,5, RAK.

1. A common hour for rainfall registration, and a common rainfall week ending on Saturday at 8 am should be adopted throughout India.

2. All rain gauges should be systematically inspected, and copies of all inspection reports by local officers should be sent to the meteorological reporter to the Government of India for this information, and suggestions for the improvement of any rain-gauge station at which the arrangements are not satisfactory.

3. Monthly returns of rainfall published by local governments, and enough copies of these returns should be supplied to the India Metrological Department to enable it to prepare and issue annual volumes giving the rainfall data of the Indian empire collected under this system for the information of all interested in the rainfall statistics of India.

4. The Imperial Meteorological department should adopt a fixed division of the year into four periods, corresponding with the periods of general rainfall throughout the year in India, for purposes of comparison.

5. To calculate the number of rainy days, a fall of one-tenth of an inch and upwards should be taken to denote a rainy day.

The following are the important Meteorological stations in Malabar district period between 1887-1904.

1. Cannanore
2. Kottayam (Tellicherry)
3. Kurumbanad (Badagara)
4. Ernad (Manjeri)
5. Walluvanad
6. Manamtoddy

7. Nilambur
8. Vayitiri
9. Calicut
10. Chevayur
11. Tirurangady
12. Palghat
13. Ponnani
14. Cochin.

Madras rainfall is published weekly and monthly by the Government Astronomer in the Fort St. George Gazette. Manjeri, Badagara, and Angadipuram were replaced by Ernad Kurumranad and Walluwanad in the Fort St. George Gazette supplement on 1st, November1887.[48] Bundles of Daily Rain Reports of the Malabar District are kept in the Kozhikode archives.[49]

Rainfall Records and Commercialization of Agriculture

The rainfall distribution is determined by topography. A system of registering the rainfall in each district was introduced under orders of the Madras Board of Revenue in March 1852. The registration was confined to the Huzoor and Talook headquarters stations. From these returns, a general statement for the whole district was prepared by each collector and submitted to the Board of Revenue before the 15th of each month, for the information of the government and quarterly publication in the Fort St. George Gazette. Subsequently, the rainfall was ordered to be given in four sections for each district, viz. north, south, east and west. In 1862 the board directed collectors to furnish the Government astronomer with a copy of the rainfall register

48 Sub Collector office Thalessery- II, Statement of Average rainfall for 35 years ending 1904 in Malabar, SK.No 4356, RAK.

49 Rainfall Report of Malabar on the 14th of May 1888 can be seen in Appendix V.A .

submitted every month, and also with the past daily registers of rainfall from 1852. The Government Astronomer then suggested a new form, which was circulated from adoption. Information regarding the average rainfall for each district is available in the Revenue Board office from 1853-54.[50] Rainfall plays a significant role in influencing agriculture, tourism, and economic development in various ways. In agriculture, insufficient or inconsistent rainfall can affect crops, resulting in lower yields and losses due to drought. On the other hand, floods and excessive rain can both harm crops and soil and interfere with farming. Rainfall has an impact on soil quality, pest frequency, crop selection, and planting periods.[51] The impacts of heavy rainfall on agricultural production have become a growing concern in recent years. According to the (IMD), heavy rainfall is defined as precipitation ranging from 64.5 to 115.5 mm per day. Changing rainfall patterns, caused by climate change, are increasingly unsettling agricultural systems, particularly in developing countries where agriculture is a primary livelihood. Climate change has amplified both the frequency and intensity of heavy rainfall events, creating significant challenges for the agricultural sector.

Rainfall Data as a Source to Understand the Past Lived Experience of Malabar Peasantry

Rainfall in the humid tropics varies from one place to another, resulting in variation at the different localities. Currently, predicting the spatial and temporal distribution of rainfall is also important due to climate change. The researcher can analyse rainfall data for the years 1870 to 2000 to reconstruct people's everyday life in Malabar.

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50 Madras Administrative Report, 1885, M32, RAK.

51 R. Sneha Babu. and G. Uma, *Analysing the Impact of Rainfall Patterns on Agriculture, Economy and Tourism in India: A Statistical Approach,* International Journal of Environment and Climate Change, Vol,13, Issue 11,2023, p.4627.

Table 4.5

Abstract of the Rainfall statistics for the 70 years ending 1939

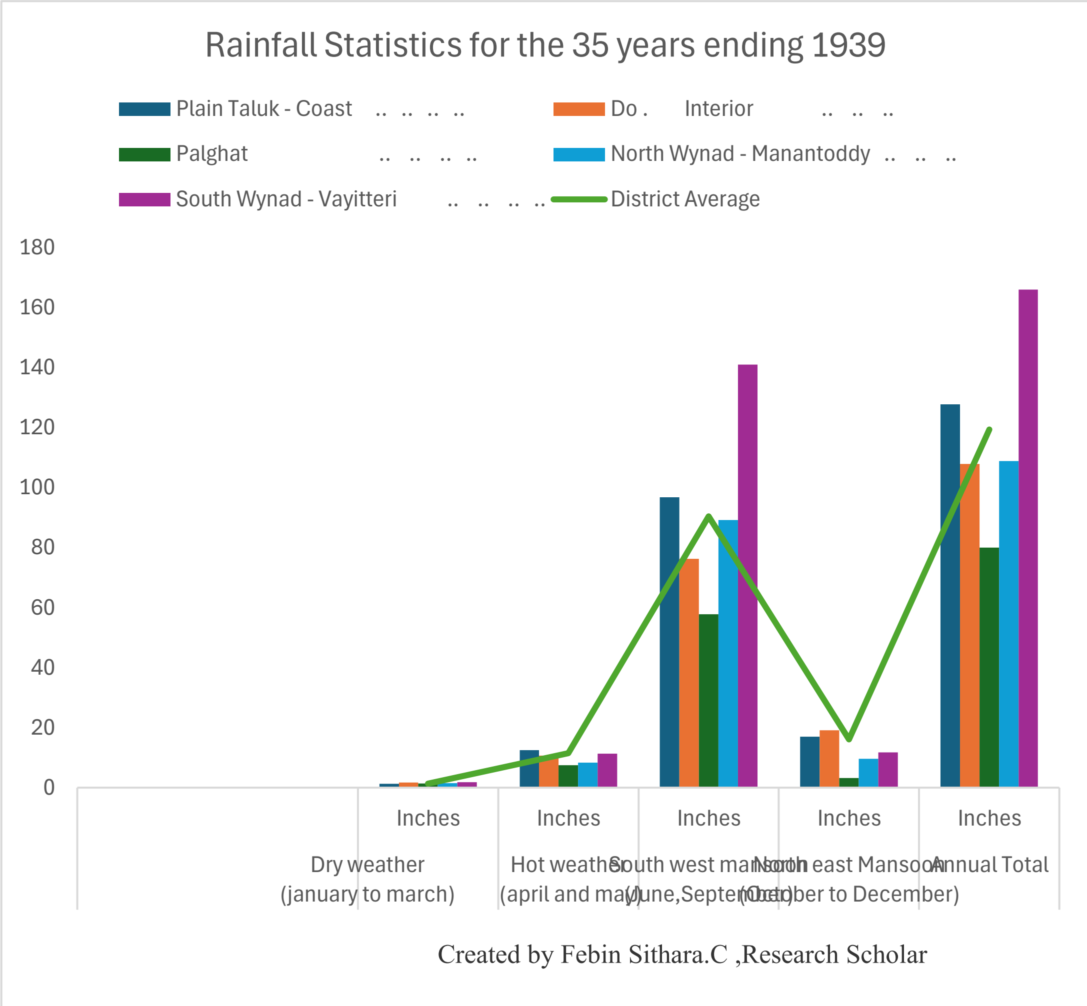
The following is an abstract of the rainfall statistics for the 70 years ending 1939					
Section of district	Dry weather (January to March)	Hot weather (April and May)	Southwest monsoon (June, September)	Northeast Monsoon (October to December)	Annual Total
	Inches	Inches	Inches	Inches	Inches
Plain Taluk - Coast	1.3	12.58	96.79	17.03	127.7
Do. Interior	1.72	10.68	76.31	19.16	107.87
Palghat	1.48	7.51	57.77	3.21	80
North Wynad - Manantoddy	1.54	8.42	89.2	9.62	108.87
South Wynad - Vayitteri	1.9	11.4	140.92	11.76	165.98
District Average	1.37	11.53	90.38	16.1	119.38

Source: *Statistical Atlas of Malabar,1940-41, p.3, RAK.*

Table 4.5 shows the Abstract of the Rainfall statistics for the 70 years ending 1939. It describes the district sections Palghat, north Wayanad, South Wayanad, and the coastal plains. The highest annual total of rainfall was recorded at 165.98 in South Wayanad. The lowest Annual total of rainfall was recorded at 80 in Palghat. The highest of 90.38 inches of rainfall was recorded in the district during the southwest monsoon season (June to September). The lowest of 1.37 inches of rainfall recorded in the district, average during the Dry weather from January to March.

Graph 4.1

Rainfall Statistics for the 35 years ending 1939.



The seasons are wonderfully regular. Thunderstorms begin at the end of March, especially among the hills, and recur at frequent intervals throughout the hot weather. Towards the end of May, their greater violence heralds the approach of the southwest monsoon, on which the principal wet and dry crops of the district depend. The southwest monsoon, which has never been known to fail, ordinarily sets in about the first week of June, and with occasional breaks, the rain continues till the end of September. Nearly three-fourths of the total rainfall of the district falls in these four months. It is heaviest in Wayanad, especially at those places which are near the western edge of the plateau. In some years, the rainfall in these places totals as much as 300 inches. The rainfall is least at Palghat, where the winds blow fiercely through the funnel of the gap, and much of the monsoon drifts by into Coimbatore in mere vapour. In October, the retreating monsoon continues to give fairly general rain, but the effect of the northeast monsoon is as a rule not greatly felt. By the end of December, the weather is firmly established and lasts till the end of March.

Table 4.6

Average Rainfall of the District in Inches1870-1940

Years	January	February	March	April	May	June	July	August	September	October	November	December	Monthly Avg	Total
1870	0.69	0.33	1.12	1.02	3.59	28.71	26.1	7.93	6.72	15.28	2.57	0.25	8	94.31
1871	2.97	0.44	1.66	5.14	6.97	37.15	38.51	12.25	9.58	6.38	8.83	0.21	11	130.09
1872	..	0.26	0.02	3.99	7.91	34.67	35.79	18.2	16.76	4.12	3.62	2.24	12	127.58
1873	..	2.82	..	4.84	11.26	30.76	38.28	9.08	6.66	7.66	0.39	0.75	11	112.5
1874	..	0.33	0.03	3.36	21.06	44.89	30.48	12.83	8.88	9.86	2.7	1.04	12	135.46
1875	0.05	..	0.45	2.9	4.73	33.81	30.11	11.44	4.98	6.09	1.88	0.4	9	96.84
1876	..	0.01	1.94	1.74	2.28	21.84	37.49	12.23	5.63	2.41	1.15	0.07	8	86.79
a1877	..	..	0.53	2.66	4.78	39.62	10.97	25.32	14.9	19.59	4.07	2.3	12	124.74
1878	0.01	..	0.92	3.52	6.93	35.6	22.05	33.02	24.24	12.39	4.37	1.38	13	144.43
1879	0.14	0.34	1.56	2	21.23	18.51	25.81	16.04	7.12	9.99	3.81	1.68	9	108.23
1880	0.02	0.23	0.34	5.01	10.16	30.59	25.5	7.59	5.59	4.73	7.87	1.11	8	98.74
1881	0.02	..	0.62	0.91	5.27	10.92	18.06	22.69	7.48	3.82	7.86	0.12	7	77.77
1882	0.37	..	0.1	1.49	14.33	42.68	54.77	14.77	9.05	12.14	5.41	0.34	14	155.45
1883	0.08	0.01	1.72	3.45	6.9	28.1	33.45	18.85	4.65	11.83	6.94	1.26	10	117.24
1884	..	0.02	0.26	1.66	3.76	17.78	21.59	24.45	12.73	7.47	5.43	0.55	9	95.7
1885	..	..	0.52	0.98	3.99	45.61	36.15	18.56	3.97	12.77	3.16	3.07	13	128.78
1886	0.03	..	0.01	1.98	13.09	24.94	28.56	7.57	6.18	7.77	3.44	0.78	9	94.35
1887	..	0.06	0.64	3.37	3.19	39.23	26.58	5.66	6.02	11.67	7.22	1.23	10	104.87
1888	..	0.09	0.05	4.39	11.94	46.96	29.31	21.39	4.52	4.29	6.98	0.11	12	130.03

Years	January	February	March	April	May	June	July	August	September	October	November	December	Monthly Avg	Total
1889	..	0.06	0.29	4.69	6.7	37.31	21.24	22.09	18.23	12.08	2.37	1.33	11	126.39
1890	0.05	0.6	1.8	4.82	6.67	27.38	28.36	11.19	3.13	5.22	2.71	0.9	8	92.83
1891	0.11	0.02	1.01	3.67	4.28	25.9	34.08	14.23	2.4	13.64	3.62	0.62	9	103.58
1892	..	0.08	0.81	7.18	16.92	14.69	58.76	22.02	5.8	15.25	2.39	0.13	13	144.03
1893	0.21	0.62	1.98	1.97	10.02	34.65	15.99	12.4	7.63	8.51	5.31	..	9	99.29
1894	0.13	0.21	3.57	5.47	4.64	31.16	25.78	19.33	5.91	6.51	1.6	0.12	9	104.43
1895	0.03	..	0.21	6.87	3.59	38.47	29.9	13.81	4.14	12.26	2.05	0.15	10	111.48
1896	0.32	..	0.26	2.52	7.49	46.22	26.82	26.04	3.5	6.73	4.4	1.42	11	125.72
1897	0.03	1.31	0.1	3.94	6.16	43.84	40.63	32.26	10.22	8.37	2.19	0.25	12	149.3
1898	..	0.24	0.17	3.32	6.06	31.47	32.29	6.4	9.51	11.98	6.92	0.48	10	108.84
1899	0.12	0.42	0.25	13.69	5.42	35.6	15.68	5.55	3.66	9.12	0.17	0.11	7	89.79
1900	0.16	..	0.06	6.55	2.54	35.25	37.87	28.41	6.36	7.31	1.17	0.56	11	126.24
1901	0.8	0.72	1.34	4.68	4.75	33.25	34.66	16.09	9.15	8.99	12.72	1.77	11	128.92
1902	0.22	0.11	1.75	2.43	4.55	16.09	52.77	12.1	19.38	12.16	4.94	4.91	11	131.41
1903	0.03	0.15	0.07	1.4	9.63	22.22	47.31	16.72	9.57	11.38	6.18	1.93	11	126.59
1904	0.54	0.02	0.88	1.9	9.81	43.39	29.72	14	7.7	1.97	0.73	..	10	110.66
1905	0.05	0.4	0.06	1.35	9	34.85	26.51	12.11	7.34	15.24	2.44	..	10	109.35
1906	0.06	0.16	0.04	0.63	4.78	15.2	41.86	14.58	5.02	7.13	3.4	2.46	8	95.32
1907	1.06	0.02	1.15	5.6	3.17	35.25	34.65	48.04	5.54	10.06	7.93	1.76	13	154.23
1908	0.05	0.61	0.86	3.57	4.59	25.86	46.32	17.05	3.92	7.69	0.86	0.29	9	111.67
1909	0.33	0.14	0.49	6.7	22.12	34.82	38.39	9.13	7.91	6.95	5.53	1	11	133.51
1910	0.06	0.25	0.45	3.41	5.91	32.33	20.08	18.51	9.13	12.36	8.76	..	10	111.25

Years	January	February	March	April	May	June	July	August	September	October	November	December	Monthly Avg	Total
1911	0.06	0.11	0.33	1.35	6.47	43	31.15	8.68	1.34	10.07	4.6	2.18	9	109.34
1912	0.06	0.08	0.08	3.18	7.92	41.57	39.12	25.39	5.11	15.34	4.13	0.18	12	142.16
1913	..	0.13	0.16	1.45	7.14	24.31	33.83	0.47	7.94	18.45	2.09	0.99	9	96.96
1914	..	..	0.14	0.13	4.08	23.63	42.33	17.85	8.06	14.85	2.93	3.85	12	117.85
1915	0.37	0.25	1.57	3	4.67	29.88	31.28	14.2	14.09	7.68	11.36	0.33	10	118.68
1916	..	0.11	0.16	2.39	7.99	41.91	22.66	16.85	13	12.05	4.11	0.4	11	121.63
1917	..	2.11	1.56	1	4.33	31.98	15.45	11.68	19.56	12.35	8	0.85	10	108.87
1918	0.2	0.02	0.78	0.97	29.41	20	7.8	14.84	4.41	7.47	12.15	1.24	8	99.29
1919	0.57	0.04	0.58	1.45	9.16	25.1	27.53	21.13	8.95	8.45	10.99	1.2	10	115.15
1920	0.87	0.16	0.17	5.11	3.05	42.59	43.56	9.91	4.67	13.5	10.87	0.01	11	134.47
1921	0.95	0.1	0.19	6.2	4.81	21.99	25.8	32.07	5.73	8.65	5.13	0.03	9	111.65
1922	0.86	0.2	0.51	3.09	10.81	27.15	50.67	14.48	7.96	7.88	9.46	0.46	11	133.53
1923	0.46	..	2.23	1	2.97	28.31	47.09	45.52	8.2	4.8	2.78	0.42	13	143.78
1924	0.3	0.02	1.9	4.24	6.99	43.59	60.44	27.86	9.6	5.8	6.21	0.87	14	167.82
1925	..	0.01	2.57	2.71	8.98	32.08	32.12	26.46	4.94	10.55	7.37	3.55	12	131.34
1926	0.74	0.05	0.31	1.08	5.39	25.26	43.56	24.22	11.75	8.1	2.23	0.19	10	122.88
1927	0.05	0.77	0.88	2.61	9.01	30.1	41.62	14.39	13.33	4.01	5.82	0.04	10	122.63
1928	0.09	2.81	1.33	2.95	2.49	23.51	20.22	25.29	2.39	10.4	3.48	1.44	8	96.4
1929	0.2	0.35	1.18	6.85	5.1	43.33	39.4	13.25	10.14	13.15	3.64	0.43	11	137.02
1930	0.14	0.27	0.66	2.92	16.53	28.09	19.15	11.23	14.45	15.36	7.67	3.24	10	119.71
1931	0.02	0.01	0.2	3.68	5.21	22.18	32.08	55.27	6.47	5.72	4.87	2.26	11	137.97
1932	..	0.09	0.28	3.44	27.47	16.16	35.88	16.72	14	22.54	6.55	0.5	13	143.63

Years	January	February	March	April	May	June	July	August	September	October	November	December	Monthly Avg	Total
1933	..	0.11	0.63	5.25	24.41	37.16	36.58	18.53	17.78	16	3.23	0.73	15	160.41
1934	0.94	0.01	0.89	3.62	2.63	38.4	18.97	16.87	1.7	12.4	3.5	0.07	8	100
1935	0.26	0.03	0.16	3.2	1.7	18.88	35.18	9.68	11.75	3.72	3.32	0.32	7	88.2
1936	0.01	0.32	4.02	1.27	14.36	30.34	31.55	18.16	10.7	9.02	6.6	0.28	11	126.63
1937	0.02	0.13	1.32	5.89	4.63	21.56	47.22	11.57	5.66	15.63	3.71	0.28	10	117.62
1938	..	0.61	1.24	5.32	6.68	33.07	31.59	12.23	7.5	8.64	2.35	0.19	10	109.42
1939	0.02	0.06	0.27	6.05	2.53	28.05	35.12	16.89	4.13	13.71	8.19	0.11	10	115.13
Avg	0.27	0	1	3	8	31	33	18	8	10	4.91	1	10	119.38
1940 ..	10.01	..	0.01	4.10	8.21	25.50	24.17	27.35	2.07	9.33	8.70	1.01	10.04	120.49

Source: *Statistical Atlas of Malabar,* 1940-41, RAK.

Table 4.6 shows the average rainfall of the district (measured in inches) from 1870 to 1940, encompassing data from January to December. The year 1921 recorded the highest annual rainfall at 168 inches**,** while the year 1881 experienced the lowest annual rainfall, totalling 78 inches**.** Over 70 years, the rainfall consistently peaked during June, July, and August. The highest recorded rainfall for June was 2181 inches, for July 2288 inches**,** and for August 1268 inches**.** The 70-year monthly average rainfall for the peak monsoon months demonstrates distinct seasonal trends and notable variations over the decades. Specifically, the average rainfall in June is recorded at 31.27 inches, highlighting the early monsoon flow. July, often the wettest month, averages 33.05 inches, reflecting the peak intensity of the monsoon season. By contrast, August sees a marked decline in rainfall, with an average of 18.45 inches, signalling a tapering of the monsoon's vigour. These figures provide valuable insights into the temporal distribution and fluctuations of monsoonal rainfall over a long-term period. The British government keep the Rainfall fall records in continues years.[52]

[52] Malabar District Statement of the Average Rainfall for 35 Years Ending 1904, see in Appendix V.B.

Graph 4.2

Graphical Representation of Average Rainfall of District in Inches

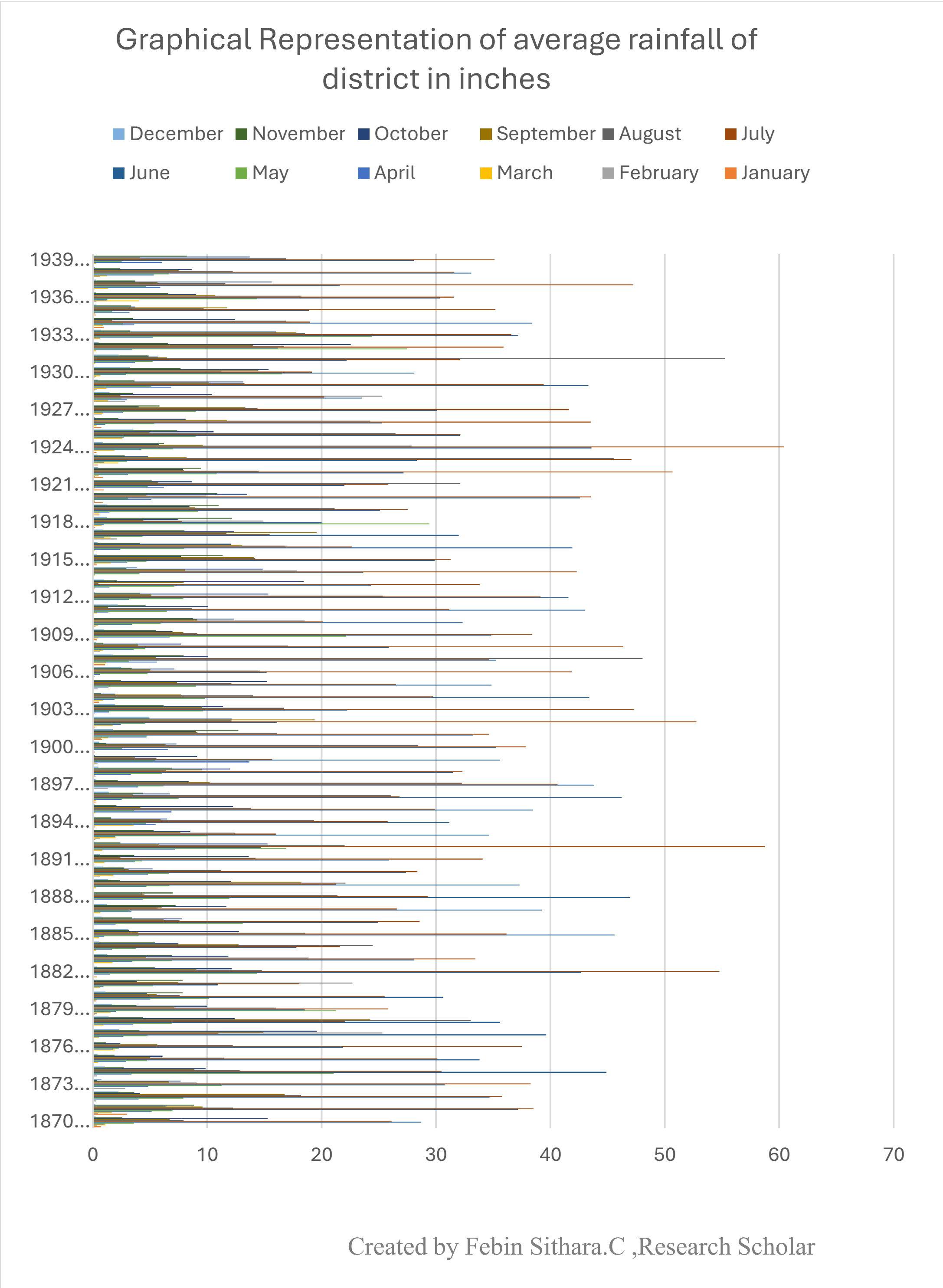


Table 4.7

Average Number of Wet days-1870-1940

Years	January	February	March	April	May	June	July	August	September	October	November	December	Monthly Average	Total
1870	1	..	2	2	5	21	27	16	12	15	5	1	**10**	107
1871	4	1	2	8	10	26	28	17	14	10	9	1	**11**	130
1872	..	1	..	5	5	23	26	23	18	6	6	3	**12**	116
1873	..	4	..	6	12	27	28	14	10	13	1	2	**12**	117
1874	..	1	..	5	19	26	27	22	19	14	5	1	**14**	139
1875	..	..	1	3	6	24	29	19	12	10	3	1	**11**	108
1876	..	..	3	4	5	23	29	21	8	4	3	..	**11**	100
1877	..	..	1	5	8	25	19	23	17	19	6	4	**13**	127
1878	..	..	1	5	8	23	19	24	24	15	7	3	**13**	129
1879	..	1	3	3	15	21	25	26	12	14	6	3	**12**	129
1880	..	..	1	7	8	26	28	11	12	10	12	2	**12**	117
1881	..	..	1	2	8	20	18	23	14	7	10	..	**11**	103
1882	2	..	..	3	9	23	30	17	15	13	9	1	**12**	122
1883	..	..	3	6	11	25	27	20	8	14	7	2	**12**	123
1884	..	..	1	4	5	18	26	20	20	11	8	1	**11**	114

Years		January	February	March	April	May	June	July	August	September	October	November	December	Monthly Average	Total
1885 ..	..	..	..	1	2	6	27	27	15	7	17	5	6	**11**	113
1886 ..	..	..	..	..	2	13	25	25	16	12	14	5	1	**13**	113
1887 ..	..	..	..	2	6	6	25	25	12	11	14	9	2	**11**	112
1888 ..	..	..	..	..	4	13	27	28	26	8	8	8	..	**15**	122
1889 ..	..	..	..	1	6	8	26	25	26	17	11	4	2	**13**	126
1890 ..	..	..	1	3	8	8	25	25	12	11	9	4	2	**10**	108
1891 ..	..	..	2	2	6	8	23	27	18	8	16	5	1	**11**	116
1892 ..	..	..	..	1	12	14	18	29	26	15	15	4	..	**15**	134
1893 ..	..	..	1	3	4	11	25	25	20	12	12	9	..	**12**	122
1894 ..	..	..	..	5	8	6	25	26	24	11	10	3	..	**13**	118
1895 ..	..	..	..	..	8	5	21	28	20	9	15	2	..	**14**	108
1896 ..	..	..	..	1	4	9	26	28	25	7	9	6	3	**12**	118
1897 ..	..	..	2	..	6	7	20	26	24	14	10	4	..	**13**	113
1898 ..	..	..	..	..	5	8	23	28	14	17	15	9	1	**13**	120
1899 ..	..	..	1	1	14	9	23	17	11	8	12	1	..	**10**	97
1900 ..	..	..	..	..	7	4	21	27	24	14	11	2	1	**12**	111
1901 ..	..	1	1	2	6	8	23	28	21	10	9	12	3	**10**	124

Years			January	February	March	April	May	June	July	August	September	October	November	December	Monthly Average	Total
1902	..	..	1	..	2	5	6	17	29	15	19	15	7	5	**11**	121
1903	..	..	..	..	..	2	12	20	30	21	17	12	7	3	**14**	124
1904	..	..	1	..	1	4	10	28	27	15	15	14	1	..	**12**	116
1905	..	..	..	1	..	2	12	21	26	19	11	15	4	..	**12**	111
1906	..	..	2	..	..	1	8	19	29	19	11	10	5	3	**11**	107
1907	..	..	1	..	2	8	5	24	24	29	8	12	8	3	**11**	124
1908	..	..	..	1	1	5	6	22	29	20	8	10	2	..	**10**	104
1909	..	..	3	..	1	5	9	24	29	13	13	9	8	1	**10**	115
1910	..	..	..	..	1	5	7	24	17	21	19	16	9	..	**13**	119
1911	..	..	..	..	1	2	8	22	26	15	4	11	5	3	**10**	97
1912	..	..	..	..	..	5	10	26	27	25	10	16	7	..	**16**	126
1913	..	..	..	..	..	3	9	22	26	17	9	16	3	1	**12**	106
1914	..	..	..	..	..	..	8	23	30	23	14	16	4	5	**15**	123
1915	..	..	1	..	2	5	7	21	22	16	16	10	12	1	**10**	113
1916	..	..	..	2	..	4	10	28	21	20	20	16	6	1	**13**	128
1917	..	..	..	..	2	2	4	27	18	18	19	16	10	1	**12**	117
1918	..	..	1	..	1	2	23	21	14	22	8	10	13	2	**11**	117

Years			January	February	March	April	May	June	July	August	September	October	November	December	Monthly Average	Total
1919	..	..	1	..	1	2	11	25	25	25	13	13	11	2	**12**	129
1920	..	..	2	..	..	8	4	25	30	18	10	14	11	..	**14**	122
1921	..	..	2	..	..	1	6	21	23	25	11	11	5	..	**12**	105
1922	..	..	1	..	1	4	14	23	29	22	16	11	10	1	**12**	132
1923	..	..	1	..	4	2	4	20	29	27	14	8	3	1	**10**	113
1924	..	..	1	..	3	6	9	25	30	23	12	8	6	1	**11**	124
1925	..	..	..	..	4	5	10	19	23	24	7	15	5	5	**12**	117
1926	..	..	1	..	1	1	6	22	26	22	13	11	3	..	**11**	106
1927	..	..	..	1	2	4	11	23	30	19	14	7	6	..	**12**	117
1928	..	..	..	4	2	5	5	23	24	24	5	15	9	2	**11**	118
1929	..	..	..	1	2	11	7	27	28	20	15	14	5	1	**12**	131
1930	..	..	1	1	1	5	11	22	23	13	16	17	9	3	**10**	122
1931	..	..	..	..	..	6	7	24	27	30	12	10	7	3	**14**	126
1932	..	..	..	..	1	5	16	21	29	19	20	20	11	1	**14**	143
1933	..	..	..	..	2	6	16	25	28	20	22	18	4	2	**14**	143
1934	..	..	2	..	1	4	6	24	22	19	5	14	4	..	**10**	101
1935	..	..	..	..	..	5	4	21	27	16	14	15	4	1	**12**	107

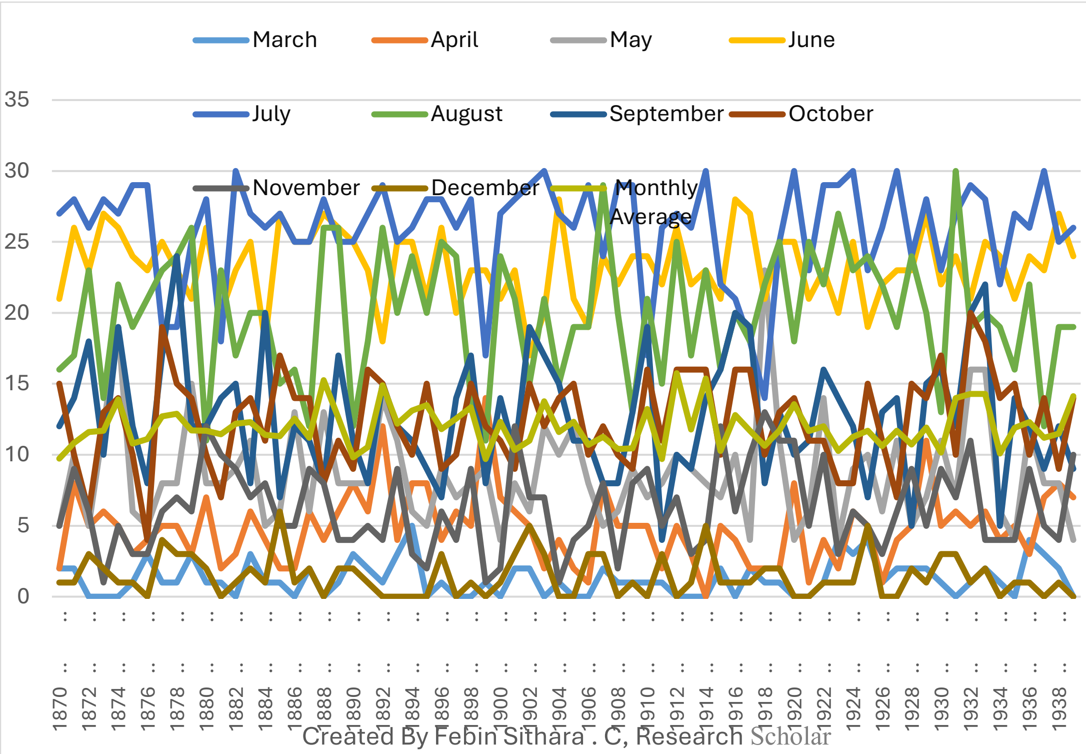
Years	January	February	March	April	May	June	July	August	September	October	November	December	Monthly Average	Total
1936	..	..	4	3	12	24	26	22	12	10	9	1	**12**	123
1937	..	1	3	7	8	23	30	12	9	14	5	..	**11**	112
1938	..	..	2	8	8	27	25	19	12	9	4	1	**12**	115
1939	..	..	..	7	4	24	26	19	9	14	10	..	**14**	113
Yearly Average	**..**	**..**	**1**	**5**	**9**	**23**	**26**	**20**	**13**	**12**	**6**	**2**	**12**	117.3461
1940	**..**	**..**	**..**	**5**	**11**	**20**	**29**	**26**	**4**	**11**	**12**	**2**	**10**	120

Source: *Statistical Atlas of Malabar,1940-41*, RAK.

Table 4.7 displays the average number of wet days (measured in days) from 1870 to 1940, encompassing data for the period January to December. The highest recorded number of wet days occurred in 1932 and 1933, with a value of 143 days. In contrast, the lowest recorded value, 97 wet days, was observed in 1899. Over 70 years, the total monthly wet days were 1,651 for June, 1,843 for July, and 1,422 for August. The average number of wet days per month was calculated as follows: June 23.59 days; July, 26.33 days; and August, 20.31 days, respectively."

Graph 4.3

Graphical Representation of Average Number of Wet Days- 1870- 1940



Graph 4. 3 shows the Average number of wet days between 1870 to 1940.The monthly rainfall conditions and growing of crops are the followings. In January, there is no rain. But if there are heavy rains in the month (this is most unlikely) the second crop *paddy* will be adversely affected. Showers in January keep the grazing lands alive for a longer period in the hot weather. February is usually rainless. Heavy showers will affect the second crop *paddy* harvest and the subsequent operations of drying

paddy straw and seed. In march usually there is no heavy rain. In April the absence of rains delays the preliminary operations for sowing *paddy* and fugitive crops. Normal rains were beneficial for preparing the land for sowing crops. Both absence and excess of rain will affect the third crop *paddy* (*Meda Punja).* In the month of May sowing of *paddy* (main sowing of first crop and nurseries) and other dry crops is generally commenced. Sowing *Modan* and *Punam* paddy will be finished. Excessive rains hinder paddy sowing, and washing of the soil takes place and the soil becomes hard for the germination of seeds. Flushing and flowering of pepper take place rather early. Heavy rains are quite refreshing for the coconut trees only. Moderate hot weather and rains are congenial for pepper. Bright sunny days check the leaf-rot of coconuts. Good rains in the latter half of May are good for timely sowings of all wet and dry land and crops. When the pre-monsoon rains in May are abnormally low, the growth of paddy in dry sown areas and nurseries will be poor. Sowing will be delayed and more weeds will spring up in paddy crops in the June-July months.

In month of June moderate rains are beneficial to all crops and facilitate the transplanting of paddy, broadcast sowings of paddy, planting ginger, turmeric and other root crops, sowing cowpeas in coconut gardens, planting of pepper vines, coconuts and other fruit trees. Heavy rain sometimes causes floods, damaging delays in transplanting paddy. The absence or shortage of rain after transplanting paddy causes silver shoots on the paddy. Month of July, the southwest monsoon is active. heavy and continuous showers for about 25 days. Finishing up transplanting of paddy and planting of all crops. Continued rains encourage Mahali disease of areca nuts. Very heavy rain in July causes floods along the low-lying areas and river banks and damage to paddy crops. Moderately good rains are useful and facilitate all agricultural operations. August and continuous rain causes surface wash in garden lands, encourages leaf-rot disease of coconut, Mahali disease of areca nut, interferes with the flowering of paddy and formation of grains and sowing of second crop nurseries.

Moderate rains are beneficial for all crops. The absence of rain postpones the sowing of paddy for the second crop. September rains delay the harvesting and threshing of *Modan Punam* and short-duration varieties of wet paddy. Sowing of the second gingelly and horse gram in dry lands and raising of second crop nurseries. Moderate and intermittent rainfall with bright sunshine will be beneficial for all crops and agricultural operations.

October rain increases *Pollu* and the shedding of pepper spikes causes the shedding of grains and lodging of paddy, a hindrance to drying of agricultural products, produces leafy growth in gingelly and horse gram sown in dry lands, delays the progress of harvest of the first crop and the transplanting of the second crop of *paddy.* North-East monsoon rains with cloudy weather cause *Pollu* and shedding of pepper. The absence of rain interferes with the development of ginger and other root crops grown in dry lands and the second fruiting of chillies, Moderate rains are beneficial for pepper and second-crop paddy. The November month usually the moderate rains good for increasing *Pollu* and shedding of pepper. The absence of rain injurious to the second crop of paddy and root crops restricts the area under horse gram and other pulse crops, reduces the percentage of flowering and increases the leaf shedding coconut in the subsequent hot months. Retards the growth of long-duration second-crop varieties and hastens the flowering of short-duration varieties. month of December heavy unusual rains and bad for pepper and paddy. Moderates' lights rains are beneficial for all standing crops, Sowing of Kole cultivation, etc.[53]

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53 Statistical Atlas of Malabar,1940-41, p.11.

Table 4.8

Monthly Rainfall at Calicut 1881-1890

Months	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890
January	0.00	0.52	0	0	0	0	0	0	0	1
February	0.00	0	0	0	0	0.3	0.35	0	0	0.75
March	0.00	0.1	1.5	0	0	0	1	0	0	1.35
April	0.32	0.72	9.3	0.87	1.65	2	1.75	5.4	2.63	4.97
May	3.02	25.9	5.3	3.71	4.05	15.35	3	12.65	6.47	6.6
June	13.39	35.96	29.9	21.62	52.67	25.65	45.65	57.7	40.85	32.19
July	18.39	39.5	28.75	20.99	41.3	28.85	29.4	20.6	17.41	26.37
August	23.93	12.61	13.6	19.14	17.9	5.9	1.03	21.33	19.71	9.98
September	5.99	7.55	4.2	10.07	2.32	7.05	5.63	5.5	19.68	3.19
October	4.30	13.97	15.07	4.81	11.22	10.19	10.95	6.8	14.42	
November	4.89	4.56	3.78	7.47	4.45	3.04	8.2	5.1	2.6	
December	0.02	0.15	0.15	2.4	3.77	1.45	1.1	0	2	
Average	**6.19**	**11.80**	**9.30**	**7.59**	**11.61**	**8.32**	**9.01**	**11.26**	**10.48**	**9.60**
Total	**74.25**	**141.54**	**111.55**	**91.08**	**139.33**	**99.78**	**108.06**	**135.08**	**125.77**	**86.40**

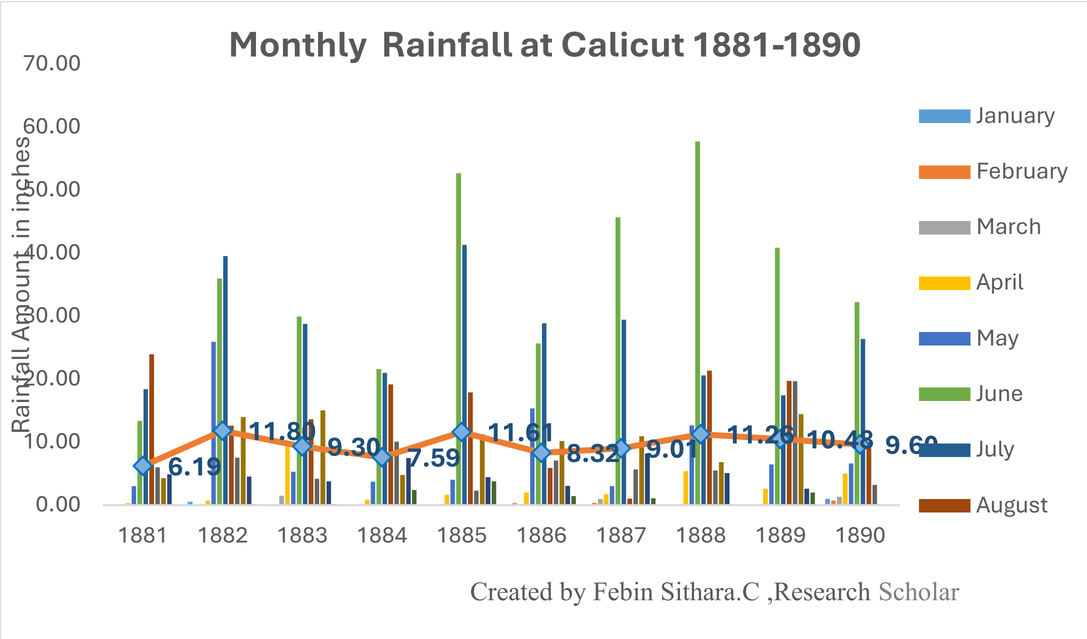
Source*: Malabar Collectorate Correspondence File, Bundle No:181, RAK.*

The table 4.8 records rainfall details of Calicut in the year 1881 to 1890. Each year except 1890 describes the details of rainfall from January to December. In the year 1890 January to September, rainfall record was marked. October to December was depicted the next 10 years rainfall records 1890-1900. Unfortunately, the file is brittle in Calicut archives. In this table the highest average rainfall (11.80) in the year 1882. The lowest average rainfall is shown in the year 1881. The meteorological registers are kept by the officers in each station.[54]

[54] The rain records of Calicut station from 16th to 31st July 1864 seen in Appendix V.C. Rainfall and Prices of the Staple Food Grains. See in Appendix V.D.

Graph 4.4

Graphical representation of monthly rainfall at Calicut .1881-1890



Monthly rainfall in the Calicut district in the years 1881-1890 is given in the figure on the above table 4.8. rainfall amounts are given in inches. The annual total is the sum of all the rainfall received in a year. The highest rainfall in the year 1888 and the average rainfall are shown in the line graph above chart. The average rainfall is shown in the pointed value.

Wayanad observations

Wayanad is a small hill district in Kerala with an area of 2131 km^2. When the State of Kerala came into being in 1956, Wayanad was part of Cannannore district. Later in 1957, South Wayanad was added to Kozhikode district and North Wayanad remained with Cannannore district. By amalgamating the North Wayanad and South Wayanad, the present Wayanad district came into being on 1st November1980, comprising three Tehsils viz. Vythiry, Mananthawady and Sulthan's Bathery. The district is also divided into three blocks- Kalpetta, Mananthawady, and Sulthan Bathery. One more block has been created in the district, namely Panamaram, includeing 5 Panchayats i.e. Kaniambetta, Mullankoly, Panamaram, Poothadi and Pulapalli. Now the district consists of four blocks namely Kalpetta, Mananthawady, Panamaram and Sulthanbathery. The district has the highest tribal population of about 1.25 lakh consisting of 17% of the total population. Even though, the term Wayanad is derived from the word *Vayal Nadu*, which means the land of paddy fields now it is famous for its spices and coffee plantations. The major crops grown here are coffee, pepper, tea, cardamom, areca nut etc. These are perennial cash crops.

Wayanad experiences a salubrious climate with a mean rainfall of 2786 mm. Lakkidi, Vythiri and Meppady are the high-rainfall experiencing areas. It is seen that the southern, southwestern and northeastern areas of the district receive more than 3000 mm of annual normal rainfall. Eastern and northeastern areas receive lesser rainfall of less than 1500 mm. Some areas bordering Karnataka state experience still lower rainfall with some areas falling under the rain shadow region. An increase in rainfall is observed towards the south, southwest and northeast. The SW and NE monsoons contribute to rainfall in the area, with 80 % of the rainfall from the SW monsoon. The month of June experiences abundant rainfall and is the wettest month. The months of July, August and October also receive heavy rainfall. The climate is generally hot and humid. March and April months are the hottest and January and February months are the coldest. The maximum temperatures range from 28.9 to 36.2°C and the minimum temperatures range from 17.0 to 23.4°C. The temperature starts rising from January and reaches a peak in March and April and then decreases during the monsoon month and again rises from September onwards.[55]

Wayanad lies on the crest of the Western Ghats it is the herald of the arrival of both monsoons (south-west and north-east monsoon). In recent years pattern of rainfall has altered much, along with reduced quantity. The Village Cess Act IV of 1864 (Madras) should be brought into force in the marginally noted eight Amsams of

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[55] *Ibid.*, p.5.

the Wayanad taluk of Malabar District. Eight Amsams of Malabar Wayanad are: - Ganapathivattom, Puthadi, Kuppalod, Ellornad, Nallurnad, Edavaga, Periya, ondarnad.

Wayanad is a high-altitude valley in Northern Kerala that is surrounded by mountain ranges and enjoys a unique local climate. Community and traditional knowledge systems are an important source for understanding the local climate experiences of people in Wayanad. The majority of people are directly dependent on nature for their livelihood but the district faces highly vulnerable climate variability, with climatic changes having profound direct and indirect impacts. The first part of this chapter discussed the traditional classification of weather, climate and seasonality and analysed meteorological data. Archival documents are used here to understand the climatic variations of Wayanad.

In the Wayanad, there are extensive plantations of coffee and tea, while at the foot of the hills in the Calicut and Ernad taluks are several valuable rubber estates. The Central part of Wayanad taluk has been denuded of forests by shifting cultivation, but there is a fringe of deciduous forest, Containing some teak, all along the eastern frontier. The Wayanad taluk lies above the Western Ghats and at its North-Eastern boundary merges imperceptibly into the Mysore plateau; the rest of the district, except two forests -Clad valleys, the Silent Valley and the Attapadi Valley, which run down from the Nilgiri plateau, lies below them.[56] In 1832, Madras observers paid attention to observations made in the hill regions of Wayanad. Such observations were registered at the Madras and Trivandrum observatories in December 1836, and January 1838. In 1832 observations were taken in the hill regions of Wynand and Coorg giving the monthly means of the barometer, thermometer, and hygrometer.

[56] Statistical Atlas of Madras Presidency, Government Press, Madras, 1924, p1.

Table 4.9

The variations in the rainfall of Wayanad from 1870 to 1919.

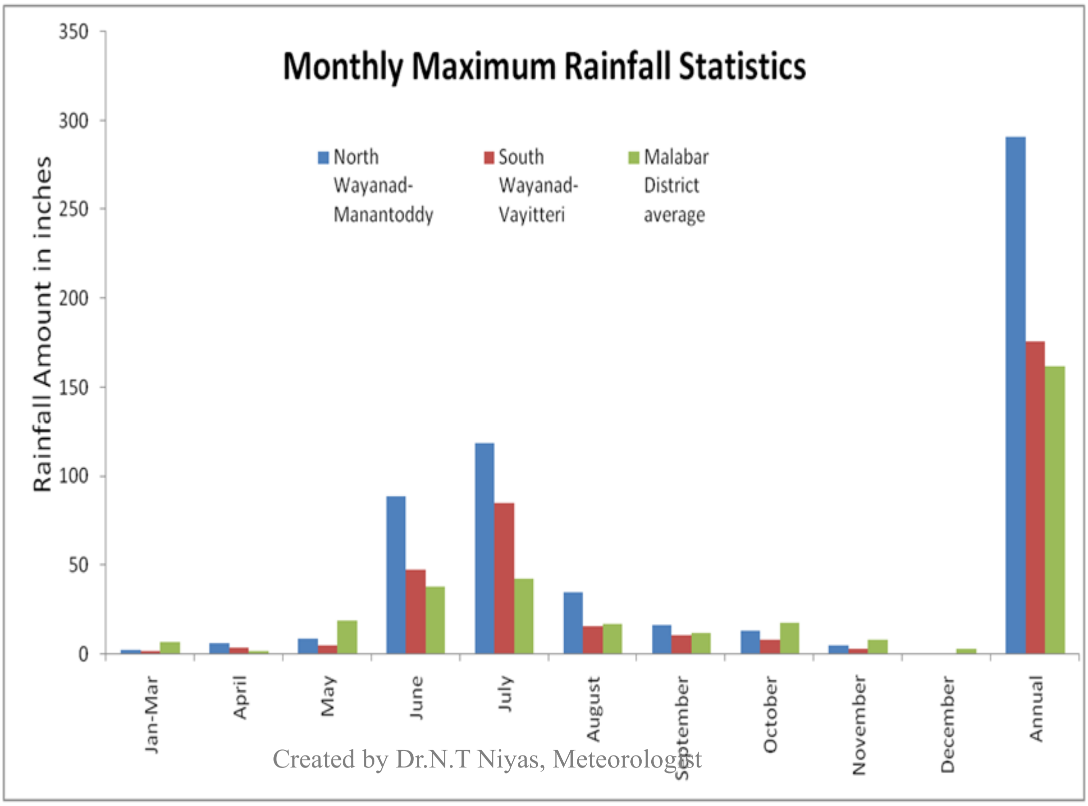
Recording Station	Year or Period	January to March	April	May	June	July	August	September	October	November	December	Total
Vayitri (South-East Wayanad)	Maximum 1882	1.94	5.76	8.16	88.56	118.2	34.35	16.34	12.7	4.52	0.2	290.73
	Maximum 1893	2.08	1.35	7.94	38.33	15.9	20.15	12.57	9	4.52	-	111.84
Manatoddy (North-Wayanad)	Avarage 1870-1919	1.81	4.23	6.8	45.73	53.74	27.67	11.36	10.82	4.72	1.13	168.01
	Maximum 1882	1.25	2.91	4.29	47.06	84.68	14.98	9.89	7.87	2.68	-	175.61
	Minimum 1918	0.03	2.47	17.74	11.07	7.4	18.48	4.14	3.84	8.2	0.24	73.61
	Avarage 1870-1919	1.49	3.28	5.18	24.66	35.94	78.98	7.33	6.48	2.64	0.55	106.53
Malabar District	Maximum 1882	6.61	0.96	18.67	37.79	41.98	16.59	11.7	17.05	7.63	2.75	161.59
	Minimum 1918	3.46	0.5	24.53	15.47	4.88	12.78	3.49	6.27	6.67	2.84	80.59
	Average 1870-1919	1.27	3.23	8.07	31.78	31.41	16.64	8.26	9.96	4.73	1.01	116.36

Source: *A Statistical Atlas of the Madras Presidency, Statistical Atlas: Malabar,* Govt. Press, Madras, 1924, pp. 24- 25, RAK.

These rain records indicate some wet days. It means when the rain is below 2.5mm , the wet days badly affected the crops, especially tea and coffee. The growth of the crops was decreased it also caused the workers to be unemployed. The owners of the estate do have not enough money to satisfy the need for workers, salaries etc. So, it badly affected the everyday life of people. The heavy rain also caused the same thing repeated everyday life of people. G.S Puri compares the average annual rainfall or seasonal variations in rainfall over small parts of the country with the type of vegetation. It seems that there is some relationship between the rainfall and vegetation.

Graph 4.5

Monthly Maximum Rainfall Statistics, Wayanad



Highest Maximum Rainfall Statistics in Monthly and Annual of South Wayanad- Vayitteri, North Wayanad-Manantoddy[57]

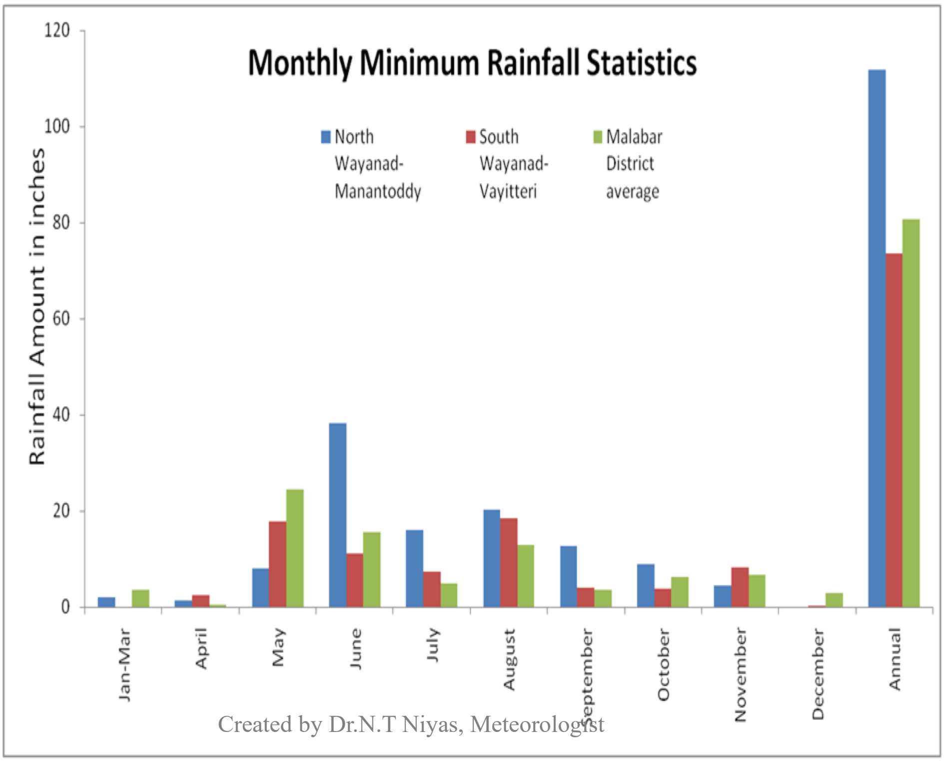
[57] The archival records Mananthavady named as Manantoddy

and Malabar District during 1870-1919.

The highest Maximum Rainfall Statistics in the Monthly and Annual of South Wayanad- Vayitteri,[58] North Wayanad-Manantoddy and Malabar District from 1870-1919 are given in graph 3.6. The highest annual rainfall of 290.73, 175.61 and 161.59 inches was received respectively at South Wayanad- Vayitteri, North Wayanad-Manantoddy and Malabar District in the year 1882.

Graph 4. 6

Monthly Minimum Rainfall Statistics, Wayanad



Lowest Minimum Rainfall Statistics in Monthly and Annual of South Wayanad- Vayitteri, North Wayanad-Manantoddy and Malabar District during 1870-1919.

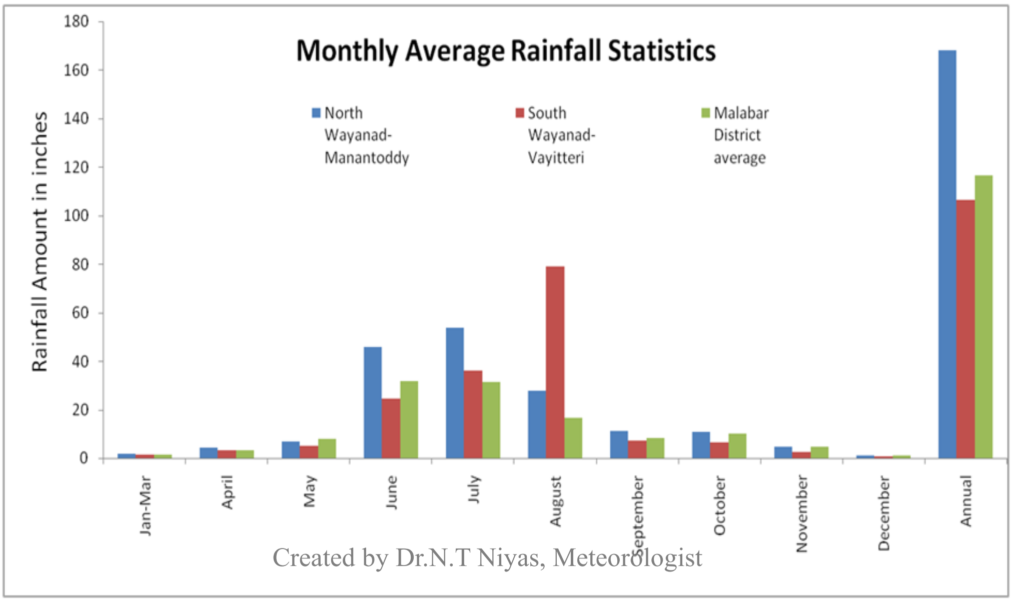
The lowest Minimum Rainfall Statistics in the Monthly and annual of South Wayanad- Vayitteri, North Wayanad-Manantoddy and Malabar District from 1870-1919 are given in graph 4.6. Rainfall amounts are given in inches. The lowest annual rainfall of 111.84, 73.61 and 80.59 inches were received respectively at South

[58] The archival records vythiri named as Vayitteri.

Wayanad- Vayitteri, North Wayanad-Manantoddy and Malabar District respectively during 1893, and 1918. The graphs depict the lowest rainfall that occurred during March, April, and January months.

Graph 4.7

Monthly Average Rainfall Statistics, Wayanad



Average Rainfall Statistics in Monthly and Annual of South Wayanad- Vayitteri, North Wayanad-Manantoddy and Malabar District during 1870-1919.

Average Rainfall Statistics in the Monthly and annual of South Wayanad-Vayitheri, North Wayanad-Manantoddy and Malabar District from 1870-1919 are given in graph:4.7. Rainfall amounts are given in inches. Each value is the average among all the respective rainfall values during 1870-1919. The highest average rainfall value of 53.74 in July, 78.98 in August and 31.78 in June was received respectively at South Wayanad- Vayitteri, North Wayanad-Manantoddy and Malabar District. The peak rainiest months are June to August for both South Wayanad-Vayitheri and North Wayanad-Manantoddy.

Wayanadu region gives lots of rainfall records from regional archives in Calicut. Through these records, we can analyse climatic variations in a particular region. Before the great flood in 1924, Wayanad witnessed one of the worst floods in

1865 and 1896. The Acting Collector Malabar mentioned that the floods in Wayanad were the heaviest in 1896 than in 1865. There were heavy Floods in Wayanad in June 1896. The District Collector Reported heavy damages to the bridges, coffee estates etc.[59]

Like Wayanadu Palakkad[60] region also contributed a bundle of rain records. The Palakkad district has a tropical climate, an oppressive hot season and plentiful and fairly assured seasonal rainfall. The hot season from March to May is followed by the southwest monsoon season from June to September. October and November from the post-monsoon or retreating monsoon season. The period from December to February is the northeast monsoon season. Although the rains stop by the end of December the rest of the period is generally dry.[61] The Western Ghats extend from the Tapti River in the Bombay presidency just south of the Sautpooras down Cape Cameron. They are only divided by the Palakkad gap, the northern section measuring 800 miles in length and the southern section 200 miles. The opposite faces of the Western Ghats, at least except their most southerly portion, differ very remarkably. To the side of the land, there is a gradual slope to the tableland or plateau proper of the Deccan. The Western Ghats are exposed to the full force of the Southwest Monsoon and rains. As a consequence, moisture on the sea face is excessive. The Palakkad gap affords a singular passage to the winds, elsewhere barred by the range. The country immediately east of this gap receives the rainfall of the southwest monsoon, and even during the northeast monsoon ships passing Beypore meet with a much stronger wind

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59 Revenue District File, Bundle No.117, SL.NO.12, RAK.

60 The Palakkad District is located very close to the central part of Kerala bordering Tamil Nadu. This hilly district is devoid of any sea coast. The district is bounded north and east by the Nilgiri and Coimbatore districts of Tamil Nadu, respectively, and West and South by the Malappuram and Thrissur Districts of Kerala. The Palakkad District is politically divided into five tahsils (taluks) namely Palakkad, Mannarkad, Chittoor, Alathoor, and Ottapalam. See., in, Bijumon Varghese, *The Tribes of Palakkad, Kerala A Sociolinguistic Profile*, SIL International, 2015, p.1.

61 Dr . C.K Kareem, *Kerala District Gazetteers,* Trivandrum, 1976, p.10.

from the land than is felt elsewhere along the coast.[62] The Palakkad District is predominantly an agricultural area. The main crop is paddy, which is grown in three seasons. Palakkad, the largest producer of rice in Kerala, is known as the granary of the state. Other important crops include sugarcane, groundnut, areca nut, cotton, rubber, cardamom, and coffee.[63] Palghat District experiences four main weather seasons throughout the year.

Table 4.10

The different seasons in Palakkad District

Section of district	Dry weather	Hot weather	Southwest monsoon	North-east monsoon	Annual total
Palghat	1.76	6.09	56.34	14.51	78.7
District Average	1.15	9.11	88.69	17.57	116.52

Source: *Malabar District Gazetteer*

Table 4.10 shows four different seasons the dry weather season, hot weather season, Southwest monsoon, and Northeast monsoon**.** Palakkad experiences very little rainfall during the dry weather season, with only 1.76 mm of rain, and a slight increase during the hot weather season at 6.09 mm. The majority of rainfall occurs during the southwest monsoon, with 56.34 mm, followed by 14.51 mm in the northeast monsoon. The annual total rainfall for Palakkad is 78.7 mm. In comparison, the district average shows higher rainfall in all seasons, with 1.15 mm during dry weather, 9.11 mm in the hot season, a much higher 88.69 mm during the southwest monsoon, and 17.57 mm in the northeast monsoon, adding up to an annual total of 116.52 mm. This shows that Palakkad receives significantly less rainfall than the district average, especially during the monsoon seasons. Based on the table 3.10 researcher created one graphs of

62 *Manual of the Administration of the Madras Presidency,* Vol.II, E. Keys Government Press, Madras,1885, pp.1-2.

63 Biju Mon Varghese, *op.cit*., p.1.

seasonal and annual rainfall statistics with the help of Dr. N.T. Niyas, a scientist and Meteorologist of the Trivandrum observatory.[64]

This session examines the general rainfall pattern in the Palakkad plains using the historical rainfall data available at six rain–gauge stations located at Alathur, Palakkad, Mankara or Parli, Ottapalam, Cherupulcherry, and Mannarkkad. The Table Variations of the Rainfall in Inches from 1870 to 1919 available in Kozhikode regional archives.[65] Based on the table researcher created a graph of monthly maximum rainfall statistics, monthly minimum rainfall statistics and monthly average rainfall statistics.[66]

Monsoon in War Experiences

Warfare on water and in the air is especially dependent on climate and Season. From the past decades, we can understand that climatic influences can never be excluded, even if the technical means are highly developed. Knowledge of the climate is necessary on the battlefield to understand the landscape and environment of the region. Monsoons played an important role in the hindrances to the coming of invaders to India. For example, in history, the spring of 328 B. C., Alexander the Great crossed over the Indus and in the summer the Jhelum River. However, the greatest military leader of antiquity was mastered by the Indian monsoon and was obliged to stop his victorious march. The SW monsoon prevented him from following his divine ancestors Heracles and Dionysos into the fabulous country of India. A climatic phenomenon delimited the first world empire in history.[67] The strategy in water and air has to be adapted to climatic conditions. Even modern steamers and aircraft are

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[64] See in appendix VI. A.

[65] See in Appendix VI.B.

[66] Seen in Appendix VI.C, Appendix VI.D, Appendix VI.E.

[67] V. Conrad, *War Climatology,* Bulletin American Meteorological Society, Vol.23,1942, p.217.

dependent upon the velocity of the wind. The situation of an individual battle is influenced to a high degree by the wind direction relative to the position of the opposing forces. The behavior of temperature with height is of special importance for the stability of aircraft. Steamers and planes are dependent upon visibility, especially in fog. Ships of every sort are endangered by icebergs.[68] The incidences of the war are closely connected with climate and weather, despite technical developments. Unfavorable climatic conditions affect the attacker more than the defender, especially in the war on land.[69]

The British administration in Malabar was deeply affected by warfare and the region's monsoon climate, creating a unique set of challenges that shaped their colonial policies and military strategies. The Malabar district experiences heavy and extended southwest monsoon rains, creating severe practical difficulties for military operations. The dense tropical forests of the Western Ghats, joined with cloudy and flooded roads, made troop movements, supply lines, and communication nearly impossible. The heavy rains led to many problems on battlefields and caused ammunition and gunpowder to become damp and ineffective. Heavy rains badly affected food supplies for the soldiers, which disrupted local agriculture and transportation. The British faced strong resistance from indigenous forces, particularly Pazhassi Raja, who used guerrilla warfare tactics. The Madras Government was very much bothered about the shelter of the soldiers. The Collector suggests the expediency of establishing Comfortable quarters in Wynand to accommodate the native battalions in case any reinforcement should be sent to that district during the rainy season.[70] Upon the representation of the Commander-in-Chief of the severe effects which continue to be experienced by the troops stationed in the Wayanad from the climate

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68 *Ibid.,* p.219.

69 *Ibid.*

70 Madras Secretariate File, Vol.2326,1/4/1806.

of that district, the Government intend to withdraw the whole of the soldiers if possible and accordingly desires the Collector to state his opinion as to the practicability of entrusting the defense of that country to a detachment from the Kolkar Crops.[71]

The prices obtained in different parts of the district vary so considerably that it is impossible to form one general average from them. Indeed, establishing such an Average price for the whole of Malabar would cause a wide inequality of loss and gain for the manufacturers. It, therefore, appears to him advisable to fix the average price of each division of the district as the price that the government should pay to the manufacturers in that division. He does not comprehend any decrease in the demand for salt or in the manufacturers' receipt of his measure. He moreover, recommends a remission of the land revenue or compensation to be granted to them in unfavorable seasons.[72]The British government helped to arrange better shelter for the troops in the Payazhi revolt. The Officer Commanding the forces in Mysore is directed to issue orders for the construction of temporary buildings in Wayanad for the protection of the troops from the indemnity of the weather during the southwest monsoon.[73]

The rainfall records from Malabar helped to re-constructing agrarian and climatic variations of Malabar. The distribution and intensity of rain vary with this may cause challenges like landslides soil erosion and flood etc. The establishment of meteorological department helped to integrate scientific monitoring of rainfall, and predicts natural calamities.

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[71] Madras Secretariate File, Vol.2245,6/11/1806.

[72] Madras Secretariate File, Vol.2327, 24/06/1806.

[73] Madras Secretariate File, Vol.2243,11/04/1806.

CHAPTER 5

RAIN FEARS: THE FLOOD NARRATIVES AND THE ANTHROPOCENE FUTURE

The previous chapter discussed the relationship between colonialism, scientific knowledge, and evolving human-nature interactions in modern South Asia, focusing on the Malabar region. This chapter primarily examines the great flood of 1924, the flood of 1961, and the flood of 2018, along with other significant contemporary natural disasters, analysing their immediate and long-term impact on affected communities. It explores how people handled these calamities, gradually rebuilding their lives and restoring a sense of normality. Monsoons have influenced the history of modern humans and climate change for hundreds of thousands and even millions of years, helping shape our species evolution. Multiple factors were influenced by human evolution, as well as all human prehistory and history. Just as history is not determined by politics, economics, culture, or religion, neither is a specific historical outcome predetermined by climate change. However, climate change was a pivotal driving force for human evolution. Recent environmental history scholarship examines the effects of climate change, monsoon patterns, and flood risks, particularly in the context of the growing frequency of natural disasters. Droughts, floods, cyclones, landslides, tsunamis, and earthquakes are the major types of disaster phenomena occurring in our country. Almost all parts of India experience one or more of these disasters. The occurrence of floods is a natural phenomenon, and man had to live with it since the very beginning. Many parts of India have experienced flooding for ages. Special consideration is given to the government's side in post-disaster recovery, with a critical assessment of major relief efforts and formal responses aimed at mitigating the socio-economic and cultural consequences of such events.

In the early 2000s, geologists began rethinking the 19th-century geological timeline, suggesting that Earth may have moved beyond the Holocene epoch and entered a new, human-driven era known as the Anthropocene. This concept highlights the profound impact of human activity on the planet's systems, including global warming, ocean acidification, biodiversity loss, freshwater scarcity, and the rising seasonal variations. As the idea gained traction, universities around the world introduced it into their curricula, sparking debates across disciplines. Within the growing field of global environmental history, the Anthropocene became a lens through which to examine the historical roots of the climate crisis. These new courses encouraged students and scholars to develop historical perspectives on urgent societal issues linked to climate change, while historians engaged in discussions about how adopting the term "Anthropocene" could reshape historical interpretation and writing.[1]

The Anthropocene concept can be seen in the writings of modern environmental historians. Climate forecasts must deliver early warnings for food, water, energy, health, transportation, and long-term predictions at society-relevant timescales of a few years to a decade. According to Ranjan Chakrabarti in his work *Climate Calamity and the Wild: An Environmental History of the Bengal Delta, C.1737-1947*, the Bengal Delta is well known as one of the most climatically weak zones of the world. It has a rich history of super-cyclones along the Bay of Bengal coast and is prone to severe thunderstorms, rising sea levels, high tides, and floods. The people here live in the floodplains or sandbars (*chars*) amid a fragile environment. In coastal areas, devastating storms also resulted in the loss of life, property, livestock,

[1] Justin Mathwe, 'Capitalism, Climate Crises, and methodological challenges in Environmental History', *Economic and political Weekly*, Vol.58, Issue.28,15th July 2023.

human settlements and wildlife.[2] Dipesh Chakrabarty, in his book *The Climate of History in a Planetary Age (2021)*, argues that historians may have to revise many of their fundamental assumptions and methodologies in this period of human-induced climate change. Chakrabarty observes the following in the opening sentences of the above work. 'If Hegel-a self-declared admirer of Spinoza, were alive to plumb the depths of our sense of the present, he would notice something imperceptibly but inexorably seeping into the everyday historical consciousness of those who consume their daily diet of news: an awareness of the planet and its geobiological history. This is not happening everywhere at the same pace, for the global world remains undeniably uneven. The current pandemic, the rise of authoritarian, racist, and xenophobic regimes across the globe, and discussions of renewable energy, fossil fuel, climate change, extreme weather events, water shortage, loss of biodiversity, the Anthropocene, and so on, all signal to us, however vaguely, the something is amiss with our planet and that this may have to do with human actions.'[3]

Climate change occurred in several forms during the period of human evolution. Human ancestors evolved during a period of general cooling. Within Africa, the opening of the Great rift valley led to increasing aridity in East Africa, where most hominin species originated. Cycles of glaciation, often called ice ages, gradually affected habitats starting 2.58 million years ago during the Quaternary period. These glaciation cycles periodically shifted or moved the habitats in which our human ancestors lived. All these climatic tendencies influenced human ancestors' evolution, and the glacial cycles played a significant role in the distribution of human

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2 Ranjan Chakrabarthy, *Climate, Calamity and the Wild: An Environmental History of the Bengal Delta, C.1737-1947,* Primus Books, Delhi, 2022, p.10.

3 *Ibid.*, p.1; Dibesh Chakrabarty, *The Climate of History in a Planetary Age*, The University of Chicago Press, London, 2021, p.1.

forebears and ultimately of humans.[4] Climate change is not just a natural phenomenon. It is a social, economic, geopolitical, and national security problem, besides being an ethical and justice issue.[5] Weather and climate forecasts must deliver early warnings for food, water, energy, health, and transportation, and long-term predictions at society-relevant timescales of a few years to a decade. India's dream of continued economic growth cannot be achieved without climate tools to navigate the future.[6]

India is in a great position to advance the IPCC projection enterprise and focus on participating in the global annual to decadal climate update project under the World Meteorological Organisation. The investments funded in improving weather, climate, and cyclone forecasts have yielded valuable improvements.[7] Weather and climate are two different terms, but people use them for the same phenomenon, without realizing the differences between them. The weather is defined by measuring certain atmospheric parameters such as temperature, humidity, rainfall, clouds, sunshine, etc., at a particular time.[8] Climate is an abstract concept, and it represents the total of all the atmospheric phenomena at a place over a specific period in a year. The climate of a place in a particular month or season is based on the observed weather data of that place for the last many years.[9] Natural hazards are extreme events, and disasters are potential risks to these events. Human civilization gradually spread out and flourished near riverbanks. With increasing population and economic development, more and more of the floodplains were occupied. This interfered with the natural drainage due

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4 Benjamin Lieberman and Elizabeth Gordon, *Climatic Change in Human History: Pré History to the Present*, Bloomsbury Academic, London,2022, pp.11-12.

5 Raghu Murtugudde, 'Is IPCC the Answer to the Climate Crisis', *Frontline*,8, September 2023, p.83.

6 *Ibid.*, pp.83-84.

7 *Ibid.,* p.85.

8 Sushil Kumar Dash, *Climate Change: An Indian Perspective,* Cambridge University Press India Pvt. Ltd, New Delhi, 2007, p.9.

9 *Ibid.,* p.10.

to the construction of roads and railways, and indiscriminate occupation of floodplains led to the adverse effect of floods being felt significantly.[10] The primary cause of all floods in India is heavy and concentrated rainfall. June to September is the rainiest time of the year for most parts of the country. The Southwest monsoon sets in towards the end of May and is established all over the country by the end of June. The principal feature of this season is a heat of low pressure which forms in the north Bay of Bengal and moves in a westerly direction across the country, giving heavy rainfall. The intensity and degree of monsoon rainfall vary from year to year. The monsoon may settle late, with many breaks during July or August; there may be less rainfall or withdrawal early. October-November is a transition period. The weather is fine over India, except in the Deccan Peninsula, which receives significant rainfall during these months.[11]

India's annual monsoon rains have become more erratic, resulting in severe drought and devastating flooding. There are so many natural disasters that occur in India, resulting from climate change. During the contemporary period in 2016, more than 330 million Indians suffered drought, which followed two years of weak monsoons. This badly affected the everyday lives of people in rural areas where crops were destroyed and livestock's access to water dried up. In November 2015, Chennai experienced the heaviest rainfall in a century, which caused huge flooding and killed more than 300 people. In August 2016, a flood occurred in Ganges, resulting in the displacement of thousands of people and killing 150. In August 2017, in Mumbai, a

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10 Dr. G. J. Sudhakar, 'Flooding India with Special Reference to Chennai Floods-2015', in Dr. S. Aruldoss, (ed.), *Indian Historical Studies*, Vol. XIV (2), April 2018, p.14.

11 *Ibid.,* pp.14-15.

huge amount of rain occurred, which stupefied the city after as much rain fell in twelve hours as usual during the twelve days of a typical monsoon.[12]

Climate change is influenced by every person around the world. However, these consequences are not being experienced evenly, and certain individuals are distinctively affected. These individuals confront social, economic, cultural, and political inequalities, and they live in coastal areas.[13] During the 21st century emerging challenges of the disasters caused the climate change. Disasters like landslides, and floods are the most common natural disasters that affect human society and the economy. The high intensity of rain cause flooding, which has become common in India. India witnessed some of the most unprecedented extreme precipitation events that caused flooding and loss of lives in the recent past. During 2018 and 2019 marked widespread flooding in Kerala exemplify the enormity of extreme rainfall and large-scale floods in India. These natural calamities have caused serious destruction to the biodiversity of most of the natural habitats in Kerala.[14]

The Twentieth Century Flood Narratives: 1924 catastrophic

The year 1924[15] witnessed unparalleled and heavy floods in almost all rivers of Kerala. It caused heavy losses of life, property, crops, etc. Heavy floods badly affected every aspect of people's lives. The 16th-18th July 1924 rainstorm was caused by the Southwest monsoon that extended to the south of the peninsula on 15th July and

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12 Mira Kamdar, *India in the 21st Century: what Everyone Needs to Know,* Oxford University Press, New Delhi, 2018, p.212.

13 Sam Sellers, *Gender and Climate Change: A Closer Look at Existing Evidence,* OAK Foundation, 2016, p.4.

14 Aswini V.J, *Studies on Angiosperm Flora and Biomonitoring of Walayar Hill Ranges of Southern Western Ghats, Kerala, India,* Unpublished PhD Thesis, University of Calicut,2023, pp.50-51.

15 The Flood Occurred in 1924 according to the Gregorian Calander. However, as Kerala followed the Malayalam Calendar according to which it was 1099 at the time, the flood is called *Thonnoottu Onpathile Vellapokkam* (flood of 99) and the Great Flood.

caused rainfall in Malabar. Under its influence, heavy rainfall occurred in almost all parts of Kerala. The wrath of the 1924 flood levels in most of the rivers was still fresh in the memory of the people of Kerala.[16]

'The Great Flood of Travancore 1924' is an MPhil thesis by Meenu Jacob, which she completed by recollecting the memories of old people who witnessed it. She mainly concentrated on how the flood affected the areas of Travancore and the Munnar high ranges. *Deepika,* the century-old Malayalam newspaper in kerala, quoted several accounts by local correspondents about the Great Flood story of 1924. It was mentioned that 'Ernakulam, Ponjikkara, Venduruthi, Njarakkal were flooded within no time, the Broadway grounds in Ernakulam became an ocean, and instantly boats conquered the streets of Ernakulam, bridges being washed away, and transport being disrupted. The rail bridges at Chovvara, Edappally, Aluva, and Chalakkudy had water flowing over them that could let a boat pass through. They added that 'all high places on land were brimming with refugees.[17]

Bodies were seen floating, and 'water rose to three feet in the night, and the salt and sugar stocked in Travancore's main trading center of Alappuzha all dissolved and disappeared'. Many refugee camps were flooded, the reports said that at Manimala, Mundakkayom, 'houses were tied to trees with ropes' and '150 buildings floated within two hours. Accounts also narrated about men and elephants flowing by, of carcasses of elephants; a live tiger, and a leopard being washed down from the forests.[18] These are some examples of the destruction of the great flood of 1924 in

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16 *Ibid.,* p.2.

17 Almost 8,000 refugees had gathered in 'Thiruvalla, Tirumoolapuram, Tookalasseri in two days.

18 Rejimon Kuttappan, *Rowing Between the Rooftops: The Heroic Fishermen of the Kerala Floods,* Speaking Tiger Publishing Pvt. Ltd, Ansari Road Daryaganj, New Delhi, 2019, pp.17-19.

Travancore and central Malabar. The studies related to the 1924 floods are mostly associated with the Travancore region. Of these, only the studies are based on the literature and the experiences of those who were victims of the floods. However, very few studies are based on archival records, especially on how the 1924 floods affected the lives of the people of Malabar. All the findings of the researcher are based on archival records and newspaper reports. Like Travancore, the 1924 flood also affected the Malabar region. The Malabar Collector sent several telegrams to the Chief Secretary (Government of Madras) to report serious cyclonic disturbances affecting the everyday life of people in Malabar. The storm began at about midnight on the 10th-11th of 1924 and lasted, with a daybreak, until about 8 a.m. On the 11th the storm heavily affected the coastal areas from Badagara to Cannanore. In this coastal area, a huge number of trees were uprooted and smashed, and thatched roofs were blown away. Some houses were damaged by the fall of trees. Tellicherry town and its neighbourhood traffic were completely disorganized by fallen trees, and telegraphic communication was interrupted for two days. The temporary bridge at Iritty was washed away, and communication with Coorg was again interrupted. The rainfall recorded in Tellicherry during the period of the storm was 7.35 inches, and in Badagara, 6.20 inches. At sea, the course of the storm appears to have been northerly or northwesterly and to have extended from Cochin to Cannanore. The center of the storm seems to have been in the latitude of Tellicherry, and it was in that part of the coast that most of the casualties occurred. Survivors reported[19] that their boats were lifted forcibly from the sea in a whirlwind and dashed again into the water. Sailing craft played a major role in rescue activities. In the 2018 flood in Kerala, the community of fishermen played a major role in the rescue activities. Collective actions

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[19] The reports show that 83 boats were damaged, and 187 men are missing at Ponnani Taluk alone. From the Kottayam Taluk 40 boats and 82 men are missing and from the Chirakkal Taluk 4 boats and 7 men are missing. See., in, *The Malabar District Collectorate Files,* GO. NO.136,20.01.1926, RAK.

emerged impulsively in the flood-affected areas, particularly amongst the coastal communities, to survive and cope with this disaster. The fishermen's community had expertise in seafaring in all weather conditions. These poor and marginalized fishermen communities met the expenses of hiring trucks that would transport their boats to flood-affected areas. They reached out to the worst-affected areas far away from their native places with their mechanized boats and fuel, in trucks, with day and night operations.[20] The same rescue operations were observed in the 1924 flood, also. The community of fishermen played a significant role In rescue activities.[21]

> *"The total number of men who were at sea on the night of 10-11-1925 and are still not accounted for is 266, or 187, as stated, are fishermen. The rescues have already been reported from remote places, and rumour has it that some shipwrecked persons have landed at Colombo. The government had established that all the port's cautionary signals were hoisted from the seventh to the ninth and warning signals from the ninth to the thirteenth of November, and that the fishermen who went to see at those ports did so either despite the signals or in ignorance of them. It appears that many fishermen do not even know the significance of these signals. So, the Madras government suggested to the director of fisheries that his subordinate officers should make a special effort to explain to fishermen the meaning of the various port signals.[22]"*

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20 Joice K. Joseph, Dev Anand, P. Prajeesh, et, al, 'Community Resilience Mechanism in an Unexpected Extreme Weather Event: An Analysis of Kerala Floods of 2018 India', *International Journal of Disaster Risk Reduction*, Vol. 49, October 2020.

21 S.S Jalavayaji named ship rescue 4 men and the S.S Philadelphia named ship rescued 5 men and took them Mangalore.

22 *Malabar District Collectorate Files,* GO. NO.136,20.01.1926, RAK.

In Cannanore, the local merchants and boat owners assisted the boatmen, who partook in the activities of rescue, with food, clothes, and money. Rescued people were immediately taken to the hospital, and only one death occurred among the rescued. In Tellichery, a public meeting was held, and about Rs. 280 were collected for the relief of distress.[23] In the Kottayam taluk, approximately 100 families left their relatives or lost their families. The government of Madras issued instructions to the divisional officers to carry on the work of distributing money grants for the people appointed by voluntary agencies to assist officers in the work.

The Madras government organized a relief system for flood victims, and the government provided new boats and nets to survivors. A public meeting was held in Calicut to raise funds and implement more permanent relief activities for the flood-affected region.[24] The Malabar floods relief committee was established to help flood-affected people.

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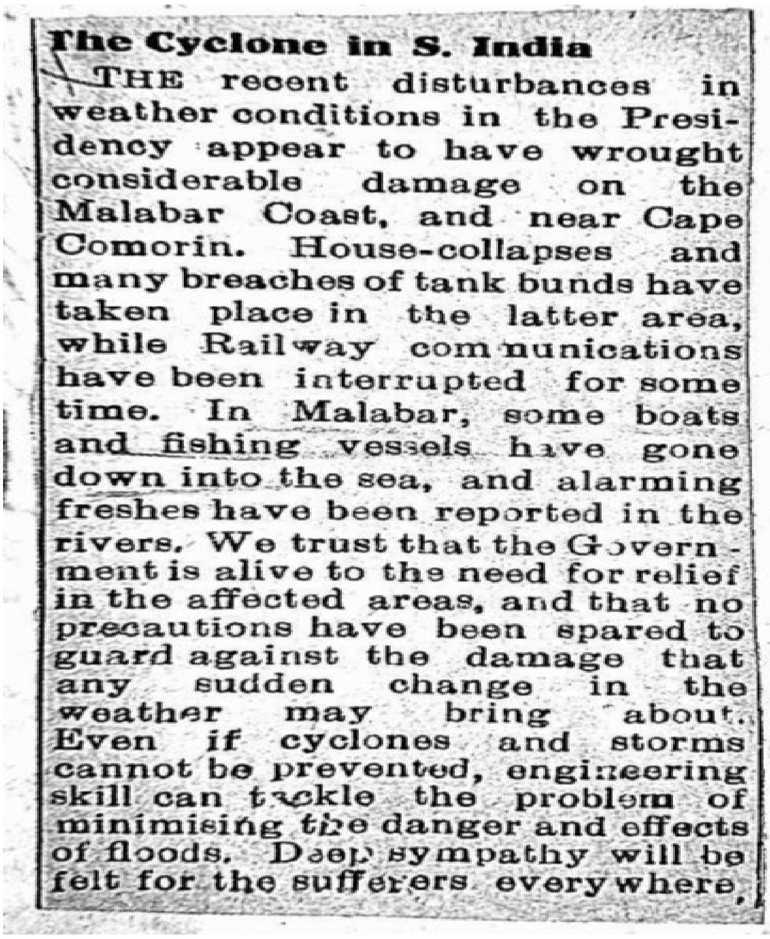
[23] Subsequently the working committee of the Malabar Floods Relief Committee collected Rs. 2,000 for relief work. see in, Malabar District Collectorate Files, GO. NO.136,20.01.1926.

[24] *Ibid.*

Figure 5.1

The Cyclone in South India



The Cyclone in S. India

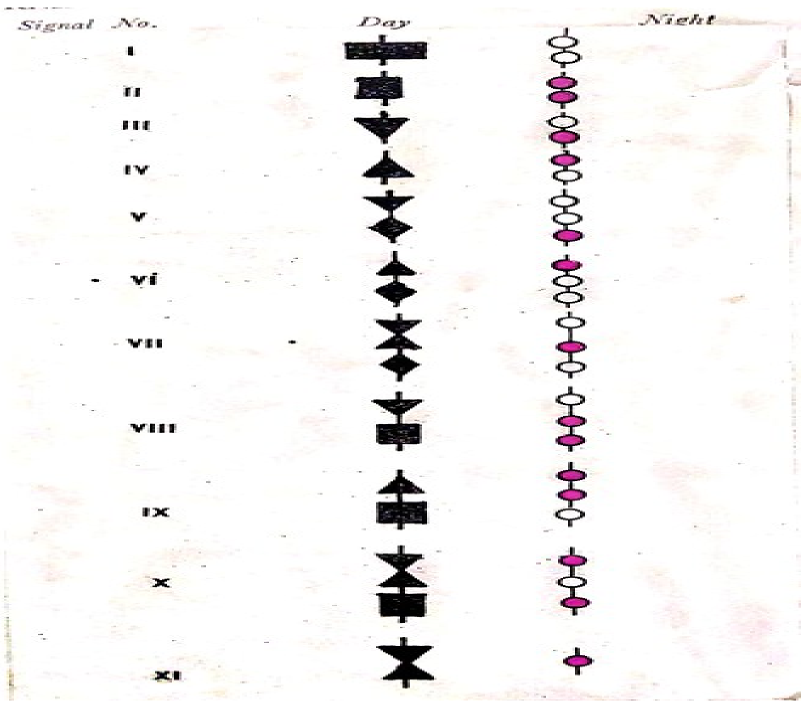
THE recent disturbances in weather conditions in the Presidency appear to have wrought considerable damage on the Malabar Coast, and near Cape Comorin. House-collapses and many breaches of tank bunds have taken place in the latter area, while Railway communications have been interrupted for some time. In Malabar, some boats and fishing vessels have gone down into the sea, and alarming freshes have been reported in the rivers. We trust that the Government is alive to the need for relief in the affected areas, and that no precautions have been spared to guard against the damage that any sudden change in the weather may bring about. Even if cyclones and storms cannot be prevented, engineering skill can tackle the problem of minimising the danger and effects of floods. Deep sympathy will be felt for the sufferers everywhere.

Source*: Malabar District Collectorate Files, GO. NO.136,20.01.1926, RAK.*

The archival documents describe cyclones that occurred in South India. The Malabar coast and the area around Cape Comorin seem to have suffered significant damage because of the recent weather disruptions in the Presidency of Malabar. Numerous tank bund breaches and house collapses occurred, and railway communications were disrupted for a long period.

Figure 5.2

Visual storm warning signals



Source: *Cyclone plan for Kerala, the government press, Ernakulam,1980, RAE*

Squally weather is meant to cover occasional, frequent squalls with rain or a persistent type of strong qusty winds (mean wind speed not less than 20 knots) accompanied by rain. Such conditions are associated with low-pressure systems or onsets and strengthening monsoons. Mean wind speeds exceeding 33 knots[25] associated with cyclonic storms are generally covered by signs higher than LC-III. The word generally has been added to permit hoisting of LC-III at ports outside the inner storm area where wind speeds may exceed 33 knots. The officers are created monthly wise tracks of cyclonic storms of month January to December.[26]

In Malabar, some boats and fishing vessels went down into the sea, and a dangerous flush of water was reported in the rivers. The Government introduced many

[25] 33 knots is a measurement of speed, often used in aviation and maritime contexts.

[26] Seen in the Appendix VII.

relief activities in flood-affected areas, and every precaution was taken to prevent the damage that any abrupt change in the weather may cause. The 1924 flood highly affected the area was the South Canara District in Kasargod Taluk, Hosdrug Division. The government has submitted a detailed report of the damage that occurred in the flood. This report was sent by K. Ramavarmaraja (Deputy Tahsildar of Hosdurg to the Collector of South Canara, Mangalore.

In 1924, there were heavy rains in these parts as a result of which the Ariakadav river overflowed the banks to a height of about 6 feet and a distance of about 100 yards from the banks. Consequently, many houses along the banks of the river collapsed. A rough estimate of the loss gathered from inquiries is given below: -

Table 5.1

The Number of houses destroyed in the 1921 flood in Kasargod Taluk.

Title	No. of houses destroyed
West Eleri	20 of which 9 are tiled ones.
Podavur in Kayyur	23
Mayyil in Kayyur	20
Cherukorn in Kayyur	20
Kizhinale in Karindala	20
Chimmeni	17
	120

Source: *Malabar District Collectorate Files, GO. NO. 1404,17.9.1923, RAK.*

> *Most of the houses destroyed are thatched huts built with mud. There has been no loss of life. But articles have been washed away from the houses. A few houses in Padnna and Kinnaur have also collapsed. Yesterday and the day before yesterday, there was not much rain, and so the water had gone down almost to the level of the bank*

in the upper courses of the river. where the damage has been heavier. Crops have not been damaged to an appreciable extent. After further inquiry, a further report will be submitted.[27]

Natural calamities also caused food shortages, leading to reduced food production, increasing the prices of goods, and making it difficult for people to buy food. In extreme cases, a food shortage can lead to starvation and famine. Floods are the most prevalent natural calamities confronting nations regardless of their state of development. In earlier times onwards the threat of floods caused many problems all over the world. Floods have a devastating effect on lifestyle as well as critical assets. Moreover, the relationship between flooding and good security took center stage in global environmental and socioeconomic discourses.[28] For centuries, widespread famine in several regions of the Indian subcontinent resulted in diseases, epidemics, and an excessively large number of mortalities. The Malabar district of the Madras presidency under british rule had also confronted constant food shortages.[29]

The 1924 flood also affected food shortages in the Malabar area, so the Malabar collector sent a telegram to the Madras government to help meet the livelihood. The madras government send continuous letters seeking help to british Government to overcome their destructions.[30] This letter indicates that the rice stock is getting low, and merchants are importing the rice at a high price. The Collector

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27 Malabar District Collectorate Files, GO. NO. 1404,17.9.1923, RAK.

28 D. Danjibo Nathaniel, Adeoye Adesoji E. and Ojo Oladayo S, 'The Relationship Between Flooding and Food Security in Kogi State', *African Journal of Environment and Natural Science Research*, Vol. 2, Issue 2, 2019, p.31.

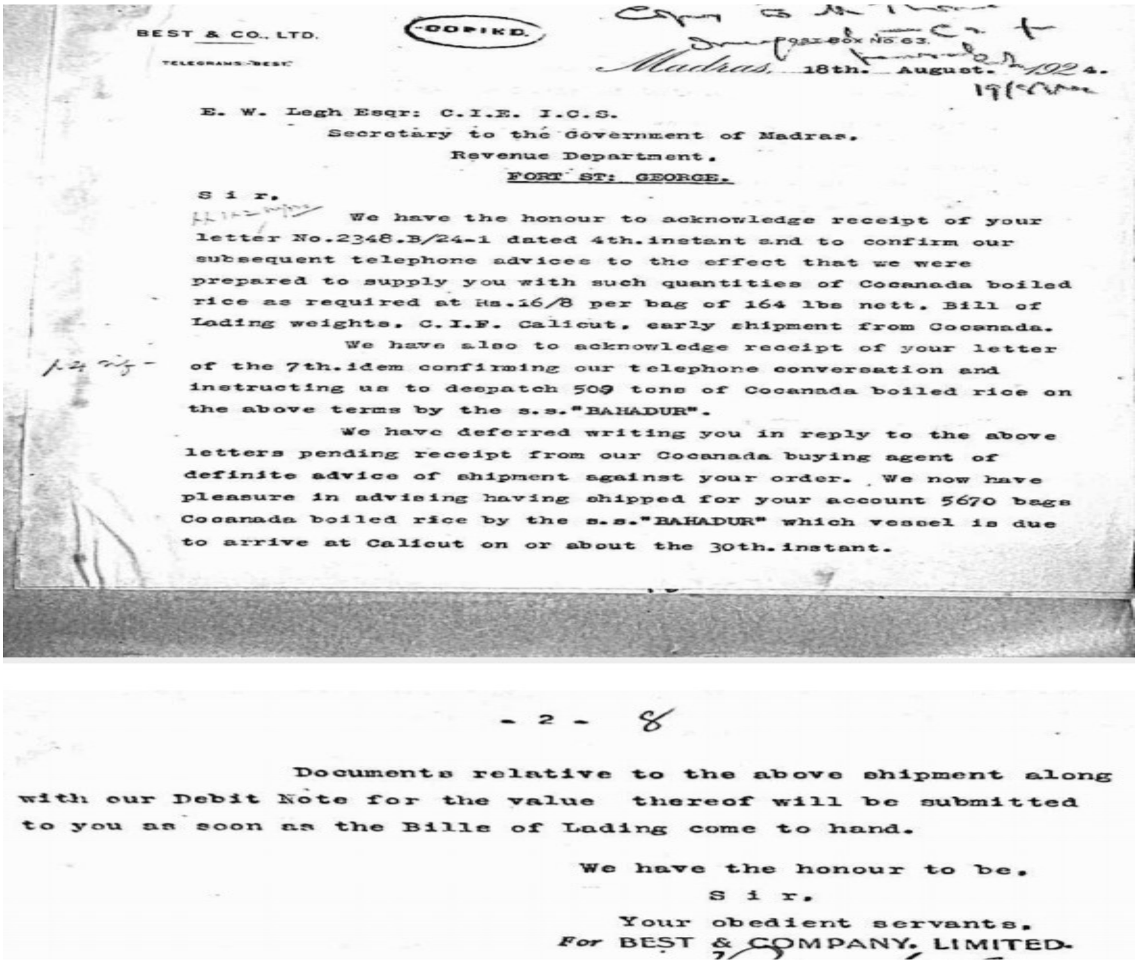
29 M. Raghavan, *State* Failure *and Human Miseries: A Study with Special Focus on Famines in British Malabar,* Kalpaz Publications, New Delhi, 2016, p.19.

30 See in Appendix VIII.

suggests the possibility of arranging imports through a reliable firm such as yours and selling them by official depots at reasonable rates.[31]

Figure 5.3

The figure showing the import of Cocanada boiled rice[32]



BEST & CO., LTD.

TELEGRAMS "BEST"

COPIED

Madras, 18th. August. 1924.

E. W. Legh Esqr: C.I.E. I.C.S.
Secretary to the Government of Madras.
Revenue Department.
FORT ST: GEORGE.

Sir,

We have the honour to acknowledge receipt of your letter No.2348.B/24-1 dated 4th.instant and to confirm our subsequent telephone advices to the effect that we were prepared to supply you with such quantities of Cocanada boiled rice as required at Rs.16/8 per bag of 164 lbs nett. Bill of Lading weights. C.I.F. Calicut. early shipment from Cocanada.

We have also to acknowledge receipt of your letter of the 7th.idem confirming our telephone conversation and instructing us to despatch 509 tons of Cocanada boiled rice on the above terms by the s.s."BAHADUR".

We have deferred writing you in reply to the above letters pending receipt from our Cocanada buying agent of definite advice of shipment against your order. We now have pleasure in advising having shipped for your account 5670 bags Cocanada boiled rice by the s.s."BAHADUR" which vessel is due to arrive at Calicut on or about the 30th.instant.

- 2 - 8

Documents relative to the above shipment along with our Debit Note for the value thereof will be submitted to you as soon as the Bills of Lading come to hand.

We have the honour to be.
Sir.
Your obedient servants.
For BEST & COMPANY, LIMITED.

Source*: Malabar District Collectorate Files, GO. NO.1391,10.09.1924, RAK.*

Figure 5.3 shows a replay of the Telegram the secretary to the government of madras sent a letter to the Malabar collector promising to import Cocanada boiled rice to satisfy the hunger of the people in Malabar. The Madras government also supplied

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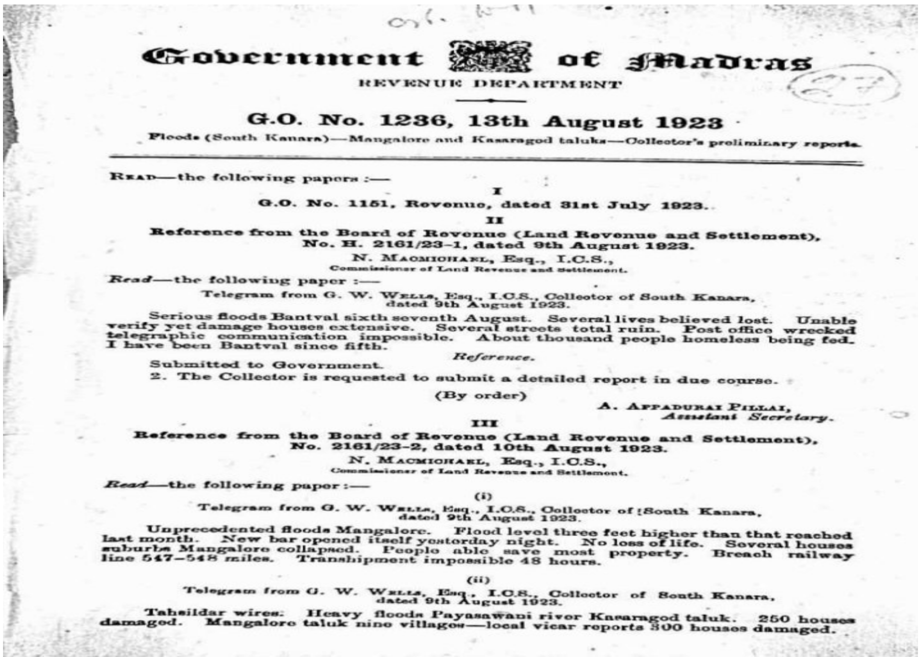
31 Malabar District Collectorate Files, GO. NO.1391,10.09.1924, RAK.

32 Some kind of rice Kakinada in Andra Pradesh.

509 tons of Cocanada boiled rice imported with the S.S. Bahadur steamship.[33] Before the flood of 1924, Malabar got rice by sea and rail from Kolkatta, Rangoon, Karachi, and Cocanada. However, due to the destruction of railway lines, rice imports were temporarily stopped in malabar. There was a running passenger train, only one or two trains each day as far as Tirur. So, the people were entirely dependent on steamers. In the monsoon season, it was very difficult to depend only on steamers because huge waves destroyed steamers. Thus, stocks are short, which also affects the everyday activities of people in Malabar.

Figure 5.4

Telegram from the Collector G.W. Wells, I.C.S., South Canara district to the Madras Government



Government of Madras

REVENUE DEPARTMENT

G.O. No. 1236, 13th August 1923

Floods (South Kanara)—Mangalore and Kasaragod taluks—Collector's preliminary reports.

READ—the following papers :—

I

G.O. No. 1151, Revenue, dated 31st July 1923.

II

Reference from the Board of Revenue (Land Revenue and Settlement), No. H. 2161/23-1, dated 9th August 1923.

N. MACMICHAEL, Esq., I.C.S., Commissioner of Land Revenue and Settlement.

Read—the following paper :—

Telegram from G. W. WELLS, Esq., I.C.S., Collector of South Kanara, dated 9th August 1923.

Serious floods Bantval sixth seventh August. Several lives believed lost. Unable verify yet damage houses extensive. Several streets total ruin. Post office wrecked telegraphic communication impossible. About thousand people homeless being fed. I have been Bantval since fifth.

Reference.

Submitted to Government.

2. The Collector is requested to submit a detailed report in due course.

(By order)

A. APPADURAI PILLAI, *Assistant Secretary.*

III

Reference from the Board of Revenue (Land Revenue and Settlement), No. 2161/23-2, dated 10th August 1923.

N. MACMICHAEL, Esq., I.C.S., Commissioner of Land Revenue and Settlement.

Read—the following paper :—

(i)

Telegram from G. W. WELLS, Esq., I.C.S., Collector of South Kanara, dated 9th August 1923.

Unprecedented floods Mangalore. Flood level three feet higher than that reached last month. New bar opened itself yesterday night. No loss of life. Several houses suburbs Mangalore collapsed. People able save most property. Breach railway line 547–548 miles. Transhipment impossible 48 hours.

(ii)

Telegram from G. W. WELLS, Esq., I.C.S., Collector of South Kanara, dated 9th August 1923.

Tahsildar wires: Heavy floods Payasawani river Kasaragod taluk. 250 houses damaged. Mangalore taluk nine villages—local vicar reports 300 houses damaged.

Source*: Malabar District Collectorate Files, GO. NO.1236,13.08.1923, RAK*

Figure 5.4 shows that the 1924 flood most affected the South Canara District. G.W. Wells, I.C.S., Collector of South Canara, sent a telegram to the Madras

33 Malabar District Collectorate Files, GO. NO.1391,10.09.1924, RAK.

Government to notify of the condition of the Canara region due to the calamity. Serious floods occurred in Bantval in the South Canara District. Several houses and streets were ruined. The post office was wrecked, and as a result, telegraphic communication was impossible. Approximately a thousand homeless people are being fed.[34] Another Telegram from G.W.Wells, Esq., I.C.S., Collector of South Canara, wrote on unprecedented floods in Mangalore. Several houses in the suburbs of Mangalore collapsed.[35] Heavy floods occurred at the Payasawani river in Kasaragod taluk, and 250 houses were damaged.[36]

Figure 5.5

Letter from J.A. Thorne, Esq., I.C.S., Collector of Malabar, to the Secretary to the Land Commissioner.

Government of Madras

REVENUE DEPARTMENT

G.O. No. 1320, 30th August 1923

Floods (Malabar)—Chirakkal and Kottayam taluks—Collector's report.

READ—the following paper :—

Reference from the Board of Revenue (Land Revenue and Settlement), No. H. 2387/23-1, dated 23rd August 1923.

N. MACMICHAEL, Esq., I.C.S.,

Commissioner of Land Revenue and Settlement.

Read—the following paper :—

Letter from J. A. THORNE, Esq., I.C.S., Collector of Malabar, to the Secretary to the Commissioner of Land Revenue and Settlement, dated the 19th August 1923.

For a month past the rain has been exceptionally heavy. It reached a climax about the 5th and caused floods throughout the district. No very serious damage has been reported from the south of the district; though roads were submerged in many places and much land has been under water, there has been no great loss of property in that part. But in the taluks of Chirakkal and Kottayam in North Malabar the rivers failed to carry off the water and did much damage to house property along their banks—from Iritti down to Azhikkod on the Valarpattanam river and at various places along the river further north. It is not easy to estimate the number of houses and persons affected owing to the localities affected being so scattered. In Chirakkal taluk about 1,700 houses or shops are said to have been destroyed, and in Kottayam taluk about 300. The classes affected are mostly the agricultural labourers living by paddy fields and the Mappilla merchants interested in timber. Much timber has been washed down the rivers and lost, of course.

2. Calicut was not seriously affected till the night of the 15th when the water in the Kallayi river and the canals connected with it rose rapidly and flooded all the low-lying eastern suburbs of the town. When I went round the place on the 16th with the Chairman I found the water up to the roofs of the houses and 5 feet of water over the road in some parts. The municipal council held a special meeting on the 17th to consider relief measures.

3. I am unable to say yet whether any assistance from the Government in the form of advances under the Agriculturists Loans Act will be required. Crops have been injured or destroyed in many places, but I do not think any suspension or remission of assessment should be necessary. For the last three or four days there has been an improvement in the weather, and the floods should subside rapidly if the break holds.

4. There are signs of activity among the public, but I cannot yet say whether any considerable efforts can be expected. I attended a meeting in Calicut convened to discuss relief measures on the 15th; the attendance was disappointing and I think there will be a tendency for charity to be parochial. The poorer classes affected in North Malabar are mostly attached by quasi-feudal ties to landlords, and I am hoping that these will realize their responsibilities towards their dependents.

5. There does not seem to have been much loss of life among cattle, and the only loss of human life credibly reported is the drowning of a military mule-cart driver who, on the road between Malappuram and Tirur, capsized his cart in the floods and perished along with his mules.

Source: *Malabar District Collectorate Files, GO. NO.1320,30.08.1923, RAK*

[34] Malabar District Collectorate Files, GO. NO.1236,13.08.1923, RAK.

[35] *Ibid.*

[36] *Ibid.*

The above figure 5.5 indicates a heavy flood in the Malabar region, specifically in the districts of Chirakkal and Kottayam Taluks. The southern part of the district faced submerged roads and inundated land, but reported no significant property damage. However, the northern taluks of Chirakkal and Kottayam in North Malabar suffered extensive harm as rivers overflowed, destroying their banks from Iritty to Azhikkod on the Valapattanam River and other locations further north. The dispersed nature of the affected areas makes it difficult to assess the full impact, but approximately 1,700 houses or shops were destroyed in Chirakkal taluk and about 300 in Kottayam taluk. The flood mostly affected agricultural labourers dependent on paddy fields and mappila timber merchants, with significant timber losses as the floods swept logs downstream.

Calicut remained relatively unaffected until the night of the 15th, when water levels in the Kallayi River and its connected canals rose rapidly, inundating the town's low-lying eastern suburbs. On the 16th, during an inspection with the municipal chairman, water was found to have reached the roofs of houses, with some roads submerged under five feet of water. The municipal council convened a special meeting on the 17th to discuss relief measures.[37] Despite the devastation, cattle losses appear minimal, and the only confirmed human fatality was a military mule-cart driver who drowned, along with his mules, when his cart overturned on the flooded road between Malappuram and Tirur.[38]

In Badagara-Kurumranad Taluk, one man died when his house collapsed, while in Chalil, Tellicherry, another man died after falling from his roof while attempting to remove an arecanut tree that had fallen on it. Additionally, two men in Badagara sustained injuries due to the collapse of their houses. However, the loss of

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[37] Malabar District Collectorate Files, GO. NO.1320,30.08.1923, RAK.

[38] *Ibid.*

lives, boats, and cargo at sea was significant, affecting nearly the whole coastline from Cochin in the south to Cannanore in the north. The stream appeared to flow in a north-westerly direction, starting south of Cochin and ending near Cannanore Port. In response, the Malabar Collector requested the port officers of Calicut and Cochin to provide a scientific analysis of the storm.[39]

There were many relief activities conducted by the Malabar collector, and there was a discussion with Dr Sundara Raj, Director of fisheries, about the methods of inquiry they should follow in investigating the distress caused amongst the fishermen by the recent Cyclone. Dr Sundara Raj replied to the Malabar collector, they appointed a staff directly under the fishing villages, whose chief duty was to promote the economic welfare of the fishermen. This staff was so intimately connected with the fishermen.[40]

In Calicut, a cyclone relief committee was established. The letter seeking help from the Madras Government.[41] Karunakaran Menon, Assistant Director of Fisheries, made arrangements for the purchase and distribution of boats, with the help of P.V. Gopalan.

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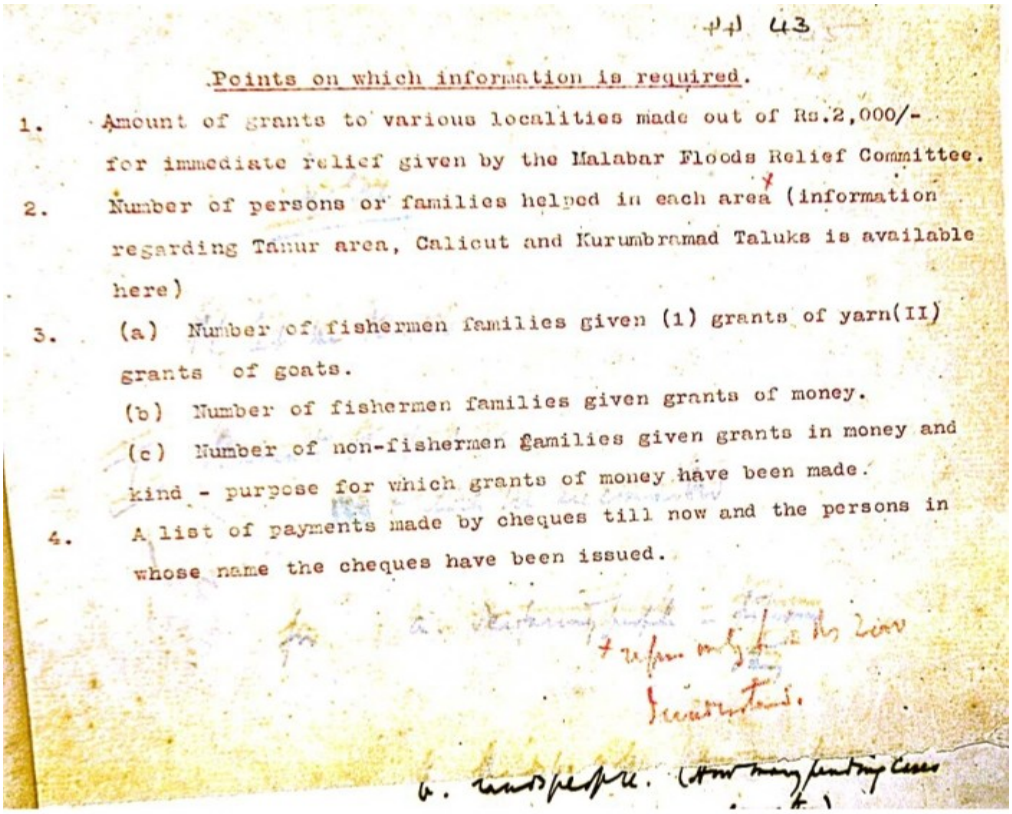
[39] Malabar District Collectorate Files, GO. NO.10611/25Vol.1,10.03.1927, RAK.

[40] Malabar District Collectorate Files, GO. NO10611, vol,1,10.3.1927, RAK.

[41] see in the Appendix IX.

Figure 5.6

Immediate Relief Activities of The Malabar Flood Relief Committee



41 43

Points on which information is required.

1. Amount of grants to various localities made out of Rs.2,000/- for immediate relief given by the Malabar Floods Relief Committee.

2. Number of persons or families helped in each area (information regarding Tanur area, Calicut and Kurumbranad Taluks is available here)

3. (a) Number of fishermen families given (1) grants of yarn(II) grants of goats.

(b) Number of fishermen families given grants of money.

(c) Number of non-fishermen families given grants in money and kind - purpose for which grants of money have been made.

4. A list of payments made by cheques till now and the persons in whose name the cheques have been issued.

Source: *Malabar District Collectorate Files, GO. NO10611, vol,1,10.3.1927, RAK*.

Figure 5.6 shows the immediate relief activities of the Malabar flood relief committee. Several families and fisherman communities helped the people in flood-affected areas.

Flood in Ponnani Region

The 1924 flood affected the Ponnani region. Three rivers in Ponnani Taluk, Ponnani River, Valiangod River, and Chetuvaya River were affected by floods in 1924. All the Paddy crops in the low-lying villages south of Ponnani along the coast were under water during this period. In Ponnani, the agricultural area was fully destroyed. Instances of some places in Nattika,[42] 590 acres of Kanni and 1100 acres of *Nagaram* crop were completely damaged, and another 500 acres of crop were damaged. Choraghat,850 acres, and 410 acres of partial loss of standing crops were also mentioned. 1500 acres of *Kanni* crop, 750 acres of *Nagaram* crop, and 280 acres of seedlings were damaged. The heavy loss of crops is in Vadanapalli[43], Elluvattirutti[44], Edakkazhiyur, and Ayirur[45] Amsams.

Floods, Crises and Social Relationships: Analyzing Relief Activities

A successful disaster recovery program also requires painstaking efforts to combine knowledge, technology, expertise, institutional capacities, management skills, and practical experience for the best possible results, which would not be possible without the synergy between the state and civil society.[46] For flood relief activities, the government introduced flood loans. The Nedungadi Bank offered loans charging 15% for small loans on the security of gold ornaments, and the rate for the co-operative societies is Rs 10-15 per Rs.100.[47]

The Malabar Collector submitted that the damage caused to the roads, culverts, etc., coming to this taluk board had been estimated at Rs. 10,000/- and that the taluk board is not in a position to spend this large amount on its funds. The collector requested that the government be so pleased as to contribute Rs. 10,000/- to this Taluk board, to enable it to set right the damaged portions of the roads and culverts as early as possible.[48] A sum of Rs 300 is allotted for flood relief in the Taluk board area, and

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42 Malabar District Ponnani Taluk, Desam NO.431, RAK.

43 Settlement Register, Malabar District Ponnani Taluk, Desam NO: 429, RAK.

44 Settlement Register, Malabar District Ponnani Taluk, Desam NO:163, RAK.

45 Settlement Register, Malabar District Ponnani Taluk, Desam NO :340, RAK.

46 K.M.Seethi, *Development Rebound: Challenges in Kerala's Development Scenario,* Raspberry Books, Calicut, May 2017, p.21.

47 Malabar District Collectorate Files, GO. NO: 281, RAK.

48 Malabar District Collectorate Files, GO. NO .2224, RAK.

out of this Rs 40/- will be paid to each of the following committees: Areacode, Kondotty, Parappanangadi, and Nilambur, and a balance Rs.100-/ will be paid to the Manjeri relief committee.[49] In submitting herewith an extract from the proceedings of the Palaghat taluk board at its meeting held at Kollengode, on monday, the 25th August last, the Malabar collector had requested to government to sanction for the payment of Rs. 100/- by the taluk board towards flood relief in the district of Malabar.[50]

Flood relief activities in the Canara District, Kasargod.

There are numerous problems affected by the Canara district of Kasargod due to the flood. The people of Kasargod sent a letter to the Madras government. There were seven hundred and thirty aggrieved people in the district. Their houses, temples, and lands were all being washed away, and more and more of them were daily made homeless.[51] So, seeking the help of the madras government, a group of people under the leadership of landlords, landholders, cultivating tenants, agricultural labourers, and other inhabitants submitted a memorandum.

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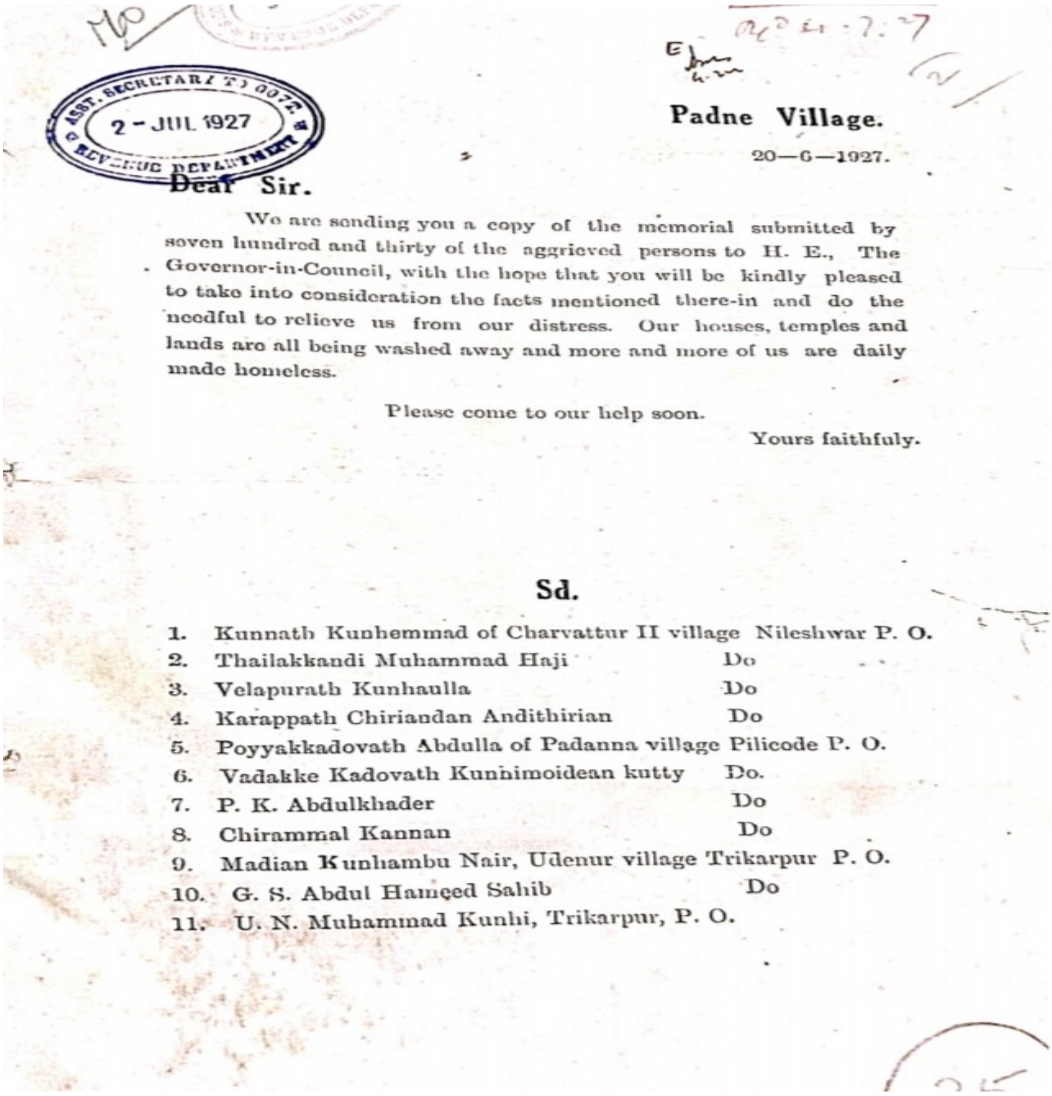
[49] *Ibid.*

[50] *Ibid.*

[51] Malabar District Collectorate Files, GO. NO.1639, RAK.

Figure 5.7

Memorandum to the Governor-in-council of Padne village in Kasargod Taluk



2 - JUL 1927

Padne Village.

20—6—1927.

Dear Sir.

We are sending you a copy of the memorial submitted by seven hundred and thirty of the aggrieved persons to H. E., The Governor-in-Council, with the hope that you will be kindly pleased to take into consideration the facts mentioned there-in and do the needful to relieve us from our distress. Our houses, temples and lands are all being washed away and more and more of us are daily made homeless.

Please come to our help soon.

Yours faithfuly.

Sd.

1. Kunnath Kunhemmad of Charvattur II village Nileshwar P. O.
2. Thailakkandi Muhammad Haji Do
3. Velapurath Kunhaulla Do
4. Karappath Chiriandan Andithirian Do
5. Poyyakkadovath Abdulla of Padanna village Pilicode P. O.
6. Vadakke Kadovath Kunhimoidean kutty Do.
7. P. K. Abdulkhader Do
8. Chirammal Kannan Do
9. Madian Kunhambu Nair, Udenur village Trikarpur P. O.
10. G. S. Abdul Hameed Sahib Do
11. U. N. Muhammad Kunhi, Trikarpur, P. O.

***Source**: Malabar District Collectorate Files, GO. NO.1639, RAK.*

Figure 5.7 shows the people in Padne village in Kasargod taluk submitted a memorandum to the Governor-in-council seeking help. The Padne village completely collapsed, houses, temples, and lands were washed away, and many people became homeless.

Figure 5.8

Memorandum undersigned by landlords, landholders, cultivating tenants, and agricultural labourers of South Kanara.

TO

HIS EXCELLENCY.

The Governor-in-Council,

MADRAS.

The most humble Memorial of the undersigned and other land-lords, land-holders, cultivating tenants, agricultural labourers and other inhabitants of the under-mentioned villages of the Kasaragod Taluk, in the District of South Kanara.

MOST RESPECTFULLY SHEWETH,

Memorialists are the owners of lands and persons interested in lands and residents of the villages of South Thrikaripore, Udinur, Padne, Thuriti and Cheruvathur in Kasaragod Taluk. These villages and others are effected by the Karianakode and Nileshwar rivers which emptied themselves along with the Kavvayl river into the Arabian Sea at Kavvayi from time immemorial to the immediate north of the hills known as the Ezhimala. The bar at Kavvayi was natural and kept within limits by the hills on the south and so long as the river kept to this bar the lands to the north of the river in the villages aforesaid enjoyed prosperity and security. But it would appear that certain inhabitants of Nileshwar,--through which village also the river flows,–backed up by the Raja of Nileshwar complained to the collector of South Kanara that the river used to get flooded in the rainy season and submerge the adjacent fields and gardens owing to there being no outlet near at hand through which flood-water could escape to the sea. As a result of the complaint the Collector of South Kanara appears to have given permission in August 1909 to cut open the sand-bank near *Katukachery* as an experimental measure for one year. The permission granted was quite beyond the necessities of the situation as the floods were not a constant occurence, nor were the inconveniences due to such floods of a permanent nature. Further the said order was given out of sheer short sightedness without taking into consideration the serious consequences of interfering with the natural outlet of the river into the sea. This act of the authorities was the subject-matter of protest by the people of the villages concerned.

2. Memorialists' misfortunes began ever since this ill-fated decision of the authorities and the residents of the localities have been petitioning from time to time about the grievous consequences that accrued soon after the new bar was formed. The new bar began to eat into the lands on its southern side and extended its ravages from year to year washing away three-crop fields, fertile and smiling gardens and costly buildings. The mischievous tendencies of the river culminated in such havoc by 1916 that the then Collector of South Kanara, Mr. Veiburt, recommended to Government that the new bar that had been formed and extending south from *Katukachery* ought to be blocked up and the river forced to take to its natural and original outlet at Kavvayai, which had been blocked up ever since the new bar was opened. But somehow or other the proposals of the Collector were not given effect to and the inhabitants of the place have been left to the tender mercies of nature, memorialists fondly hoping that Government would initiate some ameliorative measures to relieve the distress of the people.

Source*: Malabar District Collectorate Files, GO. NO.1639, RAK.*

Figure 5.8 shows that the humblest memorial that was undersigned by landlords, land-holders, cultivating tenants, agricultural labourers, and other inhabitants of the aforementioned villages of the Kasaragod Taluk, in the District of South Canara.

Flood-Affected Areas of Central Malabar.

It was certain that the information that so far reached the Malabar collector about the floods had been pervasive indeed and had done hefty damage. The number of damages in several places, like between Kallayi, Olavakkod, Trikkandiyur (Near Tirur), and Baliapatam. The railway line was breached in several places between Kallayi and Olavakkod. The Collector received a message that Trikkandiyur (Near Tirur) and Baliapatam were flooded. There was huge damage in Malappuram in Ernad Taluk. The Arikkod bazar was under water. There was a wireless message from Nilambur that the M.S.P. camp was surrounded by water and abandoned. There was a great loss of property and land. At Malappuram, the bazar was destroyed, and many lives were lost, and three dead bodies were recovered from the river near the barracks.[52]

Bridges are important in the modern world, and it is their beauty that makes them remarkable. Bridge failures are one of the most serious infrastructure problems in the world. Floods can damage bridges, sometimes permanently. It often leads to catastrophic consequences, loss of life, destruction of communication, damage to public property and Road networks. It was reported by the overseer and contractors that the roads and bridges were completely unusable. The Oradam Bridge had been washed away, and there were only two possible routes to Palaghat. One was the road from Calicut to Malappuram, Malappuram-Pulamanthole via Kolathur, and the other

[52] Malabar District Collectorate Files, GO. NO ,6371, RAK.

was Calicut-Pulamanthole via Manjeri, Pandikkad, Mucharakadav, Perinthalmanna.[53] Edavanna Bridge was safe, but several houses and shops on the roadside fell due to it paving the way to the traffic block between Manjeri and Nilambur.

It was reported with huge losses in the Nilambur areas. The walls of the old hospital building collapsed. Several bamboo clusters and trees fell from Nilambur to Vazhikkadavu, which caused a heavy traffic block. The ghats' 4 big slips are reported to have occurred, and some carts and men are reported to be held up between them. Kurikkal families sent some 40 men to the flood-affected area. They assisted in removing the obstructions. Kalikavu bridge had only a few planks of the old bridge, which were reported to have been washed away; the new bridge in 13/4(place) was reported to be all right. Another big slip occurred on road No. 92 between Karuvarakkundu and Pandicad. Nellikuth Bridge was reported to be safe.[54] The person named Mr. Jacobi had distributed 200 bags of rice to Malappuram and 50 for use in the Areekode neighbourhood. P. Veeran haji of Feroke arranged the carts for Feroke to Manjeri.

On the north side of Calicut, Eranhikkal Palam was underwater. Eranhikkal bridge was full of water, and there was limited communication between people in Eranhikkal. A few people went to Kalluchethukadavu by boat, but it was risky. There was no communication between the people living on either side of the river, and the bridges at Puthiyapalam and Mooriyad were underwater. Panniyankara and Nallalam were also underwater. In Tali, the water reached the college ground, and the sub-jail garden was 3 feet underwater. In the Cannoli Canal, it was over 13 or 14 feet above the ordinary level.[55] There were a large number of people who were shut off from their houses in Puthiyara. Some found shelter in the vacant building in the taluk office, and

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53 *Ibid.*

54 *Ibid.*

55 *Ibid.*

a large number of people found shelter in the mission girls' school near the taluk office. About 300 refugees were found in Zamorins College. In Kundugal, poor and rich people accompanied each other, and they together stayed in vacant houses. Approximately 20-25 houses in Kundungal were underwater, and the residents had been removed elsewhere. Malayalamorama daily reports the destruction of the 1924 flood from Calicut to Ernakulam.[56]

Flood Relief activities in Malabar

The daily sales of rice in the bazaar amounted to 1500 bags on average. The stock with the wholesale merchant could be calculated as 40,000 bags, and with the retail merchants and small shopkeepers was 10,000 or 50,000 bags in all. One steamer with 4,000 bags was unloaded when there was a slight break in the weather. Business in the bazaar was dull that week on account of the rice, and when communication was restored, the sales increased as there was demand from the taluks. Rice was brought down this season from calcutta by rail and steamer, which was distributed to the flood-affected people.[57]

Many houses collapsed, and people became refugees. The rise of water by daytime was heavy, and it gave enough time to give notice to the residents of the flooded area. The collapsed building included the old hospital building, the post office, and the Kovilakom buildings. One of the Kovilakom buildings was fully under water, and the outhouse's main building was dangerously collapsed.[58] Road communications were similarly interrupted. Coorg Ghats, the Periya Ghats from Thelicheri to Mananthavadi and the Thamarassery Ghats from Calicut to Wayanad were blocked by landslips.

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[56] Newspaper reports can be seen in Appendix X.

[57] *Ibid.*

[58] *Ibid.*

Table 5.2

The table shows the flood destruction and relief activities in the Malabar district.

Taluk	No. of destitute families relieved	Amount	No. of lower-middle-class families	Amount	Total
Calicut	2671	15,659-0-0	565	23,613-0-0	39,272-0-0
Ernad	6022	33,311-0-0	209	32,135-0-0	35,446-0-0
Valluvanad	1784	14,374-0-0	35	1,538-0-0	15,912-0-0
Ponnani	6162	29,043-8-0	270	6,228-0-0	35,271-8-0
Palaghat	----	269-0-0	25	650-0-0	919-0-0
Waynad	66	750-0-0	--	-----	750-0-0
North Malabar	2614	18,424-15-0	43	2,020-0-0	20,444-15-0
	19,319	**111,831-7-0**	**1147**	**36,184-0-0**	**148,015-7-0**

Source: *Malabar District Collectorate Files, GO. NO.1336, RAK.*

Flood Relief Activities in Calicut, Malappuram, Palghat and Nilambur

As a part of relief activities, the P.W.D. Department started repairing roads and bridges that were damaged by the 1924 flood. The Madras Government asked divisional offices and district forest offices to give a few grants to the workers in the forest at Nilambur and Palghat. It is possible to grant these forms of grants in Ponnani Taluk because there is no government forest area. The Government allotted loans for these flood-affected areas. The total amount allotted to this Malabar district was Rs. 1,15,500, and Rs. 98,800 was allotted to the divisional areas.[59] The government arranged with Messrs. Best & Co. to send 5670 bags of rice from Coconada to increase stock in Malabar. 600 bags of these were bought by the Thalassery relief committee, and 600 bags of rice were supplied in Calicut.[60]

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[59] Malabar District Collectorate Files, GO. NO.560, RAK.

[60] *Ibid.*

Out of 20,000 sanctioned by the Government, over 15,310 were distributed in the taluks of Calicut, Ernad, Valluvanad, and Ponnani, which were the most affected parts of the district by the flood. The money was distributed among the people who were in urgent need of money for their subsistence or for the reconstruction of their houses.[61] The Madras Government had given cash in advance to the people in flood-affected areas. The following are instances of peculiar advances: advances to hostels for the purchase of food items, advances to farmers for the purchase of agricultural implements. On September 24th the Madras Government sanctioned an advance of Rs. 93,555/- to the collector of Malabar for the purchase and sale of rice to people at Malabar who had been affected by floods and by the consequent rise in the price of rice. The advance was to be recovered as the rice was sold, the District Collector being responsible for its recovery. The amount was, with the concurrence of the collector's office, debited to "Advances repayable – special advances". By the time the rice arrived, the price had fallen considerably, and the sales resulted in a huge loss. The question arose as to whether the write-off should not be sanctioned by the government of India, and the amount written off charged to "Central".

Under the note to Article 222 C.A.C. Vol. 1, the write-off of such advances would require the sanction of the government of India. If the amount proposed for write-off exceeds Rs. 250/-, even though the amounts of such write-offs should appropriately be charged to provincial revenues. The collector suggested that the head of "Special Advances" should provide both "Central" and "Provincial" transactions. The Central or Provincial Government should sanction the write-off of an amount sanctioned under one of these heads, according to the head under which the expenditure was originally recorded. If this course is not acceptable, and if it was considered to be desirable that the head "Special Advances" should for the present

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[61] *Ibid.*

remain wholly “Central”, the incidence of the write-off might be allowed to be decided on the merits of each case at the time of the write-off and that any advance granted for the carrying out of provincial Administration should be charged too Provincial.[62]

The Great Flood of 1924, often considered primarily for its shocking impact on Kerala, was not an isolated incident limited to a single region. Historical records, along with evidence from contemporary journals and magazines, indicate that floods of similar scale occurred in other parts of the world during the same period, underscoring the global scale of climatic disruptions in the early twentieth century. By examining archival reports, articles, and periodicals from different countries, it becomes evident that the 1924 flood was part of a broader pattern of extreme weather events that affected different nations.[63]

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62 *Ibid.*

63 The year 1924 was marked by devastating floods across the world mainly three countries like China, philippines and Philadelphia. In North China, riverine overflows displaced millions amid political instability. In the Philippines, a powerful typhoon unleashed torrential rains, isolating provinces and claiming dozens of lives. Closer to home in the United States, heavy spring rains swelled the Schuylkill River, causing regional havoc in Pennsylvania, including around Philadelphia. These events, though separated by geography, shared meteorological roots in intense precipitation and revealed common vulnerabilities: inadequate embankments, rapid urbanization, and limited relief mechanisms. This analysis dissects each flood's causes, progression, human and economic tolls, and responses, followed by a comparative lens to illuminate broader patterns in early 20th-century disaster management.

Table 5.3

The table shows the Flood Relief Activities of the Malabar District.

Centre	No. of Houses	Amount
Feroke	55	325
Ottappalam	21	276
Parappanangadi	55	219
Tirur	19	107
Nilambur	55	253
Areakode	47	212
Mannarghat	1	15
Ponnani	150	500
Manjeri	146	573
Iritti (North Malabar)	141	973
Irikkur ”	43	400
Mahe ”	37	441
Pappinisseri ”	170	1091
Sreekandhapuram ”	458	2935
Total	**1394**	**8320**

Source: *Malabar District Collectorate Files, GO. NO.560*

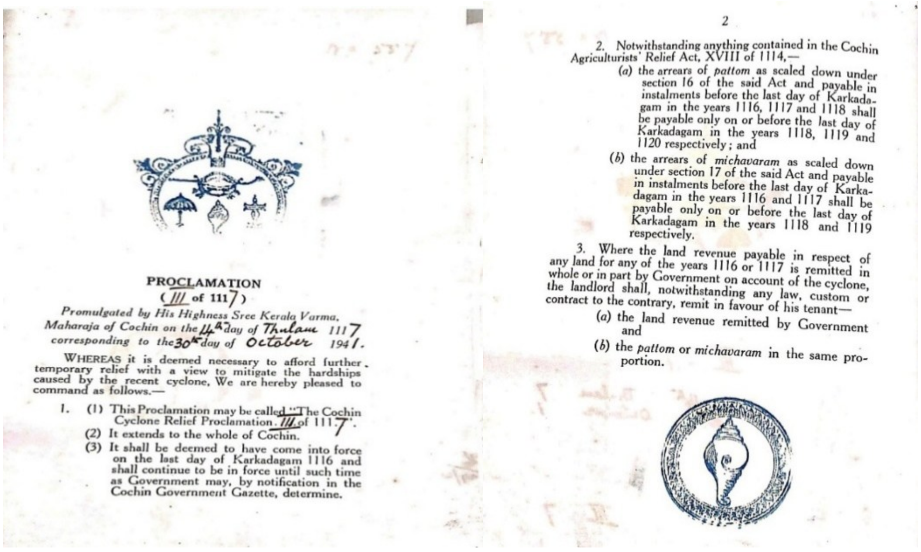
The Malabar Floods Relief Committee, Calicut, shows receipts, expenditures, distribution of relief in the distressed areas, bank balance, etc.[64]

These types of flood relief activities continued until later calamities occurred in Kerala. The proclamation of flood relief activities of the Cochin state is the following.

64 These receipts are seen in Appendix XI.A, Appendix XI.B, and Appendix XI.C.

Figure 5.9

Proclamation of His Highness Sree Kerala Varma



PROCLAMATION
(III of 1117)

Promulgated by His Highness Sree Kerala Varma, Maharaja of Cochin on the 14th day of Thulam 1117 corresponding to the 30th day of October 1941.

WHEREAS it is deemed necessary to afford further temporary relief with a view to mitigate the hardships caused by the recent cyclone, We are hereby pleased to command as follows.—

1. (1) This Proclamation may be called "The Cochin Cyclone Relief Proclamation III of 1117".
(2) It extends to the whole of Cochin.
(3) It shall be deemed to have come into force on the last day of Karkadagam 1116 and shall continue to be in force until such time as Government may, by notification in the Cochin Government Gazette, determine.

2

2. Notwithstanding anything contained in the Cochin Agriculturists' Relief Act, XVIII of 1114,—
(*a*) the arrears of *pattom* as scaled down under section 16 of the said Act and payable in instalments before the last day of Karkadagam in the years 1116, 1117 and 1118 shall be payable only on or before the last day of Karkadagam in the years 1118, 1119 and 1120 respectively; and
(*b*) the arrears of *michavaram* as scaled down under section 17 of the said Act and payable in instalments before the last day of Karkadagam in the years 1116 and 1117 shall be payable only on or before the last day of Karkadagam in the years 1118 and 1119 respectively.

3. Where the land revenue payable in respect of any land for any of the years 1116 or 1117 is remitted in whole or in part by Government on account of the cyclone, the landlord shall, notwithstanding any law, custom or contract to the contrary, remit in favour of his tenant—
(*a*) the land revenue remitted by Government and
(*b*) the *pattom* or *michavaram* in the same proportion.

Source: *The Cochin Cyclone Relief Proclamation, p.5.1, RAE*

Figure 5.9 displays the royal emblem of the cochin state, a former princely state in present-day Kerala. This emblem is featured on a historical document, specifically a proclamation issued by the Maharaja of Cochin in 1941, related to cyclone relief efforts. The "Cochin cyclone relief proclamation of 1117" was enacted by the Maharaja of Cochin, Sree Kerala Varma, on October 30, 1941 (11th day of *Thulam* 1117), to provide temporary relief from the hardships caused by a recent cyclone. The proclamation extends to the entire Cochin region and is retroactively effective from the end of *Karkadagam* 1116, remaining in force until specifically revoked by the Government.[65]

Yet Another Major Flood: 1961

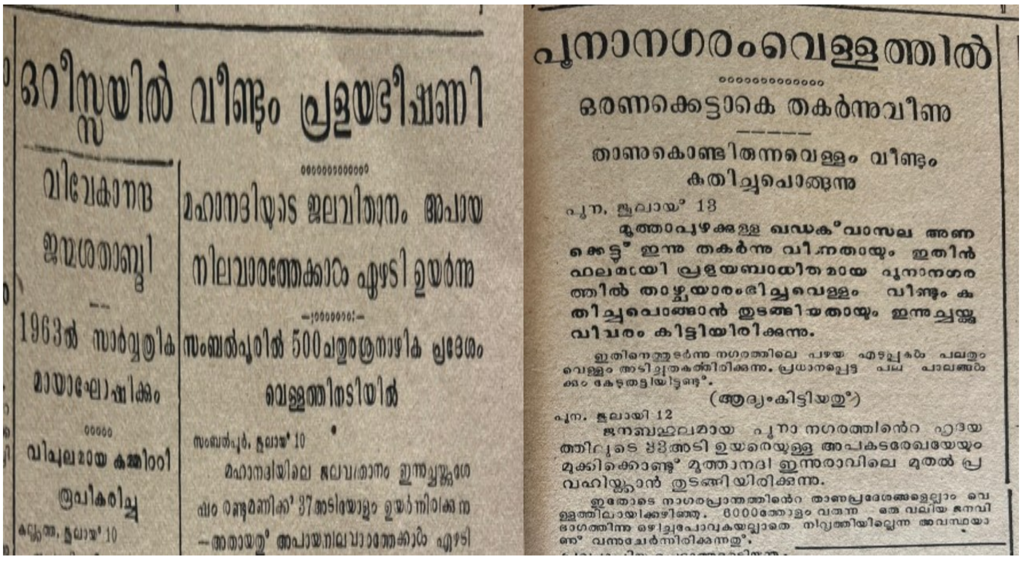
The Arabian Sea branch of the monsoon was ushered in over Kerala about 10 days before the normal date due to a trough of low pressure in the South-East Arabian

[65] The Cochin Cyclone Relief Proclamation, RAE.

Sea. The low-pressure area intensified into a severe cyclonic storm on 24th May, 1961. It later moved inland, making landfall on the western coast between Devgad and Ratnagiri during the night of the 24th. Consequently, the monsoon was over Konkan and Madhya Maharashtra. Simultaneously, the development of a severe cyclonic storm in the central Bay of Bengal towards the close of May resulted in the advance of the Bay branch of the monsoon also. The monsoon established itself over the Peninsula, Orissa, Bihar, West Bengal, and East of Uttar Pradesh by the first week of June 1961. Though further advance was halted, its fury continued unrelenting over Kerala. The monsoon established itself over the entire country by the end of June. During its retreat, it seemed to have withdrawn from most of northwest India by the end of September. Finally, the monsoon withdrew from north and central India by the 20th, about 15 days after the normal dates. During October, south bihar, South U.P., and west madhya pradesh recorded severe floods.[66]

Figure 5.10

Deshabhimani Daily Report on the Flood of 1961, Pune and Orrisa



ഒറീസ്സയിൽ വീണ്ടും പ്രളയഭീഷണി

വിവേകാനന്ദ ജന്മശതാബ്ദി

1963ൽ സാർവ്വത്രികമായാഘോഷിക്കും

വിപുലമായ കമ്മിറ്റി രൂപീകരിച്ചു

കല്ക്കത്ത, ജൂലായ് 10

മഹാനദിയുടെ ജലവിതാനം അപായനിലവാരത്തേക്കാൾ ഏഴടി ഉയർന്നു

സംബൽപൂരിൽ 500 ചതുരശ്രനാഴിക പ്രദേശം വെള്ളത്തിനടിയിൽ

സംബൽപൂർ, ജൂലായ് 10

മഹാനദിയിലെ ജലവിതാനം ഇന്നുച്ചയ്ക്കുശേഷം രണ്ടുമണിക്ക് 37 അടിയോളം ഉയർന്നിരിക്കുന്നു — അതായത് അപായനിലവാരത്തേക്കാൾ ഏഴടി

പൂനാനഗരം വെള്ളത്തിൽ

ഒരണക്കെട്ടാകെ തകർന്നുവീണു

താണുകൊണ്ടിരുന്ന വെള്ളം വീണ്ടും കുതിച്ചുപൊങ്ങുന്നു

പൂന, ജൂലായ് 13

മൂത്താപുഴക്കുള്ള ഖഡക് വാസല അണക്കെട്ട് ഇന്നു തകർന്നു വീണതായും ഇതിൻ ഫലമായി പ്രളയബാധിതമായ പൂനാനഗരത്തിൽ താഴുവാനാരംഭിച്ച വെള്ളം വീണ്ടും കുതിച്ചുപൊങ്ങാൻ തുടങ്ങിയതായും ഇന്നുച്ചയ്ക്കു വിവരം കിട്ടിയിരിക്കുന്നു.

ഇതിനെത്തുടർന്നു നഗരത്തിലെ പഴയ എടുപ്പുകൾ പലതും വെള്ളം അടിച്ചുതകർത്തിരിക്കുന്നു. പ്രധാനപ്പെട്ട പല പാലങ്ങൾക്കും കേടുതട്ടിയിട്ടുണ്ട്.

(ആദ്യം കിട്ടിയത്)

പൂന, ജൂലായി 12

ജനബഹുലമായ പൂനാനഗരത്തിന്റെ ഹൃദയത്തിലൂടെ 23 അടി ഉയരെയുള്ള അപകടരേഖയേയും മുക്കിക്കൊണ്ട് മൂത്താനദി ഇന്നുരാവിലെ മുതൽ പ്രവഹിക്കാൻ തുടങ്ങിയിരിക്കുന്നു.

ഇതോടെ നഗരപ്രാന്തത്തിന്റെ താണപ്രദേശങ്ങളെല്ലാം വെള്ളത്തിലായിക്കഴിഞ്ഞു. 6000ത്തോളം വരുന്ന ഒരു വലിയ ജനവിഭാഗത്തിന്നു ഒഴിച്ചുപോവുകയല്ലാതെ നിവൃത്തിയില്ലെന്ന അവസ്ഥയാണ് വന്നുചേർന്നിരിക്കുന്നത്.

Source: *Deshabhimani Daily,11/07/1961***.**

[66] Rain falls and Floods During 1961 Southwest Monsoon Period, *Indian Journal of Meteorology and Geophysics*, Vol.13, No.2, April 1962, p.147.

The following are the characteristics and features of the 1961 flood.

1. Excess rainfall in 14 weeks out of 17 during June to September in Kerala.

2. Deficient rain in Assam and Sub-Himalayan West Bengal in most weeks during June, July, and September.

3. There is relatively less rainfall during August, which is usually the rainiest month, than in September over most parts of north and central India.

4. Continuous spell of heavy rain in west Madhya Pradesh and adjoining Rajasthan from 6th September to 18th October.

5. Unusual rainfall during the first half of October in U.P., Bihar, M.P., and the West Coast.[67]

Most of the rivers in central and peninsular India had floods that year. During the onset of the monsoon, the rivers of Punjab and northeast India, except the Brahmaputra, did not play a significant role in causing major floods. The major floods that attracted the greatest attention that year and were responsible for the greatest human suffering and loss of life, and property were:

1. Kerala floods in the first week of July.

2. Cauvery floods on 6th July in the upper catchment, followed by one in Madras five days later.

3. Orissa floods of 10th July and 6th September.

4. Floods in the mutha river (Poona city) on 12th July.

5. U.P. floods in 3rd week of August.

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[67] *Ibid.*

6. Narmada floods of 25th August 9th September and 13th October; river tapti was in floods near Surat on 11th September.

7. Godavari floods of 24th August and 20th September.

8. Lower Bihar Flood (Sone, Bagmati, and Kamala) of 1-3 October.

9. Gomati flooded near Lucknow on 14th October.[68]

The year 1961 also witnessed heavy floods and a rise in the water levels of reservoirs. Usually, in the State, heavy rainfall is concentrated throughout 7 to 10 days during the monsoon when the rivers rise above their established banks and flood the adjoining areas. But in 1961, floods were unusually heavy not only in duration but also in the intensity of rainfall. During the year 1961, the monsoon started getting violent towards the last week of June, and in the early days of August, the rainfall was concentrated in most parts of the southern region of Kerala. By the first week of July, the intensity gradually spread over the other parts of the State, and the entire State was reeling under severe floods by the second week of July. The worst-affected area was the Periyar sub-basin, and it also impacted other sub-basins. Many of the important infrastructures, like highways etc, were submerged. After a brief interval, by the middle of July, the monsoon became more violent, affecting the northern parts of the State. The average rainfall was 56% above normal. The maximum daily intensities recorded at four districts in 1961 are given in the table below.[69]

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[68] *Ibid*., p.151.

[69] Study Report of Kerala Floods of August 2018, Central Water Commission Hydrological Studies Organization, Government of India, September 2018, p.3.

Table 5.4

District-wise Recorded Rainfall on the First Day of the Monsoon in Kerala, 1961

Sl. No.	District	Rainfall (mm)
1	Calicut	234
2	Trivandrum	136
3	Cochin	189
4	Palakkad	109

Source: *Study Report of Kerala Floods, Central Water Commission Hydrological Studies Organization, Government of India, September 2018***.**

1961 was the worst flood that affected all of India after the flood of 1924. As a result of this, the houses of thousands of people in the state were destroyed, road traffic was blocked, and people were brought to the other side of the authorities in many places. In Kerala, the water level of Pamba, Periyar,and Bharathapuzha rose tremendously. Road traffic between Angamaly and Aluva, Thrissur and Kunnamkulam, and Aluva and Paravur came to a standstill. Many places in Palakkad, Kozhikode, and Kannur Districts were underwater.

The Flood damages emergency resolution was passed after the 1961 floods. The full text of the resolution is given below. "Due to the rains that had been falling for the last few days, many areas in Kerala experienced untold suffering due to floods. Many houses were destroyed; ten thousand acres of paddy fields were covered with water, and the crops were destroyed. Thousands of families were starving without any work to do and not even food.[70]

The flood of 1961 caused great distress to the areas of Palakkad District because of landslides at two places in Attapadi, and 78 people were killed. The tribal people of Attapadi were severely affected by the floods of 1961. A part of the

[70] *Deshabhimani Daily*, 4, July 961.

mallishan mudi of Attappadi collapsed and flowed with mud, rocks, and water, covering the entire village and killing 62 tribals, including women and children.[71] Chathunni (85), who experienced the floods of 1961 says, "Due to the overflowing of the river for a week, all the paddy fields were under water. The farmers could not complete the planting of the *'Markazhama'* due to the flood. Those crops were destroyed.[72]A timber merchant in Kallayi, remembers the 1961 flood as follows. In Kozhikode, timber mills like Mankavu, Muriyad, and Puthiyapalam, were not working due to the flood. It caused the timber business people a heavy loss of money.'[73]

Malayala Manorama reports that the 1961 flood affected Kozhikode, Wayanad, and Nilambur Districts. In the Kozhikode District, more than 4000 families relocated to relief camps. In Nilambur more than 500 houses were destroyed. There was heavy traffic in the Wayanad District for more than one week.[74] Deshabhimani Newspaper reports that all the rivers in Kozhikode District were overflowing. Many villages were submerged due to the floods in the Muriad, Kallai, Tengilakadavu, Chaliyar, Kadalundi, and Tirur rivers. 150 families from Kozhikode Taluk and 200 families from Ernad Taluk were washed away. The flood of 1961 affected the Wayanad District very gravely. Around 35 families lost their homes in Chanthapoyil in Mananthavadi due to a flood. As a part of the flood of 1961, people in many places suffered epidemics like cholera, fever, and smallpox, which were widespread. This flood affected places of landslides in the ghats sections, and roads were washed away in some areas. Places like Nilambur, Kunnamangalam, Kozhikode town, Quilandy, Badagara Taluks, and Vythiri Ghats were affected. Thousands of people were rendered

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71 The Deshabhimani Daily reports the damages of the Attapadi area, which can be seen in Appendix XII.A and Appendix XII.B.

72 Interview with Chathunni, (85), Mananthavady, 6.10.2023.

73 Interview with Moideen (80), Kallayi, Kozhikode, 2.10.2023.

74 These newspaper reports can be seen in Appendix XII.C.

homeless during the Flood of 1961. There were many flood relief activities held all over Kozhikode and Wayanad Districts. The Government also provided relief measures to look after the medical and other needs of the evacuated people. The sanitary arrangements were made to clean the premises of relief camps, visit the different camps, and provide necessary medical support.[75]

Figure 5.11

Malayalamorama Daily Report of 1961 Flood


കേരളത്തിൽ സർവ്വത്ര വെള്ളപ്പൊക്കവും നാശനഷ്ടങ്ങളും

മൂന്നു കുട്ടികളുൾപ്പെടെ 24 പേർ മരണമടഞ്ഞു-ഗതാഗതങ്ങൾ മിക്കവാറും നിലച്ചു

മലമ്പുഴ, പീച്ചി, പെരിയാർ റിസർവോയറുകൾ തുറന്നുവിട്ടു

വിവിധ സ്ഥലങ്ങളിൽ നിന്നുള്ള റിപ്പോർട്ടുകളുടെ സംഗ്രഹം

Source: *Malayala Manorama Daily, 5/09/1961.*

Figure 5.11 reports that heavy rains in Kerala caused the Malampuzha, Peachey, and Periyar reservoirs to be opened immediately, leading to severe flooding. The Bharatapuzha, Periyar, and Pampana Rivers overflowed. A landslide in Wayanad resulted in 55 fatalities. Aluva town experienced significant flooding, and approximately 1,000 houses were submerged in Neria Mangalam.

Epidemics are not viewed as extraneous phenomena but are resituated within dynamic political, economic, social, and cultural milieus. Robert Peckham argues that studying epidemic diseases contextually in this way can help us understand critical themes in Asian history, shifting relations between local and state authorities, the causes and after-effects of migration, the expansion of inter-regional trade networks,

75 The newspaper report of heavy rain can be seen in Appendix XII.D, Appendix XII.E, and Appendix XII.F.

modernization, and the development of new forms of citizenship.[76] The 1961 flood affected waterborne diseases, including cholera and dysentery, since drinking water sources were contaminated by floodwaters. Poor sanitation in the flood-hit areas also contributed to the spread of diseases, further straining the local population and emergency response teams. The government has also taken precautionary measures to prevent the epidemic. The DMO (Health), the Municipal chairman and the commissioner were present at the flood relief committee meetings.

- Ramesh Metha is the treasurer of the committee, and T.V. Padmanabha Kurup is the convenor of the committee.
- Kozhikode District Collector R. Gopala Swami took the initiative to form a flood relief committee. He appealed to social service organizations and the philanthropic public to pool all their resources and send donations to the relief committee.
- A committee in the name of the Kozhikode flood relief committee was formed.
- People from all walks of life, irrespective of political parties, associations, and religions, all participated in flood relief activities.
- An executive committee consisting of the following members was also formed to be in charge of the collection of finance and other matters. It was resolved by meeting as frequently as possible.

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[76] Robert Peckham, *Epidemics in Modern Asia,* Cambridge University Press, United Kingdom, 2016, p.10.

Table 5.5

Members of the Malabar Flood Relief Committee

1)	Smt. A.V. Kuttimalu Amma	Representing the congress party.
2)	S.K Kader	P.S. P
3)	Sri. B.V. Abdulla Koya	The Muslim League
4)	H. Majunatha Menon	Communist Party
5)	Sri.C Achuthamenon	Representing the Malabar chamber of commerce
6)	M.C. Pothan	The Planters
7)	S.V. Govindaswami	Food Grains Merchants Association
8)	Dr. C.V. Narayana Iyer	Chairman, Calicut Municipal Council
9)	Sri. C. Kunhukutty	Representing the Transport Association

Source: *Kozhikode Collectorate R-Dis File, File No: 14009/61, 30.06.1962*

The following associations and traders are for the collection for the Flood Relief Fund

1) Lions Club
2) Rotary Club
3) Rice Merchants Associations
4) Bankers Association
5) Piece Goods Merchants Association
6) Timber Merchant Association
7) Saw mill Association
8) Pierce, Leslie 7 Company Ltd.
9) The Commonwealth Co. Ltd.
10) Tile Manufacturers Association
11) Umbrella Stock Manufacturing Association
12) Bullion Merchants Association

13) Hotel Association

14) Calicut district Varthaka (Merchants) Association

15) Bus Owners Association

16) The Malabar Chamber of Commerce

17) Calicut Chamber of Commerce

18) The west Coast & Industrialists association

19) Malabar Planters Association

20) The Medical Association

21) The Bar Association

22) Kerosene Dealers Association

23) Vegetable Dealers Association

24) Retail Merchants Association

25) Indian Red Cross Society

All the representatives of the above-mentioned association gave their maximum support and donations to the flood relief committee.[77]

The following are the donations for the various associations.

- All the Bishops and their related institutions were contacted and supplied with milk powder.

- A room was opened as a storeroom to store the articles received in kind from flood relief funds.

- Old clothes were collected, and Kutti Malu amma was in charge of the collection of clothes.

- The Merchants Association donated medicines to the flood relief committee.

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77 Receipts and letters of some of these associations can be seen in Appendix XIII.A and Appendix XIII.B.

- To issue an appeal to the public through the local press requesting liberal donations both in cash and in kind.
- The State Bank of India appointed bankers to the district flood relief committee, Kozhikode.

There were heavy natural calamities in the Kozhikode district due to heavy rains, floods, soil erosion, etc. Several families were homeless, and large areas of paddy and other crops were damaged.[78] As part of the 1961 flood, it can be seen that various kinds of flood relief funds were received from different parts of Kerala. Funds received in this way were deposited in banks as fixed accounts. The government used these funds to survive the monsoon calamities in the following years.

Figure 5.12 mentioned that huge calamities occurred in the Calicut District due to heavy rains, floods, and soil erosion. Several families became homeless, and large areas of paddy and crops were damaged. so, the flood relief committee was established under the leadership of the government.

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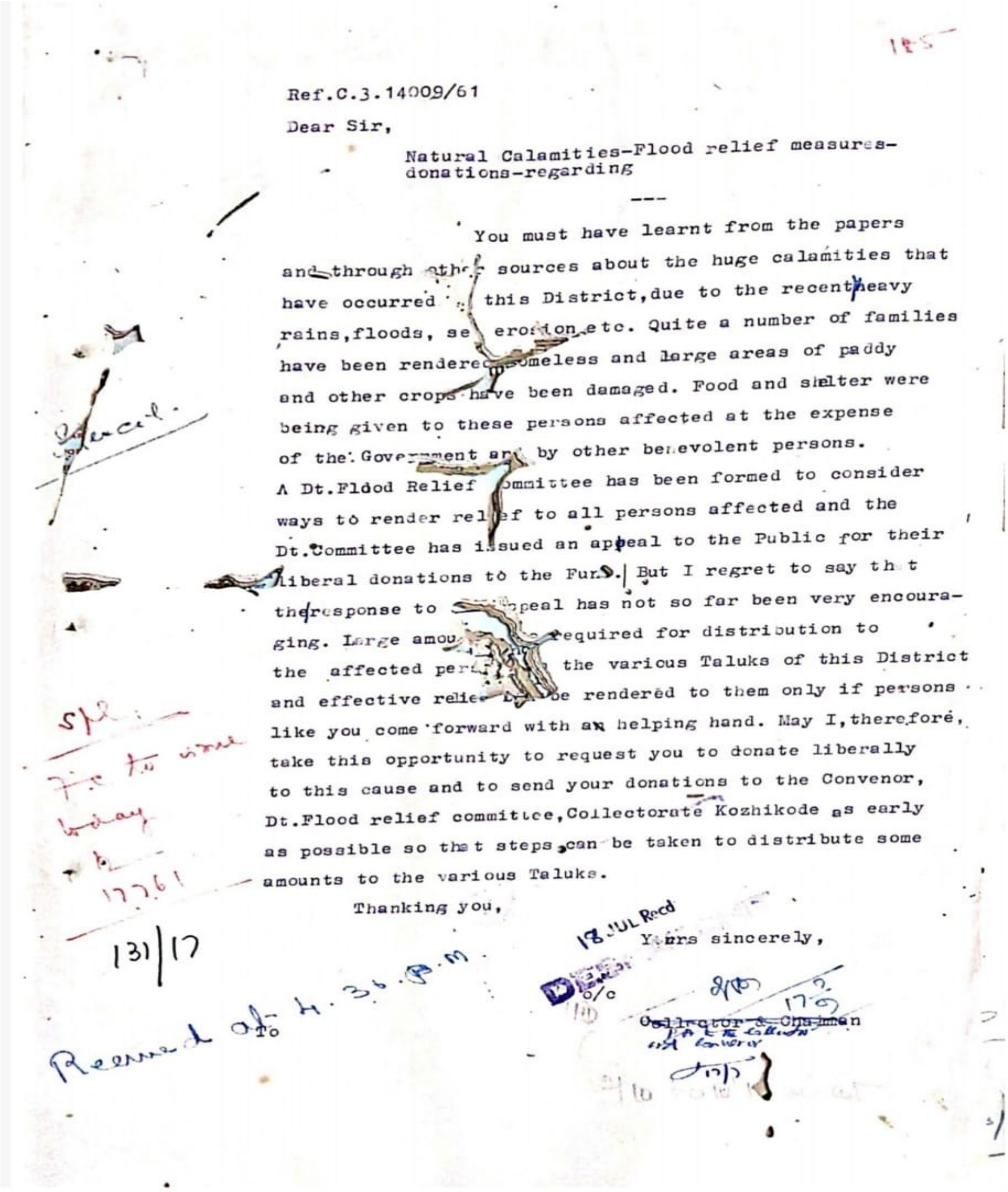
[78] Kozhikode Collectorate R-Dis File, File No: 14009/16, 30.6.1962.

Figure 5.12

Flood Relief Donations of the 1961 Flood



185

Ref.C.3.14009/61

Dear Sir,

Natural Calamities–Flood relief measures–donations–regarding

You must have learnt from the papers and through other sources about the huge calamities that have occurred in this District, due to the recent heavy rains, floods, sea erosion etc. Quite a number of families have been rendered homeless and large areas of paddy and other crops have been damaged. Food and shelter were being given to these persons affected at the expense of the Government and by other benevolent persons. A Dt.Flood Relief Committee has been formed to consider ways to render relief to all persons affected and the Dt.Committee has issued an appeal to the Public for their liberal donations to the Fund. But I regret to say that the response to the appeal has not so far been very encouraging. Large amounts are required for distribution to the affected persons in the various Taluks of this District and effective relief can be rendered to them only if persons like you come forward with a helping hand. May I, therefore, take this opportunity to request you to donate liberally to this cause and to send your donations to the Convenor, Dt.Flood relief committee, Collectorate Kozhikode as early as possible so that steps can be taken to distribute some amounts to the various Taluks.

Thanking you,

Yours sincerely,

Collector & Chairman

Special.

Spl: Fix to issue today 17.7.61

131|17

Received at 4.30 p.m.

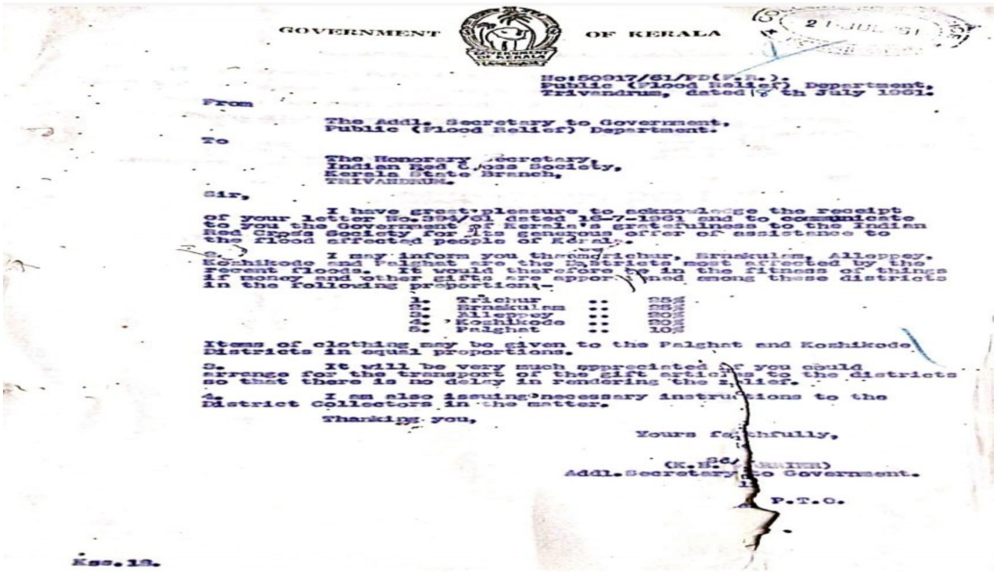
18 JUL Recd

Source: *Kozhikode Collectorate R-Dis File, File No: 14009/16, 30.6.1962, RAK.*

Epidemics are the aftermath of all-natural calamities. Due to the flood in 1961, serious epidemics spread all over the district. The government took immediate precautionary measures all over the district to prevent the outbreak of any epidemics. They had appointed health inspectors and other supporting staff to take care of them.

Figure 5.13

Acknowledgement letter to the Indian Red Cross Society



GOVERNMENT OF KERALA

21 JUL 61

No:50917/61/FD(F.R.).
Public (Flood Relief) Department,
Trivandrum, dated 18th July 1961.

From

The Addl. Secretary to Government,
Public (Flood Relief) Department.

To

The Honorary Secretary,
Indian Red Cross Society,
Kerala State Branch,
TRIVANDRUM.

Sir,

I have great pleasure to acknowledge the receipt of your letter No.394/61 dated 16-7-1961 and to communicate to you the Government of Kerala's gratefulness to the Indian Red Cross Society for its generous offer of assistance to the flood affected people of Kerala.

2. I may inform you that Trichur, Ernakulam, Alleppey, Kozhikode and Palghat are the Districts most affected by the recent floods. It would therefore be in the fitness of things if money and other gifts are apportioned among these districts in the following proportion:-

1. Trichur :: 25%
2. Ernakulam :: 25%
3. Alleppey :: 20%
4. Kozhikode :: 20%
5. Palghat :: 10%

Items of clothing may be given to the Palghat and Kozhikode Districts in equal proportions.

3. It will be very much appreciated if you could arrange for the transport of the gift articles to the districts so that there is no delay in rendering the relief.

4. I am also issuing necessary instructions to the District Collectors in the matter.

Thanking you,

Yours faithfully,

Sd/
(K.N. [illegible])
Addl. Secretary to Government.

P.T.O.

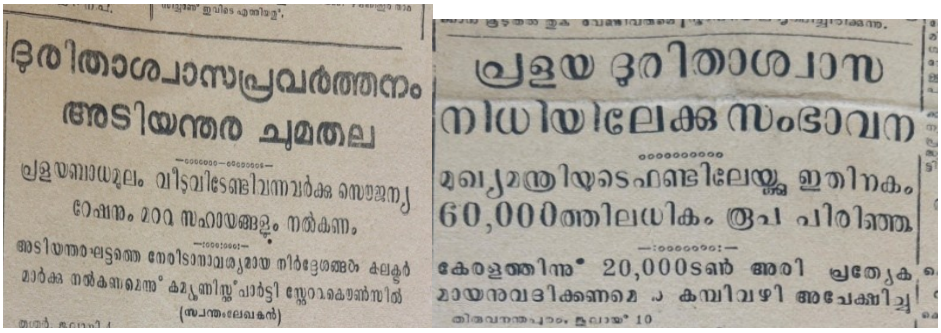
Kss.19.

Source: *Kozhikode Collectorate R-Dis File, File No: 14009/16, 30.6.1962, RAK.*

The Kozhikode Regional Archives hold several copies of letters sent to various organizations seeking help for flood-affected areas. Figure 5.13 is an acknowledgement letter to the Indian red cross society for their support of the flood-affected people of Kerala.

Figure 5.14

Desabhimani Daily reports on the Chief Minister's Relief Fund Allocation for the 1961 Flood



ദുരിതാശ്വാസപ്രവർത്തനം അടിയന്തര ചുമതല

പ്രളയബാധമൂലം വീടുവിടേണ്ടിവന്നവർക്കു സൌജന്യ റേഷനും മററു സഹായങ്ങളും നൽകുന്നു.

അടിയന്തരഘട്ടത്തെ നേരിടാനാവശ്യമായ നിർദ്ദേശങ്ങൾ കലക്ടർമാർക്കു നൽകണമെന്നു് കമ്യൂണിസ്റ്റ് പാർട്ടി സ്റ്റേററു കൌൺസിൽ

(സ്വന്തം ലേഖകൻ)

പ്രളയ ദുരിതാശ്വാസ നിധിയിലേക്കു സംഭാവന

മുഖ്യമന്ത്രിയുടെ ഫണ്ടിലേയ്ക്കു ഇതിനകം 60,000ത്തിലധികം രൂപ പിരിഞ്ഞു

കേരളത്തിന്നു് 20,000ടൺ അരി പ്രത്യേകമായനുവദിക്കണമെന്നു കമ്പിവഴി അപേക്ഷിച്ചു

തിരുവനന്തപുരം, ജൂലായ് 10

Source: *Deshabhimani Daily,10/07/1961.*

Figure 5.14 mentioned that there were many contributions from the government during the 1961 floods. More than Rs. 60,000 was allocated to the flood distress relief fund as part of the chief minister's fund. Similarly, free ration and other assistance were provided to those who had to leave their homes due to the floods. The government was specifically requested to allocate 20,000 tons of rice for Kerala.

Many have opined that huge destruction can be seen in the floods of 1961 and 1924 compared to the flood in 2018. Kerala at that time people estimated to be about less than 8 million; it's more than 34 million now. Given the unpredictable climate change scenario, one cannot be sure of anything. Long-cycle theories don't work on climate and the environment. Surely, it is a grim reminder that the time has come to revisit our 'development' activities in the Western Ghats, and our strategies of engaging nature. Madhav Gadgil, who headed the Western Ghats Ecology Expert Panel, reminded this to Kerala, Goa, and Maharashtra.[79] Writing on the situation in Kerala, Shiv Visvanathan, an independent observer, noted: The Kerala flood has been huge in scale and almost unprecedented. One has to go back to 1924 to think of a flood

[79] K.M. Seethi, *op.cit.,* p.21.

of a similar scale. Yet this is one disaster that has avoided exaggeration. A wise observer said, "this is a flood that has avoided sentimentality. The response is realistic and pragmatic. Citizens have moved into action, and yet they knew the limits of aid and relief"[80]

Details of storms which affected Kerala in the past

27th May 1911, North of Cochin: Heavy rainfall in coastal stations of Kerala. Rough seas with hurricane winds reported by passing ships in the inner storm area, speed over 52 Kts. *19th November 1912, passed through Kerala after crossing the Pamban Coast*: Many stations in Kerala reported heavy rainfall of over 4, causing destructive flooding in Gadilam and Kaveri. *29th November 1922, Near Tuticorin and passed through Trivandrum and emerged into the Arabian Sea*: Caused widespread very heavy rainfall at many stations in Kerala from 27th to 1st December. Many stations reported rainfall of 7-8 inches in 24 hours, the heaviest being 10 inches at Neyyatinkara and 12 inches at Sithapal Low-lying areas were inundated. Ships in the Arabian sea passing through the passage of a storm experience hurricane wind.

80 *Ibid*., p.14.

Table 5.6

Chief Amounts of Rainfall Recorded During the 24 Hours Ending on 30th November

Nayyathinkara	10.00
Pechippara	7.00
Puttandam	7.25
Clarlakod	7.15
Tadikarankonam	7.85
Sithapal	12.00
Aruamozhi	7.20
Tamarakulam	9.24
Old salt factory	10.65
New sault factory, Kottaram	8.35

Source: *Cyclone plan for Kerala, Government Press, Ernakulam,1980, RAE*

10th November 1925, near Calicut: very strong southeast winds lashed at coastal stations of Trivandrum and Alleppey. Rainfall was very heavy in North Malabar, the highest being 10.35 at Ponnani for 24 hours ending at 0830 hours on 11th November 1925. Caused considerable damage to country crafts and fishing vessels with heavy loss of life among their crew and great damage to property on land.[81]

24th May 1932, near Calicut: A Strong gale continued to blow on 24th and 25th at the Malabar Coast. Strong winds and widespread rain around Calicut caused considerable damage to the Railway and telegraph lines and public property. Worst-affected areas are Calicut Kurumbanad, Ernad, and Ponnani Taluks. The areas affected are 20 miles inland. Trees were blown down in large numbers, 16 deaths were

[81] Chief amounts of rainfall are Cherupulcheri 5.60", Tellicheri 7.35", Badagara 6.20", Kuttiyadi 6.25", Calicut 7.57”, Ponnani 10.33", etc. See, in. *Cyclone plan for Kerala, Government Press, Ernakulam,*1980, p.16, RAE.

reported, and -sub-jail in Calicut was flooded.[82] *5th December 1965 in North Malabar*: Widespread heavy rainfall and gales were experienced on the North Malabar coast.[83] Several country crafts, fishing vessels were sunk. A few lives were lost off the coast due to the cyclonic storm that also caused disruption of Telegraphic and Telephone communications and uprooted many coconut trees in South Malabar.[84]

Floods in the Anthropocene and other Factors

Kerala is ecologically fragile and significantly susceptible to large-scale landslides due to climate change. This vulnerability has intensified since Kerala, renowned for its tropical climate and diverse geography, is one of the most comfortable states to live in India. Its lush environment benefits from the southwest monsoon (June to September) and the northeast monsoon (October to November), which sustain a rich array of flora and fauna. The state's unique ecology is supported by 44 rivers and the Western Ghats, which shield the region from extreme climate conditions. The Arabian Sea to the west and the Western Ghats to the east are crucial in maintaining Kerala's moderate climate, avoiding the extremes experienced in other parts of India. Many tourists are attracted to Kerala during the monsoon season. However, deforestation and changing monsoon patterns result in far more frequent floods and landslides. The monsoon pattern changed for many reasons. This is because of widespread deforestation and denuding of hills, causing heavy floods and landslides, especially during the southwest monsoon when the state receives more

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82 The highest rainfall recorded for 24 hours ending at 08:30 hours on 25th May 1932 was 10-57 inches at Calicut and 10-1 at Manjeri. Other rainfall amounts are Nilamboor 8-26", Vaittiri 6-19, Payyanur 7-20", Badagara 9-40", Kuttiyadi 9-71", Quilandi 7-22", Tirurangadi 7-70 inches etc.

83 The chief amount of rainfall is in Trivandrum, 18 cm. On 4th, Minicoy 15 cm, on 7th and 8th 22 cm at Minicoy, 15 cm: at Androth, Cochin 9 cm. on 10th Androth 21cm., Cochin 12 cm.

84 *Cyclone plan for Kerala*, Government Press, Ernakulam,1980, RAE.

than two-thirds of its annual rainfall. Environmentalists have different opinions regarding the changing rainfall patterns. According to S. Abhilash, Research director at the Advanced Center for Atmospheric Radar Research at Cochin University of Science and Technology, 'Climate change is the most important cause for calamities like floods and landslides, which leads to global warming.' Under his guidance, a group of scientists discovered that the nature of clouds is also changing; thicker cumulonimbus clouds, which extend up to 14 km in height and could create sudden heavy rain over small areas, are forming over Kerala during the Southwest monsoon.

Kerala is one of the most densely populated Indian states, making it more vulnerable to damage and losses on account of disasters. Floods are the most common natural hazard in the state. Nearly 14.5% of the state's land area is prone to floods, and the proportion is as high as 50% for certain districts. Landslides are a major hazard along the Western Ghats in Wayanad, Kozhikode, Idukki, Palakkad, and Kottayam districts. The flood in August 2018 was the worst in Kerala in nearly a century. The torrential rains triggered several landslides and forced the release of excess water from 37 dams across the state, aggravating the flood impact. Approximately 341 landslides were reported from 10 districts. Idukki, the worst-hit district, was ravaged by 143 landslides. Floods and landslides resulted in extensive damage to houses, roads, railways, bridges, power supplies, communications networks, and other infrastructure; a decrease in crops, and badly affected the lives and livelihoods of millions of people in the state.

Flood has positive and negative impact for our environment. Floods play an important role in sustaining key ecosystem functions and biodiversity. They link the river with the land surrounding it, recharge groundwater systems, fill wetlands, increase the connectivity between aquatic habitats, and move both sediment and nutrients around the landscape and into the marine environment. For many species, floods cause migration and dispersal. These natural systems are resilient to the effects of all but the largest floods.

Kerala experienced notable shifts in its precipitation patterns in recent years, driven by climate change and increasing temperatures over the Arabian Sea. These shifts resulted in irregular and extreme rainfall events, including frequent cloudbursts. These meteorological changes and unsustainable land use practices caused devastating floods in 2018.[85] The 2018 floods, the worst in the state's population's history, affected a sixth of the 3.3 crore population and killed 483 people. In the same year, within three days in August, the state received a third of its average annual rainfall. Similar monsoonal calamities in 2019 and 2020 claimed more than 100 lives. In 2021, it was the Northeast monsoon that caused landslides and took dozens of lives.[86]

Climate change affects many aspects of our Earth, floods, droughts, forest fires, etc. Kerala experienced strangely heavy rainfall from June 1 to 19, August 2018. This resulted in severe flooding in 13 out of 14 districts in the State.[87] Month-wise rainfall for the period, as reported by IMD, is given below.

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85 Azad, P.; Salim, A. P. Muhammed; Das, K. S. Anoop, *op.cit.*, p.4.

86 Sruthilal, *op.cit.*, P.74.

87 The description of IMD Data, Kerala received 2346.6 mm of Rainfall from 1st June 2018 to 19th August 2018 in contrast to an unexpected 1649.5 mm of Rainfall. This rainfall was about 42% above normal. Further, the Rainfall over Kerala during June, July, and the 1st to 19th of August was 15%, 18%, and 164% respectively, above normal. See.,in. *Study report of Kerala floods of August 2018*, Central Water Commission Hydrological Studies Organization, Government of India, September 2018, p.1.

Table 5.7

Monthly Rainfall: Actual, Normal, and Percentage Departure

Period	Normal Rainfall (mm)	Actual Rainfall (mm)
Jun-18	649.8	749.6
Jul-18	726.1	857.4
1-19, August,2018	287.6	758.6

Source*: Study Report of Kerala floods of August 2018* [88].

Kerala experienced unprecedented torrential rainfall, which caused a massive flood in several state districts. In 2019, rainfall intensity was around 200-250 cm, 30% above the annual average. Hundreds of people lost their lives, and crops and properties were destroyed. The cost to the state and its people stands at Rs. 20000 crores approximately. 2019 remains a crucial chapter in the history of Kerala. Floods have been termed a natural calamity since many human lives were lost. The floods occurred in the last week of July and lasted till the third week of August. Other than heavy rainfall, thirty-five out of the fifty-four dams were opened. The Idukki dam waters from the dams did not spare animal and human life. The worst-affected areas include Chengannur, Edanad, Aranmula, Kozhancherry, Ayiroor, Ranni, Kuttanad, Aluva, and Chalakkudy.

Among the districts in northern Kerala, Malappuram, 58 people died, and 130 people were found missing; Wayanad is the worst hit. The life of people in Kerala is slowly getting back to normal as the rains reduce. The heavy rains and landslides

[88] The first onset of flooding appeared at the end of July as a result of heavy rainfall. On August 8th and 9th, 2018, there was an intense period of rain in several places. The 1st-day rainfall of 398 mm, 305 mm, 255 mm, 254 mm, 211 mm, and 214 mm were recorded at Nilambur in Malappuram District, Mananthavady in Wayanad District, Peerumaedu, Munnar and Myladumpara in Idukki District and Palakkad District respectively on 9th August 2018. This led to further flooding at several places in Mananthavady and Vythiri in the Wayanad district during 8th-10th August 2018. Water was released from several dams due to heavy rainfall in their catchments. Se in, *Study report of Kerala floods of August 2018*, Central Water Commission Hydrological Studies Organization, Government of India, 2018, p.1.

destroyed infrastructure and the means of livelihood of people in many places across the state. The government is still assessing the magnitude of damage due to heavy rains and landslides in the state that is recovering from last year's flood, which claimed the lives of 450 people and damaged properties worth Rs 40,000 crore. As per the data from the Kerala State Disaster Management Authority (KSDMA), as many as 1,789 houses were fully damaged between August 8 and 19, whereas the number of partially damaged houses was 14,542.

In the Malappuram district, a total of 795 houses were fully damaged and 3,409 houses were partially damaged. In Wayanad, 535 houses collapsed, and 5,435 households were damaged. Most of the losses are being reported from north Kerala, which was hit the worst this time. Among the districts in northern Kerala, Malappuram, 58 people died, and 13 people were found missing; Wayanad is the worst hit.

Kavalappara and Puthumala Incidents

Kavalappara's landslide occurred a few hours after Puthumala's in the nearby Wayanad district. The two landslide locations are in the Nilgiri district of Tamil Nadu, on either side of a portion of the ecologically sensitive area of Western Ghats. Water from the Puthumala hills pours into the Chulika stream[89], which flows through valleys and gorges to create the larger Chaliyar River, which passes by Kavalappara. The Chaliyar flooded many towns along its banks on August 8th-9th.[90] The Kavalappara was a remote village in the Boothanam ward of Puthukal-panchayat of Malappuram district. Huge losses took a toll of 81 lives, and heavy property damage was reported. Around 8.00 p.m. on 8th August 2019, Kavalappara in the Puthukkad area of

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89 Chulika River is another name for the Chaliyar River, which is the fourth longest river in Kerala.

90 Shaju Philip, 'Kavalappara landslide: How a hill in the Western Ghats buried part of a village in Kerala', *The Indian Express*,14.08.2019.

Malappuram District suffered multiple hazards of landslides and floods. The landslide was initiated along the north-facing hill slopes. The 4th order stream joining the Chaliyar River, flowing west to east, started flooding on the morning of the same day. At noon, the flood level reached more than 2 m above the bridge at Bhoodanam in the Puthukkad area.[91]

Figure 5.15

2019 landslides at the site: Kavalappara, Malappuram District

Source: *https://www.researchgate.net/publication/344039924.*

Puthumala, a plantation village near Meppadi, is 20 km away from Kalpetta in Wayanad District and is at 1230m above main sea level. On 8th August 2019, Kerala witnessed devastating floods and landslides due to the heavy rainfall during the monsoon season. The epicentre of the landside was 290 metres high on the mountain, which brought down 20 hectares of land, pushing it to about 2 km. The Puthumala landslide started as one of those smaller landslides that occurred deep inside the forest. However, the landslide turned catastrophic because the soil structure in the lower parts was fragile and soaked with rain. When rocks and soil were crushed under pressure, they turned into a huge landslide. It was observed that a large portion of the hill had

[91] Sudesh Kumar Wadhawan, Balmukund Singh and Maneesha Vinodini Ramesh, 'Causative actors of landslides 2019: A Case Study in Malappuram and Wayanad Districts of Kerala India', *Landslides,* 18 August 2020, p.2690.

collapsed, and a huge strip of valley land was filled with mud, rocks, and debris. Some of the major factors for landslides in this region were high rainfall intensity resulting in soil disintegration, deforestation, shallow soil depth resulting in water seeping into the cavities or soil piping, cardamom farming on the side of the mountain made the soil loose, vanishing stream length due to construction and occupation, unscientific construction, and mining on the hill which changed the structure of the soil. In Puthumala, nearly 100 acres of tea plantation were washed away in the massive landslide. The village's primary livelihood depended on agriculture, with crops such as cardamom, pepper, coffee, and tea. Based on the assessment of the soil conservation department of Wayanad district, about 25,000 hectares of area had lost the top fertile soil layer of 2 cm, which severely affected the agricultural production. Nearly 40 hectares of land were affected by landslides, landslips, and silt deposits. The soil nutrients were washed away due to high-intensity rainfall events in the region. As a result of the landslide, soil covered the whole plantation of coffee and tea of 300 acres. The landslide sites are a part of the ecologically sensitive Western Ghats, and they were on the list of areas vulnerable to landslides. In Wayanad, 102.6 km^2 and 196.6 km^2 areas are extremely landslide-prone and moderately landslide-prone, respectively, with some locations also susceptible to the soil piping effect. The landslide-prone regions are likely to increase in the future due to climate change. Therefore, it is necessary to regulate and prohibit unscientific constructions and regulate land development activities and the functioning of quarries in landslide hazard-prone areas of the district to prevent such disasters in the future.[92]

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92 Sujeet Desai, 'Landslide events of Kerala, their causes and impacts: A Case study of Puthumala Landslide in Wayanad District', *https://www.researchgate.net/publication/339983293, Aceessed,18/11/2024,7:15.*

The Monsoon as a Gendered Experience

Gender inequalities have social, economic, political, and cultural implications that influence how individuals respond to climate change. Gender is important because women, men, boys, and girls are homogeneous groups; they have faced different types of problems about climate change based on the inequalities associated with socially constructed gender roles.[93]

Climate change has badly affected agriculture as it was heavily dependent on the regularity, duration, and climate features of the season and the availability of natural resources. Smallholder farmers constitute a significant portion of the world's population with an estimated 450-500 million people worldwide, representing 85% of the hungry across the globe. Hence, the farmers, particularly the small and marginalized, are disproportionately affected the climate change.[94] Terry Cannon persuasively argues that 'while hazards are natural, disasters are not. Social processes generate unequal exposure to risk by making some people more prone to disaster than others, and these inequalities are largely a function of the power relations operative in every society.'[95] Historically marginalized people have been mostly affected by the changing monsoon patterns. J. Devika, Professor at the Center for Development Studies in Thiruvananthapuram, points out that it is mainly dalits and marginalized sections who stay in the most environmentally vulnerable areas of Kerala because they did not benefit from the much-celebrated land reforms. The Rebuild Kerala Development program document also acknowledges this, saying that floods and landslides disproportionately affect vulnerable groups such as women, elderly

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93 *Ibid*.

94 K. Paul Thomas, 'Climate Change and Agriculture', in Sunil B, Irshad A, Vasudevan V.N, et,al. (eds.), C*limate Change and Sustainable Food Production*, Excel India Publishers, New Delhi, 2017, p.10.

95 Greg Bankoff,Georg Frerks and Dorothea Hilhorst, (eds.), *Mapping Vulnerability; Disasters, Development and People*, Earthscan in the UK and USA, 2004, p.2.

children, persons with disabilities, scheduled tribes, scheduled castes, and fisherfolk. Devika's opinion is that strengthening local government institutions is necessary to find a solution suited to each locality and create income opportunities.[96]

During the natural calamities, women played an important role in their homes and families. There is evidence that floods increase women's domestic burden. The loss of utensils and other household essentials was hard, and floods also undermined women's well-being in general because of their dependence on economic activities linked to the home.[97] Local community knowledge, strong social networks, key roles in families, and active work roles make women resourceful actors in crises, but it is observed that women are rarely recognized by 'front-line' responders. Moreover, women are markedly absent in the decision-making process, leadership roles, and higher levels of the emergency management field.[98] Floods negatively affect rural women more than rural men. Floods destroyed the household resources, undermining rural women's economic well-being. Women are rarely involved in the decision-making process regarding disaster response.

Water and sanitation are the major problems in many areas, in which the suffering of women and girls is exacerbated during disasters. During flood, women and girls spend 4-6 hours a day, walking, too far off places in search of drinking water. During floods, when toilets and hand pumps were all flooded, women waited until late evening to go out and relieve themselves. Many decreased their intake of food and water due to this fear. Going to isolated places also puts their safety at risk.

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96 *Ibid.*, p. 75.

97 Terry Cannon, 'Gender and climate hazards in Bangladesh', *Research gate*, 26, February 2018, p. 48.

98 Mirza Ali Ashraf1and Md. Abul Kalam Azad, 'Gender Issues in Disaster: Understanding the Relationships of Vulnerability, Preparedness and Capacity', *Environment and Ecology Research*, September 2015, p.140.

Maintaining personal hygiene during a disaster became a challenge when people took shelter in relief camps or on embankments in the absence of privacy. During the Bihar Floods 2016, out of the 37 villages where joint rapid needs assessments were conducted by humanitarian organizations in India, a requirement for clean clothes for menstrual hygiene. More than 50% of women were borrowing clothes from neighboring hamlets where the effect of floods was less. Another challenge with displaced women during floods is that they don't have access to soap or clean water. They are forced to wash sanitary cloths in contaminated water and reuse them. At times, due to continuous rain and high humidity, the cloth used during menstruation is not even properly dried before reusing, leading to urinary tract infections. further, the lack of sanitary napkins/clean clothes reduces the mobility of adolescent women and girls. The recent Bihar floods and flood alert warnings in Kerala are just the latest in a long line of natural disasters that periodically strike India, leaving behind a trail of devastation. The focus afterwards is on assessing the loss of life and economic cost, of course, rehabilitation. But though it is well known, the gender dimension of such disasters is not emphasized enough.

Historically, Kerala has experienced several deadly landslides, even before the 2018 floods. Notable incidents included the Mundakkai landslide in 1984, the Kappikalam landslide in 1992, and the Vallamthode landslide in 2007, which resulted in 14, 11, and 4 deaths respectively.[99] Kerala encountered several contemporary climate issues, primarily driven by global climate change and local environmental challenges. The main issues include heavy rainfall and flooding that caused unseasonal and extreme rainfall events, like the devastating floods in 2018 and subsequent years, which became more frequent, attributed to climate change and changes in monsoon patterns. Another important issue was droughts it held because

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[99] S.L.Kuriakose, G.Sankar,and C.Muraleedharan, 'History of landslide susceptibility and a chorology of landslide-prone areas in the Western Ghats of Kerala, India', *Environmental Geology*, 57, 2009, pp.1553–1568.

of the scarcity of rain, despite heavy rains, certain regions experienced water scarcity during summer. Deforestation is another important contemporary issue which was caused by the encroachment on forest land, quarrying, and urbanization which contributed to the loss of biodiversity and climate issues. Landslides occurred in unregulated construction, deforestation, and heavy rainfall increased the frequency and severity of landslides, particularly in hilly regions like Wayanad and Idukki. Addressing these issues requires a combination of sustainable development practices, conservation efforts, and climate adaptation strategies.

Today, the Western Ghats, the oldest ecosystem in the world, is in a very dangerous situation. Out of the 34 Biodiversity Hotspots in the world, 8 are described as 'Hottest Hot Spots'. Among them are the Western Ghats, which are also included as bio-cultural spots. It is home to many endangered species of flowering plants, fish, birds, and other species. About 40 crore people depend directly and indirectly on the Western Ghats for their livelihood and basic needs. Fourty percent of India's land is dependent on the large rivers like Kaveri, Krishna, and Godavari that originate from the Western Ghats and flow eastward, and hundreds of small rivers that flow from the western slopes to the Arabian sea. For the past 200 years, Western ghats experienced various complexities due to human interventions. It includes forest destruction to plantations, mining (a lot of reserve forest has been cleared for iron ore in Goa), dams (there are over 800 dams on the rivers that flow through the Western Ghats), immigration, tourism, highways, pollution, etc. Many development departments (Energy, Transport, Agriculture, Water Resources, Tourism, Mining) are implementing every project and activity with only an eye on their objectives. In the last 20 years, the private and corporate sectors have also exploited the natural resources of the Western Ghats. It caused increasing water scarcity, pollution, soil erosion, landslides, destruction of rivers, loss of biodiversity, and health problems.

The Gadgil report argues that it is not possible to move forward without considering these kinds of serious environmental impacts.[100]

Famine: Historical Outlines of Food Shortage and Rainfall Variability

Nature provides us with clean air, clean water, and food, all of which are essential for human survival. Due to heavy rainfall, many areas in Kerala are experiencing flooding. After 1924 and 1961, Kerala witnessed the worst floods in 2018. Every year, the monsoon season becomes a nightmare for Malayalis. Almost all rivers in Kerala are contaminated canals that flow only during the rainy season. By the time the rainy season is over, all this water has turned Kerala into an invisible severe drought. Rainfall variability has been a significant ecological factor shaping the incidence, severity, and duration of famine and drought throughout human history. Farming was dependent on expected seasonal rains; whether it was delayed, badly affected the growing of crops, and led to food shortages. There is a general statement that famine is the outcome failure of crops. The Madras famine code observed that famines occurred because of insufficient and untimely rainfall, resulting in the failure of crops.[101]

The proximate cause of a famine in time of peace is the failure of harvests resulting from insufficient or untimely rainfall. The loss of a single harvest over a restricted area, after a year of normal plenty, will not, of necessity, produce famine, or even such a degree of scarcity as to call for State intervention, the food outturn of an ordinary year being usually more than sufficient to meet the wants of those dependent on it for their subsistence until the next harvest, but, when two or more

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[100] Dr.Ladha, Kavalmalaye Kathidan, Manila, (eds.), *Madhav Gadgilum Paschimaghatta Samrakshanavum,* Mathrubhumi Books, Kozhikode, 2019, p. 87.

[101] Abdul Rasheed, 'Food and Power; In the Context of Malabar Famine', *International language of English Language and Humanities*, Vol.III, May, 2015, p.553.

harvests in succession fail over a large extent of country, the probable result will be severe distress among the smaller landholders, the landless classes and field and other labourers, and petty artisans, who, having no stores of grain, are dependent on their labour, the demand for which slackens at such seasons, for the means of purchasing their daily food. Should the drought continue, the distress becomes more widespread; the reserves of grain laid by for domestic consumption by even the better classes of landed proprietors are gradually exhausted; the grain dealers keep their stocks back from the market, prices rise rapidly, private charity becomes contracted, and the pinch of famine is sensibly felt by all but the wealthy.[102]

The Indian famine commission of 1880 had stated that "in the western district of Malabar, rain never fails so that its population are safe from famine." This was later mentioned by Innes and Evans in their well-known Madras District Gazetteer, when they claimed that "Malabar is protected from famine by the unfailing south-west monsoon, and the prices of foodstuffs do not fluctuate so much as in other less fortunate districts. William Logan noted that the Malabar region was constantly on the 'brink' of famine, but after the first half of the eighteenth century, there was no record of any famine in the district.[103] But the work of M. Raghavan, *State Failure and Human Miseries: A Study with Special Focus on Famines in British Malabar*, give a detailed description of the famine in Malabar that occurred in the 19th century also.

The actual famine occurred in Malabar, and monsoons became acutely unfavourable for seasonal sowings. Heavy rains and the accompanying floods considerably restricted the area under field crops, resulting in a drop in the outputs of all major and minor foodgrains.

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[102] Madras Famine Code, p.1, RAK.

[103] M. Raghavan, *State Failure and Human Miseries: A Study with Special Focus on Famines in British Malabar,* Kalpaz Publications, New Delhi, 2016, p.53.

Table 5.8

The table showing Rainfall in Malabar,1875- 1878 (in inches)

	Malabar District	Madras Presidency
1. **South-West Monsoon**		
Avg. for preceding 10 yrs.	93.71	27.33
1875-76	87.91	25.87
1876-77	78.93	22.44
1877-78	96.11	27.93
2. North-East Monsoon		
Avg. for preceding 10 yrs.	14.24	16.18
1875-76	10.53	11.41
1876-77	4.26	6.67
1877-78		20.19
3. Total		
Avg. for preceding 10 yrs.	107.95	43.52
1875-76	98.44	37.28
1876-77	83.19	29.11
1877-78	123.49	48.12

Source: *Proceedings of the Board of Revenue, Madras for the years 1878 and 1879, RAK.*

Table 5.8 shows that the starting point of the famine was the unpredictable monsoon from July 1875 to June 1876. Paddy cultivation was decreased due to the unfavourable weather. Farmers had to dispense with large portions of the area under paddy. So, the everyday life of the people was badly affected. The 1876-77 season was more disastrous than the preceding season. The average rainfall in Malabar was recorded at 83.19 inches, as against 107.95 inches in the last ten years. The rainfall was not only unseasonal but also highly unequally distributed across the district. The south-west monsoon, the principal rainfall season, failed in most parts of Malabar. Owing to deficient rains, the second crop of the region had also failed almost entirely. The prices of rice and other foodgrains flared up. Loss of employment in agriculture and the resultant loss of purchasing power led the common people to impoverishment, which, when continued, deepened into a massive famine in the entire areas of the Malabar district.[104]

The monsoon in 1877-78 was different from that of the previous two years. Though above normal, the rainfall was unequally distributed. Availability of water was insufficient during the maturing stage of the crop, but the rainfall became sufficient when the crop was ready for harvest. The crops harvested during September-October were the most affected. The total production of foodgrains of all three seasons taken together in 1877-78 was just two-thirds of the corresponding outputs in the previous year, which itself witnessed a disastrous harvest. Finally, in 1878-79, the Malabar region received sufficient rain. As a result, the production improved, foodgrain prices became normal, and the famine slowly began to recede.[105]

Table 5.9

The table showing Market prices of foodgrains in Malabar,1875-79

	Last 10 yr average	1875-76	1876-77	1877-78	1878-79
Rice					
I Sort	548	406	549	612	577
II Sort	498	369	499	564	538
Paddy					
I Sort	212	157	251	272	259
II Sort	192	142	166	221	210
Horse gram	318	226	383	507	381
Cholam	143	196	356	479	340
Cumbu	126	173	313	421	299
Ragi	242	174	318	435	309

Source: *Board Revenue Reports, Madras, RAK.*

104 *Ibid*., p.62.

105 *Ibid*., p.61.

Table 5.9 shows the Market prices of foodgrains in Malabar during the year between 1875-79. The table explains the price of the different foodgrains like Rice, Paddy**,** Horse gram, Cholam, Cumbu, and Ragi. According to the availability of rainfall, the price of the foodgrains varied the year between 1875 to 1879.

Famine Relief Activities

Like flood relief activities in Malabar, there existed famine relief activities also. During the 19th and early 20th centuries, famine relief activities in Malabar were shaped by colonial administrators. British authorities established relief works, such as land improvement loans, agricultural loans, advances to weavers, etc.

Land Improvement Loans.

The most effective ways to provide relief and create employment opportunities for people close to their homes during times of hardship are to promote the clearing of grass and similar tasks through State loans granted under Act XIX of 1883. The collectors initiated that when distress occurs in any district, he should take immediate steps to bring to the knowledge of the ryots in all localities the advantages of the rules; should invite applications for loans; and make special arrangements for disposing of the applications with despatch. They appointed an extra Revenue Inspectors to conduct the necessary inquiries, and for additional allotments of funds.[106]

Agriculturist' loans

There are some conditions for the government to provide loans to the farmers. The government also provided loans to farmers for the purchase of fodder for the maintenance of their cattle and to meet their daily living costs. Loans are usefully distributed to ryots for purchasing their necessary items. Fodder loans are granted only

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[106] Madras Famine Code, *Op.cit.,* p.26.

to the person who properly takes care of their cattle. Loans for the purchase of cattle should only be granted when they are likely to lead to an increase in agriculture in that area. When the season improves after a period of drought, advances are also given to farmers for purchasing seed grain. Ordinarily, seed grain is not to be purchased by Government officers for distribution, but advances were given in the form of money to the agriculturists. Weavers are an important category of people in the Malabar region, and during the famine days government provided wages to the weavers well in advance. The case of weavers who, by the practice of their profession, are unsuited for hard manual labour, may require special treatment, if their condition is not merely the result of a temporary pressure arising from high prices. When these classes are congregated together in considerable numbers, either in the same village or in a group of contiguous villages, employment in their craft should be given to those who need relief. This should be done by advances made through a supervising official appointed expressly for the purpose, who will work in communication with the head of the guild in each village. The government also sanctioned some procedures for weavers for their advancement." The first step is to draw up a list of weavers who are unable to find a market for their goods, and who, though willing to work, are in danger of falling into a state of starvation for lack of employment. The list should show the name of the head of the family, the number of members of the family, and the number of looms in the house".

There are some sanctions required of the government for advances to the weavers. They are;

> '*No advances should be made to weavers without the sanction of the Board, and in submitting proposals for making such advances, full details of the description and sizes of cloths proposed to be woven*

should be reported, together with information as to whether they are ordinarily in demand locally'.[107]

The government also provided special privileges to gosha women. They were respectable women in national custom, unable to appear in public, so the government provided necessary information towards the emancipation of gosha women.[108]

Famine can indirectly contribute to drought-like conditions, especially in regions such as Malabar with unsystematic monsoon-dependent ecosystems. Our country has witnessed several droughts (1966-67, 1979-'80, 1986-'87, 1996-'97, 2001-2002). At that time, food production fell below the national average. Many people and livestock died due to starvation. In 1987, 267 districts and 166 million people were affected by drought. Studies show that 40% of the struggles going on in the world today are related to the environment. When the daily life and survival of the people are threatened, many struggles are formed from the grassroots under the leadership of the common people. Not only do non-organised political parties and movements come to support these struggles, but they often stand on the other side. It is remarkable that environmental protection, which used to be the preserve of an elite group of highly educated environmentalists, has become part of the common people's struggle for existence and survival.[109]

After Bangladesh, India is the second most flood-affected country in the world. It occurs during the heavy monsoon. The southwest monsoon between June - September brings the heaviest rainfall in India. But geographically, rainfall is not uniform. It can be seen in many variations. In some places, the monsoon passes very normally, in other places, it is visible in the form of droughts and floods. The average

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107 *Ibid.*

108 *Ibid.,* p.27.

109 V.N. Haridas, *Keralathile Paristhithi Munnettangal*, DC Books, Kottayam, 217, p.117.

annual rainfall is 1,170 mm. meters. However, it varies from 100 mm. in the western deserts to 11,000 mm. in the north-eastern regions. 15% of the rainfall falls in just fifteen days and 100 hours in a year. The heavy rains coupled with the melting of the himalayan snows, also inundate the states. Uttaranchal, U.P., Bihar, Jharkhand, West Bengal, Orissa, and Assam are the seven major flood-prone regions of the country. The National Flood Commission (Rashtriya Barh Ayog) estimated the area of flood-prone areas in India to be about 40 million hectares. On average, floods claim 1,600 human lives, 95,000 livestock, and 1.2 million houses every year. The annual loss they cause is about Rs. 13,470,000.[110]

Climatic changes played a crucial role in life of the people of Malabar and the monsoon patterns reveals a thoughtful interaction between humanity and nature. Contemporary natural disaster revels how shifts in monsoon behaviour, caused climate change, transformed people livelihoods, work structures, and cultural practices. Floods, caused for the destruction of the agriculture, and public health challenges emphasize the vulnerability of communities. This session also analysed how people overcome the disasters through the relief measures of government. This inquiry proves that the monsoon is not merely a climatic event but a fundamental force shaping human existence. The monsoon thus develops both a metaphor and a reality of adaptation in an era of climatic vagueness.

[110] Kiran B. Chokker, Mamatha Pandya, Meena Raghunathan (eds.), Ravindranath (trans.), *Paristhithiye Manassilakkam,* DC Books, Kottayam, 2013, p.95.

CHAPTER 6

CONCLUSION

Ecology emerged as a distinct branch of science during the latter half of the 20th century. Environmental awareness emanated as a response to the misuse of scientific developments for selfish motives, which led to disturbances in the environment. These disruptions then led to various ecological problems, persuading philanthropists to study the environment deeply. Environmental concerns existed since ancient times. People on ancient times were also conscious of environmental issues, although they perceived them differently. It is the relationship of humanity with nature that has inculcated the belief that it must be protected. Environmental challenges exist globally, and people involved in these issues are actively working towards solutions. Among these, climate change has emerged as the most critical environmental issue worldwide. One of its impacts is the increasing irregularity of monsoons, with shifts in rainfall patterns and intensity. This variability affects both natural climate cycles and human settlement patterns. The Monsoon has always been a vital seasonal phenomenon in the Indian subcontinent, eagerly awaited by its people. Its variations have been perceived differently monks, travelers, poets, traders and researchers. The Monsoon has sustained civilizations by nurturing crops, nourishing rivers and helping human settlements to thrive.

This thesis titled ‘Monsoon in Colonial Malabar: Histories, Memories and Everyday Life’ develops that this seasonal variation is far more than a natural phenomenon; it is intensely tried to understand region’s collective memory, historical descriptions, and patterns of everyday life. The monsoon has shaped not only the agricultural cycles and economic structures of Malabar but also its cultural expressions, social relationships, and lived experiences across generations. Through Traditional Ecological Knowledge we can understand that how people have adapted to the rhythms of rain and survived changing climatic variations. Thus, the monsoon emerges as a powerful force that connects the past with the present, representing a unique intersection of memory, history, and everyday life that continues to define the identity of Malabar.

The first chapter of the thesis concentrated objectives, hypothesis, sources, review of literature, relevance and scope of the study. The second chapter focuses on the Etymology of the term Monsoon and traces its origin. The Indian Monsoon has been pivotal in shaping the subcontinent's cultural history from the Indus Valley civilization to the modern societies. The monsoon has not just influenced agriculture, but has also woven cultures, festivals, art, infrastructure, travel and poetry. The seasonal wind shifts that bring heavy rains across the subcontinent have always been crucial to agriculture and climate. Since ancient times, sailors heavily relied on these winds to navigate through the Indian ocean. This emphasizes that the significance of the monsoon is deeply rooted in history and not a recent idea. During the medieval period, water systems such as canals, lakes, ponds, and fountains became integral elements of Mughal landscapes. Even Indian classical texts vividly describe the vagaries of seasonal variations. Both early colonial travel writings as well as modern literature explores how the monsoon influences trade, agriculture and daily life. The *Arthashastra* of Kaudilya, the *Meghadoot* of Kalidasa, ancient Vedic literatures such as the *Rigveda, Yajurveda,* and *Taittiriya Samhita*, as well as the *Mahabharata*, highlighted the ecological importance of the region and how rainfall variations contributed to the country's richness. Tamil literature, mainly the Sangam texts, is replete with references to weather and climate. The Sangam Works such as the *Tolkappiyam, Akananuru, Purananuru, Mathuraikanchi, and Kuruntokai* provide insights into how ancient tamils inferred and predicted weather conditions as well as how Tamil seafarers relied on winds and sails for navigation. Prominent travel figures like Marco Polo, Ibn Battuta, and Francis Buckan have documented Kerala in their travel accounts describing the role of monsoon winds in promoting trade across the Arabian Sea and the Indian Ocean. These narratives reveal how monsoons influenced settlement patterns, agriculture, and urban planning. In the Malabar region, architectural structures were specifically designed to withstand the heavy monsoon rains, with design elements such as sloping roofs, deep verandas, courtyards, and water channels, designed to embrace and manage the monsoon. Prominent Malabar mosques like the ones in Kuttichira and Ponnani had such features incorporated in them for protection against heavy rains. Similar monsoon shielding architectural styles can also be found in regions like China, northern India, India's eastern coast, as well as East African coast. Malayalam Literature too presents rain as a central narrative shaping human experiences, economies, and artistic expressions across history. The works of authors such as P. Vatsala, M.T. Vasudevan Nair, and Takazhi Sivasankara Pillai were mentioned. Rain is depicted not merely as a natural phenomenon but as a powerful symbol interwoven with nature, social issues, personal experiences, and cultural contexts.

The third chapter analyzes how Britishers utilized traditional ecological knowledge to reinforce their scientific understanding about climate. We used traditional ecological knowledge as a potential source for environmental information. Experiences of social and cultural memories were preserved in the form of stories, songs, folklore, linguistic and literary artefacts. The people of Malabar previously relied on long-standing Traditional Ecological knowledge for weather forecast. After the advent of colonialism, British adopted this knowledge and paved the way for the institutionalization of climate studies. This thesis also explores folk archives including memories, folklore, and Arabi-Malayalam literature, to project the intricate relationship between monsoon rhythms and the formation of socio-cultural life in the

Malabar region. It argues that rituals, beliefs, and practices reflect a complex interplay between monsoon patterns, emotions, memory and knowledge systems. These sources also offer insights into how past societies responded to environmental challenges. During 19th and 20th centuries, rain knowledge, agricultural practices, and weather-related proverbs delivered valuable insights into how communities understood and navigated their environment. They revealed not only practical survival strategies but also the ways in which societies organized their social relationships and economic systems aligned with the rhythms of nature. Changing knowledge is a way to critique not just nature but our current development patterns. Kerala's agrarian knowledge embedded in these proverbs served as repositories of traditional ecological knowledge, guiding farmers in decision-making related to crop selection, planting seasons, harvesting techniques, and weather predictions. Proverbs related to seasonal variations and soil fertility helped farmers to synchronize their agricultural activities with the region's unique climatic rhythms, leading to better yields and economic prosperity. Furthermore, these proverbs structured and reinforced social norms, labour ethics, and farmers' cooperation in activities such as paddy transplantation and harvest festivals. Oral histories, folklore, and personal narratives serve as invaluable resources, capturing the life experiences of agrarian communities. These memories provide the complexities of agrarian relations, relations between colonial policies, land tenure systems, and peasant resistance movements. By engaging with these collective memories, historians can construct a more comprehensive and nuanced understanding of Malabar's agrarian past, acknowledging the resilience and agency of its rural populace amidst external pressures and internal challenges. However, all this traditional wisdom that we have understood based on these proverbs is being unsettled as a part of climate change.

The fourth chapter analyses the establishment of the meteorological department and examines how indigenous rain knowledge intersected with the evolution of meteorological practices in colonial India. This challenges Eurocentric perspectives and broadens our understanding of climate science in the colonial context. The colonial state played a central role in the expansion of science and technology which led to fostering of new ideas and organizations. A key turning point arose with the establishment of weather stations with reliable meteorological instruments across their growing territories, which were preserved as sources of knowledge in colonial archives. These sources in the form of records included the annual rings of trees, the rainfall records, flood relief measures, telegraphs of officials, seasons and soil reports, Rain report correspondence file, District Gazetteer. Such materials significantly strengthen our understanding about the climatic knowledge. Rain Gauges were established in Malabar as well as in many other regions, through which rainfall was systematically observed. Most rain gauge stations were located in plantation estates, urban centers, and saltpans with appointed special officers responsible for collecting and measuring the rainfall. British colonial administrators relied on these records to track the rainfall variations and to plan their activities such as construction of roads, bridges, buildings, etc. So, the Britishers were able to grasp these climatic variations with the help of rain records. The rain gauges are maintained under the supervision of the officers of the salt department, since rainfall directly influenced the operation of salt pans, particularly the processes of salt production and the efficiency of its extraction. Shifts in monsoon patterns driven by climate change, along with increasing instances of extreme weather events, and rising sea levels pose long-term challenges to salt pan sustainability. The second part of this chapter analyzes the interlinked between war and monsoon. The Malabar district experiences heavy and extended southwest monsoon rains, posing serious obstacles for military operations. Both warfare and the region’s monsoon climate, deeply influenced the British administration, creating a unique set of challenges that shaped their colonial policies and military strategies.

The establishment of early meteorological stations in the Malabar region reflected the colonial administration's need to monitor climatic patterns for agricultural, economic, and infrastructural planning. Acknowledging the critical role of monsoonal variability in the agrarian economy, the British authorities set up some of the earliest rain gauge stations in key administrative and trade centers such as Calicut, Cannanore, and Palghat. These stations were vital for tracking seasonal rainfall, particularly the southwest monsoon, which dictated the success of rice cultivation and plantation agriculture, including tea, coffee, and spices. By the early 20th century, meteorological stations in Malabar had expanded in number, incorporating both manual and instrument-based observations of precipitation, temperature, humidity, and pressure. The colonial meteorological network also played a pivotal role in early cyclone warnings, given Malabar's exposure to occasional tropical storms from the Arabian Sea.

The fifth chapter of the thesis described natural calamities such as floods, famine, and droughts. Recent environmental history scholarship has highlighted the impacts of climate change, monsoon patterns, and flood risks, especially in the context of the rising frequency of natural calamities. Climate forecasts must deliver early warnings related to flood, water, energy, health, transportation, and long-term predictions at society-relevant timescales of a few years to even a decade. Droughts, floods, cyclones, landslides, tsunamis and earthquakes are a major part of the wide spectrum of disasters occurring in our country. Almost all parts of India experience one or more of these disasters. Monsoons have carved the history of modern humans and climate change for hundreds of thousands and even millions of years, helping shape our species' evolution. Human evolution, including all of prehistory and history, was shaped by multiple influencing factors. Today, climate change is the major driving force behind calamities such as floods and landslides, which leads to global warming. So, this chapter particularly analyses early floods I the years like 1924,1961, and the recent disasters in 2018 and 2019. Floods bring both positive and negative impacts on the environment: they can cause widespread damage to homes, crops, infrastructure, and also affect human and animal life while also sustaining key ecosystem functions and biodiversity. The flood creates impacts differently depending upon the region. The earliest work of 'The Great Flood of Travancore1924' mainly concentrates on recollecting the testimonies of old people who witnessed the flood and how it affected the areas of Travancore and the Munnar high ranges. In contrast, the present study analyses how the flood in 1924 affected the Malabar region on the basis of archival documents. Numerous archival sources in the form of telegrams were sent by the Malabar collector to the Chief Secretary (Government of Madras), reporting serious cyclonic disturbances affecting the everyday life of people in Malabar. Food shortages in the Malabar area followed, prompting the Malabar collector sent a telegram to the Madras Government to request urgent assistance. These Telegrams became a salvation for demanding essential food. They indicated diminishing rice stocks, resulting in merchants importing the rice at a higher price. The collector suggested the possibility of arranging imports through a reliable firm selling them by official depots at reasonable rates. All relief activities provided essential aid and restored hope to the affected communities just as the flood relief activities also did. The fisher Man community was more adversely affected by the disaster. There were many relief activities laid out by the Malabar collector, and a discussion was held with the Director of Fisheries about the methods of inquiry they should follow in investigating the distress caused amongst the fishermen by the 1924 flood. They then appointed a staff directly under the fishing villages, whose chief duty was to promote the economic welfare of the fishermen. This study also gives a special concern about the recent calamities in order to analyses the climatic conditions in the post-colonial period.

The 1961 flood was the most severe to impact all of India after the great flood of 1924. This flood causes widespread devastation across Kerala. As a result, thousands of homes were destroyed, road traffic was blocked, and people had to be rescued by local authorities in several places. Water levels in Pamba, Periyar, and Bharathapuzha rose tremendously, and road traffic between Angamaly and Aluva, Thrissur and Kunnamkulam, and Aluva and Paravur came to a standstill. Large parts of Palakkad, Kozhikode, and Kannur districts were submerged. Heavy rains in Kerala forced the immediate opening of the Malampuzha, Peachey, and Periyar reservoirs, leading to severe flooding. Kozhikode District faced severe natural calamities due to heavy rains, floods, soil erosion, etc. Several families were rendered homeless, and large stretches of paddy and other crops were destroyed. During the 1961 flood, it can be seen that various kinds of flood relief funds were raised through different parts of Kerala. More recently, the floods of 2018 and 2019 remain a dark chapter in the history of Kerala. The final part is Monsoon as a gendered experience. Gender inequalities, shaped by social, economic, political, and cultural implications, influence how individuals respond to climate change. Gender comes into light because women, men, boys, and girls are homogeneous groups; they face different types of problems associated with climate change based on the inequalities stemming from socially constructed gender roles. Dalits and marginalized sections continue to stay in the most environmentally fragile areas of Kerala as they are excluded from the much-celebrated land reforms. Consequently, floods and landslides disproportionately affect vulnerable groups such as women, elderly children, persons with disabilities, scheduled tribes, scheduled castes, and fisherfolk.

The major findings of the thesis highlights that the subject of climate change is no longer confined to being the subject of geologists and scientists. It is a central subject of social scientists also. The research shows how human adapt to changes and reschedule their everyday life based on monsoon variations. This study paces way to a new area of discipline called ‘Monsoonology’, which refers to the scientific study of the monsoon system- its origin, development, variability as well as its impact on climate, agriculture and society. The position of ‘Monsoonology’ may came out in this study as an interdisciplinary field that integrates meteorology, climatology, folklore, agriculture and hydrology. This study moves beyond a purely regional focus, rather it aims to analyses through general to particular approach. Unlike earlier studies on climate change that emphasized on disastrous aspects of monsoon, this study focusses on both the catastrophic side but also its role shaping the rhythm of people's lives. The 2018 flood instilled a perception of nature as an element of fear and threat among the people. During this period of flood and landslide, people revisited the wordings and premonition of ecologist Madhav Gadgil. The Gadgil Report *Western Ghats Ecology Expert Panel*, (2011) not only proposed present ecological recommendations but it also critiqued the colonial legacy in the production of rain and monsoon knowledge. Gadgil argued that the knowledge systems developed by the British observed rainfall and rivers primarily through the lens of resource withdrawal, scientific control, and commercial agriculture. By the late 20^{th} century, intellectual and political movements emerged as a critique to industrial modernity, colonial exploitation of nature, and the ecological consequences of capitalism. There was a rise of new terms such as green politics, sustainable development, consumer culture as a result of our intellectual thought and endeavor. Historically these terms were not merely a policy orientation, but a part of a larger, well-organized project.

A broader analysis of rain shows that rain is not always a destructive force, rather it has demonstrated other dimensions of its utility. While floods have significantly impacted traditional societies, its impacts often went unnoticed due to the smaller population and the absence of huge media coverage. Modern agricultural paradigms such as Mono-cropping, which is often called a model of a country’s development, however completely uproot the traditional ways of life and the bond that tribal communities maintain with nature.

In Kerala, rain is not strange experience. Rather, it is deeply embedded in the socio-cultural experience. People's experiences of rain vary according to the place, time and social background. For the people residing at hilly and coastal areas, rain is not a dream as it is an everyday reality. Whereas for the people who have not confronted the evil nature of rain, it is a nostalgic experience. A woman in farmer's community and a landowner experience of rain as distinct ways. Therefore, natural phenomena are not gender-neutral but manifest differently across various social roles. Rain is not considered as a universal reality but it is natural phenomena that comes in different roles. Rain has been encoded in social and cultural memories in the form of stories, songs, folklore, and linguistic and literary artefacts.

This thesis primarily concentrates on the colonial intervention of Meteorological Department. Through such institutions, people came to understand that rain can be measured and predicted for the economic and social wellbeing of the people in the country. The colonial knowledge on rain and climate cannot be completely authoritative as it reflects theoretical constructs. Therefore, the knowledge received on rain and climate should be analyzed historically, socially and politically, further integrating it with traditional ecological knowledge for accurate information about climate. Ultimately, this thesis demonstrates that rain is not considered as a single natural phenomenon, rather, it is a plural reality that influence and shapes the human life, culture, politics in both individual and collective ways.

From the point of view of application, the historical insights developed in the thesis Monsoon in Colonial Malabar: Histories, Memories and Everyday Life offer some broad suggestions for addressing the present environmental crisis in Kerala. The study shows that the monsoon historically shaped landscapes, livelihoods, and social practices across the region, linking the mountains, river systems, midlands, and coastal areas. Contemporary environmental planning may therefore benefit from an integrated approach that recognizes the ecological interconnections between the Western Ghats, river basins, and coastal ecosystems.

The thesis also highlights the significance of local knowledge and everyday practices that communities developed to adapt to the rhythms of the monsoon. Reviving and integrating such traditional ecological knowledge with modern environmental management could strengthen climate adaptation strategies. At the same time, understanding the environmental transformations that occurred during the colonial period—such as plantation expansion, forest exploitation, and infrastructural changes—can help inform present policies related to land use, forest conservation, and sustainable development.

Finally, protecting river systems, wetlands, and coastal ecosystems is crucial for maintaining ecological balance in a monsoon-dependent region like Kerala. A historically informed and community-oriented approach to environmental governance may therefore contribute to building greater resilience to climate variability and environmental change across the region.

CHAPTER 7
RECOMMENDATIONS

This thesis, *Monsoon in Colonial Malabar: Histories, Memories and Everyday Life*, has demonstrated that the monsoon is not merely a climatic event but a historical, social, and cultural force shaping the identity of Malabar. Based on the findings of this research, this chapter proposes a set of recommendations for future research, policy formulation, environmental governance, disaster management, and knowledge integration. These recommendations aim to bridge the gap between scientific climate studies and socio-cultural understandings of the monsoon, ensuring a holistic and sustainable approach to environmental challenges in Kerala and beyond.

Integration of Scientific and Traditional Ecological Knowledge

One of the central findings of this study is the importance of Traditional Ecological Knowledge (TEK) in understanding monsoon variability. Colonial meteorology institutionalized rain measurement through rain gauges and weather stations, but it often overlooked local experiential knowledge preserved in proverbs, folklore, agrarian practices, and oral traditions.

Recommendations:

- Climate policy frameworks should integrate scientific meteorological data with indigenous and local ecological knowledge systems.
- Agricultural planning in Kerala should re-engage with traditional seasonal indicators and crop practices that historically aligned with monsoon rhythms.

- Documentation and digitization of folk archives, proverbs, and oral histories related to monsoon knowledge should be encouraged through universities and research institutions.

- Community-based climate monitoring initiatives should be developed to combine local observation with modern forecasting tools.

This integration will ensure culturally rooted and socially inclusive climate adaptation strategies.

Strengthening Climate-Sensitive Policy Making

The research highlights how colonial rainfall records were used primarily for administrative, economic, and infrastructural purposes. In the contemporary context of climate change, policies must move beyond extractive models toward sustainable ecological governance.

Recommendations:

- Policy makers should adopt long-term monsoon variability assessments in infrastructure planning, especially in flood-prone districts of Kerala.

- Environmental Impact Assessments (EIA) must incorporate historical rainfall data and patterns of extreme events.

- Greater attention should be given to ecologically sensitive zones such as the Western Ghats.

- Recommendations made by ecologist Madhav Gadgil in the report of the Western Ghats Ecology Expert Panel should be revisited and implemented with region-specific sensitivity.

Such measures would reduce ecological degradation and mitigate disaster risks intensified by climate change.

Encouraging Interdisciplinary "Monsoonology"

This study proposes the conceptual development of "Monsoonology" as an interdisciplinary field integrating meteorology, climatology, history, folklore, hydrology, and agricultural studies.

Recommendations:

- Universities should encourage interdisciplinary research programs focused on monsoon studies.
- Collaborative research between historians, environmental scientists, anthropologists, and climate experts should be institutionalized.
- Curriculum development at undergraduate and postgraduate levels should include regional environmental history and monsoon studies.
- Government-funded research bodies should prioritize long-term monsoon variability research linking past and present climate data.

By institutionalizing Monsoonology, climate studies can move beyond purely technical frameworks toward culturally embedded environmental understanding.

Preserving Cultural Memory and Environmental Heritage

The thesis emphasizes that rain is encoded in literature, folklore, architecture, and collective memory. Monsoon heritage must be preserved as part of Kerala's intangible cultural legacy.

Recommendations:

- Encourage documentation of monsoon-related songs, rituals, literary expressions, and oral traditions.
- Protect traditional architectural designs adapted to heavy rainfall, such as sloping roofs and water management systems.
- Promote public history initiatives that connect environmental memory with present-day sustainability debates.
- Support community museums or digital archives dedicated to monsoon heritage in Malabar.

Preserving cultural memory enhances ecological consciousness and strengthens identity.

Expanding Historical Climate Research

This study demonstrates the value of archival sources such as rainfall registers, district gazetteers, and colonial correspondence in reconstructing environmental history.

Recommendations:

- Digitize colonial rainfall records and make them accessible for researchers.
- Encourage comparative regional studies linking Malabar’s monsoon history with other monsoon-dependent regions.
- Promote micro-level village studies to explore local adaptation strategies.
- Integrate environmental history into mainstream historiography rather than treating it as a specialized subfield.

Historical climate research provides long-term perspectives necessary for contemporary sustainability planning.

The recommendations presented in this chapter emerge from the broader argument that the monsoon is a plural reality—simultaneously ecological, social, cultural, economic, and political. Addressing contemporary climate challenges requires moving beyond technocratic solutions toward historically informed, socially inclusive, and ecologically sensitive approaches. By integrating scientific meteorology with traditional ecological knowledge, strengthening climate-sensitive policies, promoting interdisciplinary Monsoonology, and ensuring inclusive governance, it is possible to build a resilient future rooted in the lived experiences of the past. The monsoon, which has historically shaped the rhythms of everyday life in Malabar, must therefore be understood not only as a meteorological system but as a dynamic force connecting memory, identity, sustainability, and survival.

GLOSSARY

Aadi	:	The fourth month in the Tamil calendar, typically falling between mid-July and mid-August. The month includes important festivals such as Aadi Amavasai, Aadi Perukku, and Aadi Pooram, and is associated with rituals for prosperity, fertility, and ancestral remembrance.
Amavasi	:	The new moon day in the Hindu lunar calendar, when the moon is not visible. It is considered significant for rituals, ancestral offerings (Pitru Tarpanam), and spiritual practices. In many traditions, Amavasi is regarded as a time for introspection, fasting, and honoring forefathers.
Arabi Malayalam	:	A variant of the Malayalam language written in the Arabic script.
Chinga Mazha	:	Chinga Mazha refers to the rain that occurs in the Malayalam month Chingam (mid-August to mid-September).
Edavapathi	:	It refers to the Southwest Monsoon in Kerala, which usually begins in the Malayalam month of Edavam (May–June).
Idanad	:	Midland region; land situated between coastal lowlands and highlands.

Illam Nira	:	Filling the house with new harvest rice and it is part of the Puthari harvest festival customs.
kaalla villu	:	It is a kind of Rainbow appears in the morning, which is a sign of a windy day.
Kadu	:	Forest
Kali	:	Mother goddess.
Kaliyattam	:	A ritual folk performance of Theyyam in North Kerala, conducted in temples and sacred groves.
kaññikkoyttŭ	:	A traditional harvest-time feast in Kerala, where newly harvested rice is used to prepare kanji (rice gruel) and shared among family or community members as a symbol of gratitude and prosperity.
kātiru	:	A sheaf or bunch of ripe paddy stalks. It is tied and kept as a symbol of prosperity and fertility during festivals and rituals, especially during Onam when *kathirukal* (paddy stalks) are offered in prayers to express gratitude for the harvest.
Kattapattu	:	Traditional or folk songs sung in connection with forests, cultivation in forest areas, or rural tribal communities of Kerala.
kāyal	:	Backwater or lake-like stretch of water typically a large, shallow body of water connected to rivers, canals, or the sea.
koṭumpāvi	:	Rain ritual that exists in the Palakkad district.

Kolatthunadu	:	Kolattunadu had its capital at Ezhimala and was ruled by the Kolattiri royal family and roughly comprised the North Malabar region of Kerala.
Kontal	:	East wind, termed in the Sangam text
Koramba	:	The term *Koramba* also refers to a triangular-shaped umbrella hat made of bamboo, worn by tribal people—especially during farming to shield themselves from sun or rain
Krishigeetha	:	Song of Agriculture.
Kshetrapala	:	The guardian figure of the temple.
Kumba Mazha	:	The heavy rains that occur during the Malayalam month of Kumbham (February–March) in Kerala.
Kumbham	:	Malayalam month in February.
Māri villu	:	It is a kind of rainbow that comes during evening time.
Makaram	:	Makaram is the Malayalam month corresponding to mid-January to mid-February, marking the heart of the winter season in Kerala.
Malanadu	:	Malanadu refers to the hilly region of Kerala, covering areas like Idukki, Wayanad, and parts of Kottayam and Pathanamthitta.
Malayan	:	A Scheduled Tribe community in Kerala, traditionally engaged in occupations such as bamboo work, basket-making, and other crafts. The Malayans also play a role in

		ritual performances and folk traditions, including religious ceremonies in temples and local festivals.
Maruts	:	Monsoon winds are termed in the Rig Veda
Mēda Mazha	:	Meda Mazha literally means rainfall that occurs during the Medam month (mid-April to mid-May) in the Gregorian calendar.
Meenam	:	Malayalam month in March-April.
Meenkunnu	:	Eye of the fish.
Midhuna Mazha	:	Midhuna Mazha refers to the rainfall that occurs in the Malayalam month of Mithunam (mid-June to mid-July), which is part of the early monsoon period.
Modan	:	A traditional variety of paddy (rice) seed cultivated in Kerala.
Motharakoda	:	Ritual of the Kurichya community
Muthira	:	A type of legume (Macrotyloma uniflorum) commonly used in South Indian cuisine.
Nīlam	:	Malayalam term that means land or soil, often used to refer to agricultural land.
Njattuvela	:	Agricultural seasons or solar transit periods in Kerala.
Noolmazha	:	Thread rain.
Padasekarams	:	Collective paddy fields or groups of adjoining rice fields managed together in Kerala.

Pāḍi	:	A type of seasonal cultivation practiced on dry or rainfed lands in Kerala, usually dependent on monsoon rains rather than irrigation.
Pavaham	:	Ship of merchants
Perungaliyattam	:	A folk ritual dance tradition of Kerala, mostly performed in central and southern regions.
Pooyam	:	A star (nakshatra) in Indian astrology, the eighth of the 27 nakshatras in the lunar zodiac. It is associated with qualities of renewal, nourishment, and auspicious beginnings, and is considered significant for certain religious rituals and naming ceremonies.
Praise Parjanya	:	The Thunder and Rain
Pulluvas	:	A caste/community in Kerala, traditionally engaged in singing ritual songs and performing ceremonies connected to serpent (nāga) worship.
Punam	:	A type of seasonal cultivation practiced on dry or rainfed lands in Kerala, usually dependent on monsoon rains rather than irrigation.
Puñcha	:	A term used in Kerala to refer to low-lying paddy fields, especially those cultivated below sea level. Puncha cultivation typically takes place during the dry season, making use of reclaimed wetlands for rice farming.
Purayiṭam	:	Malayalam term that denotes a homestead or residential plot of land, usually surrounding a house.

puthāri	:	It marks the harvesting of the season's first paddy crop and expresses gratitude for abundance and prosperity.
Salilavataa	:	Monsoon wind termed as Rig Veda
Sliyavaya	:	Cyclones
Sukra	:	Sanskrit and Indian astrology that refers to the planet Venus, associated with wealth, beauty, and love.
Thanneer Bhagavathy	:	Water goddess.
Theyyam	:	A ritualistic folk art of North Kerala.
Tula Mazha	:	Northeast Monsoon rains that occur during the Malayalam month Thulam (mid-October to mid-November).
Ucharapottan	:	A ritual folk character / Theyyam figure found in North Kerala's theyyam traditions.
vaṇṇaṉ	:	A traditional caste community in Kerala, historically associated with washing and dyeing clothes. Apart from their occupation, Vannans are also known for their role in ritual and folk arts, such as performing *Theyyam* and other cultural practices in temples and village festivals.
Varshamana	:	Rain Gauge, termed during the Mauryan period.
varuṇakkallu	:	The stone considered the idol of the rain god.
Vashyon	:	God of the Kurichya tribal people.
vaṭai	:	North wind in the Sangam text
Velavaravu	:	Agro-social Festival.

Vettiyans	:	Traditional community in Kerala historically engaged in occupations such as carrying messages and performing minor services.
Vishu Mazha	:	Vishu Mazha means the first summer showers that usually occur around Vishu.
Vrishchikam	:	It is the name of the Malayalam month which usually falls between mid-November and mid-December in the Gregorian calendar.

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Appendix I.A

Mosques in Kuttichira

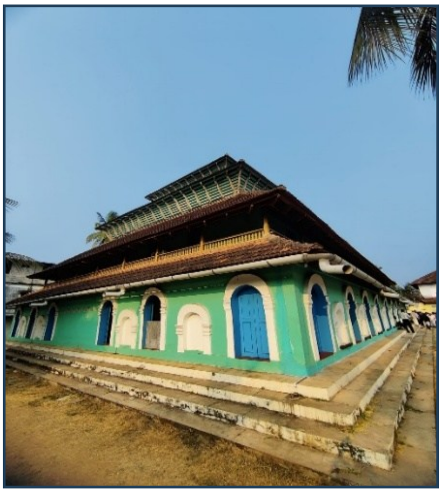


Photo by the Research Scholar, 25 January 2023

Appendix I.B

Mosques in Ponnani

Photo by the Research Scholar, 05 January 2023

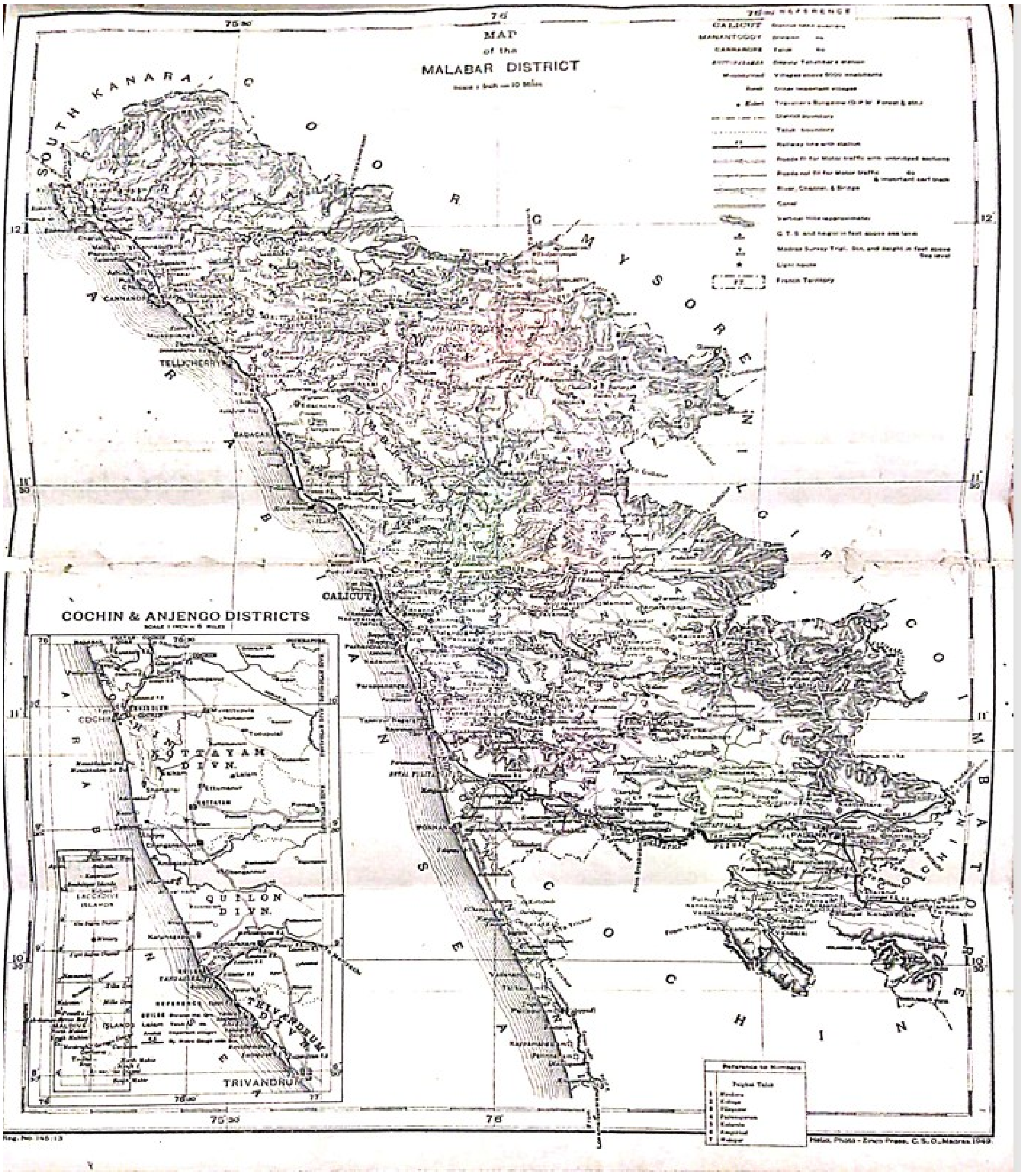
Appendix II

Megalithic Monuments Kodakkalu Parambu Thrissure

Photo by the Research Scholar, 03 March 2024

Appendix III

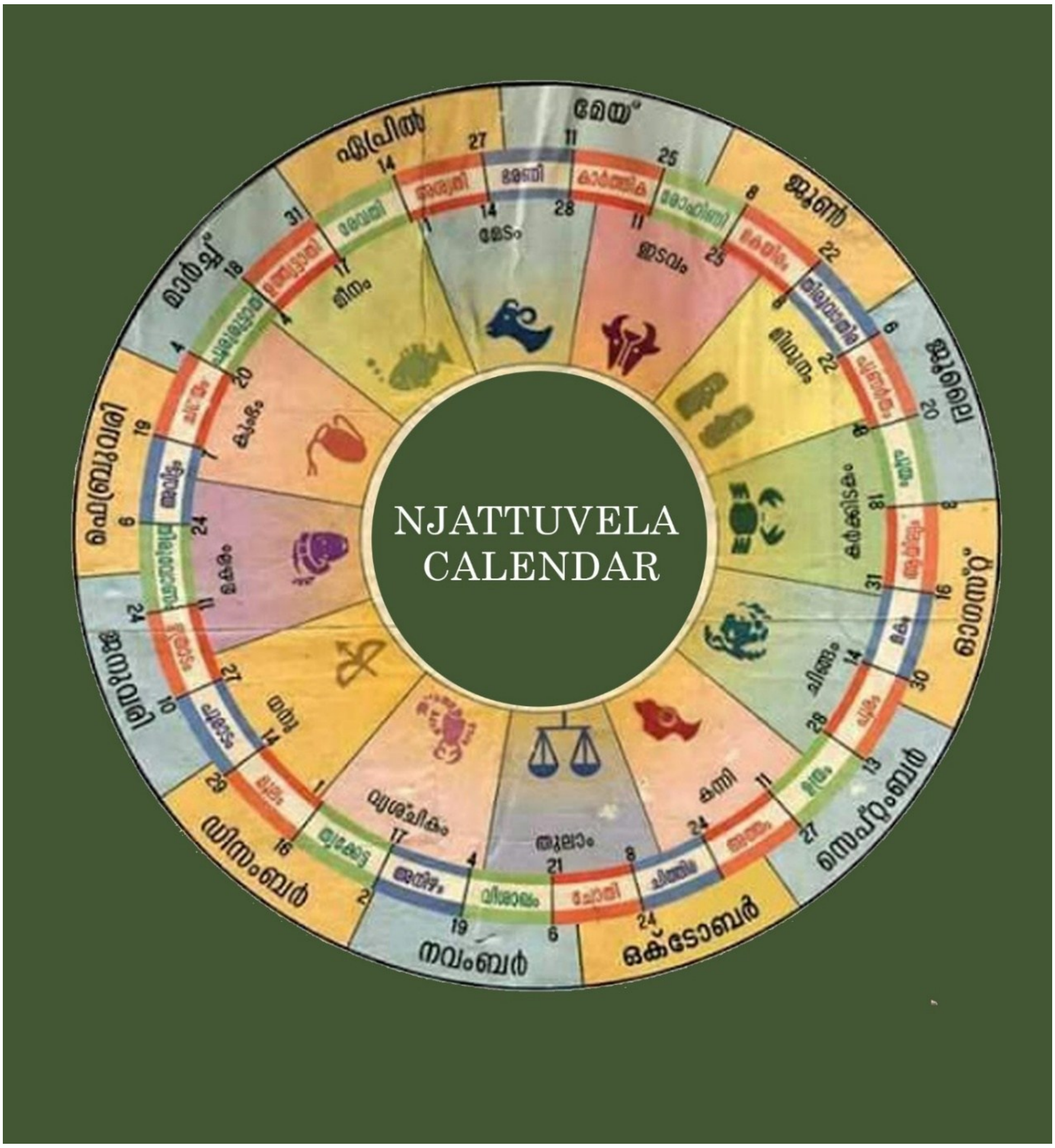
Map of the Malabar District



Source: Statistical Atlas of Malabar, 1918, RAK.

Appendix IV

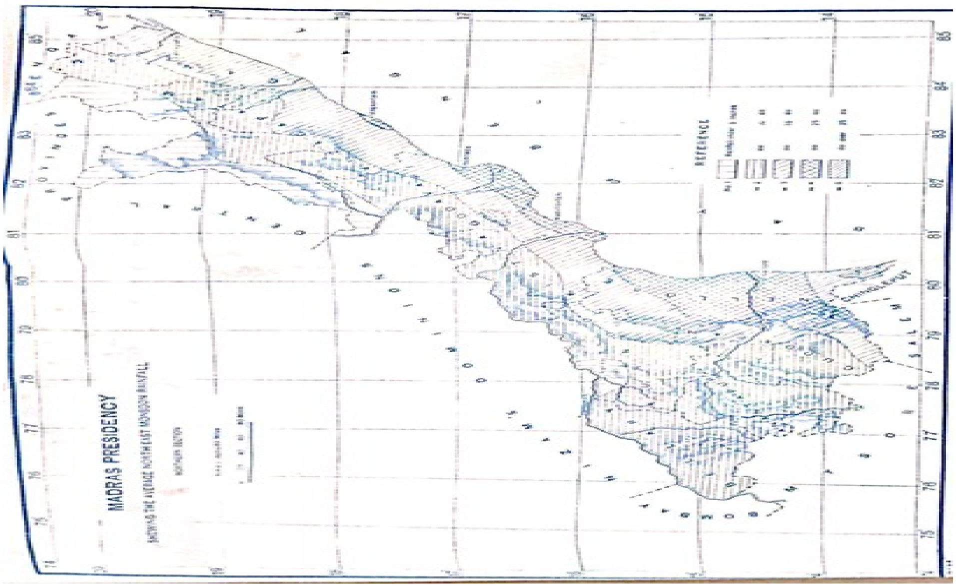
Njattuvela Calendar



Source: *https://agronature.org/kerala-njattuvela/*

Appendix IV.A

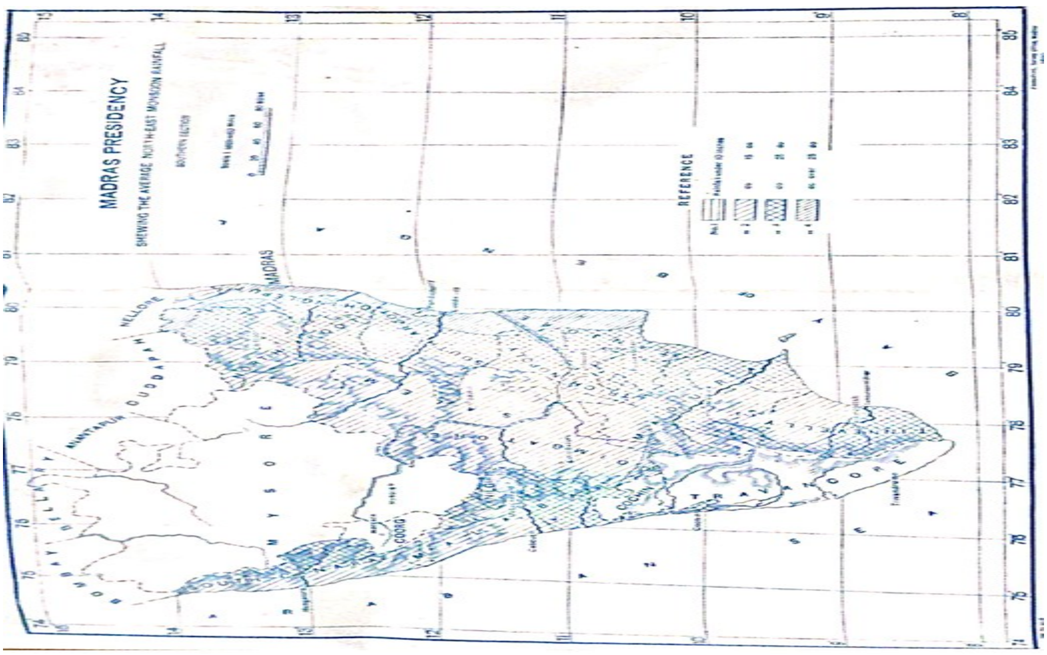
The average Northeast Monsoon rainfall northern sections of Madras Presidency



Source: Statistical Atlas of Madras Presidency, RAK

Appendix IV.B

The average Northeast Monsoon Rainfall Southern sections of Madras Presidency



Source: Statistical Atlas of Madras Presidency, RAK

Appendix V.A

Daily Rain Report of Malabar District 14. May 1888

Cf. 1151

Daily Rain Report—(Continued.)

188 7

Month of February	Vaitheri.	Calicut.	Chevayur.	Tirurangady.	Palghaut.	Ponnany.	Cochin.
	Stations at which Rain Report kept.						
1							
2	"	"	"	"	"	"	
3	"	.35	"	"	"	"	.02
4	"	"	"	"	"	"	"
5	"	"	"	"	"	"	"
6	"	"	"	"	"	"	"
7	"	"	"	"	"	"	"
8	"	"	"	"	"	"	"
9	"	"	"	"	"	"	"
10	"	"	"	"	"	"	"
11	.05	"	"	"	"	"	.02
12	"	"	"	"	.05	"	"
13	"	"	"	"	"	"	"
14	"	"	"	"	"	"	"
15	"	"	"	"	"	"	"
16	"	"	"	"	"	"	"
17	"	"	"	"	"	"	"
18	"	"	"	"	"	"	"
19	"	"	"	"	"	"	"
20	"	"	"	"	"	"	"
21	"	"	"	"	"	"	"
22	"	"	"	"	"	"	"
23	"	"	"	"	"	"	"
24	"	"	"	"	"	"	"
25	"	"	"	"	"	"	"
26	"	"	"	"	"	"	"
27	"	"	"	"	"	"	"
28	"	"	"	"	"	"	"
29		"	"	"	"	"	"
30						"	"
31							
Total month...... ..	.05	.35	-	-	.05	-	.04
No. of Rainy days.	1	1	"	-	1	-	2
Total since April...	156.72	97.13	89.81	76.59	66.82	85.29	102.31
No. of Rainy days.	162	126	114	120	120	134	151

Malabar Collector's Office,
Calicut, 17th March 1887.

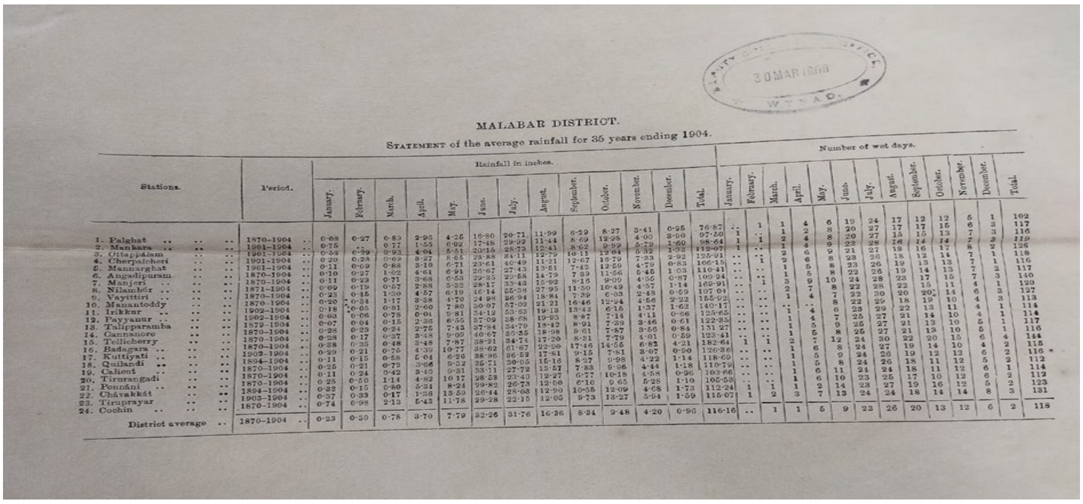
For ~~Dy.~~ Collector.

~~TO~~
~~THE SECRETARY TO THE BOARD OF REVENUE,~~
~~MADRAS.~~

Source: *Board of Revenue Settlement, Land Records and Agriculture,* RAK.

Appendix V.B

Malabar District Statement of the Average Rainfall for 35 Years Ending 1904.



MALABAR DISTRICT.

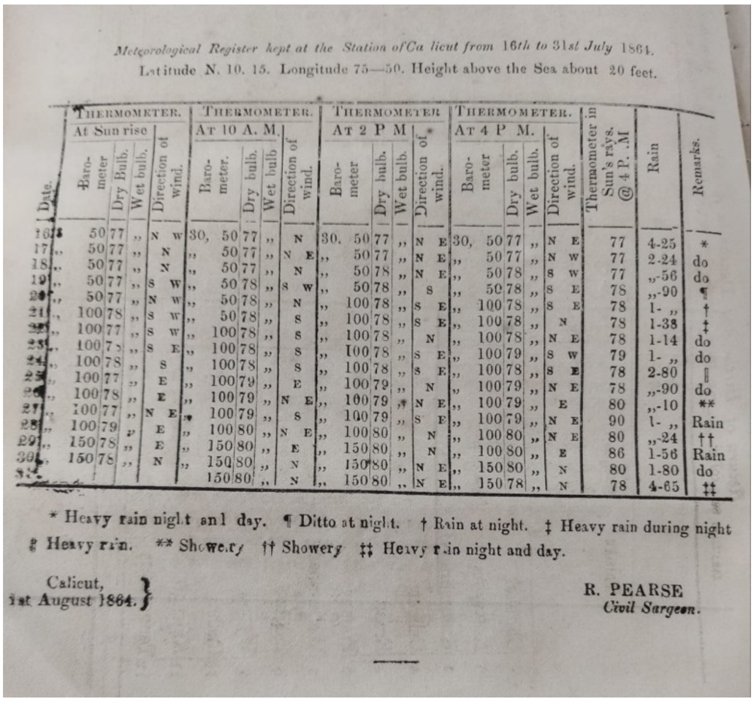
STATEMENT of the average rainfall for 35 years ending 1904.

Stations.	Period.	Rainfall in inches. January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.	Number of wet days. January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
1. Palghat	1870–1904	0·08	0·27	0·89	2·95	4·25	16·80	20·71	11·99	6·29	8·27	3·41	0·95	76·87	..	1	1	4	6	19	24	17	12	12	5	1	102
2. Mankara	1901–1904	0·75	..	0·77	1·55	6·02	17·48	29·92	11·44	8·69	12·98	4·00	3·90	97·50	1	..	1	2	8	20	27	17	17	15	6	3	117
3. Ottappálam	1901–1904	0·58	0·29	0·93	4·04	5·51	20·16	28·73	12·41	8·62	9·99	5·79	1·60	98·64	1	1	2	4	8	20	27	15	15	13	7	3	116
4. Cherpalcheri	1901–1904	0·20	0·28	0·69	3·27	8·65	23·88	34·11	12·79	10·11	12·64	5·32	1·33	112·97	1	..	1	4	9	22	28	16	14	14	7	3	119
5. Mannarghat	1901–1904	0·11	0·09	0·88	3·10	6·71	23·61	40·49	11·21	12·67	16·79	7·33	2·92	125·91	..	..	2	6	9	21	27	18	16	17	8	2	126
6. Angadipuram	1870–1904	0·10	0·27	1·02	4·61	6·91	26·67	27·43	13·51	7·42	12·59	4·79	0·83	106·15	..	1	2	6	8	23	26	18	12	14	7	1	118
7. Manjeri	1870–1904	0·11	0·23	0·71	3·68	6·53	29·35	29·58	14·79	7·39	11·56	5·45	1·03	110·41	..	..	1	5	8	23	26	19	13	13	7	1	116
8. Nilambúr	1871–1904	0·09	0·19	0·57	2·88	5·32	28·17	33·43	15·92	8·16	9·09	4·55	0·87	109·24	..	..	1	5	8	22	26	19	14	13	7	2	117
9. Vayittiri	1870–1904	0·23	0·45	1·30	4·57	6·19	46·14	55·38	27·95	11·50	10·49	4·57	1·14	169·91	..	1	3	9	10	24	28	23	17	15	7	3	140
10. Manantoddy	1870–1904	0·20	0·34	1·17	3·38	4·70	24·98	36·94	18·84	7·39	6·03	2·48	0·59	107·04	..	..	2	7	8	22	28	22	15	11	4	1	120
11. Irikkur	1902–1904	0·18	0·05	0·81	2·60	7·80	30·07	57·02	21·21	16·46	12·94	4·56	2·22	155·92	..	..	1	4	7	22	30	20	20	14	6	3	127
12. Payyanur	1902–1904	0·03	0·06	0·78	0·04	9·81	34·12	53·63	19·13	13·43	6·15	1·37	1·62	140·17	..	..	..	..	8	22	29	18	19	10	4	3	113
13. Talipparamba	1879–1904	0·07	0·04	0·15	2·36	6·55	37·09	38·68	19·93	8·87	7·14	4·11	0·66	125·65	..	..	1	4	6	23	29	22	13	11	4	1	114
14. Cannanore	1870–1904	0·28	0·23	0·24	2·75	7·43	37·84	34·79	18·42	8·91	7·39	3·46	0·61	122·35	..	..	1	4	7	25	27	21	14	10	4	1	114
15. Tellicherry	1870–1904	0·28	0·17	0·37	3·48	9·09	40·67	35·35	18·98	9·61	7·87	3·56	0·84	131·27	..	..	1	5	9	25	27	21	13	10	5	1	117
16. Badagara	1870–1904	0·38	0·35	0·48	3·48	7·87	38·21	34·74	17·20	8·31	7·79	4·01	0·59	123·41	..	..	1	5	8	25	27	21	13	10	5	1	116
17. Kuttiyati	1902–1904	0·29	0·21	0·75	4·39	10·77	38·62	61·67	22·90	17·46	14·55	6·82	4·21	182·64	1	1	2	7	12	24	30	22	20	15	6	4	144
18. Quilandi	1894–1904	0·11	0·15	0·58	5·04	6·26	38·96	36·52	17·81	9·15	7·81	3·07	0·90	126·36	..	..	1	6	8	24	27	19	14	10	4	2	115
19. Calicut	1870–1904	0·25	0·21	0·72	3·66	9·32	25·71	30·05	15·16	8·27	9·98	4·22	1·14	118·69	..	..	1	5	9	24	26	19	12	12	6	2	116
20. Tirurangadi	1870–1904	0·11	0·24	0·42	3·40	9·31	33·11	27·72	13·57	7·83	9·96	4·44	1·18	110·79	..	..	1	5	8	24	26	18	11	12	5	2	112
21. Ponnáni	1870–1904	0·25	0·50	1·14	4·82	10·17	28·58	23·40	12·27	6·77	10·18	4·58	0·96	103·66	..	..	1	6	11	24	24	18	11	12	6	1	114
22. Chávakkát	1894–1904	0·32	0·15	0·80	5·34	8·24	29·82	26·73	12·00	6·10	9·65	5·28	1·10	105·53	..	..	1	6	10	23	25	17	10	12	6	2	112
23. Tiruprayar	1903–1904	0·37	0·33	0·17	1·36	13·59	26·44	28·03	12·90	10·55	12·09	4·68	1·73	112·24	1	1	1	2	14	23	27	19	16	12	5	2	123
24. Cochin	1870–1904	0·74	0·98	2·13	5·43	11·78	29·28	22·15	12·05	9·73	13·27	5·94	1·59	115·07	1	2	3	7	13	24	24	18	14	14	8	3	131
District average	1870–1904	0·23	0·30	0·78	3·70	7·79	32·26	31·76	16·36	8·34	9·48	4·20	0·96	116·16	..	1	1	5	9	23	26	20	13	12	6	2	118

Source: *Statement of the Average Rainfall for 35 Years Ending 1904, RAK.*

Appendix V.C

Meteorological register from the Calicut station from 16th to 31st July 1864



Meteorological Register kept at the Station of Calicut from 16th to 31st July 1864.

Latitude N. 10. 15. Longitude 75—50. Height above the Sea about 20 feet.

Date.	Thermometer. At Sun rise. Barometer	Dry Bulb.	Wet bulb.	Direction of wind.	Thermometer. At 10 A. M. Barometer.	Dry bulb.	Wet bulb	Direction of wind.	Thermometer. At 2 P M. Barometer	Dry bulb.	Wet bulb.	Direction of wind.	Thermometer. At 4 P M. Barometer	Dry bulb.	Wet bulb.	Direction of wind.	Thermometer in Sun's rays. @ 4 P. M	Rain	Remarks.
16th	50	77	,,	N W	30, 50	77	,,	N	30. 50	77	,,	N E	30, 50	77	,,	N E	77	4-25	*
17 ,,	50	77	,,	N	,, 50	77	,,	N E	,, 50	77	,,	N E	,, 50	77	,,	N W	77	2-24	do
18 ,,	50	77	,,	N	,, 50	77	,,	N	,, 50	78	,,	N E	,, 50	78	,,	S W	77	,,-56	do
19 ,,	50	77	,,	S W	,, 50	78	,,	S W	,, 50	78	,,	S	,, 50	78	,,	S E	78	,,-90	¶
20 ,,	50	77	,,	N W	,, 50	78	,,	N	,, 100	78	,,	S E	,, 100	78	,,	S E	78	1- ,,	†
21 ,,	100	78	,,	S W	,, 50	78	,,	S	,, 100	78	,,	S E	,, 100	78	,,	N	78	1-38	‡
22 ,,	100	77	,,	S W	,, 100	78	,,	S	,, 100	78	,,	N	,, 100	78	,,	N E	78	1-14	do
23 ,,	100	7[illegible]	,,	S E	,, 100	78	,,	S	,, 100	78	,,	S E	,, 100	79	,,	S W	79	1- ,,	do
24 ,,	100	78	,,	S	,, 100	78	,,	S	,, 100	78	,,	S E	,, 100	78	,,	S E	78	2-80	‖
25 ,,	100	77	,,	E	,, 100	79	,,	E	,, 100	79	,,	N	,, 100	79	,,	N E	78	,,-90	do
26 ,,	100	78	,,	E	,, 100	79	,,	N E	,, 100	79	,,	N E	,, 100	79	,,	E	80	,,-10	**
27 ,,	100	77	,,	N E	,, 100	79	,,	S	,, 100	79	,,	S E	,, 100	79	,,	N E	90	1- ,,	Rain
28 ,,	100	79	,,	E	,, 100	80	,,	N E	,, 100	80	,,	N	,, 100	80	,,	N E	80	,,-24	††
29 ,,	150	78	,,	E	,, 150	80	,,	E	,, 150	80	,,	N	,, 100	80	,,	E	86	1-56	Rain
30 ,,	150	78	,,	N	,, 150	80	,,	N	,, 150	80	,,	N E	,, 150	80	,,	N	80	1-80	do
31 ,,					150	80	,,	N	,, 150	80	,,	N E	,, 150	78	,,	N	78	4-65	‡‡

* Heavy rain night and day. ¶ Ditto at night. † Rain at night. ‡ Heavy rain during night ‖ Heavy rain. ** Showery †† Showery ‡‡ Heavy rain night and day.

Calicut, 1st August 1864.

R. PEARSE
Civil Surgeon.

Source: *Malabar Gazette Supplement,16th to 31st July 1864 RAK.*

Appendix V.D.

Rainfall and Prices of the Staple Food Grains

PROCEEDINGS OF THE BOARD OF REVENUE
(REVENUE SETTLEMENT, LAND RECORDS AND AGRICULTURE).

READ.—Abstract of Season Report for the week ending 28th May 1898.

RAINFALL AND PRICES OF THE STAPLE FOOD-GRAINS.

Districts.	Rainfall in inches.			Prices in Seers (of 80 tolas) per Rupee.											
	In the week.	Up to the end of the week from 1st April.		Rice.			Ragi.			Cholam.			Cumbu.		
		1898-99.	Average of 25 years.	Average for May.*	Last week.	This week.	Average for May.*	Last week.	This week.	Average for May.*	Last week.	This week.	Average for May.*	Last week.	This week.
Circars.															
Ganjam ..	0·4	2·3	2·9	17·7	12·9	13·0	29·1	14·8	14·5	..	..	..	..	..	..
Vizagapatam A	0·3	3·2	4·3	15·3	12·4	12·4	27·6	18·1	17·9	..	18·6	18·6	28·7	19·1	19·1
Vizagapatam L	0·7	2·5	3·1												
Godavari ..	0·4	1·2	1·5	15·4	10·4	10·4	28·2	16·6	16·6	27·0	17·6	17·6	26·8	18·2	18·7
Kistna ..	0·2	1·1	1·4	14·7	10·3	10·3	28·5	16·4	16·8	22·8	14·5	14·4	22·2	14·0	12·9
Deccan.															
Kurnool ..	..	1·6	1·5	13·0	9·3	9·7	27·7	19·8	19·5	27·9	20·5	20·4	23·9	14·2	14·4
Bellary ..	0·3	3·2	2·3	12·4	9·5	9·5	35·4	22·4	22·5	28·4	20·5	20·8	..	..	..
Anantapur.	0·1	2·0	1·7	14·1	10·1	10·1	33·3	20·4	20·2	30·9	19·8	19·8	26·5	17·3	17·8
Cuddapah ..	..	2·9	1·5	14·1	9·5	9·9	32·3	20·0	20·1	28·8	18·9	18·8	28·5	16·2	16·4
Carnatic.															
Nellore ..	..	0·7	1·2	14·3	8·8	9·0	27·9	16·0	15·2	24·8	14·0	14·2	22·4	12·1	12·5
Chingleput.	..	0·5	1·4	15·3	9·2	9·3	25·7	14·7	14·7	..	..	..	..	..	..
Madras ..	..	..	2·7	12·5	9·0	9·0	25·1	16·1	15·8	..	..	..	..	..	..
South Arcot.	0·1	2·1	2·4	15·2	10·6	10·1	26·8	16·2	15·9	..	..	..	26·0	16·1	15·8
Central.															
North Arcot.	..	2·6	2·4	15·2	10·2	10·2	29·9	16·9	17·2	26·1	15·9	15·9	25·3	14·4	14·4
Salem ..	0·2	5·6	4·4	14·1	9·8	9·8	30·3	17·0	17·0	25·3	15·3	15·6	24·5	15·7	15·7
Coimbatore.	0·5	5·3	4·6	13·1	9·9	9·8	27·8	18·4	18·4	22·5	15·3	15·5	25·3	17·5	17·5
Trichinopoly.	0·4	5·0	3·9	14·5	9·4	9·5	27·0	15·3	15·5	35·8	†16·1	†16·4	25·3	14·7	11·5
South.															
Tanjore ..	0·2	2·6	2·8	14·9	10·4	10·5	26·6	16·6	16·5	..	..	..	..	..	..
Pudukkottai.	..	3·1	..	..	9·1	9·1	..	17·1	17·0	..	†19·0	†19·1	..	18·3	18·0
Madura ..	0·6	4·8	4·3	14·7	10·2	10·2	28·6	15·9	15·8	31·5	17·6	19·3	26·5	14·4	14·5
Tinnevelly.	0·5	3·2	3·6	13·8	10·2	10·1	25·3	13·9	13·9	24·4	14·4	14·7	21·1	12·7	12·6
Nilgiris ..	1·2	6·8	7·7	10·9	7·7	7·7	1·1	15·5	15·3	..	..	..	..	..	..
West Coast.															
Malabar ..	1·5	9·3	9·5	12·9	9·5	9·5	..	..	..	..	..	..	..	..	..
South Canara	1·0	4·6	5·2	13·9	11·2	11·2	..	..	..	..	..	..	..	..	..
Travancore.	2·4	9·0	12·7	..	8·5	7·9	..	..	..	..	..	..	..	..	..

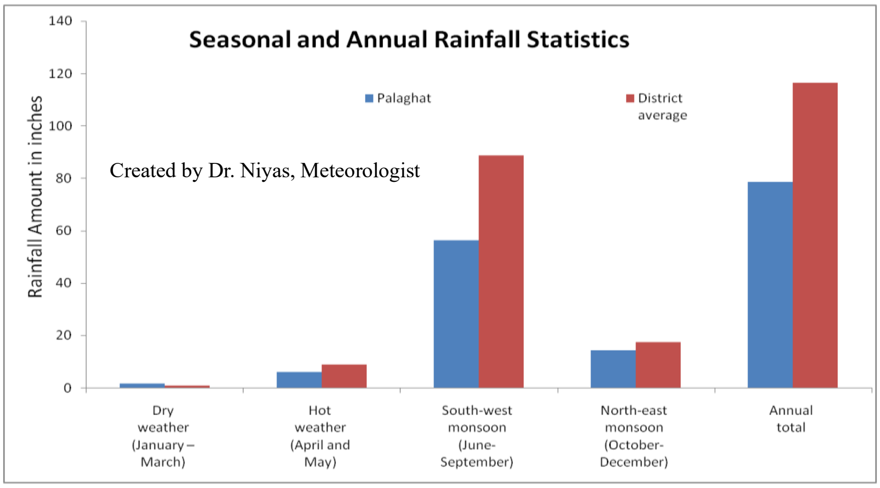
A. Agency, L. Littoral, tracts.

* Average of ten normal years previous to fasli 1305 (1895–96).
† Includes an inferior variety.

Source: *Board Revenue Settlement Land Revenue and Agriculture, No.191,31st May 1898*

Appendix VI.A

Graphical Representation of Seasonal and Annual Rainfall Statistics of Palghat



The highest contribution of rainfall is in Palaghat, and the district average in the southwest monsoon season (June to September). The highest of 88.69 inches of rainfall was recorded in the district average during the southwest monsoon season (June to September). The district average received its lowest rainfall of 1.15 inches in the Dry weather season (January to March) compared to 9.11 inches in the Hot weather season (April to May) and 17.57 inches in the northeast monsoon season (October to December). In general, Palaghat received the lowest rainfall compared to District average in all the seasons and annual rainfall.

Appendix VI.B

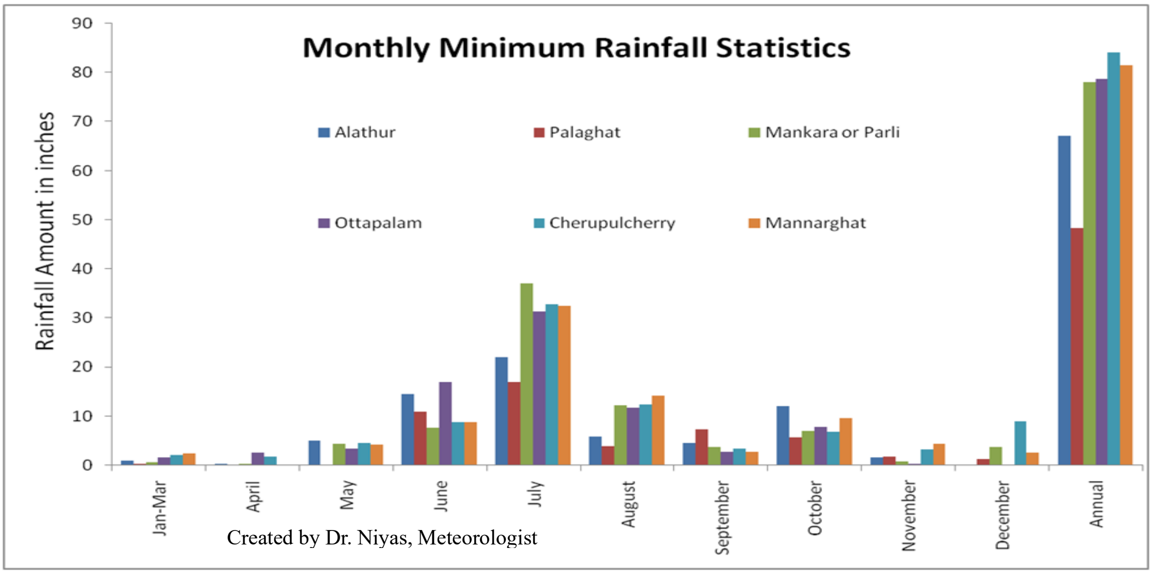
Variations of the Rainfall in inches – 1870 To 1919

Recording Station	Year of Period	Jan-March	April	May	June	July	August	September	October	November	December	Total
Alathur	Maximum 1907	3.11	6.70	2.22	18.60	27.01	40.16	1.93	6.68	4.23	2.50	113.14
	Minimum	0.95	0.39	4.99	14.46	22.10	5.87	4.55	12.02	1.70	-	67.08
	Avarage 1907-1919	1.83	2.35	5.78	19.77	21.50	13.07	6.28	8.68	6.27	0.88	86.41
Palaghat	Maximum 1900	0.32	5.09	3.63	24.82	31.46	26.46	4.76	14.39	0.70	0.03	111.66
	Minimum 1870	0.30	-	-	11.00	16.98	3.97	7.36	5.67	1.85	1.25	48.38
	Avarage 1870-1919	1.50	2.69	4.94	15.03	20.67	11.85	6.16	8.32	3.86	0.96	75.98
Mankara or Parli	Maximum 1907	3.69	5.73	3.54	20.54	27.52	42.55	3.45	12.00	10.84	0.70	130.56
	Minimum 1906	0.71	0.40	4.46	7.74	37.12	12.25	3.80	6.97	0.76	3.79	78.00
	Avarage 1901-1919	1.81	2.29	6.38	21.05	26.01	13.261	7.00	11.97	5.57	1.78	97.12
Ottapalam	Maximum 1907	4.14	7.61	1.89	21.24	28.01	44.80	6.63	12.24	6.15	2.07	134.78
	Minimum 1908	1.60	2.55	3.40	17.00	31.42	11.72	2.83	7.82	0.32	-	78.66
	Avarage 1901-1919	1.72	2.72	6.76	22.39	24.82	13.48	6.86	20.01	5.71	1.29	95.83
Cherupulcherry	Maximum 1907	1.44	4.57	2.11	26.96	26.35	46.76	8.49	17.91	9.78	0.72	1450.06
	Minimum 1906	2.05	1.83	4.51	8.88	32.78	12.34	3.48	6.85	3.32	9.03	84.07
	Average 1901-1919	1.42	2.47	7.49	25.11	26.82	12.97	7.40	11.91	6.18	1.38	103.15
Mannarghat	Maximum 1907	1.98	9.67	4.67	28.49	29.23	43.87	8.66	13.03	8.22	1.40	149.92
	Minimum 1906	2.47	0.12	4.24	8.81	32.44	14.11	2.71	9.67	4.43	2.54	81.54
	Average 1901-1919	1.69	3.29	8.52	25.51	29.02	13.69	10.63	14.82	7.78	1.49	116.44

Source*:* *A Statistical Atlas of the Madras Presidency, Statistical Atlas: Malabar Govt. Press Madras, 1924, pp.24-25, RAK*

Appendix VI.C

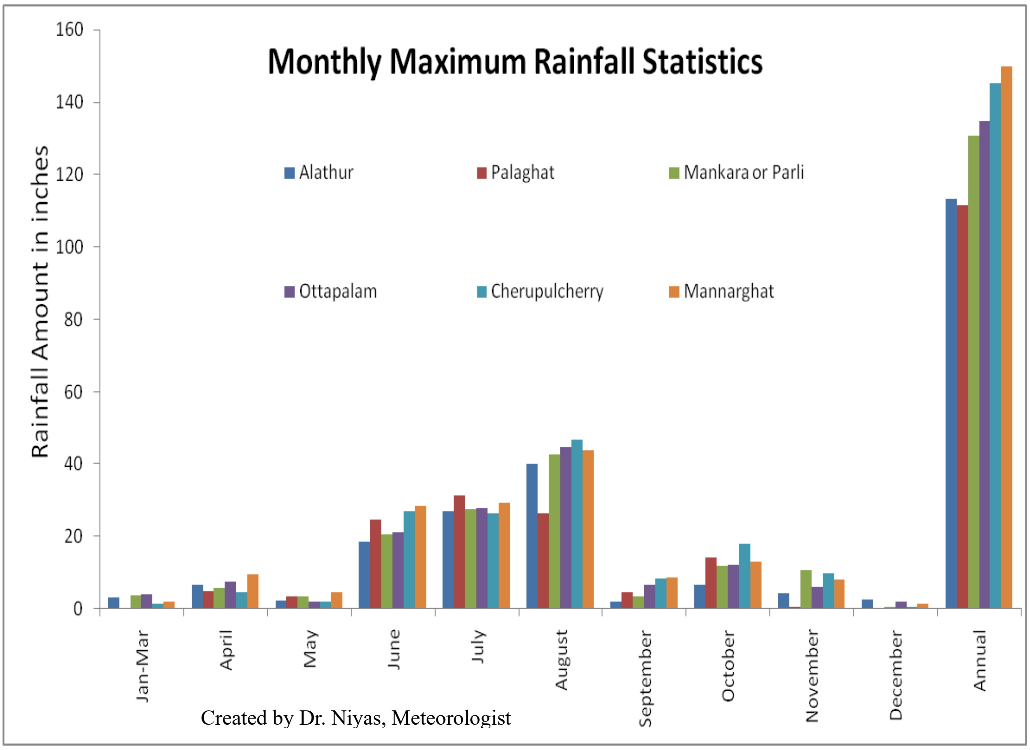
Monthly minimum rainfall statistics, Palaghat



The lowest Minimum Rainfall Statistics in the Monthly and Annual of Alathur, Palaghat, Mankara or Parli, Ottapalam, Cherpulcherry and Mannarghat during 1870-1919 are given in Figure. Rainfall amounts are given in inches. Annual is the lowest among all the annual total of all the rainfall received in each year. The lowest annual rainfall of 67.08, 48.38, 78, 78.66, 84.07 and 81.54 inches received respectively at Palaghat, Mankara or Parli, Ottapalam, Cherpulcherry and Mannarghat during respectively 1870, 1906, 1908, 1906 and 1906. The lowest rainfall of 0.3 inches was recorded in Jan-March at Palaghat, 0.32 inches recorded in November at Ottapalam and 0.39, 0.4, 1.83 and 0.12 inches recorded in April inches respectively at Alathur, Mankara or Parli, Cherpulcherry and Mannarghat.

Appendix VI. D

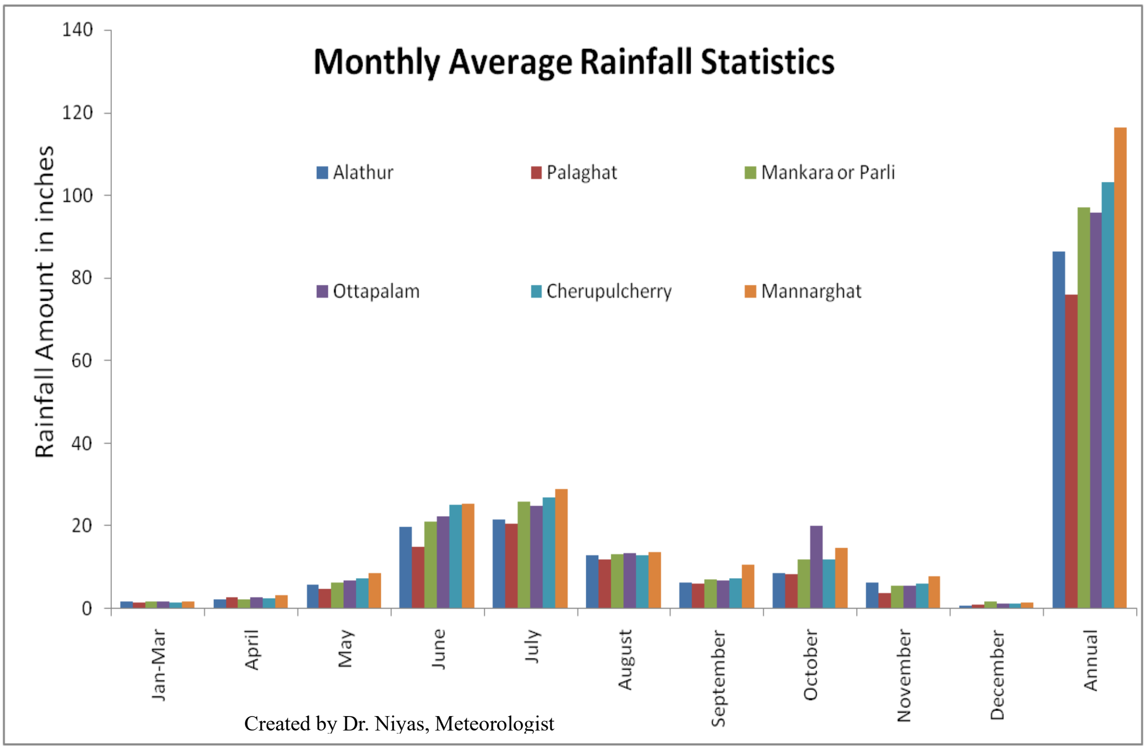
Monthly Maximum Rainfall Statistics, Palaghat



Highest Maximum Rainfall Statistics in Monthly and annual of Alathur, Palaghat, Mankara or Parli, Ottapalam, Cherpulcherry and Mannarghat during 1870-1919 are given in Figure. Rainfall amounts are given in inches. Annual is the highest among all the annual total of all the rainfall received in each year. The highest annual rainfall of Palaghat is 111.6 inches during 1900. The highest annual rainfall of 113.14, 130.56, 134.78, 145.06 and 149.92 inches received respectively at Alathur, Mankara or Parli, Ottapalam, cherpulcherry and Mannarghat during 1907. The highest rainfall of 31.46 inches recorded at Palaghat in July month followed by 24.82 inches in June. The highest rainfall of 40.16, 42.55, 44.8, 46.76 and 43.87 inches recorded respectively at Alathur, Mankara or Parli, Ottapalam, cherpulcherry and Mannarghat in August month. These two highest values August and July rainfall together contributed to the highest rainfall values during southwest monsoon season (June to September).

Appendix VI.E

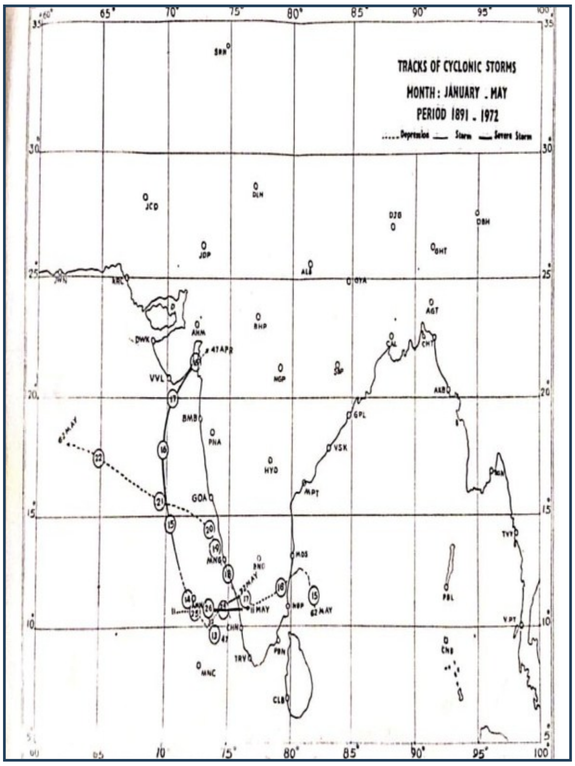
Monthly Average Rainfall Statistics, Palaghat

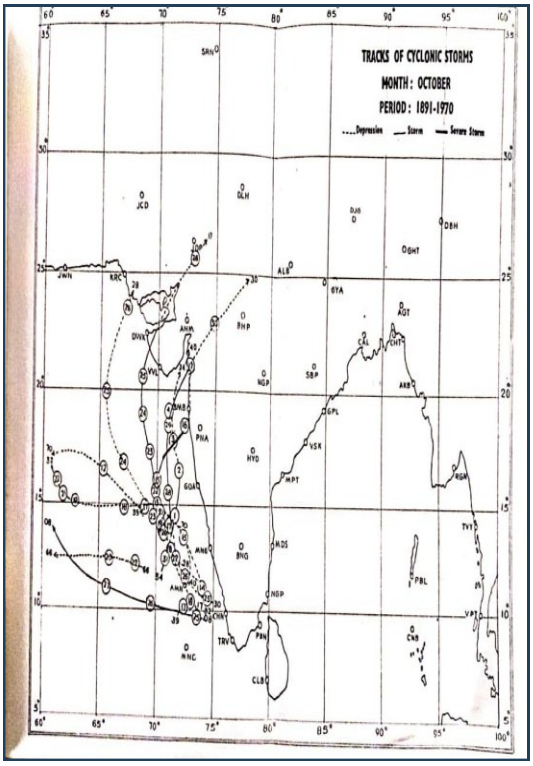


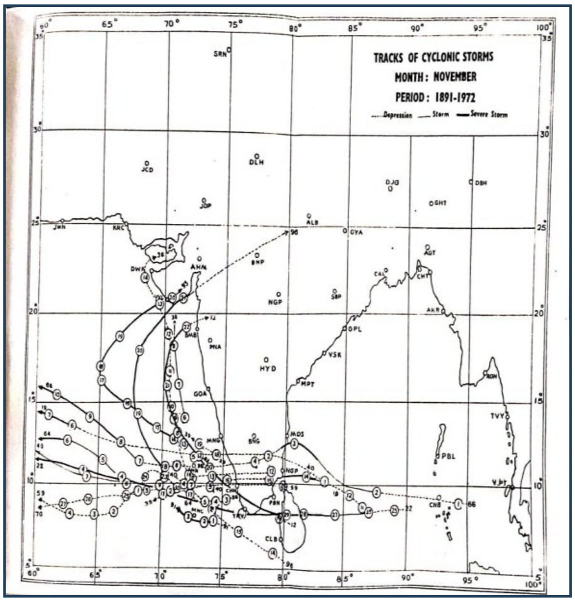
Average Rainfall Statistics in Monthly and annual of Alathur, Palaghat, Mankara or Parli, Ottapalam, Cherpulcherry and Mannarghat during 1870-1919 are given in Figure. Rainfall amounts are given in inches. Each value is the average among all the respective rainfall values during 1870-1919. The highest average rainfall value of 86.41, 75.98, 97.12, 95.83, 103.15 and 116.44 inches received respectively at Alathur during 1907-1919, Palaghat during 1870-1919, Mankara or Parli, Ottapalam, Cherpulcherry and Mannarghat during 1901-1919 respectively. The lowest average rainfall of 0.88, 0.96, 1.78, 1.29, 1.38 and 1.49 inches recorded at Alathur, Palaghat, Mankara or Parli, Ottapalam, Cherpulcherry and Mannarghat during December month. July is the peak rainiest month followed by June.

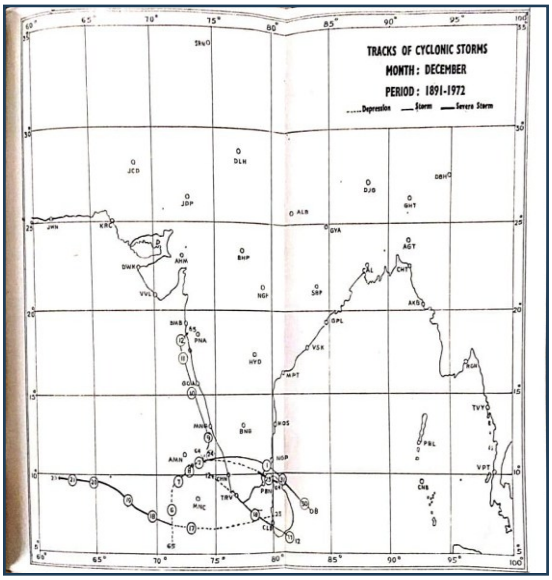
Appendix VII

Tracks of cyclonic storms of month January to December





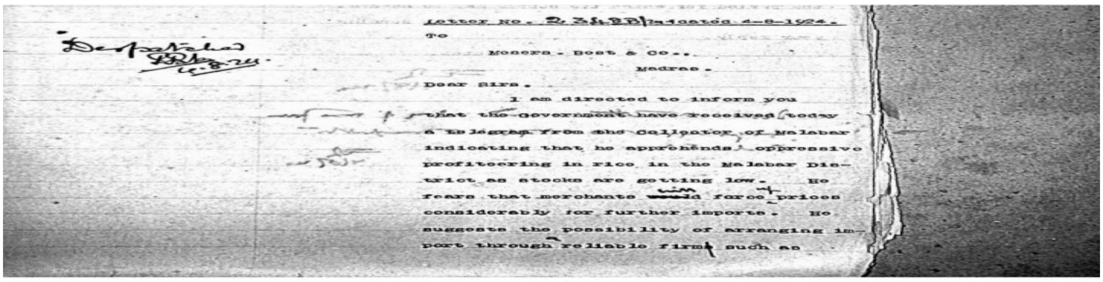




Source: *Cyclone plan for Kerala, The Government Press, Ernakulam,1980, RAE*

Appendix VIII

Telegram of the Malabar collector to Madras Government



Letter No. 2.3428B/24 dated 4-8-1924.

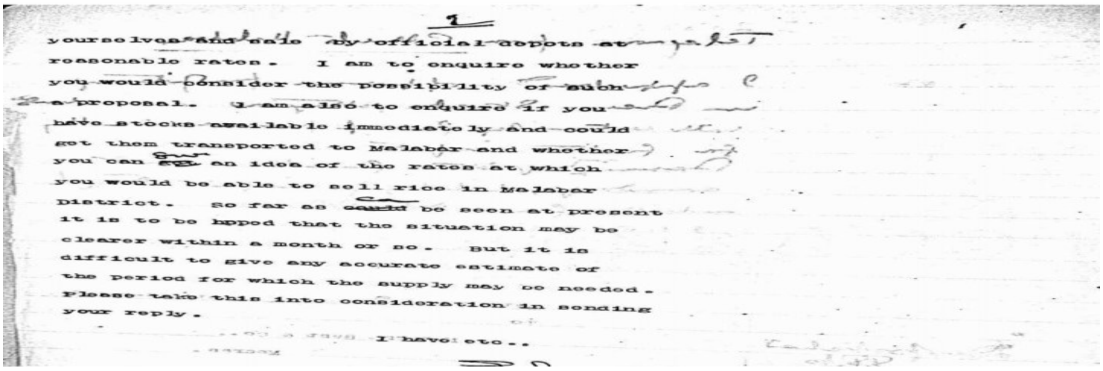
To

Messrs. Best & Co.,

Madras.

Dear Sirs,

I am directed to inform you that the Government have received today a telegram from the Collector of Malabar indicating that he apprehends oppressive profiteering in rice in the Malabar District as stocks are getting low. He fears that merchants will force prices considerably for further imports. He suggests the possibility of arranging import through reliable firms such as



2

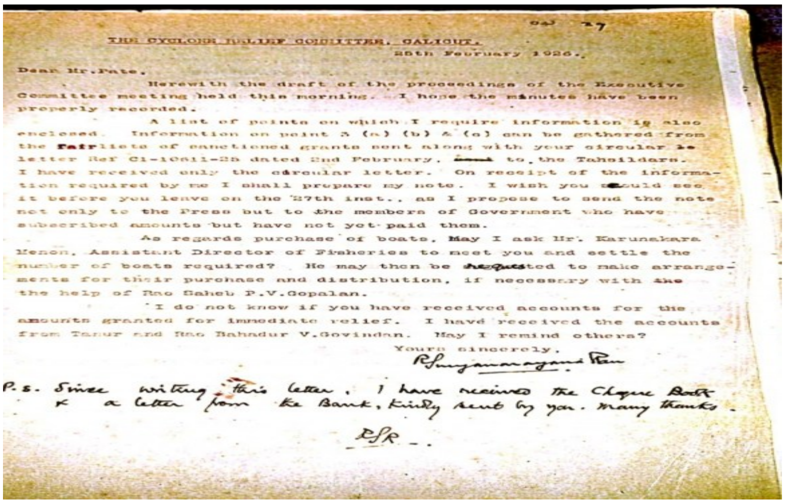
yourselves and sale by official depots at reasonable rates. I am to enquire whether you would consider the possibility of such a proposal. I am also to enquire if you have stocks available immediately and could get them transported to Malabar and whether you can give an idea of the rates at which you would be able to sell rice in Malabar District. So far as can be seen at present it is to be hoped that the situation may be clearer within a month or so. But it is difficult to give any accurate estimate of the period for which the supply may be needed. Please take this into consideration in sending your reply.

I have etc.,

Source: *Malabar District Collectorate Files, GO. NO.1391,10.09.1924, RAK*

Appendix IX

Letter to the Madras Government by Cyclone Relief Committee



THE CYCLONE RELIEF COMMITTEE, CALICUT.

25th February 1926.

Dear Mr. Pate,

Herewith the draft of the proceedings of the Executive Committee meeting held this morning. I hope the minutes have been properly recorded.

A list of points on which I require information is also enclosed. Information on point 3 (a) (b) & (c) can be gathered from the lists of sanctioned grants sent along with your circular letter Ref C1-10611-25 dated 2nd February, to the Tahsildars. I have received only the circular letter. On receipt of the information required by me I shall prepare my note. I wish you could see it before you leave on the 27th inst., as I propose to send the note not only to the Press but to the members of Government who have subscribed amounts but have not yet paid them.

As regards purchase of boats, May I ask Mr. Karunakara Menon, Assistant Director of Fisheries to meet you and settle the number of boats required? He may then be requested to make arrangements for their purchase and distribution, if necessary with the help of Rao Saheb P.V.Gopalan.

I do not know if you have received accounts for the amounts granted for immediate relief. I have received the accounts from Tanur and Rao Bahadur V.Govindan. May I remind others?

Yours sincerely,

R Suryanarayana Rao

P.S. Since writing this letter, I have received the Cheque Book & a letter from the Bank, kindly sent by you. Many thanks.

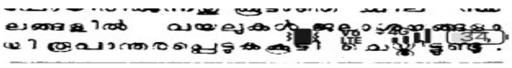
RSR

Source: *Malabar District Collectorate Files, GO. NO10611, vol,1,10.3.1927, RAK*.

Appendix X

Malayalam Manorama daily Reports of 1924 flood

…കുളം മുതൽ
കോഴിക്കോട് വരെ.



Source: Malaya Manorama Daily,7/08/1961.

Appendix XI.A

Relief Committee – Receipts, Expenditure & Distribution

Received 31 JUL 1925 — Asst. Secretary to Govt., Revenue Department

CURRENT No. Rev 2419 B 31-7-25 192 . Registered 192

Subject.

14

THE MALABAR FLOO[D]

Statement showing receipts, expenditure, distribution ., on 30-6-25.

Taluk.	Number of destitute families relieved.	Amount.			Total.		
Calicut.	2671	15,659	0	0	39,272	0	0
Ernad.	6022	33,311	0	0	35,446	0	0
Walluvanad.	1784	14,374	0	0	15,912	0	0
Ponnani.	6162	29,043	8	0	35,271	8	0
Palghat.		269	0	0	919	0	0
Wynad.	66	750	0	0	750	0	0
North Malabar.	2614	18,424	15	0	20,444	15	0
	19319	111,831	7	0	148,015	7	0
Total deposits at the Imperial Bank, Calicut.		1,87,776	1	4			
		1,87,776	1	4			

For Collector.

Source: *Malabar District Collectorate Files, GO. NO.1327, RAK*

Appendix XI.B

Malabar Flood Relief Committee Figures for the Week Ending 29-12-1924

11 B

Malabar Floods Relief Committee, Calicut.

Figures for the Week ending 29.12.1924.

89

Centre.	No. of houses.	Amount.
Feroke	55	325/-
Ottappalam	21	276/-
Parappanangadi	55	219/-
Tirur	19	253/-
Nilambur	51	212/-
Areacode	47	15/-
Mannarghat	1	500/-
Ponnani	150	573/-
Manjeri	146	973/-
Iritti (North Malabar)	141	400/-
Irikkur ..	43	441/-
Mahe ..	37	1091/-
Pappinisheri ..	170	2935/-
Sreekandhapuram ..	458	
Total.	1394	8320/-

Calicut.
2-1-25.

Sd/-------------,
Joint Secretary.

(True Copy).

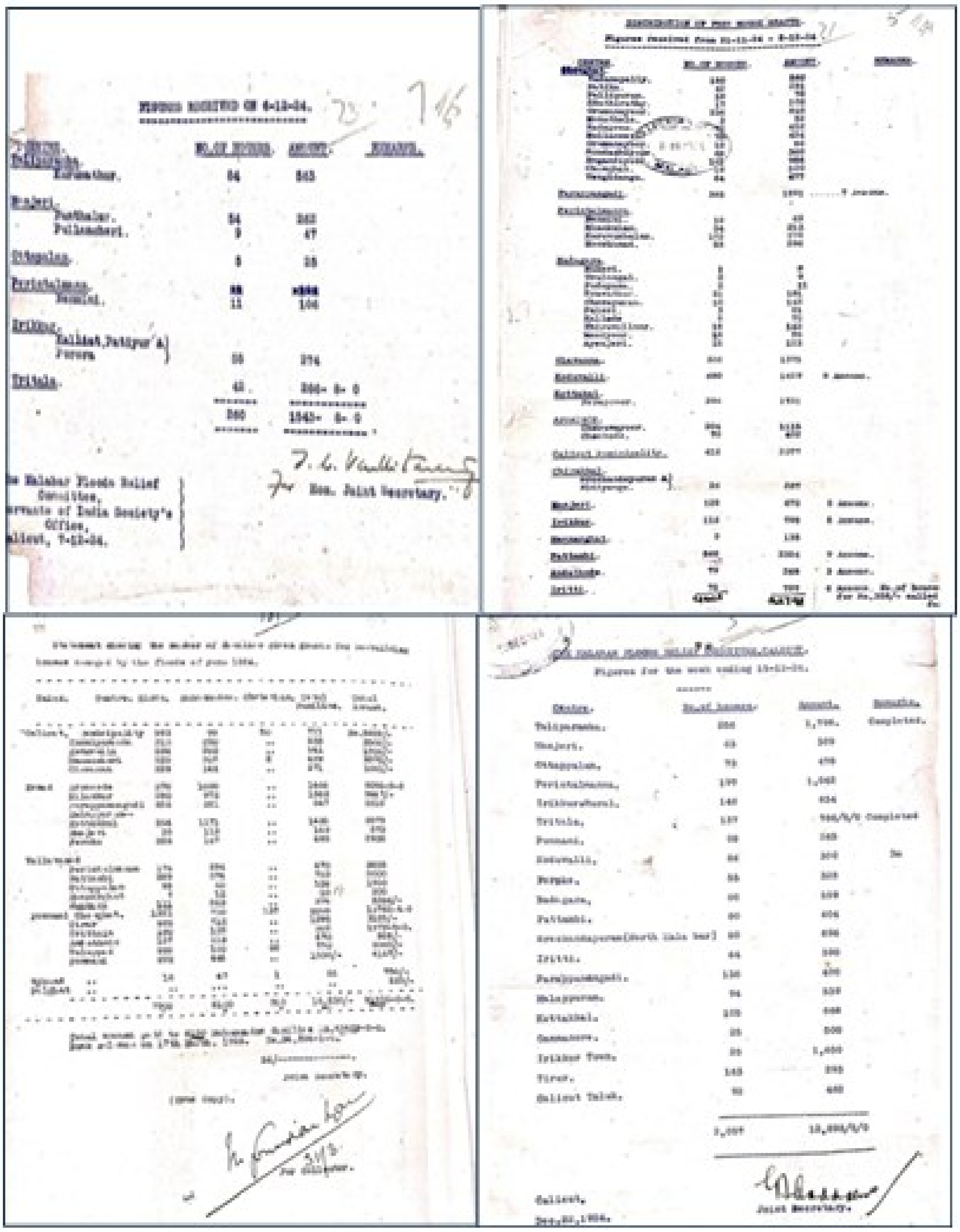
For Collector.

a.R.G. 10.1a.

Source: *Malabar District Collectorate Files, GO. NO.1336, RAK.*

Appendix XI.C

Malabar Flood Relief Committee Expenditure



Source: Malabar District Collectorate Files, GO. NO.1336, RAK.

Appendix XII.A

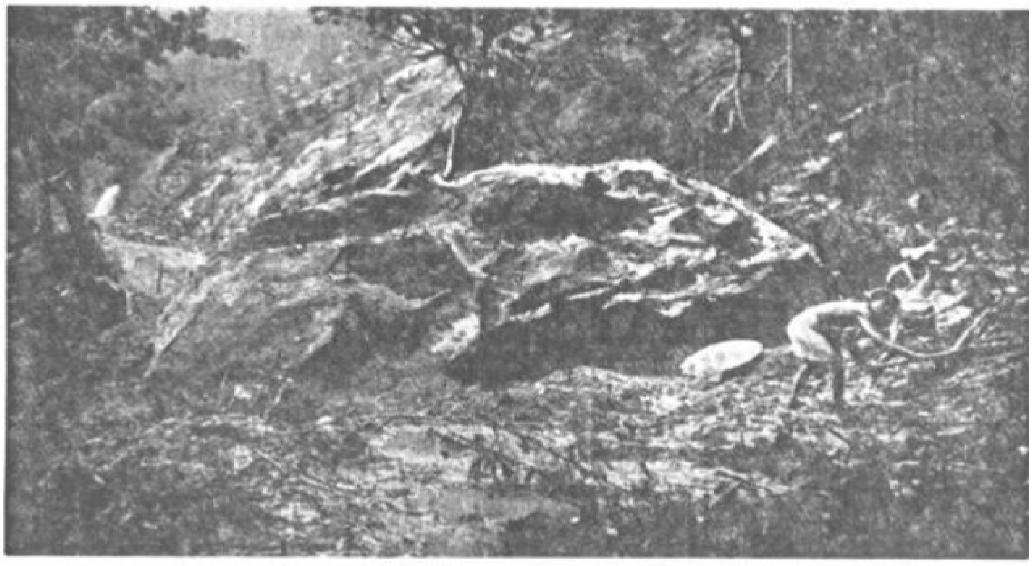
Deshabhimani Daily Reports of the 1961 Flood

മണ്ണിടിഞ്ഞതുമൂലം ഗതാഗതം തടസ്ഥപ്പെട്ട അട്ടപ്പാടി–മുക്കാളിനിരത്ത്

***Source*:** Deshabhimani,14/07/1961.

Appendix XII.B

Malayalam Manorama Daily Reports of the 1961 Flood in Attapadi Region.



പാറ വീണ് ഗതാഗത തടസ്സമുണ്ടായ [illegible] റോഡ്.

Source: Malayala Manorama Daily,15/07/1961**.**

Appendix XII.C

Malayalam Manorama daily reports of the Destructions of 1961 Flood in different parts of Kerala

കോഴിക്കോട്ട 4000 കുടുംബങ്ങളെ മാററി താമസിപ്പിച്ചു-നിലമ്പൂരിൽ 500 വീടുതകർന്നു

വയനാട്ടിലേക്കുള്ള ഗതാഗതം പുനഃസ്ഥാപിക്കാൻ ഒരാഴ്ചയെങ്കിലും വേണ്ടിവരും

(സ്വന്തം ലേഖകൻ) കോഴിക്കോട്, ജൂലൈ 6

കോഴിക്കോട് താലൂക്കിലെ താഴ്ന്ന പ്രദേശങ്ങളിൽ നിന്ന് അത്യാവശ്യമായ വീട്ടുസാമാനങ്ങളോടെ ഏതാണ്ട് നാലായിരം കുടുംബങ്ങളെ വീടുകളിൽ നിന്ന് മാററിപ്പാർപ്പിച്ചിരിക്കയാണ്. ജില്ലാ ഇൻഫർമേഷൻ ഓഫീസറുടെ പത്രക്കുറിപ്പനുസരിച്ച് ആയിരം കുടുംബങ്ങളെ ജില്ലാ അധികൃതന്മാർ തുറന്ന 28 ദുരിതാശ്വാസകേന്ദ്രങ്ങളിലായി പാർപ്പിച്ചിട്ടുണ്ട്. അരിയും കഞ്ഞിയും ഈ കേന്ദ്രങ്ങളിൽ വിതരണം ചെയ്യുകയും വീടുകൾ നശിച്ചവർക്ക പണംകൊടുക്കുകയും ചെയ്യുന്നുണ്ട്.

നിലമ്പൂരിൽ 500 വീടുകൾ തകർന്നു

നിലമ്പൂർ ഭാഗത്തു 500 വീടുകൾ തകരുകയുണ്ടായെന്നു റിപ്പോർട്ടുണ്ട്. കോഴിക്കോട് കലക്ടർ ശ്രീ ഗോപാലസ്വാമി ദുരിതാശ്വാസകേന്ദ്രങ്ങൾ സന്ദർശിക്കയും തഹസീൽദാരന്മാർക്ക് ആവശ്യമുള്ളത്ര പണം ചെലവഴിക്കാനധികാരം നൽകുകയും ചെയ്തിട്ടുണ്ട്. സ്പെഷ്യൽ തഹസീൽദാർമാർ, ബി. ഡി. ഒ. മാർ എന്നിവരെ ദുരിതാശ്വാസപ്രവർത്തനങ്ങൾക്ക് നിയോഗിച്ചിട്ടുണ്ട്.

കോഴിക്കോട്ട സ്ഥിതി മോശമാകുന്നു

കോഴിക്കോട്ടു ഇന്നലെ രാത്രി മുന്നിഞ്ചുമഴ പെയ്തതു നഗരത്തിലെ സ്ഥിതി കൂടുതൽ വഷളാക്കുകയും കല്ലായിപ്പുഴയുടെ സമീപ പ്രദേശങ്ങളിൽ കഴുത്തറ്റത്തോളം വെള്ളം പൊങ്ങുകയും ചെയ്തിരിക്കുന്നു.

കോളേജുകളിലും സ്കൂളുകളിലും ആളുകളെ താമസിപ്പിച്ചുവരികയാണ്. ഫറൂക്കിലെ ചാലിയാർപ്പുഴയിൽ 1924-ലെ വെള്ളപ്പൊക്കവിതാനത്തിലെത്താൻ ഇനി മുന്നിഞ്ചു വെള്ളം കയറിയാൽ മതി.

വയനാട്ടിലേക്കഗതാഗതതടസ്സം

വയനാട്ടുഭാഗത്തേക്കുള്ള ഗതാഗതം ഇപ്പോഴും നിലച്ചിരിക്കയാണ്. മരാമത്തുവകുപ്പുകാർ പലമാവധി പരിശ്രമിച്ചു ഗതാഗതം ഇടർന്നുകൊടുക്കാൻ ശ്രമിക്കയാണ്. ആനയോളം വലിപ്പമുള്ള പാറക്കെട്ടുകൾ 200 അടി ഉയരത്തിൽനിന്ന് റോഡിൽ നാലടിയിലധികം ആഴമുണ്ടാക്കമാറു പതിച്ചിരിക്കയാണ്. വയനാട്ടിലെ ഗതാഗതം പുനഃസ്ഥാപിക്കാൻ ഒരാഴ്ച പിടിക്കുമെന്നും ഇടർച്ചയായ മഴയിടിച്ചിൽ കൊണ്ടും കോടും തണുപ്പും മൂടലും കൊണ്ടും പ്രവർത്തനം തടയപ്പെട്ടിരിക്കയാണെന്നും എക്സിക്യൂട്ടീവ് എഞ്ചിനീയർ ശ്രീ ഗണപതി അയ്യർ പ്രസ്താവിച്ചു. വയനാട്ടിൽ സാമാനവില കുതിച്ചുകയറുകയാണ്.

മദ്രാസ്-കാലിക്കററു റോഡിൽ മൂന്നര മുതൽനാലടിവരെ ഉയരത്തിൽ വെള്ളം കയറുകയാൽ ഫറൂക്ക്—കോഴിക്കോടു ഗതാഗതം മുടങ്ങിയിരിക്കയാണ്. മലപ്പുറത്തു ആനക്കയംപുഴ വെള്ളം, റോഡിനെ അഞ്ചടിയോളം മുക്കിയിരിക്കയാണെന്നും റിപ്പോർട്ടുണ്ട്.

തീവണ്ടിഗതാഗതത്തിനു മുടക്കമില്ലെങ്കിലും തെക്കുനിന്നുള്ളവ വളരെ വൈകിയാണെത്തുന്നത്.

തടികൾ കടലിലേക്ക് ഒഴുകിപ്പോയി

കിഴക്കൻ മലയോരങ്ങളിൽ നിന്നു ധാരാളം മരത്തടികൾ കല്ലായി പുഴയിലൂടെ ഒഴുകിവന്നു കല്ലായിയിലെ തടിഡിപ്പോകളിലെ മരത്തടികളിലടിച്ചു് അവയെയും കൊണ്ടു് കടലിലേക്കൊഴുകിപ്പോയതായി വിവരം കിട്ടിയിരിക്കുന്നു.

ശവം പൊങ്ങി

കോയിലാണ്ടിക്കടുത്ത കൊല്ലത്തു തിരിച്ചറിയപ്പെടാത്ത ഒരാളുടെ ശവം പൊങ്ങിവന്നതായി വിവരം കിട്ടിയിട്ടുണ്ട്.

Source: Malayala Manorama Daily, 4/07/1961.

Appendix XII.D

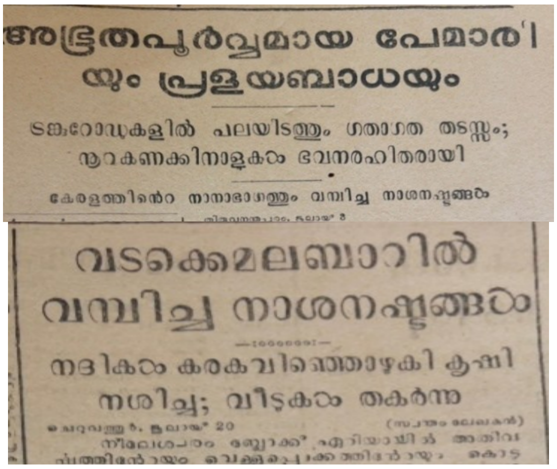
Malayalam Manorama daily reports of 1961 flood

വെള്ളപ്പൊക്കത്തിന്റെ മറ്റൊരു ദൃശ്യം

Source: Malayala Manorama Daily, 15/07/1961**.**

Appendix XII.E

Deshabhimani Daily Reports of the 1961 Flood



അഭൂതപൂർവ്വമായ പേമാരി
യും പ്രളയബാധയും

ടങ്കറോഡുകളിൽ പലയിടത്തും ഗതാഗത തടസ്സം;
നൂറുകണക്കിനാളുകൾ ഭവനരഹിതരായി

കേരളത്തിന്റെ നാനാഭാഗത്തും വമ്പിച്ച നാശനഷ്ടങ്ങൾ

വടക്കെമലബാറിൽ
വമ്പിച്ച നാശനഷ്ടങ്ങൾ

നദികൾ കരകവിഞ്ഞൊഴുകി കൃഷി
നശിച്ചു; വീടുകൾ തകർന്നു

Source: Deshabhimani, 10/07/1961.

Appendix XII.F

Deshabhimani Daily Reports of the 1961 Flood in Calicut

ദേശാഭിമാനി

വയനാട്ടിൽ ചുരം ഇടിഞ്ഞുവീണ ഒരു രംഗം

ജില്ലാ കലക്ടരുടെ
അറിയിപ്പ്

വെള്ളപ്പൊക്കത്തിന്റെ കെടുതികൾ

എഞ്ചിനീയറിംഗ്
കോളേജ് പ്രവേശനം

Source: Deshabhimani,8/07/1961.

Appendix XIII.A

Flood Relief Funds of Various Associations in Calicut (1961)

PHONE NO. 3604. PROPRIETOR: P. KELU.

P. KUTTAN BROTHERS

CHEMISTS & DRUGGISTS.

HUZUR ROAD.

CALICUT 10th July1961.

(KERALA STATE.)

To
The Convenor
Dt. Flood Relief Committe
Collectorate, Calicut

Sir,

Sub:- Natural Calamities-Floods-Sea Erosion etc. Relief Measures

Ref: C.3 13085/61 dated 8-7-1961 recd. from Collector's Office Calicut

As per instruction contained in the above reference, we sent you herewith 1x1000 Multivitamin Tabs. Please accept this. Thanking you.

Yours Faithfully,
for P.Kuttan Bros

Proprietor

Copy to:-
The Collector
Calicut.

THE MALABAR CHAMBER OF COMMERCE

INCORPORATED UNDER THE INDIAN COMPANIES ACT

AFFILIATED TO:-

THE SOUTHERN INDIA CHAMBER OF COMMERCE.

CALICUT - 1. (S. INDIA)

FOUNDED 1929

TELEPHONE NO. 2242

NO. 543/61 8th July, 1961.

The Chairman,
Kozhikode District Flood Relief Fund,
CALICUT.

Dear Sir,

Sub: Flood Relief Fund.

I am to inform you that an Emergent Meeting of the Members of the Executive Committee of this Chamber was held on Friday the 7th July, 1961 under the President-ship of Janab B.V. Abdulla Koya, Vice-President to consider the present situation arising out of the Flood havoc caused to the Calicut Town and its suburbs and it was resolved to donate Rs. 1001/= (Rupees One thousand and one only) to the Kozhikode District Flood Relief Fund out of the Chamber's Fund.

In pursuance of the above resolution I am sending herewith Cheque No. CLT 162914 dated the 7th July, 1961 for Rs. 1001/= on the Central Bank of India Ltd., Calicut.

Kindly acknowledge receipt of the same.

Thanking you,

Yours faithfully,

(R. RAMAKRISHNA CHETTIAR.)
HONY. SECRETARY.

Encl: (1 Cheque)

mk/ps.

ഹൈന്ദവ സാംസ്കാരിക സംഘടന
കോഴിക്കോട്.

The Hindu Cultural Association

Sree Nivas,
Opposite Municipal Travellers' Banglow,
CALICUT. 1

10. 7. 1961.

To

The Convenor,
Kozhikode Dt. Relief Committee,
Kozhikode.

Sir, We are here-in enclosing a cheque No. S.B. 114570. for Rs 100/- on the Nedungadi Bank Ltd, Kozhikode, dated 10. 7. 1961, towards your Flood Relief Fund. Kindly acknowledge.

yours truly,

For THE HINDU CULTURAL ASSOCIATION

R.Satyanarayanan
Secretary.

SUBJECT TO CALICUT JURISDICTION.

Sha Parshotam Madhavjee,

MERCHANTS & COMMISSION AGENT.

BRANCH: BADAGARA. (Estd. 1923)

TELE grams: "VRAJMANI"
phone No. 2425 Res. 2425A

शा परसोतम माधवजी,
कालीकट, (मलबार).

Calicut-1, 10 7 1961.
(Kerala)

COLLECTORATE 10 JUL 61 KOZHIKODE

To,
The District Collector of Kozhikode.
Calicut

Dear Sir,

We enclose herewith one cheque on The Canara Bank Ltd, in your favour for Rs 50/= (Rs Fifty only) being our share towards the Kerala Flood Relief Fund. Please accept the same and acknowledge the receipt.

Thanking you.

Yours faithfully

For SHA PARSHOTAM MADHAVJI.

Manshukh Vrajlal
Partner

Encl:-
One cheque. No S. 380213
on The Canara Bank Ltd

Entered in the "Security" Register as item No. 53/61

10-7-61

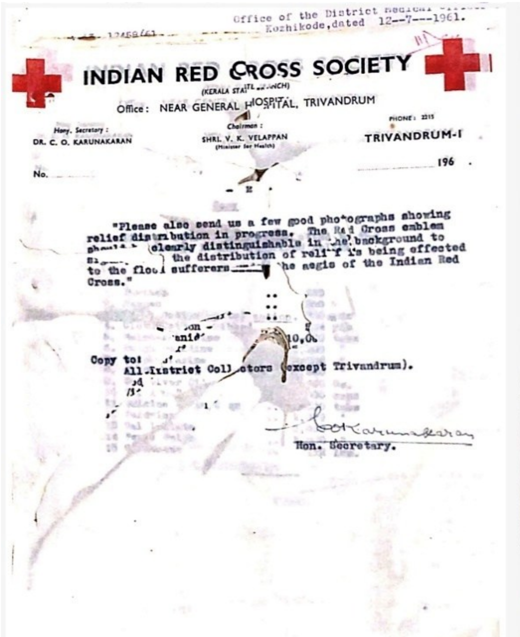
Huzur Sheristadar

10/7/61

Source: *Malabar Collectorate File, G.O.,32463230.6.1962, RAK.*

Appendix XIII.B

Flood Relief funds of Various Associations (1961)



Office of the District Medical Officer
Kozhikode, dated 12--7---1961.

INDIAN RED CROSS SOCIETY
(KERALA STATE BRANCH)
Office: NEAR GENERAL HOSPITAL, TRIVANDRUM

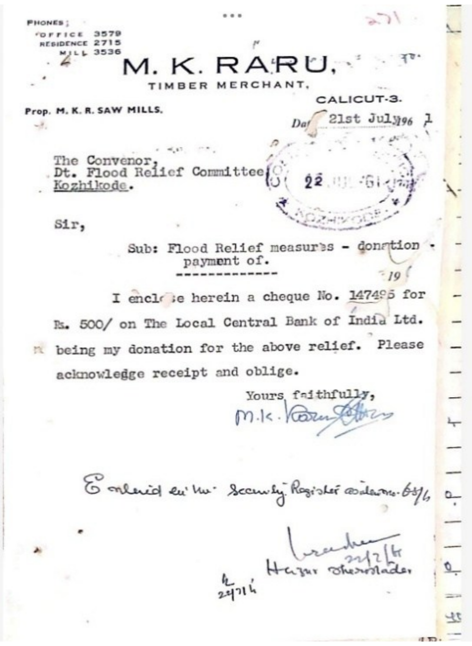
Hony. Secretary: DR. C. O. KARUNAKARAN
Chairman: SHRI. V. K. VELAPPAN (Minister for Health)
PHONE: 2215
TRIVANDRUM-1

No. .... 196 .

"Please also send us a few good photographs showing relief distribution in progress. The Red Cross emblem should be clearly distinguishable in the background to show that the distribution of relief is being effected to the flood sufferers under the aegis of the Indian Red Cross."

Copy to: All District Collectors (except Trivandrum).

C.O. Karunakaran
Hon. Secretary.



PHONES: OFFICE 3579, RESIDENCE 2715, MILL 3536

M. K. RARU,
TIMBER MERCHANT,
CALICUT-3.

Prop. M. K. R. SAW MILLS.

Date 21st July 1961

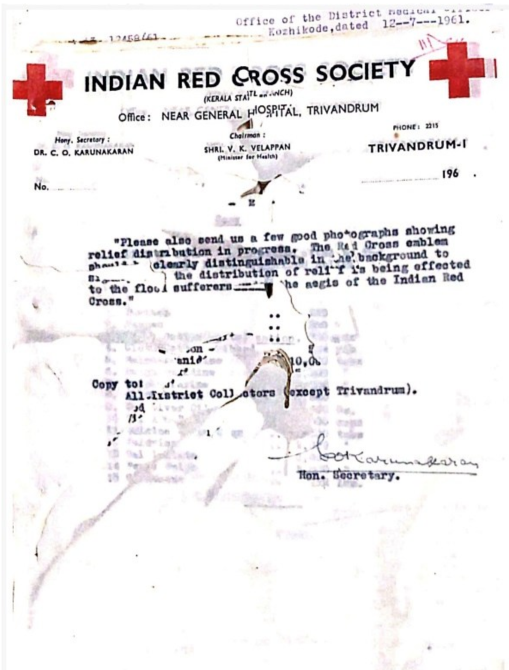
The Convenor,
Dt. Flood Relief Committee,
Kozhikode.

Sir,

Sub: Flood Relief measures - donation payment of.

I enclose herein a cheque No. 147495 for Rs. 500/ on The Local Central Bank of India Ltd. being my donation for the above relief. Please acknowledge receipt and oblige.

Yours faithfully,
M.K. Karunakaran



Office of the District Medical Officer
Kozhikode, dated 12--7---1961.

INDIAN RED CROSS SOCIETY
(KERALA STATE BRANCH)
Office: NEAR GENERAL HOSPITAL, TRIVANDRUM

Hony. Secretary: DR. C. O. KARUNAKARAN
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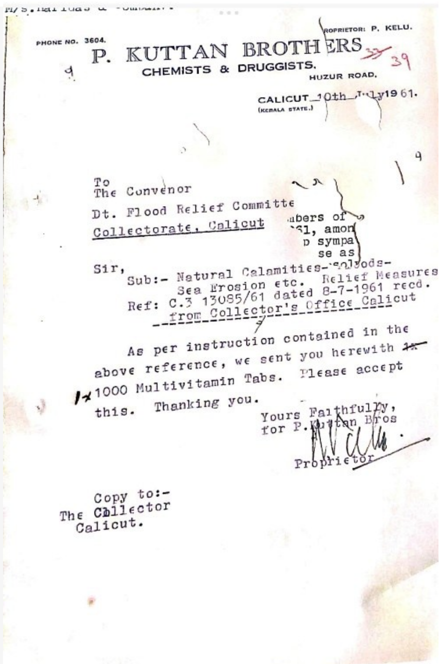
Copy to: All District Collectors (except Trivandrum).

C.O. Karunakaran
Hon. Secretary.



PHONE NO. 3604.
PROPRIETOR: P. KELU.

P. KUTTAN BROTHERS
CHEMISTS & DRUGGISTS.
HUZUR ROAD,
CALICUT 10th July 1961.
(KERALA STATE.)

To
The Convenor
Dt. Flood Relief Committe
Collectorate, Calicut

Sir,

Sub:- Natural Calamities-Floods-Sea Erosion etc. Relief Measures
Ref: C.3 13085/61 dated 8-7-1961 recd. from Collector's Office Calicut

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Yours Faithfully,
for P. Kuttan Bros
Proprietor

Copy to:-
The Collector
Calicut.

Source: *Malabar Collectorate R-Dis File, G.O.,32463230.6.1962, RAK.*