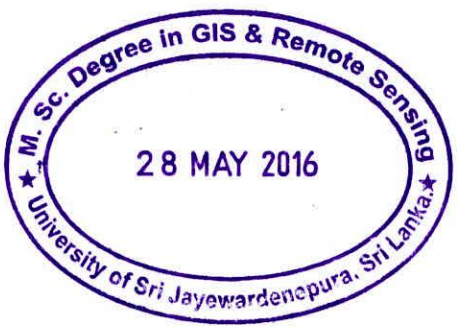
# Spatial Pattern of Filariasis in Matara Divisional Secretariat Division

By

Adithya Kumara Hettiarachchi




Thesis Submitted to the Faculty of Graduate Studies University of Sri Jayewardenepura for the Partial Fulfillment of Master's of Science Degree in GIS and Remote Sensing on 20th March 2016

## Declaration of the candidate

I do hereby declare that work described in this thesis was carried out by me under the supervision of Professor R.M.K.Rathnayaka and Dr.D.P.S.Chandra kumara and report on this thesis has not been submitted in whole or in part to any University or any other institution for another Degree/Diploma.

Date 20.03.2016

A.K.Hettiarachchi
No:15/25, Thilini Uyana,
Meddawatta, Matara.

**Acknowledgements**

Firstly, I would like to express my deepest gratitude to the two supervisors, Professor R.M.K.Rathnayaka, Department of Geography, University of Sri Jayewardenepura, Nugegoda, Sri Lanka and Doctor D.P.S,Chandra Kumara Department of Economics, University of Sri Jayewardenepura, Nugegoda, Sri Lanka, who gave entire guidance and encouragement for the research which was undertaken. I would like to especially thank professor R.M.K.Rathnayaka for the valuable guidance given to me as the course coordinator in achieving this task a success. My special thanks should go to all the lectures who taught me from the1st semester to third semester of the MSC in GIS & RS Programme 2014-2016. I also thank to the officials of Post graduate Institute in Sri Jayewardenepura University for giving me an opportunity to follow this master's degree.

I wish to express my deepest and heartiest gratitude to my staff members at Technical college- Matara and also Mr.S.Balasubramanium (Director General). Mr K.V.Anura Keerthi (Additional Director General - Academic), Mrs.J.Krishnamurthi (Additional Director General -Administration), Board of Directors in Department of Technical Education and Training,

I wish to offer my grateful thanks to the friends for encouraging me to complete the study successfully. Finally I offer my heartiest gratitude to my beloved mother Padma Hettiarachchi, Loving wife Indra Kumudeni K.Guruge and all the family members for their sincere cooperation for the completion of this study.

## Chapter Structure

## Abbreviations

| | |
|---|---|
| AFU | - Anti Filariasis Unit. |
| AFC | - Anti Filariasis Campaign. |
| CFA | - Circulating Filarial Antigen. |
| DSD | - Divisional Secretariat Division. |
| DEC | - Diethyl Carbamazine. |
| DEM | - Digital Elevation Model. |
| GND | - Grama Niladari Division. |
| GIS | - Geographical Information System. |
| GCS | - Geographical Coordinate System. |
| GSO | - Grama Seva Officer. |
| GPS | - Global Position System. |
| IDW | - Inverse Distance weighted. |
| ICT | - Immune Chromatography Test. |
| LF | - Lymphatic Filariasis. |
| MDA | - Mass Drug Administration. |
| MDSD | - Matara Divisional Secretariat Division. |
| MF | - Micro Filarial. |
| MC | - Municipal Council. |
| MOH | - Medical Officer in Health. |
| NTD | - Neglected Tropical Diseases. |
| SHS | - Superintendent of Health Service. |
| UC | - Urban Council. |
| US | - United States. |
| WHA | - World Health Assembly. |
| WHO | - World Health Organization. |
| WCS | - World Coordinate System. |

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# Spatial Pattern of Filariasis
# In Matara Divisional Secretariat Division

A.K.Hettiarachchi

## ABSTRACT

Filaria is a parasitic disease which causes lifelong mental and physical suffering to the affected. About 1.23 billion people in 73 countries worldwide suffer from filariasis. This research paper discussed about the filariasis distribution pattern in Matara Divisional Secretariat Division where the second highest filariasis patients were reported in Sri Lanka.

The objectives of this research study was to find out the distribution pattern of the filariasis in Matara Divisional Secretariat Division. Further this study concerned on the effects of filariasis of this areas, identifying the barriers to prevent filariasis, providing recommendations to minimize the risk of filariasis and identifying the methods of preventing the spreading of filariasis.

This study includes a GIS analysis about the filariasis distribution pattern in the areas and applied GEODA, ARCGIS 10.1, OZIEXPLORER and MS Excel software for data analysis. There are four data analysis was used named proximity analysis, Raster analysis, Hot Spot analysis, Overlay and IDW analysis in this research. Base on the findings of the study necessary recommendations to prevent filariasis distribution in the area was provided.

According to findings Polhena GND was the highest number of filariasis patients reported area and pits which use to stagnate coconut husks, low education level of the people in the areas, higher level of population density are some of the key factors that impact on such filariasis distribution. This study found inter relationship between land slope and the patient's density. Accordingly the risk on filariasis is high in flat land area. The risk on filariasis is moderate in low mountain areas.

(Key Words: Filariasis, lymphatic filariasis, elephantiasis, microfilaria, Mf.Malayi, Population, Elevation, Rainfall, Slope and Landuse)

# Chapter One

## Introduction

### 1.1 Introduction to study

Filaria is a parasitic disease which causes lifelong mental and physical suffering to the affected. About 1.23 billion people in 73 countries worldwide are threatened by Filariasis and require preventive large scale treatment to stop its spread. There are 37 countries out of 73 are in South Africa and Pacific nations. In America Guyana, Brazil, Costa Rica are the mostly suffered countries from filariasis. When concentrate on Asian countries Bangladesh, India, Indonesia, Thailand and Sri Lanka in at the highest threat from filariasis.

There are lot of institutions involved in activities related with preventing filariasis from the world forever such as World Health Organization, Pan American Health Organization, World Bank, USAID, UNICEF and etc. above organizations allocate and distribute a large sum of money on filariasis preventing programs worldwide. Further they get the involvement of celebrities and political leaders in the world for such programs.

Although such effort is made to prevent filariasis lack of geographical, sociological, financial data related with filariasis has become the main barrier for their effort. These information is very important to identify the areas that filariasis has spreaded, identify new areas that in threat for filariasis, identify the areas that risk on filariasis has reduced and etc.

In Sri Lanka Microfilaria rate was 0.36 in year 1995 and it was decreased to 0.02 by year 2012. When concentrate on Matara district the microfilaria rate was 0.03 in year 2005 and it has been reduced to 0.025 in year 2012.

This study expects to find geographical, sociological and financial impacts to spreading trend of increasing microfilaria rate can be identified in some areas in Matara Divisional Secretariat Division (DSD) such as Polhena, Walgama, Pamburana, Thotamuna filariasis in above areas.

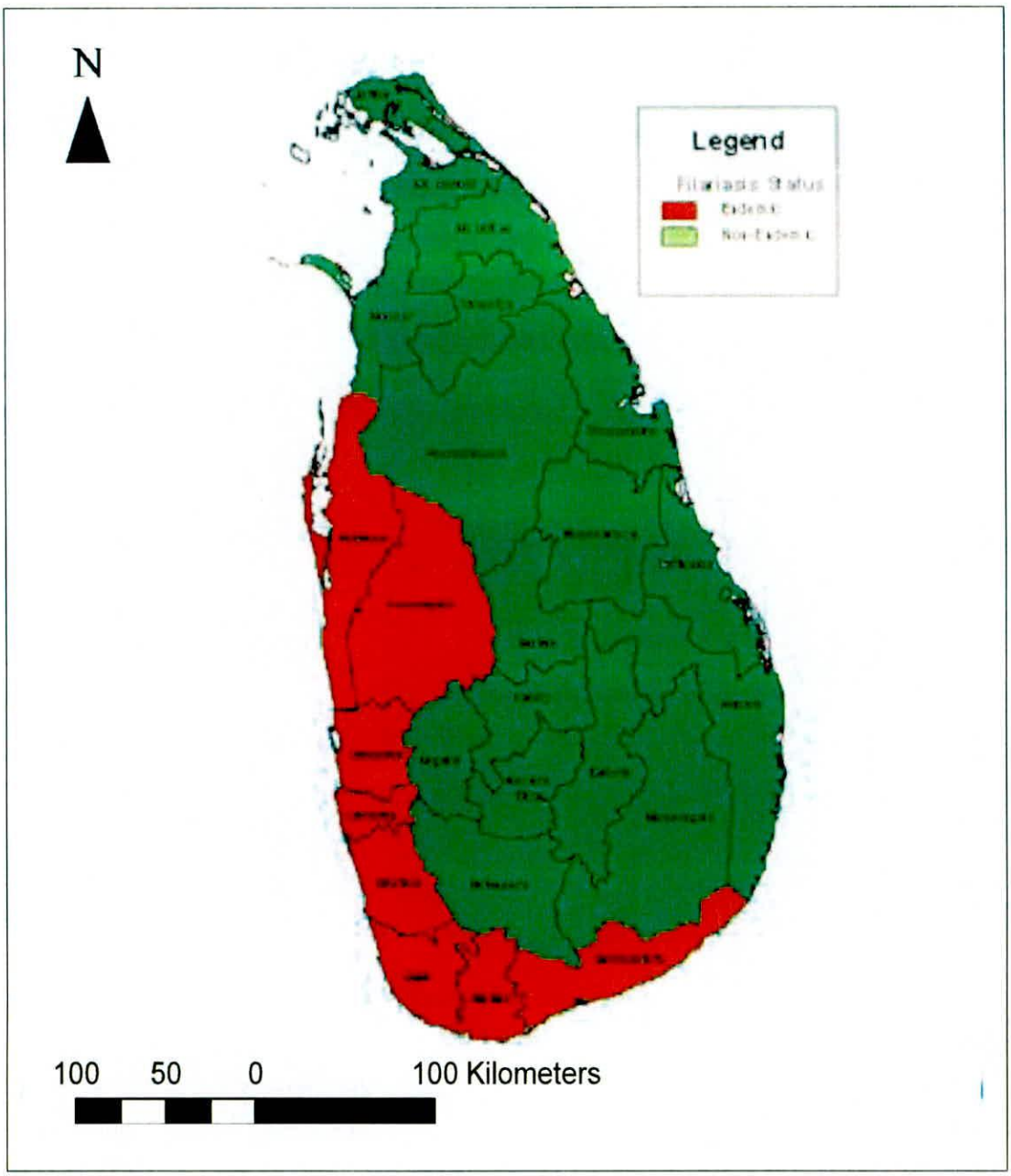


Figure 1.1 Filariasis in Endemic Districts in Sri Lanka.

Source:http://www.filariasiscampaign.health.gov.lk,2013

**1.2 Study Problem**

The microfilaria level in Matara in year 2005 was reported as 0.03 and in year 2012 it was reported as 0.025. Further in year 2005, the number of filaria patients was reported as 35 and it had decreased to 21 by 2010. Although such a decrease was reported in some areas such as Polhena, Walgama, Paramulla, Madiha, Thotamuna the microfilaria level

has increased in recent years. By June 2015 there are 501 of microfilaria patients have reported from Matara district since 2006.

In order to prevent filariasis from Matara district it is essential to gather information about filariasis such as area wise filariasis patients in Matara district, areas where trend exist for increase filariasis patients, geographical attributes of areas filariasis has spread highly, areas where threat on filariasis has reduced, other factors such as demographic, sociological and etc. that impact on spreading filariasis in Matara DSD. GIS analysis is very useful for analyze above factors as it can make different types of analysis.

Accordingly the main research problem is identified to what extent GIS can be used to trace out the recent trends in filariasis with reference to the Matara (DSD).

### 1.3 Significance of the study

This study reviews a GIS analysis of geographical, sociological, demographic and financial data that impact on spreading filariasis in Matara DSD.

Accordingly areas that opened for filariasis threat, nature of those areas, specific geographical factors in those areas, population in the area and etc. will be discussed through this study. Sociological factors such as religion, urban or rural background, life style, education level of the filaria patients and their families also will be discussed. Demographic factors such as age level, gender of filaria patients and their families and etc. also will be brought to discussion. Financial factors such as income level, source of income, income distributions, expenditures and ability to expend of the filariasis patients and their families and etc. will be discussed.

Accordingly sufficient understanding about the filariasis patients and their background can be gained to the people in the society. Further it will support to take actions to safe guard the society from filariasis. Further programs to take filariasis patients to the society can be conducted.

This GIS analysis is conducted only for Matara DSD. The researcher is able to conduct a GIS analysis for Sri Lanka to find geographical, demographic, sociological and financial factors that impact on spreading filariasis in Sri Lanka using this study as the base. Using the findings of this research other researchers also can conduct further researches about this subject.

## 1.4 Objectives of the study

The main objective is to find out the distribution pattern of the filariasis in Matara Divisional Secretariat Division (DSD).

Specific objectives are

- To identify the effects of filariasis of this area.
- To identify the barriers to prevent filariasis
- To give recommendations to minimize the risk of filariasis
- To identify the methods of preventing the spreading of filariasis.

# Chapter Two

## Literature Review

### 2.1 Conceptual Literature

Introduction to Filariasis

Filariasis is extremely a broad topic for a single discussion as it encircling several specific parasites that can caused to disease humans. Mainly eight of such parasites have been identified named "Wuchereria brancofti, Brugia malayi, Brugia timori, Onchocerca volvulus, loa loa, dipetalonema streptocerca, Mansonella perstans, human lymphatic filariasis is mostly caused by Wuchereria brancofti. In general context among 90.2 million of estimated infected 90% of them are caused by Wuchereria brancofti and only less than 10% caused by Brugian malayi and Brugia timori. Viley (1987).

There are 120 million of people in 73 countries have been suffering from lymphatic filariasis and situation goes worst day by day. Specially African and Indian subcontinents are largely open to lymphatic filariasis. There are 44 million of people afflict from elephantiasis, lymphedema and genital pathology. In addition there are 76 million of people have parasites in their blood.

According to Siddarth (2013) Filariasis is a disease group affecting humans and animals, caused by filariae; i.e., nematode parasites of the order Filariidae.[1] Of the hundreds of described filarial parasites, only 8 species cause natural infections in humans.

Ananya (2014) expressed that Filariasis is a parasitic infection caused by thread-like nematodes (filariae) that belong to the roundworm superfamily filarioidea. These infestations are common in tropical countries such as sub-Saharan Africa, southern Asia, the western Pacific islands, Brazil and Guyana.

Sally (2014) discussed about the treatments for Filariasis and according to her the main treatment of choice for managing filariasis is diethyl carbamazine (DEC). This agent kills the microflorae and has been used globally for over 50 years now.

The Global Programme to Eliminate Lymphatic Filariasis was initiated in 1998, with the main aim of control the transmission of the disease through annual mass treatment, where all possible individuals are treated without concerning whether they are infected or not (Wilma, 2005). In Sri Lanka