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## MAPPING OF MALARIA INCIDENCES IN MYSORE DISTRICT

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### Abstract:

*Malaria is one of the important public health problems; it is one of vector borne disease. In this article an attempt has been made to analyze, identify, categorize, demarcate and mapping of malaria risk taluks in the study area. Taluk wise analyses are done here from 2001 to 2010 and yearly surveillance data are used to demarcate the malaria high risk areas. Temporal analysis indicated some improvement in the disease incidence as the number of taluks with high malaria risk they were decreased after the government has adapted some Program to eradicate the Malaria in the study area. In this article GIS is used to identify and demarcate the malaria high risk areas, it facilitates the public health officer to accurate and rapid disease control.*

### KEY WORDS:

Malaria, GIS, Demarcate, Plasmodium Vivax, Plasmodium Falciperum.

### INTRODUCTION:

Over the past two decades there has been a dramatic global increase of Vector borne Diseases, Such as Malaria, Dengue and Chikungunya. (Anusorn Rungsipanich) Malaria is one of the Vectors borne disease, consumes about three million people every year (Alam et al, 2008). Malaria is a major public health problem; it is spread by single cell parasitic protozoan organism plasmodium, transmitted from person to person through the bite of a female Anopheles mosquito. Malaria caused by four different species of plasmodium vivax, malignanat tertian, quartan and ovale or mild tertian. Malaria is wide spread in the country but with uneven distribution among various states and districts. In the Study area Malaria is one of the major health problem, here, we can observe two types of malaria cases, Plasmodium vivax & Plasmodium Falciperum.

There are many potential risk factors for the transmission of Malaria, which included poor and unhealthy sanitary condition, mosquitoes, water logged areas, polluted environmental condition, human migration, unplanned and uncontrolled urbanization, developmental activities and mainly climatic factors.

### OBJECTIVES:

The study contains the following objectives: Here an attempt as been made to examine, to identify, categories, demarcate and mapping of malaria risk areas in the district using GIS. The Spatio distributions of Malaria incidence and its variations from 2001 to 2010 and mapping of malaria incidence in Mysore District.

### STUDY AREA:

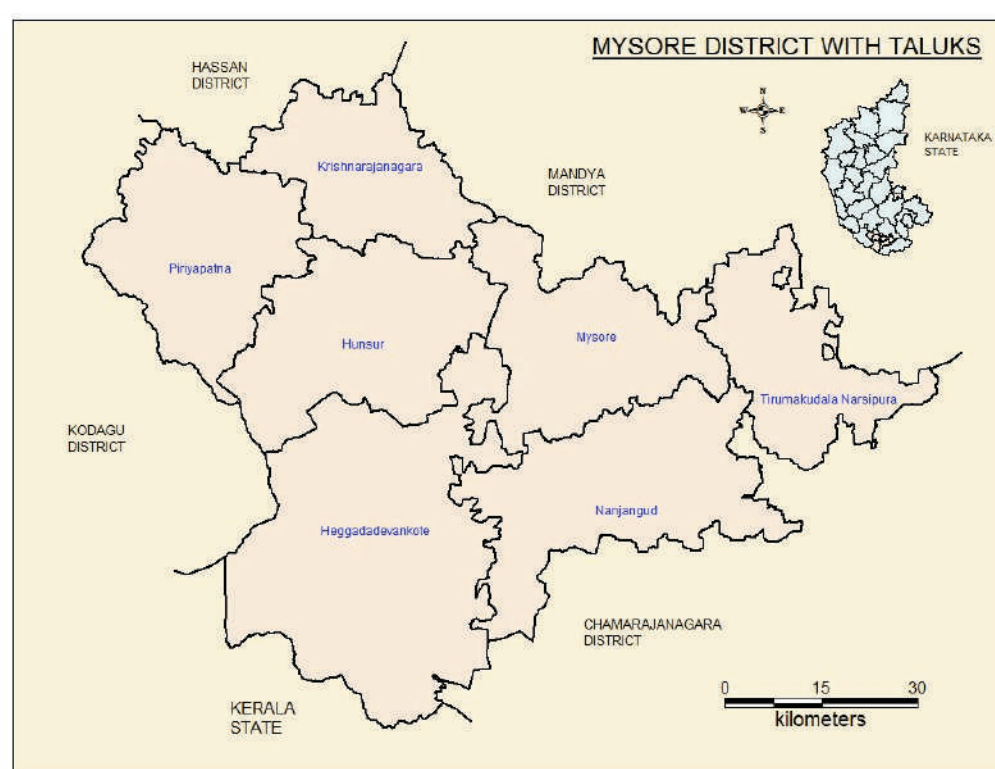
Mysore District is an Administrative District located in the southern part of the state of Karnataka,

## MAPPING OF MALARIA INCIDENCES IN MYSORE DISTRICT



India. This district has a prominent place in the history of Karnataka. Mysore district is located between latitude 11°45' to 12°40' N and longitude 75°57' to 77°15' E. The District spreads across an area of 6854 sq.km (ranked 12th in the state) constituting 4% of the state's total area and is situated in Southern Karnataka. Totally, Mysore district is having 7 taluks namely, Mysore, Tirumakudal\_Narsipur, Nanjangud, Heggadadevanakote, Hunsur, Piriapatna, Krishnarajanagara. According the Census of 2011 Mysore District had a population about 30 lakhs making it third largest district in Karnataka.

Mysore districts consist of 14 Allopathy Hospitals, 5 District hospitals, 82 Private hospitals, 96 Primary health Centres (PHCs), 41 Primary healths Unit (PHU), 10 Community health centre (CHC) and 4 Medical College including Allopathy & Indian Medicines, as per the records of 'The District Health Office of Mysore District'.



### METHODOLOGY:

The present study of Spatio temporal analysis of malaria incidence in Mysore District is based on secondary Data. The data such as, Taluk wise Malaria incidences of Blood Smears Report/Positive Cases of (yearly surveillance) are collected from District Health Office (DHO) or Nagamma Perumal Centre (NPC) and Population data collected from District Statistical Office. The Blood samples were collected and examined to each Taluk at least 10% of the total population by District Health Office based on this consequences number of positive cases are identified. Therefore, only the positive cases are considered here to analyze the Spatio temporal disparity of malaria incidence. The Blood Samples collected of both sex and aged between 2 to 50 years residing in the study area. The Base Map of Study area has been Geo-referenced and digitized using GIS Software, thematic Maps have been, generated to show the Taluk wise Spatio temporal Distribution of Malaria incidences and demarcation of high risk areas in the study area is done, and year wise Malaria incidence in Mysore district has been shown using Graphs to understand the variations.

### DISCUSSION:

The Study indicated that there is wide variation in malaria incidence within the districts. Malaria is a major public health problem; it is spread by single cell parasitic protozoan organism plasmodium, transmitted to humans. The malaria spread by the bite of the female anopheles mosquito, Malaria, is a

parasitic disease that involves infection of the red blood cells. Malaria caused by four different species of plasmodium. i.e., Vivax, Falciperum, Quartan, Ovale or mild tertian. In study area we can observe two types of malaria cases: Plasmodium Vivax (PV), Plasmodium Falciperum (PF). As the Tables below it shows the temporal patterns of Malaria positive cases from the period of 2001 to 2010 are considered for the purpose to study and to understand which is most dominant/sensitive between the plasmodium Vivax and Falciperum of malaria case.

Table: 1 MYSORE DISTRICT

TEMPORAL VARIATIONS OF MALRIA INCIDENCE

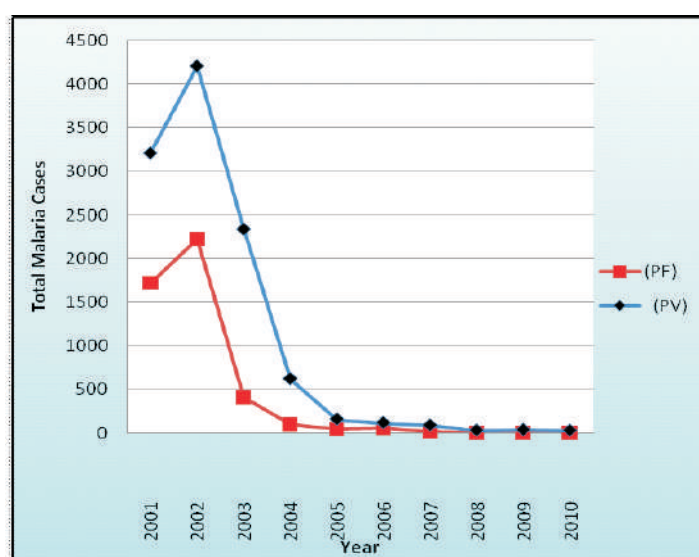
Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Population	2685374	2709022	2739910	2784574	2816611	2839195	2881203	2915281	2944342	2999196
Total Malaria Positive Cases	4935	6439	2746	720	207	168	106	35	41	36
PV*	3210	4209	2337	622	158	117	88	31	36	29
PF**	1725	2230	409	98	49	51	18	4	5	7

Source: District Health Office, Mysore

PV\*= Plasmodium Vivax  
PF\*= Plasmodium Falciperum

Fig: 1 MYSORE DISTRICT

INCIDENCE OF PV AND PF POSITIVE CASES (2001 -2010)



SOURCE: District Health Office, Mysore

By Absorbing the above table and graph we can see that among 4 types of Malaria Mysore district experience two types of Malaria i.e., Plasmodium Vivax (PV) and Plasmodium Falciperum (PF), only these two types of incidences are common in the country. The study area experienced high malaria incidence from 2001 to 2004 mainly because of the district comprises of Marshy lands, water logged areas, unhygienic condition, inaccessibility of most of the inhabited rural areas are stated to be the causative factors of malaria incidence. Here Researchers is focusing on the Mapping of Malaria incidence in study area that is to know the variations. In the study area we observe only Plasmodium Vivax is more than Plasmodium Falciperum in the study area.

**SPATIO TEMPORAL DISTRIBUTION OF MALARIA:**

When we observe the malaria incidence in Mysore District totally 4935 cases are noticed in 2001, among them we can find 3210 PV and 1725 PF, among them 2785 males and 2150 females are affected. The high Malaria incidence were found in K.R. Nagar Taluk consists of 3240 cases; Moderate incidence were found in Periya patna Taluk consists of 623cases and Low incidence were found in Hunsur consisting of 66 Cases. In 2002, totally malaria 6439 cases are noticed, among 4209 PV and 2230 were PF, among them 3612 were Males and 2877 were females, High incidence were found in K.R. Nagar taluk consist of 3710, Moderate incidence were found in T.narsipura Taluk consisting of 960 cases and Low incidence were found in Hunsur consist of 96 cases. In 2003, totally malaria 2746 cases are noticed, among 2337 PV and 409 were PF, among them 1585 were Males and 1161 were females, High incidence were found in K.R. Nagar taluk consist of 2044, Moderate incidence were found in T.narsipura Taluk consisting of 236 cases and Low incidence were found in H.D.Kote consist of 27 cases. In 2004, totally malaria 720 cases are noticed, among 622 PV and 98 were PF, among them 427 were Males and 293 were females, High incidence were found in K.R. Nagar taluk consist of 548, Moderate incidence were found in Mysore Taluk consisting of 60 cases and Low incidence were found in Hunsur consist of 11 cases. In 2005, totally malaria 207 cases are noticed, among 158 PV and 49 were PF, among them 138 were Males and 69 were females, High incidence were found in K.R. Nagar taluk consist of 110, Moderate incidence were found in Mysore Taluk consisting of 41 cases and Low incidence were found in both Hunsur and Nanjangud consist of 7 cases. In 2006, totally malaria 168 cases are noticed, among 117 PV and 51 were PF, among them 109 were Males and 59 were females, High incidence were found in Mysore taluk consist of 85, Moderate incidence were found in K.R. Nagar Taluk consisting of 40 cases and Low incidence were found in Hunsur consist of just 2 cases.

**Table: 2 TALUKWISE TOTAL POSITIVE CASES FROM 2001 TO 2010**

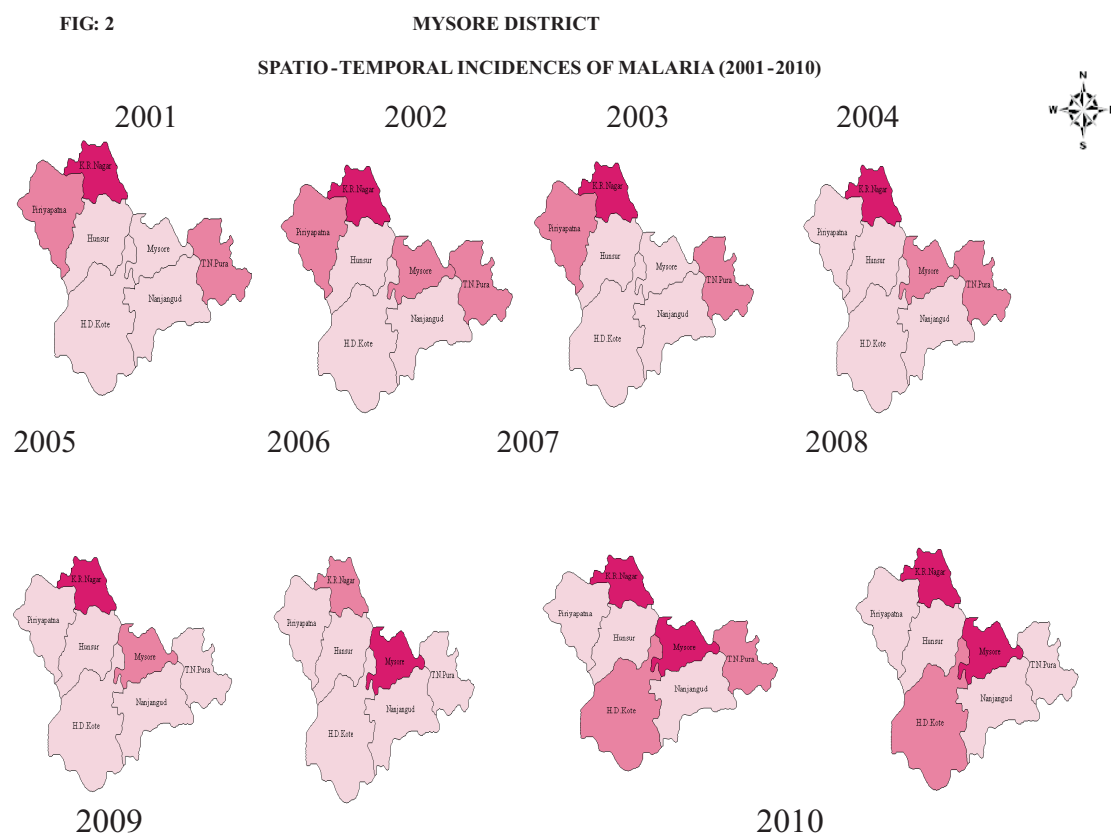
Sl. NO	NAME OF THE TALUKS	TALUKWISE TOTAL POSITIVE CASES FROM 2001 TO 2010									
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
1	Mysore	282	526	126	60	41	85	32	11	28	17
2	T. Narsipura	456	960	236	44	21	7	7	1	1	1
3	Nanjangud	188	247	56	14	7	10	2	2	0	4
4	H.D. Kote	80	136	27	16	10	8	9	6	4	3
5	Hunsur	66	96	50	11	7	2	-	2	6	9
6	Periya Patna	623	764	207	27	11	16	4	1	1	-
7	K.R. Nagar	3240	3710	2044	548	110	40	52	12	1	2
<b>TOTAL</b>		<b>4935</b>	<b>6439</b>	<b>2746</b>	<b>720</b>	<b>207</b>	<b>168</b>	<b>106</b>	<b>35</b>	<b>41</b>	<b>36</b>

Source: District Health Office

MAPPING OF MALARIA INCIDENCES IN MYSORE DISTRICT



In 2007, totally malaria 106 cases are noticed, among 88 PV and 18 were PF, among them 63 were Males and 43 were females, High incidence were found in K.R. Nagar taluk consist of 52, Moderate incidence were found in Mysore Taluk consisting of 32 cases and Low incidence were found in other taluks of Mysore Districts were consists within 10 cases and except Hunsur as nil. In 2008, totally malaria 35 cases are noticed, among 31 PV and 4 were PF, among them 27 were Males and 8 were females, High incidence were found in K.R. Nagar taluk consist of 12 cases, and other taluks consists within 10 cases. In 2009, totally malaria 41 cases are noticed, among 36 PV and 5 were PF, among them 35 were Males and 6 were females, High incidence were found in Mysore taluk consist of 28 cases, and other taluks consists within 10 cases except nanjangud as nil in this year. Finally, in 2010, totally malaria 36 cases are noticed, among 29 PV and 7 were PF, among them 27 were Males and 9 were females, High incidence were found in Mysore taluk consist of 17 cases and other taluks consists within 10 cases except Periya patna as nil in this year. Similarly, the number of Malaria Cases was decreases after the 2004, after the government has adapted some Program to eradicate the Malaria in study area.



2010

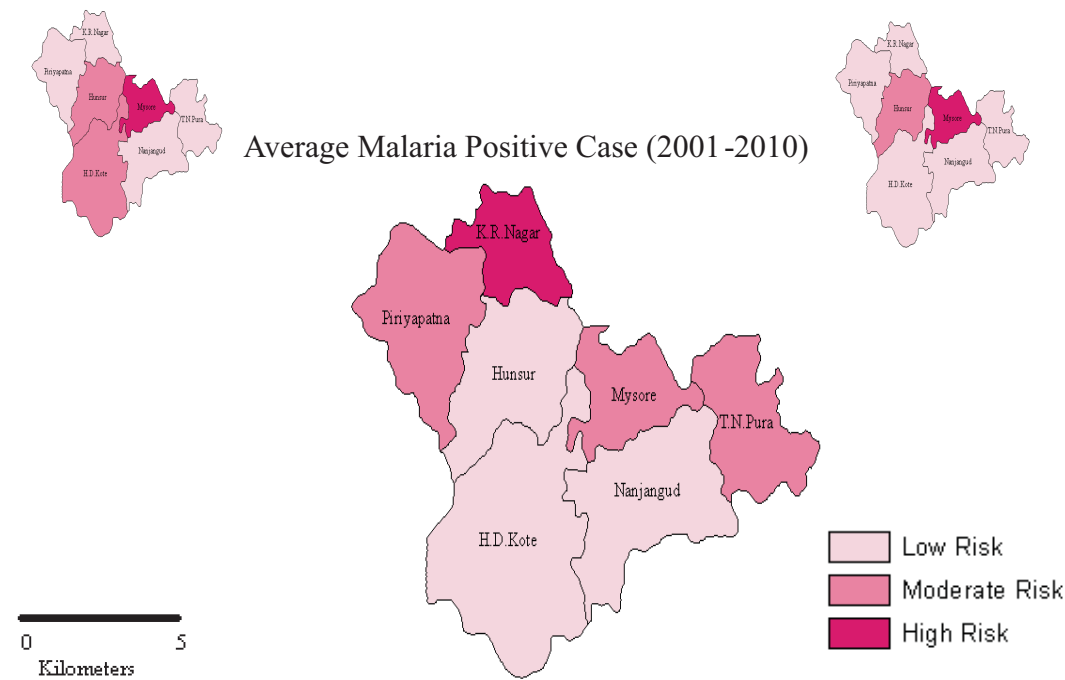
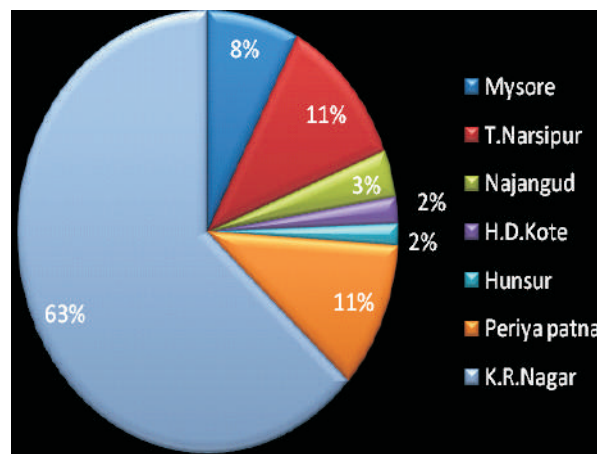


Fig: 3 MYSORE DISTRICT

Taluk wise Percentage share of Malaria Incidence



RESULTS:

So in order to understand the Spatio temporal analysis of malaria incidence the districts were grouped into three categories: High, Medium and Low risk category/taluks. The data revealed that the K.R.Nagar, taluk experience the high malaria cases, whereas, T.Narsipur, Mysore and Periyapatna moderate incidence and remaining H.D.Kote, Hunsur and Nanjangud taluks experience the low risk incidences. Mysore district experience highly malaria incidence from 2001 to 2004 mainly because the district comprises Presence of Marshy lands, water logged areas, unhygienic condition, inaccessibility of most of the inhabited rural areas are stated to be the causative factors of malaria incidence. The study area experiences two types of Malaria that is Plasmodium Vivax (PV) and Plasmodium Falciperum (PF). 'The



growth of both the vectors its temperature between 200 C and 300 C are ideal for malaria parasite. The Parasite ceases to develop at temperatures between below 160C and above 300C (Park and Park, 1977)'. In this paper, here we concentrated only the distribution of Malaria incidence were made from 2001 to 2010 to analysis the variations and taluk wise analyses are done to focus on high risk areas. By identifying the high risk area after 2004 government has adopted some program to eradicate the malaria in the study area. The programs like:

1. House hold survival activities:
2. Source Reduction Measures:
3. Educate the people through IEC and BCC Activities:

- a. IEC: Information Education and Communication
- b. BCC: Behavioral changing communication

First they noticed the high risk areas and spray the temofos it is an insecticide using to destroy the larvas and fogging activities it will use in the areas where the density of mosquitoes are high, based upon outbreaks of fever cases. Now the various local bodies spraying yearly twice fogging in rural areas and in city region yearly once so the vector borne diseases are decreasing.

#### CONCLUSION:

From the above study it can be concluded that the Mysore District as experience of high Malaria incidence with variable risk are studied through both the spatial and temporal analysis, spatial analysis indicate the high risk area and temporal analysis indicate the disease decrease after 2004 after by government had adapted some eradication program. It is an important factor to consider in relation to disease surveillance, research and prevention. With the help of modern techniques using GIS spatial analysis can be done easily which is very helpful to explain how it is useful especially in healthcare Applications and identification of diseases surveillance, control, monitoring and evaluation etc., which will helpful for risk assessment and disease prevention. The Findings of this study inspired us to state that more concentration as to be made by the concerned authorities to tackle malaria incidence in the District. Awareness camp and prevention measures should also be given to public not only in high risk area but also throughout-the-district.

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