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This form will include the following details:

1. Report Title and Type (*Thesis/Research Study/Special Study/etc*)
EXPLORING GEOSPATIAL FACTORS CONTRIBUTING TO MALARIA
INCIDENCE IN KANCHANABURI, THAILAND
2. Name of the Author
Phaisarn Jeefoo
3. Name(s) of Advisor and Committee Members
Advisor: Dr. Nitin K. Tripathi
Examination Committee: Dr. Nitin K. Tripathi (Chairperson)
Dr. Marc Souris
Dr. Vivarad Phonekeo
Dr. Kaew Nualchawee (External Expert)
4. Field of Study
Remote Sensing and Geographic Information Systems
5. Address (School)
School of Engineering and Technology
6. External Examiner (*for Dissertations only*)
7. Expert Comments on the Work and Facility for the Feedback from
the Users
8. Abstract of the Work

This investigation is aimed to contribute the concepts and methods of the innovative development and application of Geographical Information System (GIS) and Remote Sensing regarding Malaria prevalence. Kanchanaburi province, Thailand is chosen as study area. The input data are based on the geospatial factors including climatic aspects, physical environment, socio-economic and statistical record of Malaria cases. Afterwards data preprocessing needs to be carried out, for example, data format conversion, data corrections, and so forth. Malaria cases map and information value (i-value) approach will be used in order to identify the relation between physical and social factors, and also statistical analysis will be carried out so as to define the relation of climatic factor. The final output

based on those approaches is a Malaria risk map which is classified into three classes including high risk level, moderate risk level and low risk level.

On the top of that, this study also develops the model based on i-values which are formed as thematic layers in GIS database and are computed using different map analysis techniques, for example, map crossing. Finally, the model can be applied as an early warning monitoring system to enhance the awareness of vector borne disease. Public health officers can employ the model to control malaria spread through factors mentioned above. Not only it is applicable in health issues, but this model also can be applied in other application fields such as disaster management, and so on.

9. Keywords (*minimum 5; maximum 10*)
Geographic Information Systems, Remote Sensing, Malaria, Kanchanaburi, Information Value Approach, Map, ArcviewGIS, ERDAS IMAGINE.
10. Bibliographic data

Andraw, D., Cliff, & Hagget, P. *Spatial Analysis: Modeling in a GIS Environment, The impact of GIS on epidemiological mapping and modeling.* 321-344

Bureau of Epidemiology, "Malaria", Department of Disease Control, Ministry of Public Health, Thailand, May, 2004.
<URL:<http://epid.moph.go.th/dssur/vbd/malaria.htm>>

Caral, A., Johnston, Y.C., & Paster, J. *Spatial Analysis: Modeling Progress and Research issues, Modeling of spatially static and dynamic ecological process.* 149-154.

Dueker, K.J., & Kjerne, D., 1998. *Multipurpose cadastre: Terms and definition.* Falls Church, VA:ASPRA and ACSM.

Hemakumara, G.P.T.S., 2001. *Geographic Information System & Remote Sensing based study of the evolution of malaria & dengue for public health planning in Sri Lanka.* Thesis no. SR-01-04. AIT, Bangkok, Thailand.

JICA, & Lao Health Master Planning, 2002. Final report: *The study on The Improvement of Health and Medical services in The Lao People's Democratic Republic.* Ministry of Health, Lao P.D.R., November.

Keola, S., & Tokunaga, M., 2001. *Provincial risk maps for highest tendency Ranking epidemiological surveillance diseases in Ayutthaya province, Thailand*. Centre for Remote Imagine, Sensing and Processing (CRISP), National University of Singapore; Singapore Institute of Surveyors and Valuers (SISV); Asian Association on Remote Sensing (AARS) 22nd Asian Conference on Remote Sensing.

Land Development Department of Thailand, 2001. *Report of Environment and Research*.

Le Sueur, D., Ngxongo, S., Sharp, B., Martin, C., Fraser, C., Teuschner, M., Tollman, S., Green, C., Tsoka, J., Solarsh, G., & Mnzavaae, 1997. *Towards a spatial rural information system*. A publication of the Health System Trust with the Medical Research Council.

Louisa, R.B., Bradley, M.L., & L.W., Byron, "Remote Sensing and Human Health: New Sensors and New Opportunities", Centers for Disease Control and Prevention, April, 2002.
<URL:<http://www.cdc.gov/ncidod/eid/vol6no3/beck.htm>>

Ministry of Public Health, "Malaria control Program in Thailand", August, 2005.
<URL:<http://eng.moph.go.th/SpecificHealth/malaria/malaria.htm>>

Moore, D., and Carpenter, T., 1999. Spatial analytical methods and Geographic Information Systems: Use in health research and epidemiology. *Epidemiological Review*, 21(2): 143-161.

National Institute of Allergy and Infectious Diseases, "Life cycle of malaria in Thailand", National Institutes of Health, Department of Health and Human Services, August, 2005.
<URL:<http://www.niaid.nih.gov/publications/malaria/life.htm>>

National Statistical Centre, 2001. *Report on National Health Survey: Health Status of the People in Lao PDR*. National Institute of Public Health and State Planning Centre, Ministry of Health, Lao PDR.

Prakash, C., 1998. *Landslide Hazard Zonation in Doon Valley Using Remote Sensing and GIS*. Master Thesis. Kanpur, Indian Institute of Technology, India.

Puangmanee, D., "Malaria", Vector Borne Disease Control Center 4.1, Kanchanaburi province, August, 2005.
<URL:<http://www.preventioncontrol4.org/insect41>>

Rees, P., and G. Lloyd, "Malaria Information Page", The travel doctor, 2002.
<URL:<http://www.traveldoctor.co.uk/malaria.htm>>

Report of Meteorological Department of Thailand in seven years (1999-2005).

Rogers, D.J., & Randolph, S.E., 1991. Mortality rates and population density of tsetse flies correlated with satellite imagery. *Nature*, 351:739-741.

Shulian, N., 2003. *Malaria distribution and prediction based on gis and rs: A case study in Tak province*. Thesis no. SR-03-8. AIT, Bangkok, Thailand.

Srivastava, A., Nagpal, B.N., Saxena R, Eapen A., Ravindran K.J., Subbarao, S.K., Rajamanikam, C., Palanisamy, M., Kalra, N.L., & Appavoo, N.C., 2002. *GIS Based malaria information management system for urban malaria scheme in India*.

Vector Borne Disease Control Center 4.1, 2004. *Annual Epidemiological Surveillance Report 2004: Kanchanaburi province*. Vector Borne Disease Control Center 4.1, Kanchanaburi, Thailand.

Wood, B.L., Back, L.R., Washino, R.K., Hibbard, K., & Salute, J.S., 1992. Estimating high mosquito-producing rice fields using spectral and spatial data. *Int J Remote Sensing*. 13: 2813-2826.

Wood, B.L., Dister, S., Washino, R.K., & Karabian, J.T., 1992. *Preliminary results of a study describing land use surrounding high and low anopheline-producing rice fields in Northern California*. NASA Ames Research Center unpublished report.

Wood, B.L., Washino, R.K., Beck, L., Hibbard, K., Picairn, M., Roberts, D, Rejmankova, E., Paris, J., Hacker, C., Salute, J., Sebesta, P., & Legters, L., 1991. Distinguishing high and low anopheline producing rice fields using remote sensing and GIS technologies. *Prev Vet Med*, 11: 277-288.

Wood, B.L., Washino, R.K., Palchick, S.M., Beck, L.R., & Sebesta, P.D., 1992. Spectral and spatial characterization of the rice field mosquito habitat. *Int J Remote Sensing*. 12: 621-626.

World Health Organization (WHO), 1990. *Tropical Disease 1990*. Special Programmed for Research and Training in Tropical Disease (TDR). World Health Organization, Geneva, Switzerland.

World Health Organization (WHO), 1998. *The world health report 1998 Life in the 21st century: A vision for all*. World Health Organization, Geneva, Switzerland.

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