INTRODUCTION

to

GIS

G

GEOGRAPHY: **- Geo (earth) and**
- Graphy (process of writing)

WRITING ABOUT EARTH

In their writings, geographers deal with spatial relationships

GIS

INFORMATION SYSTEM:

An information system is chain of operations that takes us from planning the observation and collection of data, to storage and analysis of the data, to the use of the derived information, to use the derived information in some decision making process

The function of information system:

is to improve one's ability to make decisions

What is GIS?

- **Geographic INFORMATION SYSTEM**
- **It manages/combines large amounts of information**

  ….linking the information to geographic locations (e.g. countries, districts, health facilities, schools, villages)

- **It allows for visualising and analysing data on a map**

Components of GIS

- **Hardware** (computer/printer)
- **Software** (GIS, Windows, data base management)
- **Digital maps** (boundaries, village co-ordinates etc)
- **Information** (disease, programme data,HIS)
- **Analysis** (maps, tables, charts)
- **Procedures** (manpower, standardisation, co-ordination)
- **Decision-making ….action…response**

CAPABILITIES OF GIS

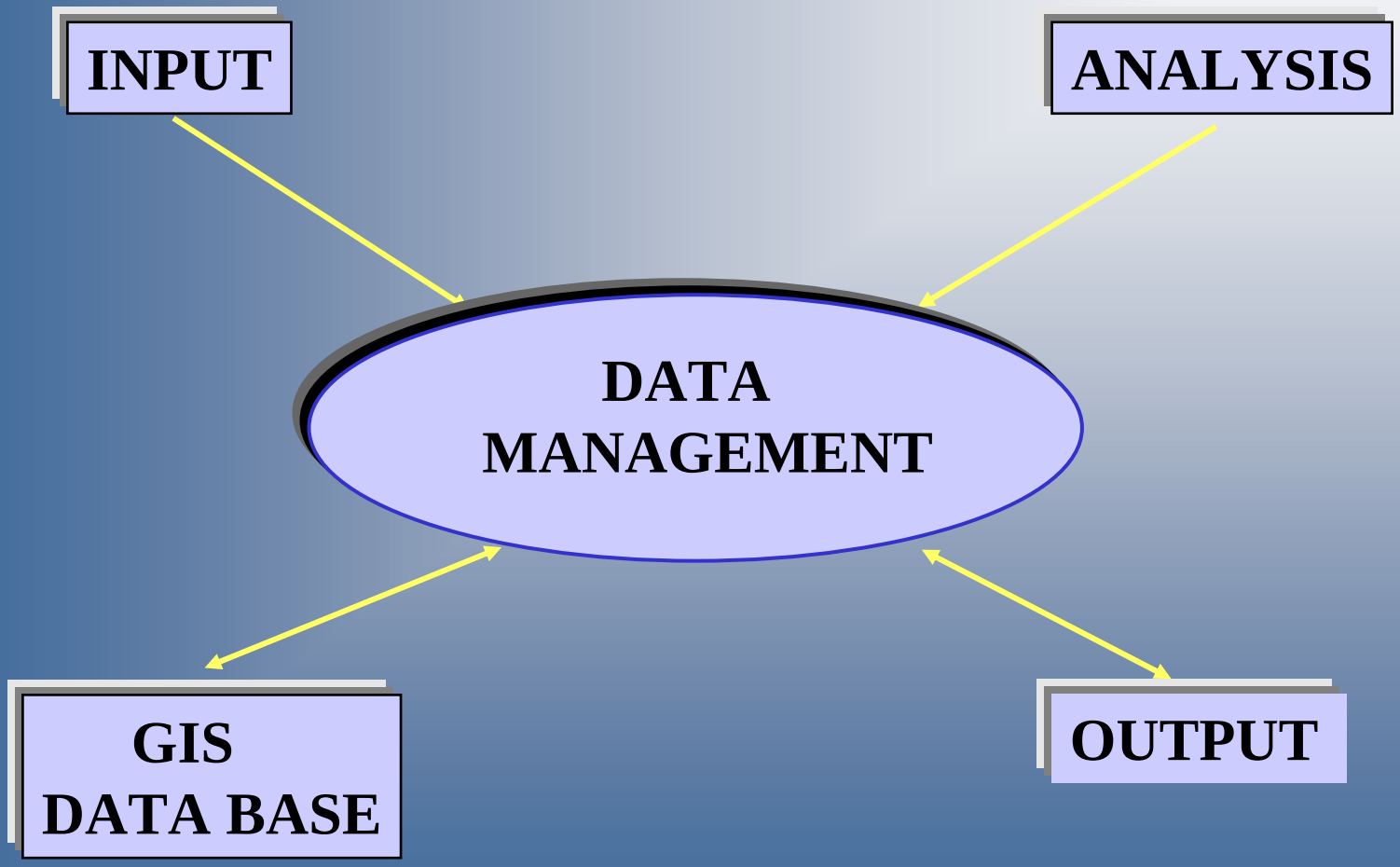
GIS CAN ANSWER THE FOLLOWING QUESTIONS

- What is at.....?
- Where is it....?
- What has change since....?
- What spatial patterns exist....?
- What if.....?

CAPABILITIES OF GIS

- LOCATION
- CONDITION
- TREND
- PATTERNS
- MODELLING

CONCEPT OF GIS



GIS

is a tool

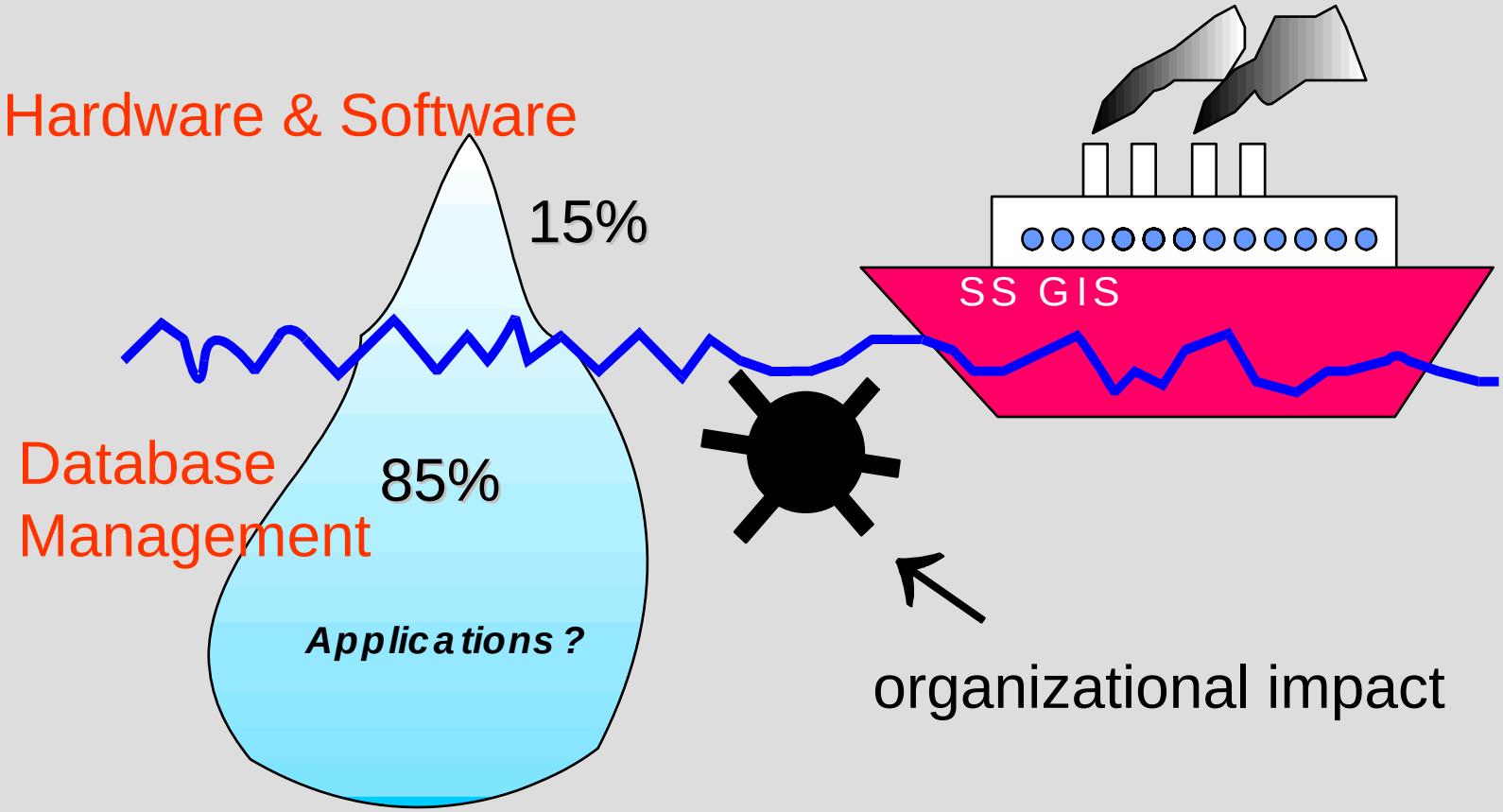
Database management represents 85% of work in running a GIS

GIS

GIS

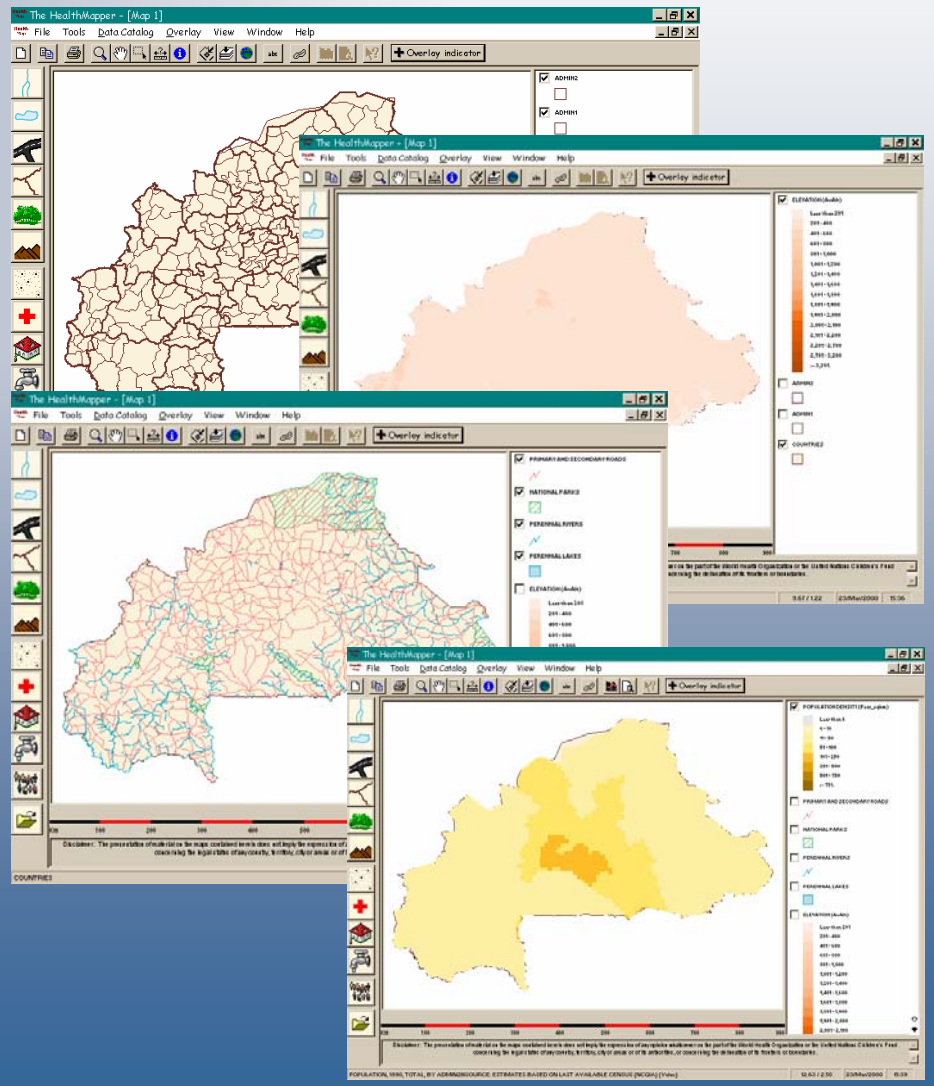
GIS

Implementing a GIS



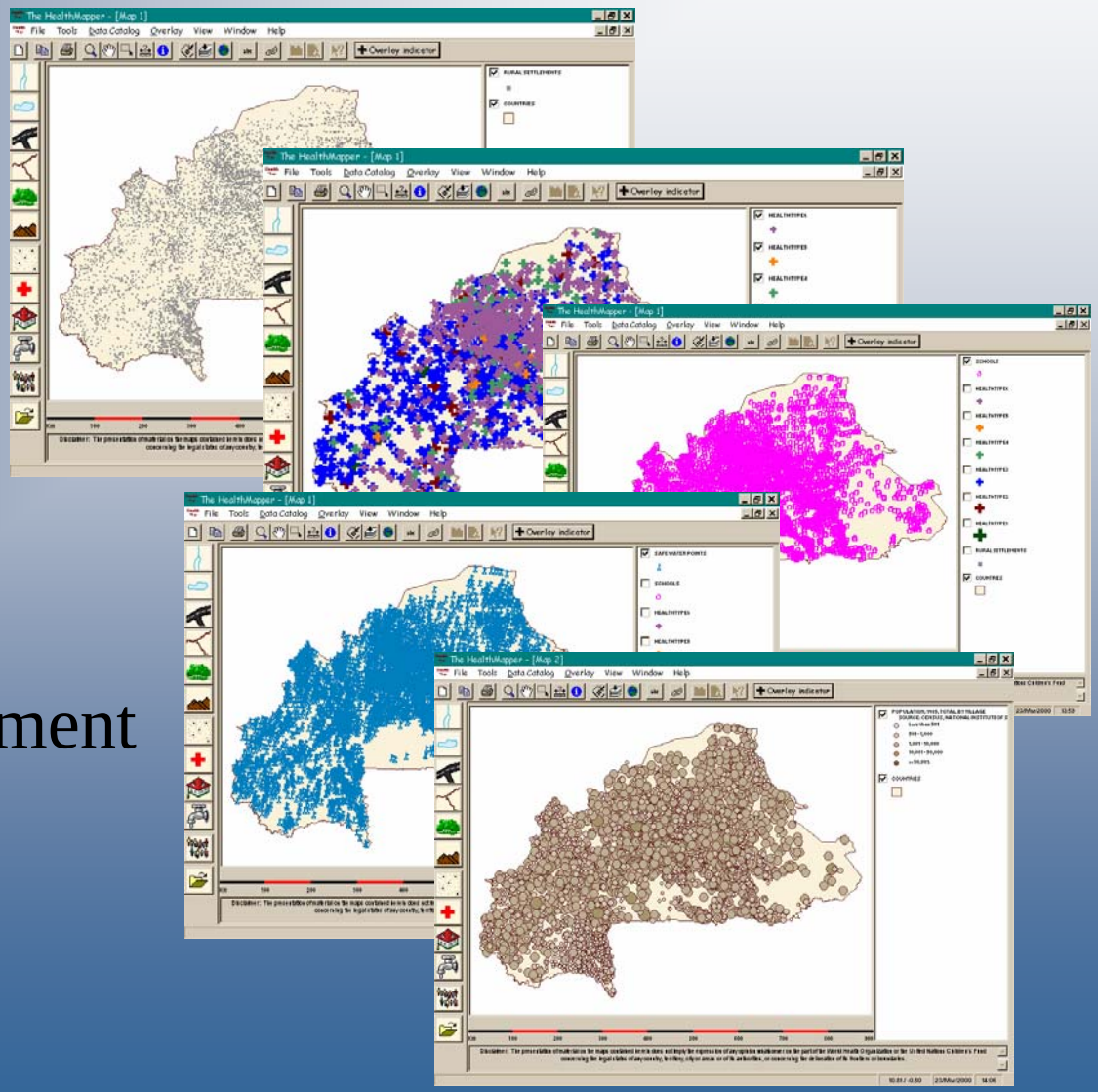
What geographic data required for an operational GIS?

- administrative boundaries
- elevation
- roads, rivers, lakes
- national parks
- urban areas
- population distribution by administrative level



Core Geographic Data

- settlements/villages
- health facilities
- schools
- safe water points
- population by settlement



How does GIS function?

- **Basemaps**
  - **digitised maps with core geographic features**
    (admin boundaries, rivers, roads, elevation, villages, etc)

- **Databases**
  - **Public health databases (survey results, census, DHS, disease surveillance, health information systems, programme monitoring indicators etc)**

- **GIS/mapping software**

- **The Data are linked to the map by a geo-reference**

(such as the name or ID of digitised boundary map or to the geographic co-ordinates of a point, such as a village)

Example of Digitised BaseMap

ArcView GIS Version 3.1

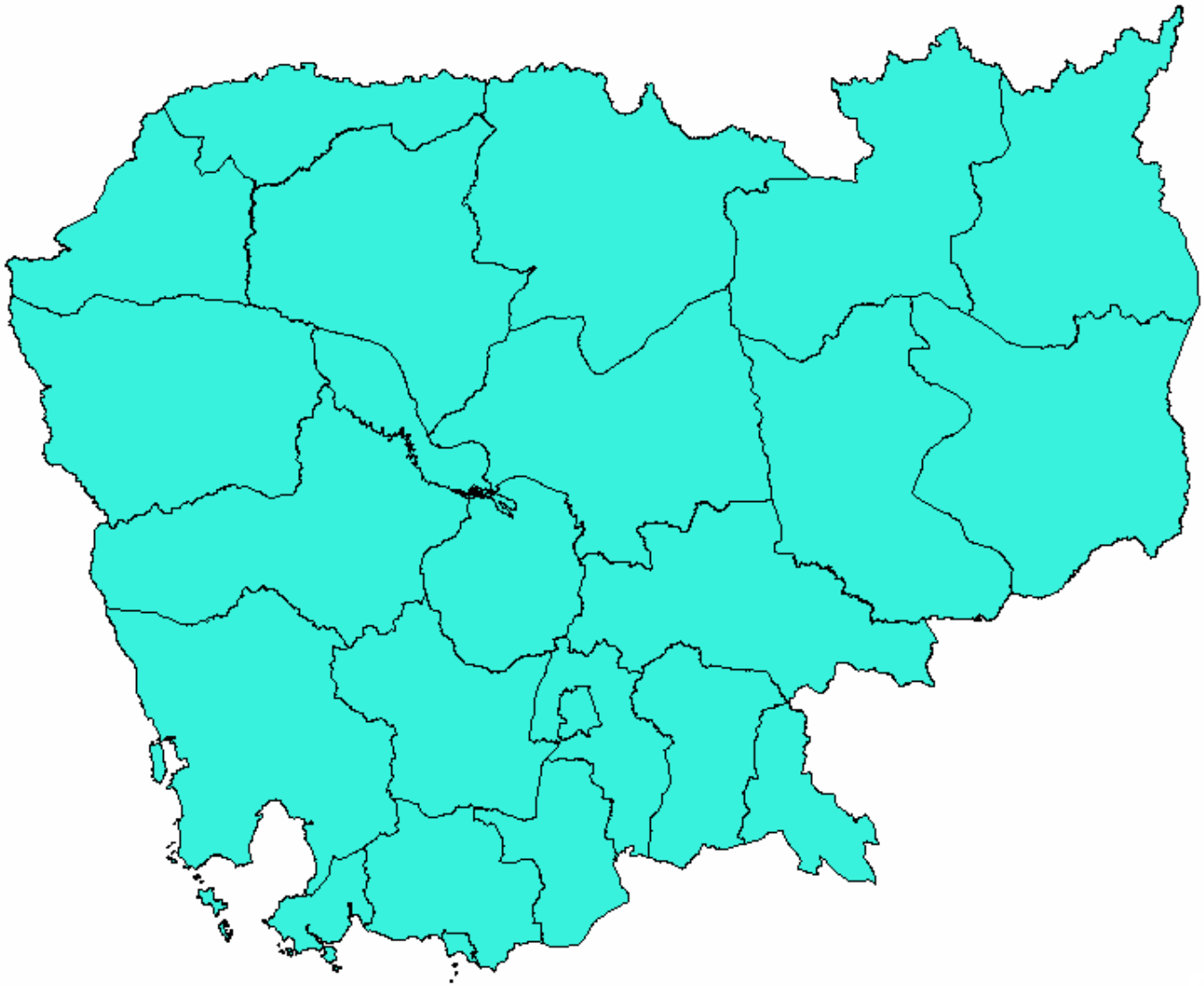
File Edit View Theme Graphics Window Help

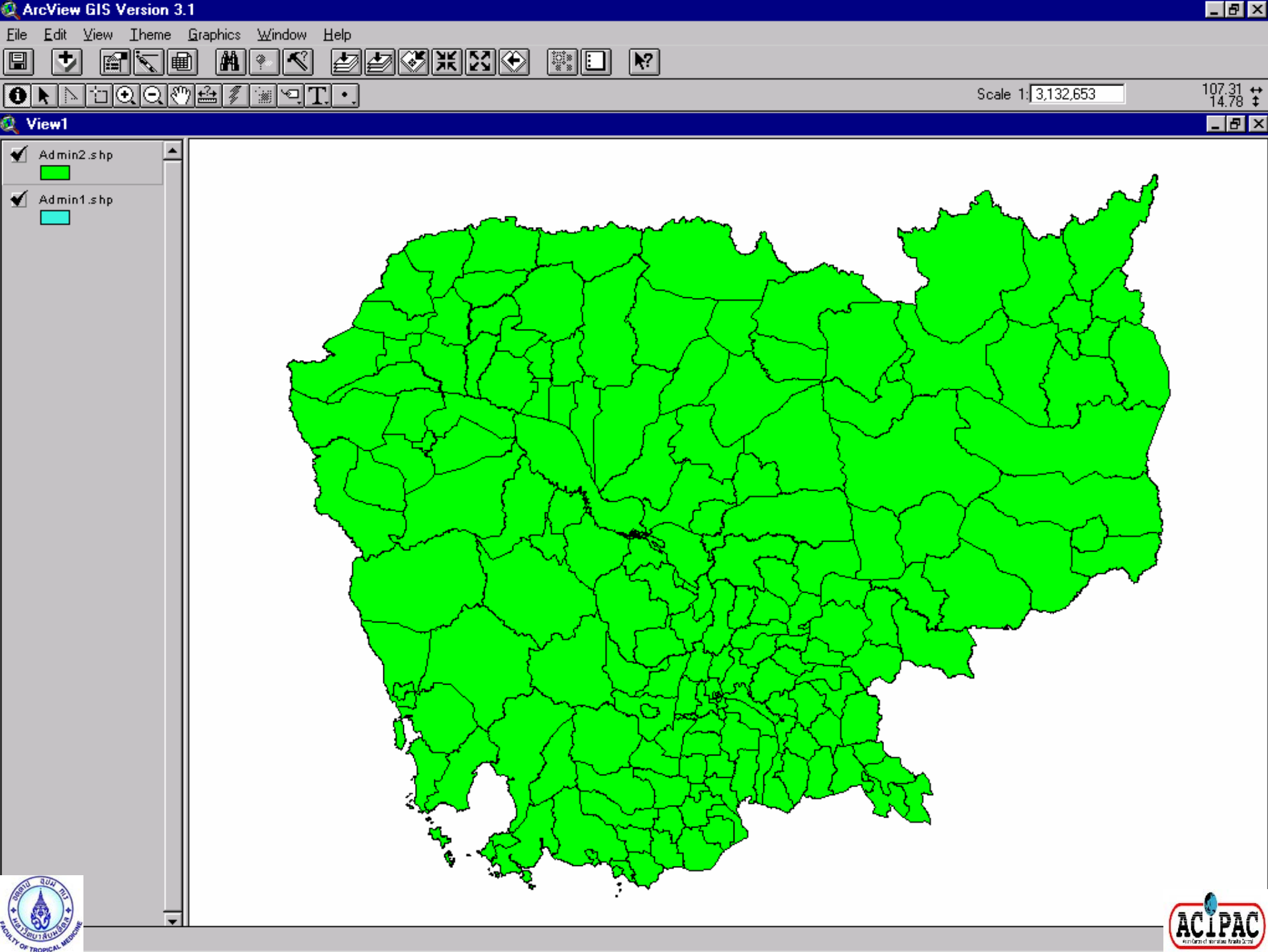
Scale 1: 3,132,653

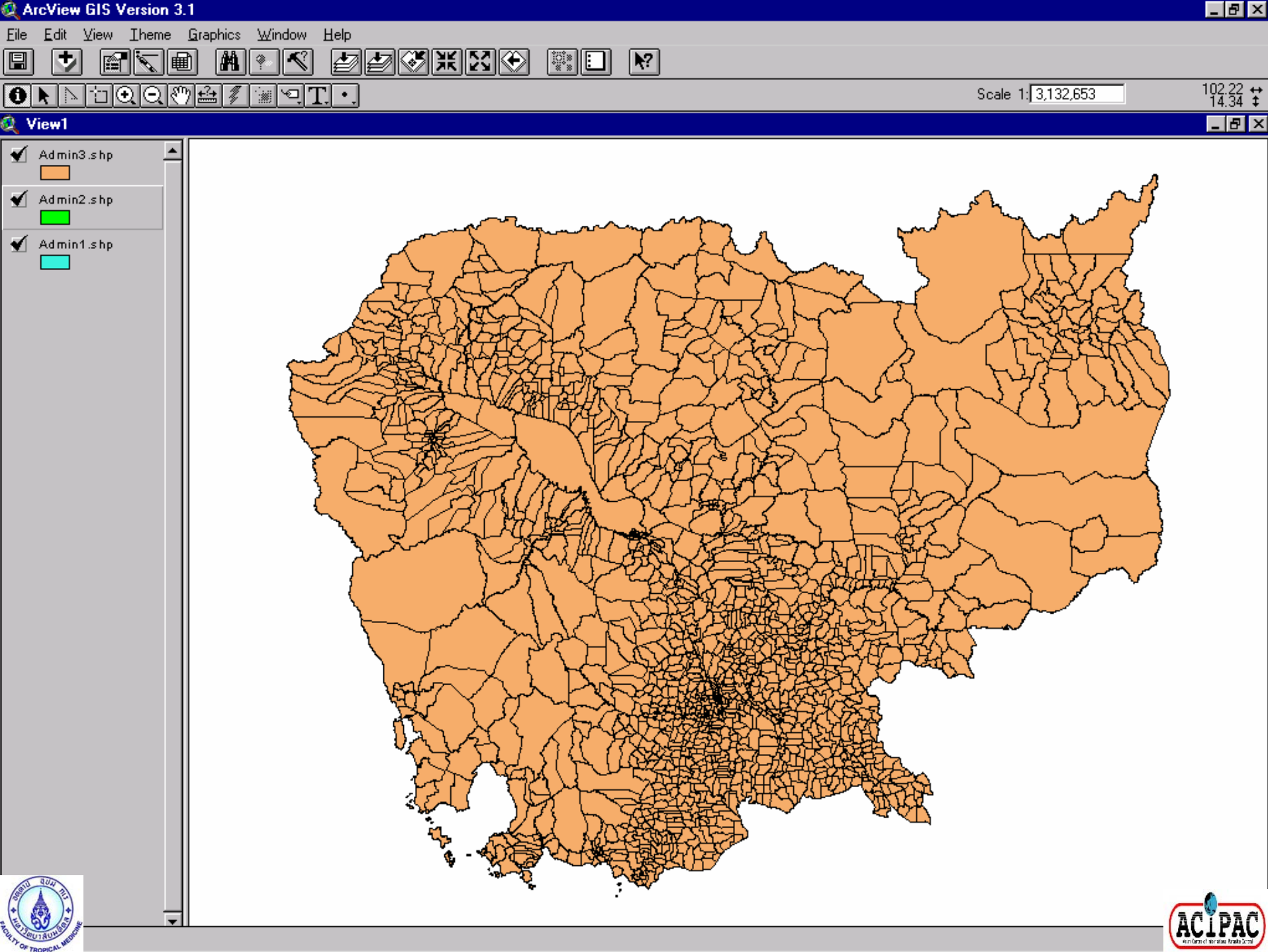
107.39
13.75

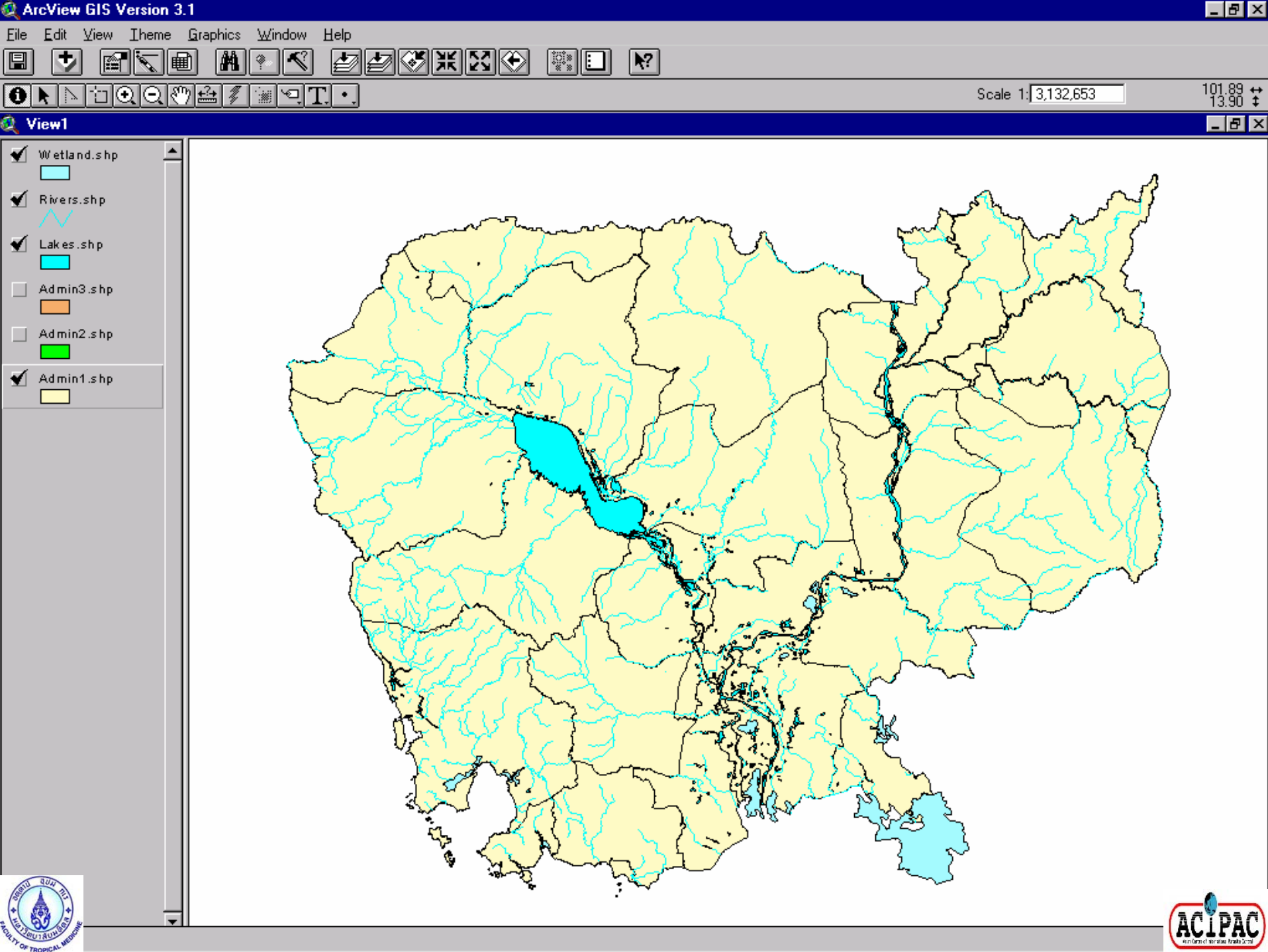
View1

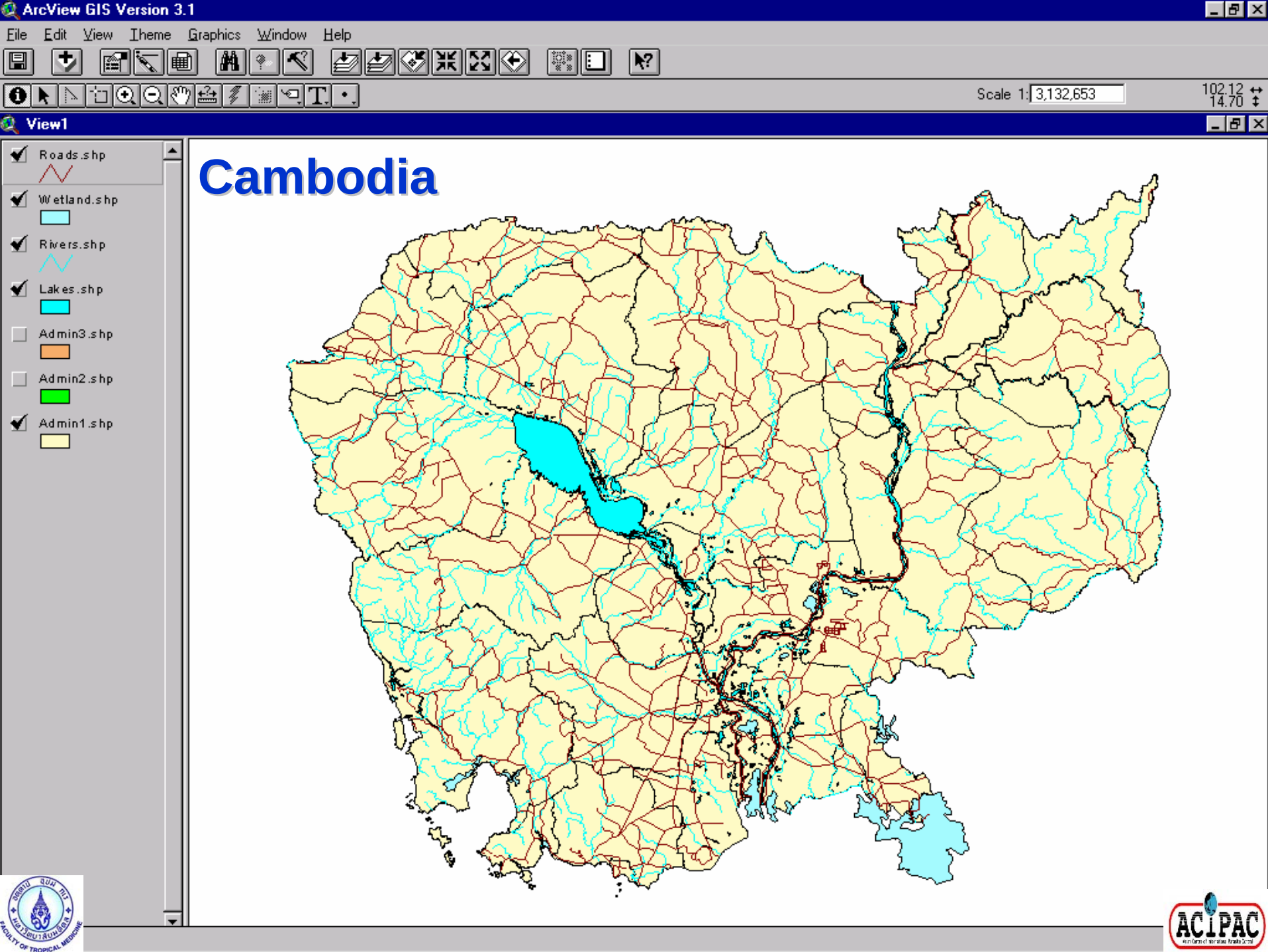
Admin1.shp

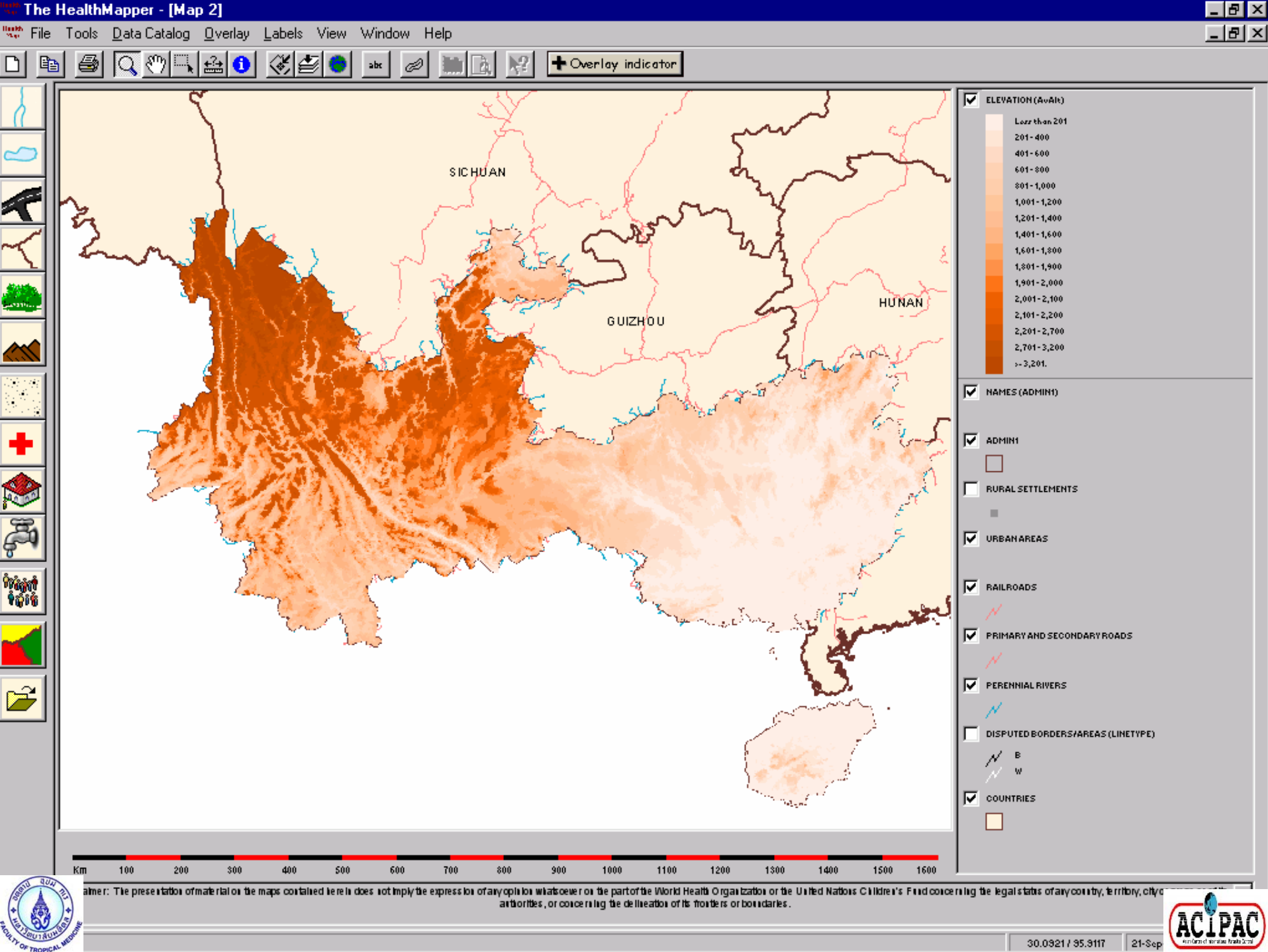


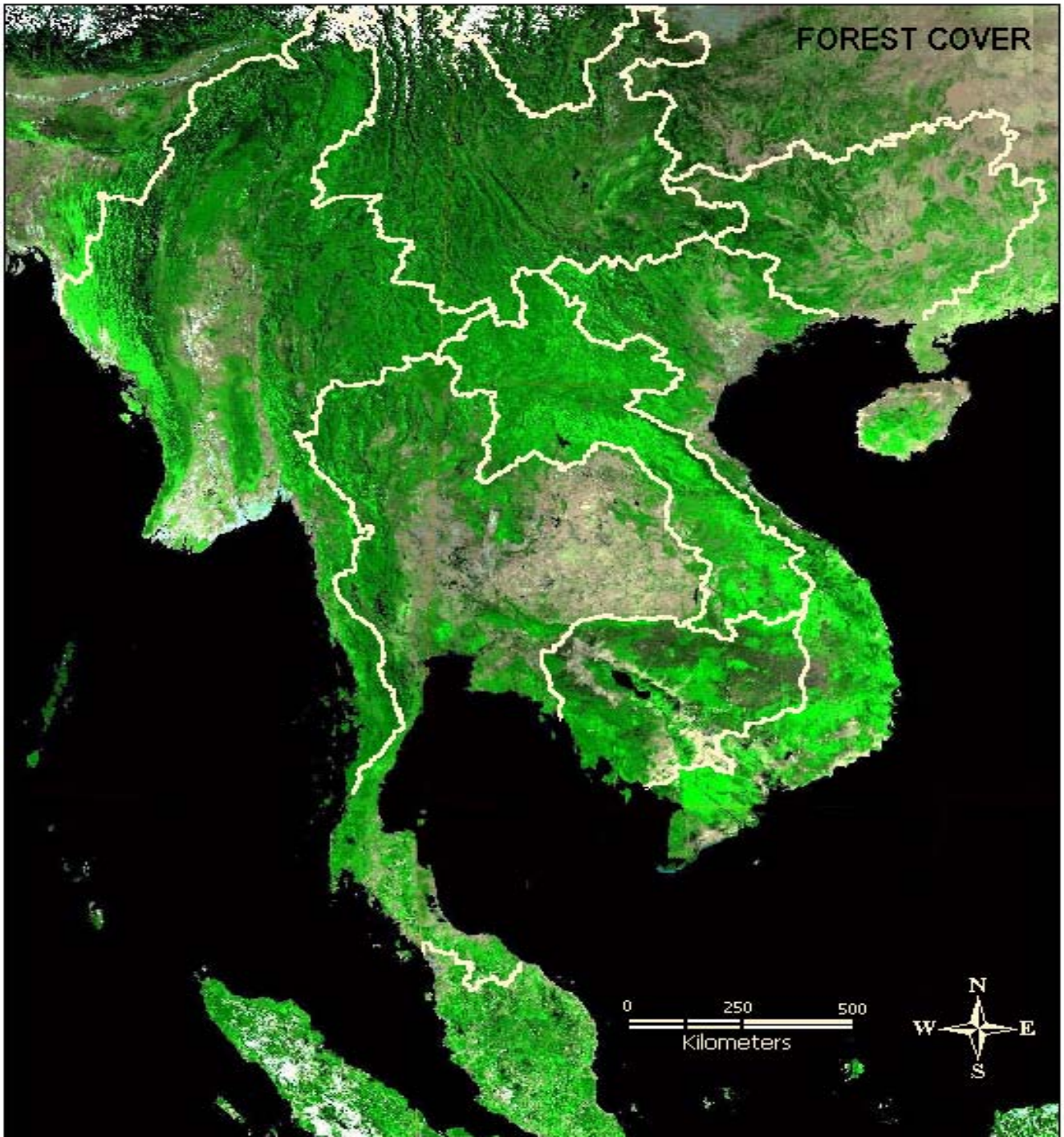

ArcView GIS Version 3.1
File Edit View Theme Graphics Window Help
Scale 1: 3,132,653
107.31
14.78
View1
Admin2.shp
Admin1.shp

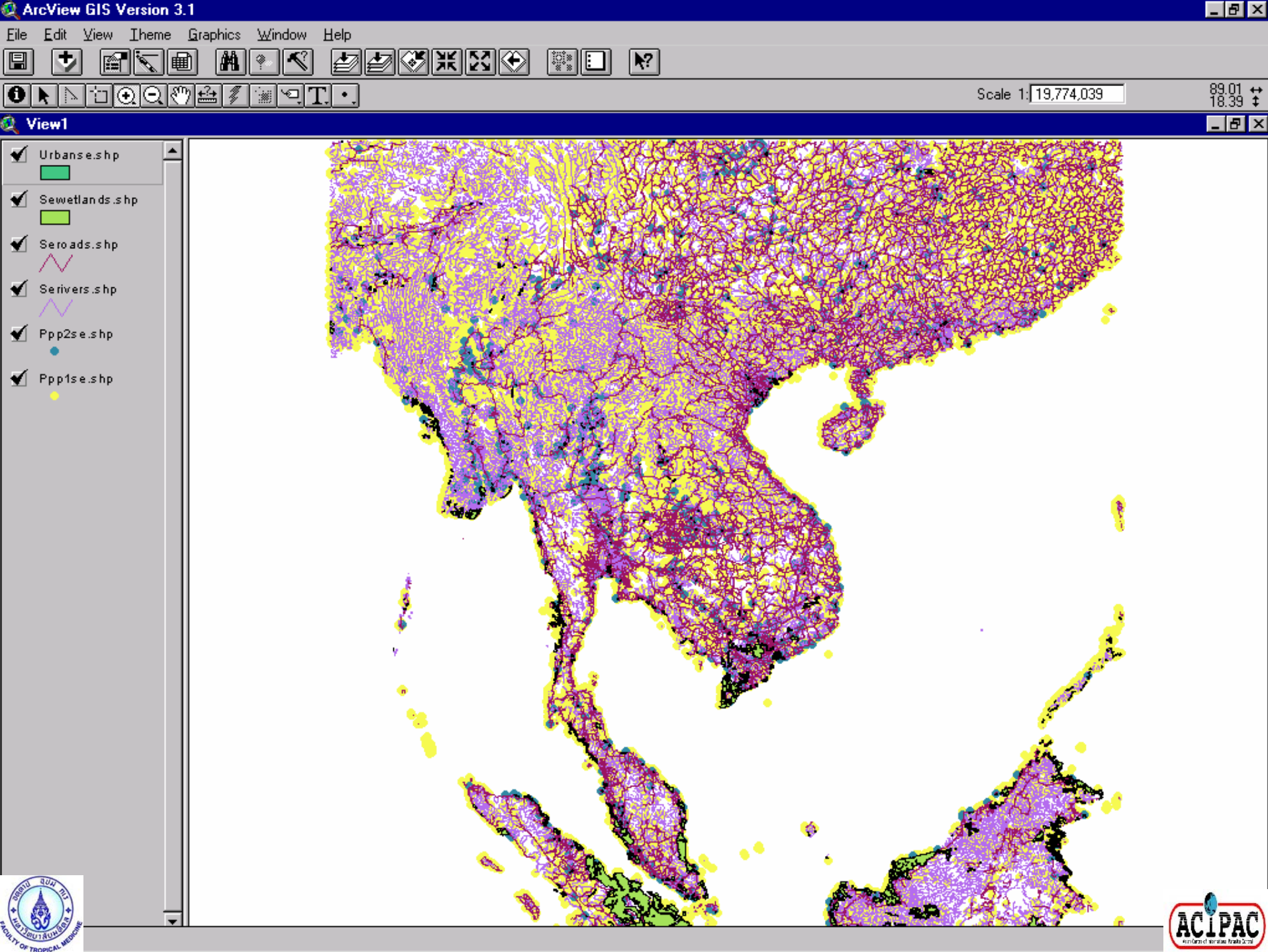

ArcView GIS Version 3.1
File Edit View Theme Graphics Window Help
Scale 1: 3,132,653
102.22
14.34
View1
Admin3.shp
Admin2.shp
Admin1.shp


ArcView GIS Version 3.1
File Edit View Theme Graphics Window Help
Scale 1: 3,132,653
101.89
13.90
View1
Wetland.shp
Rivers.shp
Lakes.shp
Admin3.shp
Admin2.shp
Admin1.shp


ArcView GIS Version 3.1
File Edit View Theme Graphics Window Help
Scale 1: 3,132,653
102.12
14.70
View1
Roads.shp
Wetland.shp
Rivers.shp
Lakes.shp
Admin3.shp
Admin2.shp
Admin1.shp
Cambodia

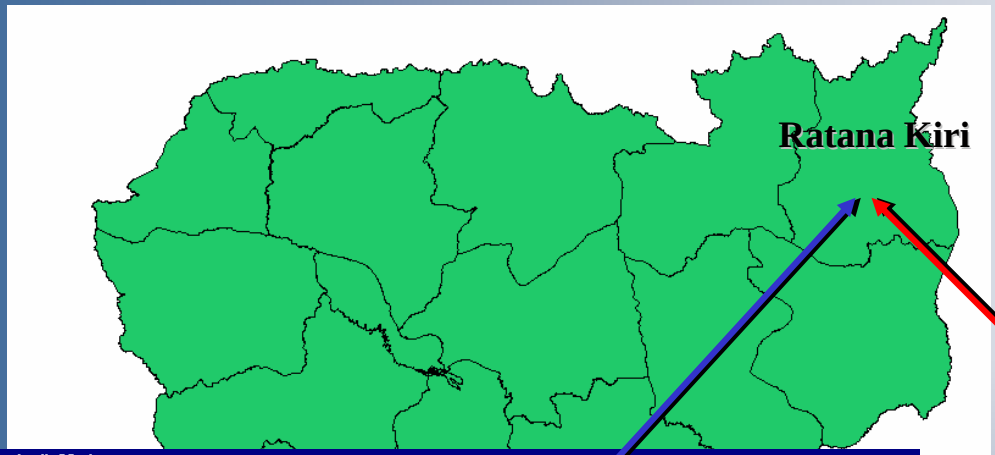

The HealthMapper - [Map 2]
File Tools Data Catalog Overlay Labels View Window Help
Overlay indicator
SICHUAN
GUIZHOU
HUNAN
ELEVATION (AvAlt)
Less than 201
201 - 400
401 - 600
601 - 800
801 - 1,000
1,001 - 1,200
1,201 - 1,400
1,401 - 1,600
1,601 - 1,800
1,801 - 1,900
1,901 - 2,000
2,001 - 2,100
2,101 - 2,200
2,201 - 2,700
2,701 - 3,200
>= 3,201.
NAMES (ADMIN1)
ADMIN1
RURAL SETTLEMENTS
URBAN AREAS
RAILROADS
PRIMARY AND SECONDARY ROADS
PERENNIAL RIVERS
DISPUTED BORDERS/AREAS (LINETYPE)
B
W
COUNTRIES
Km 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600
aimer: The presentation of material on the maps contained herein does not imply the expression of any opinion whatsoever on the part of the World Health Organization or the United Nations Children's Fund concerning the legal status of any country, territory, city
authorities, or concerning the delineation of its frontiers or boundaries.
30.0921 / 95.9117
21-Sep
ACIPAC


FOREST COVER
0
250
500
Kilometers
N
W
E
S


ArcView GIS Version 3.1
File Edit View Theme Graphics Window Help
Scale 1: 19,774,039
89.01
18.39
View1
Urbanse.shp
Sewetlands.shp
Seroads.shp
Serivers.shp
Ppp2se.shp
Ppp1se.shp
FACULTY OF TROPICAL MEDICINE
ACIPAC

Linking data to a map

Databases that link to geographic areas



Microsoft Excel - Cambodia98.xls

File Edit View Insert Format Tools Data Window WHOMenu Help

Arial 10

A1 =

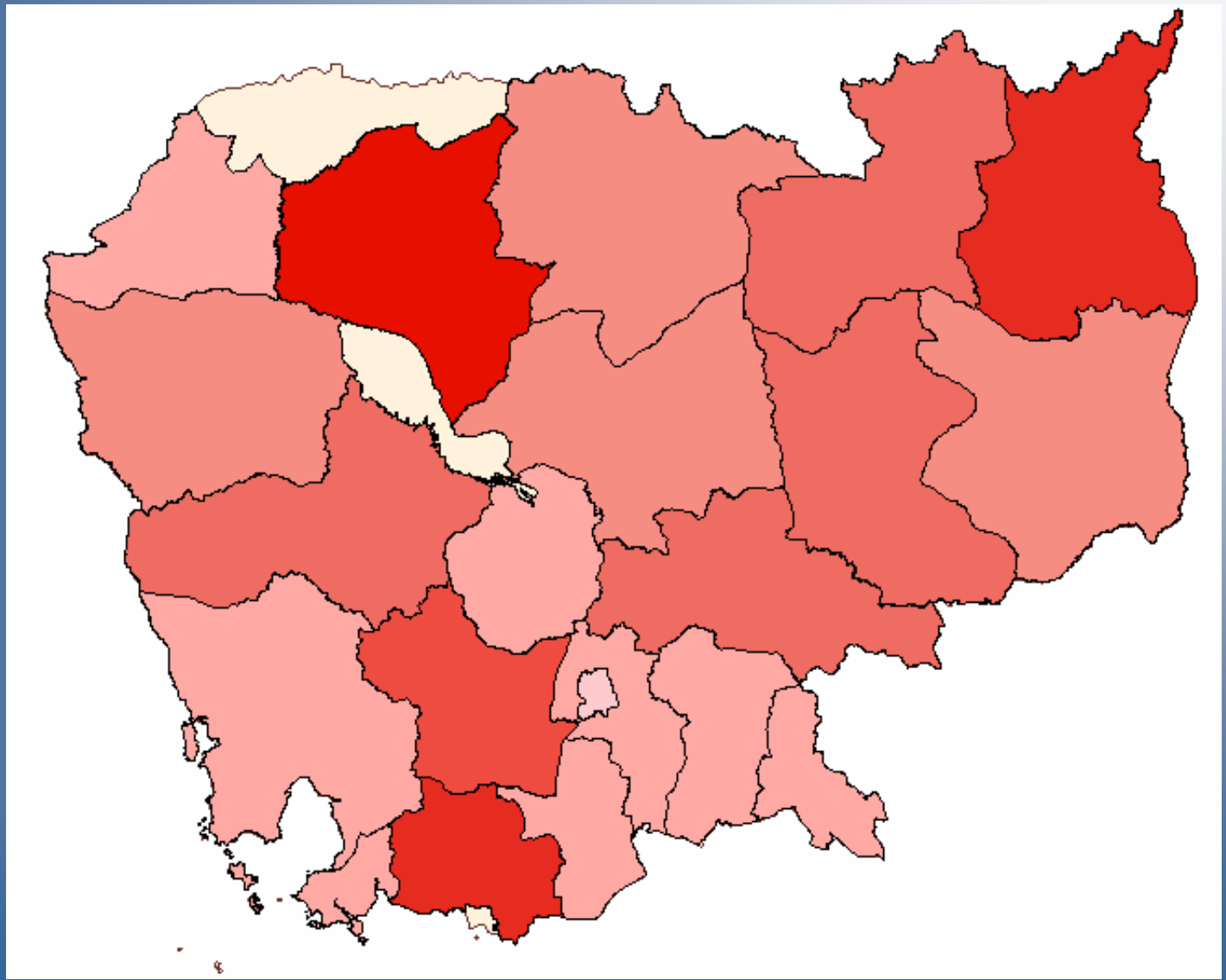
Monthly severe cases of malaria in 1998

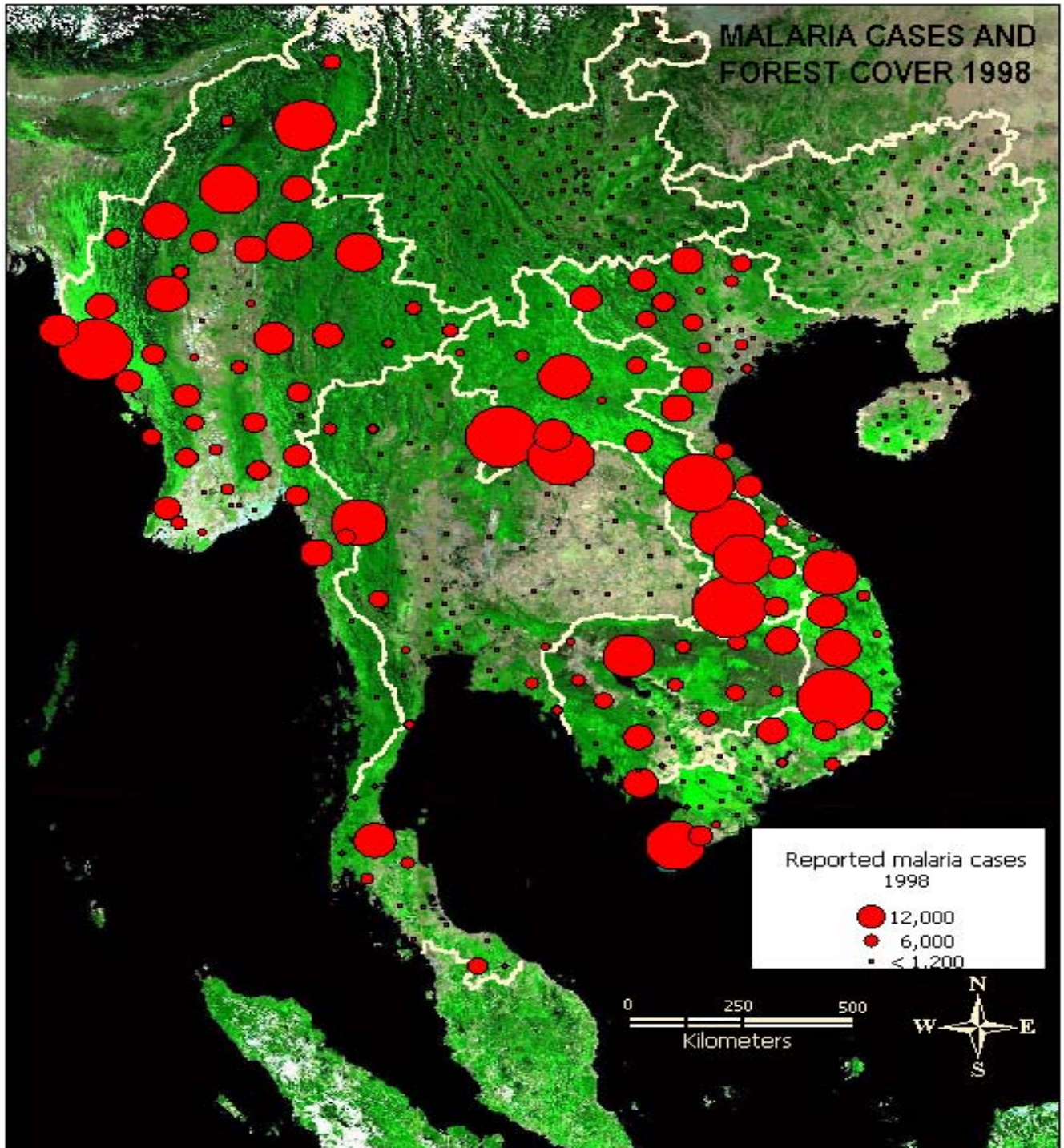
No	Provinces	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	D
1	Sv.Rieng	3	5	1	9	0	2	3	1		3	1	
2	P.Veng	4	4	7	0	2	3	8	5	2	0	5	
3	Kandal	7	4	4	2	1	4	5	37	1	3	2	
4	P.Penh	3	4	5	3	1	5	0	2	28	2	0	
5	Kg Cham	16	4	9	0	9	10	13	7	9	1	18	
6	Kg Chhnang	0	0	5	2	2	4	2	1	2	1	14	
7	Kg Speu	10	21	11	12	17	14	31	19	31	34	19	
8	Takeo	21	20	17	33	7	10	6	17	39	19	29	
9	Kampot	41	34	8	23	18	72	91	75	73	47	105	
10	Sihanouk v.	9	15	15	15	11	9	1	2	1	2	0	
11	KohKong	13	20	28	7	6	38	6	5	4	8	15	
12	Pursat	51	32	38	22	29	33	39	69	77	64	70	
13	B.Bang	48	29	35	28	50	56	72	69	54	56	50	
14	B.Meanchey	2	1	1	2	16	23	10	10	7	9	13	
15	Siemreap	68	37	51	31	33	28	54	132	97	98	73	
16	Kg Thom	22	16	21	20	20	25	35	29	39	35	34	
17	Preah Vihear	2	2	5	0	2	0	2	2	1	1	0	
18	Kratie	11	12	6	6	9	5	5	5	11	12	12	
19	St.Treng	3	3	2	0	1	2	0	4	6	4	15	
20	Mondulkiri	3	3	2	2	0	3	3	5	5	5	5	
21	Rattanakiri	4	5	7	0	10	9	18	17	10	22	12	
22	Chup	2	2	2	6	5	5	1	0	1	1	1	
23	Kep	0	0	0	9	0	0	0	0	0	0	0	
	Total	343	263	300	242	249	360	405	513	498	427	493	

Attributes of Admin1.shp

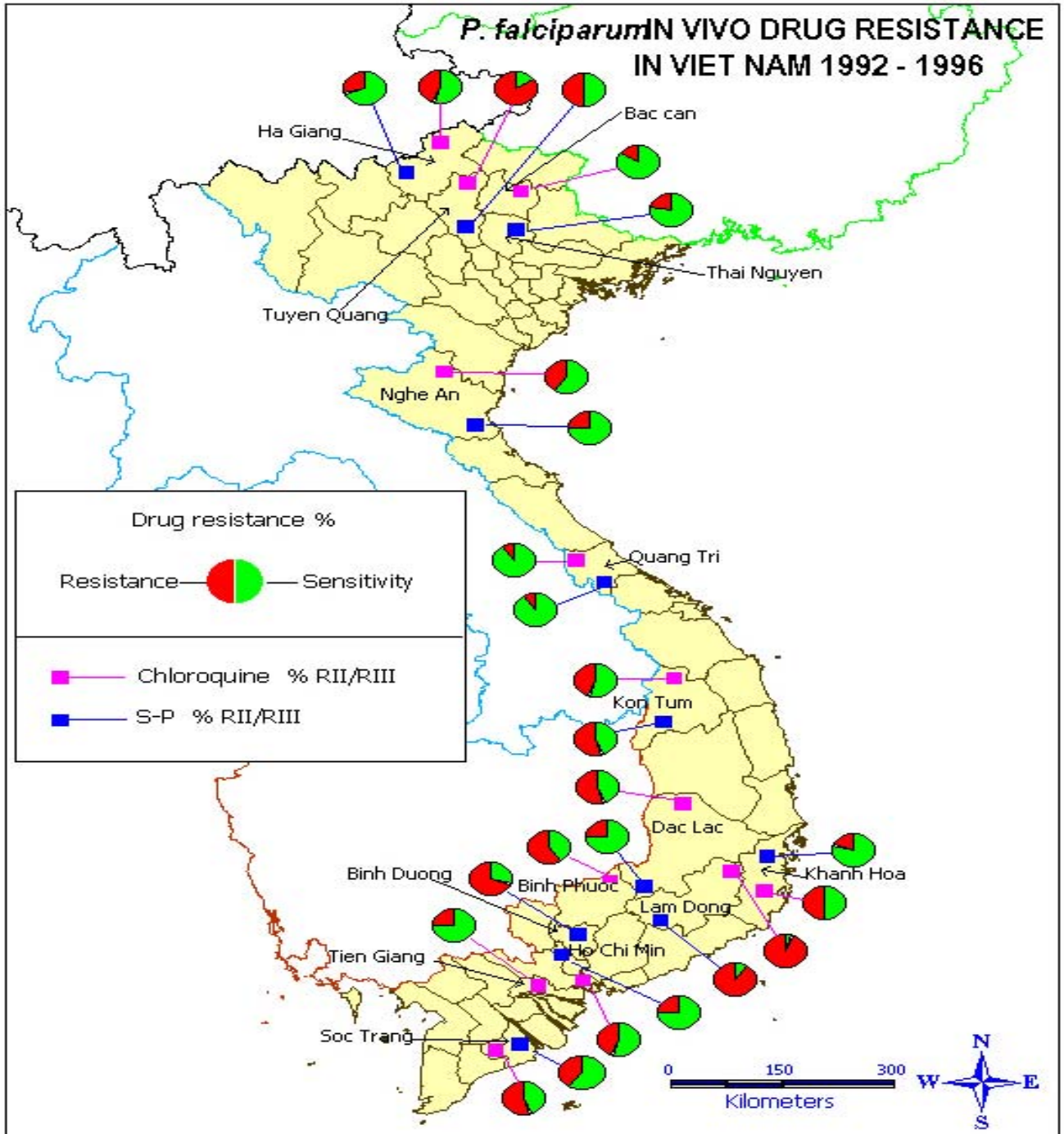
Shape	Id	Code	Name
Polygon	1	01	Banteay Meanchey
Polygon	2	02	Baat Dambang
Polygon	5	05	Kampong Speue
Polygon	22	22	Oddar Mean Chey
Polygon	24	99	Tonle Sap
Polygon	17	17	Siem Reab
Polygon	21	21	Takeo
Polygon	7	07	Kampot
Polygon	8	08	Kandaal
Polygon	14	14	Prey Veaeng
Polygon	20	20	Svaay Rieng
Polygon	12	12	Phnom Penh
Polygon	3	03	Kampong Chaam
Polygon	13	13	Preah Vihear
Polygon	10	10	Kracheh
Polygon	11	11	Mondol Kiri
Polygon	19	19	Stueng Traeng
Polygon	16	16	Rotana Kiri
Polygon	4	04	Kampong Chhnang
Polygon	23	23	Krong Kaeb
Polygon	9	09	Kaoh Kong
Polygon	15	15	Pousaat
Polygon	6	06	Kampong Thum
Polygon	18	18	Krong Preah Sihanouk

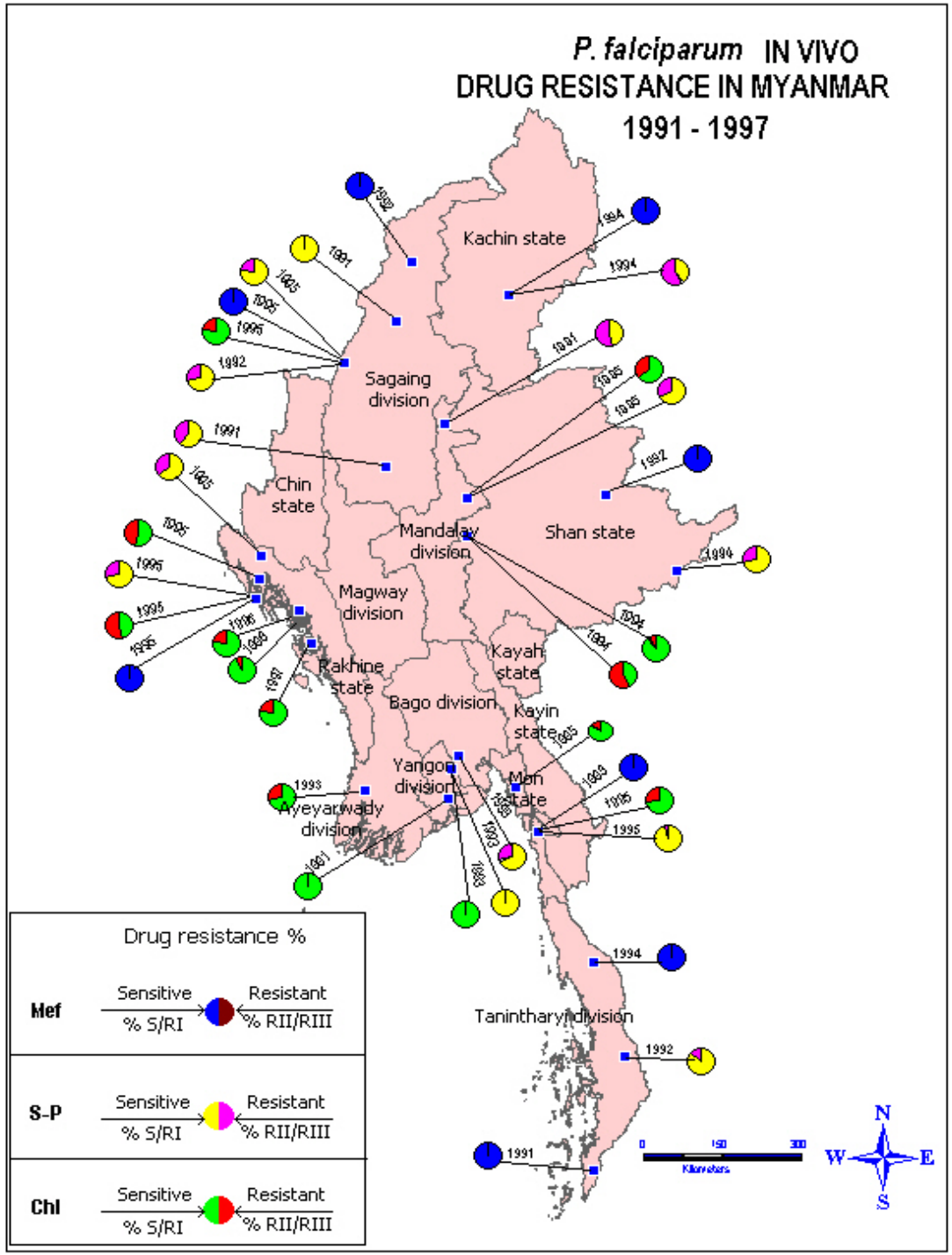
Malaria Monthly Cases Cambodia, 1998

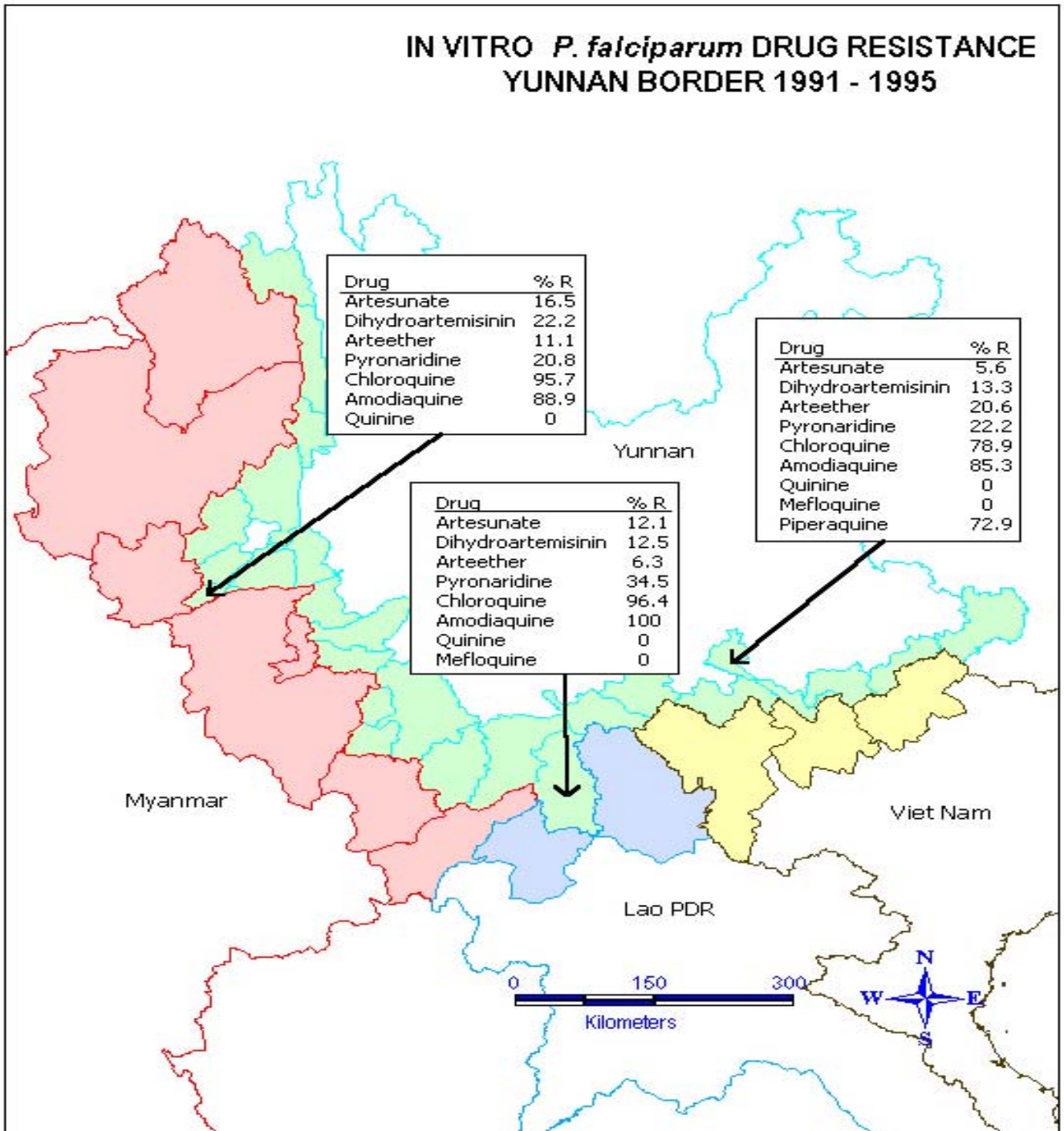


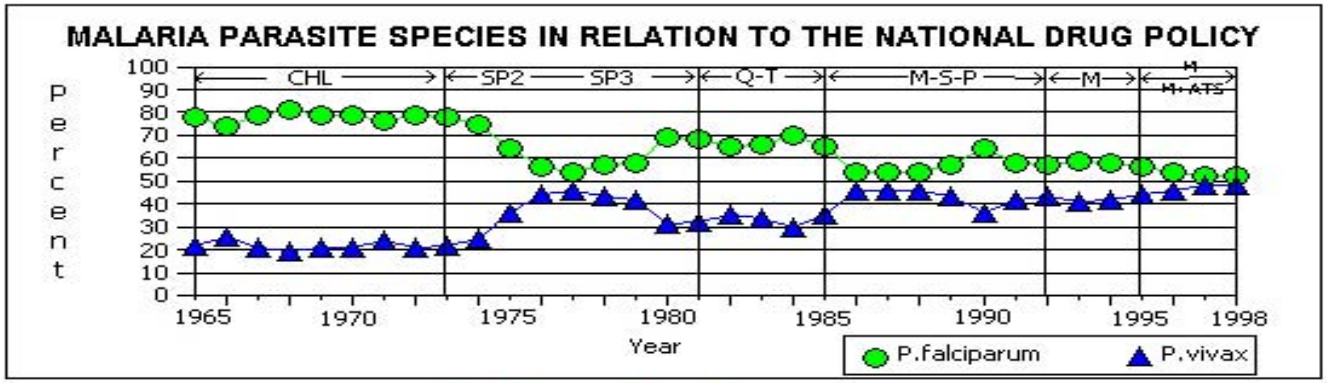

MALARIA CASES AND
FOREST COVER 1998
Reported malaria cases
1998
12,000
6,000
≤ 1,200
0
250
500
Kilometers
N
W
E
S

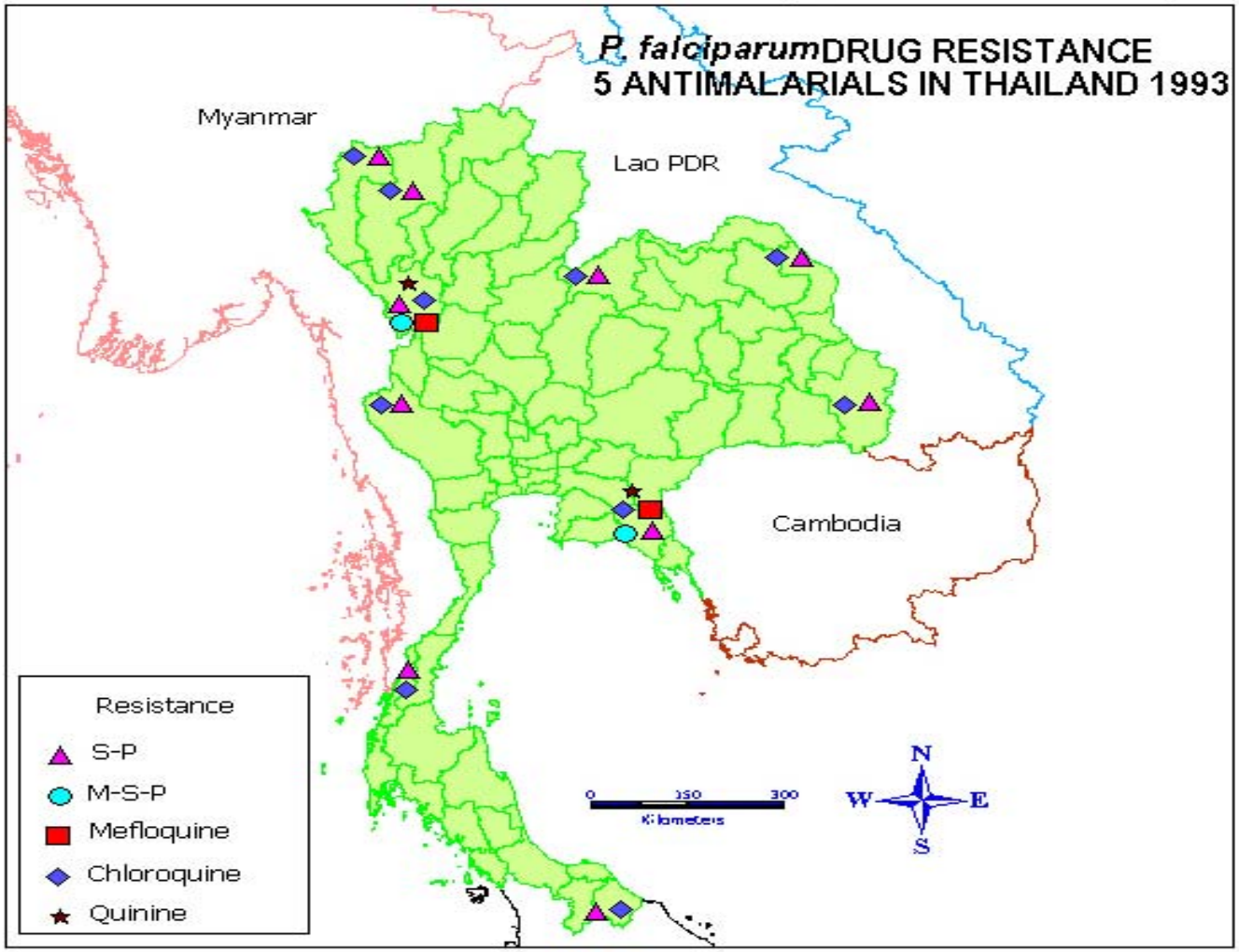
Determining geographic distributions of diseases


P. falciparum IN VIVO DRUG RESISTANCE
IN VIET NAM 1992 - 1996
Ha Giang
Bac can
Thai Nguyen
Tuyen Quang
Nghe An
Drug resistance %
Resistance
Sensitivity
Chloroquine % RII/RIII
S-P % RII/RIII
Quang Tri
Kon Tum
Dac Lac
Khanh Hoa
Binh Duong
Binh Phuoc
Lam Dong
Ho Chi Min
Tien Giang
Soc Trang
0
150
300
Kilometers
N
W
E
S

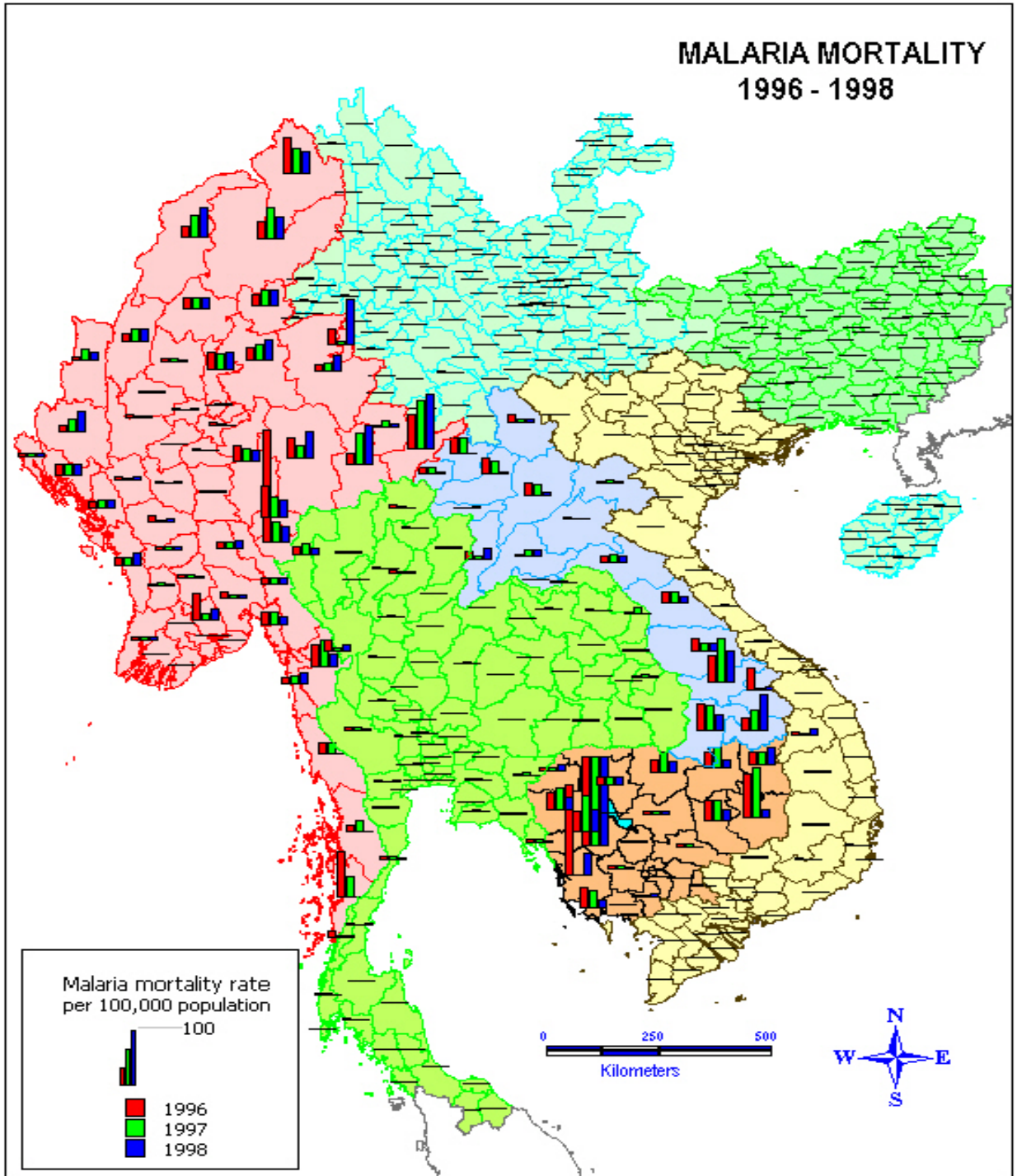

P. falciparum IN VIVO
DRUG RESISTANCE IN MYANMAR
1991 - 1997
Kachin state
Sagaing division
Chin state
Mandalay division
Shan state
Magway division
Kayah state
Rakhine state
Bago division
Kayin state
Yangon division
Mon state
Ayeyarwady division
Tanintharyi division
Drug resistance %
Mef
Sensitive
% S/RI
Resistant
% RII/RIII
S-P
Sensitive
% S/RI
Resistant
% RII/RIII
Chl
Sensitive
% S/RI
Resistant
% RII/RIII
0
150
300
Kilometers
N
W
E
S

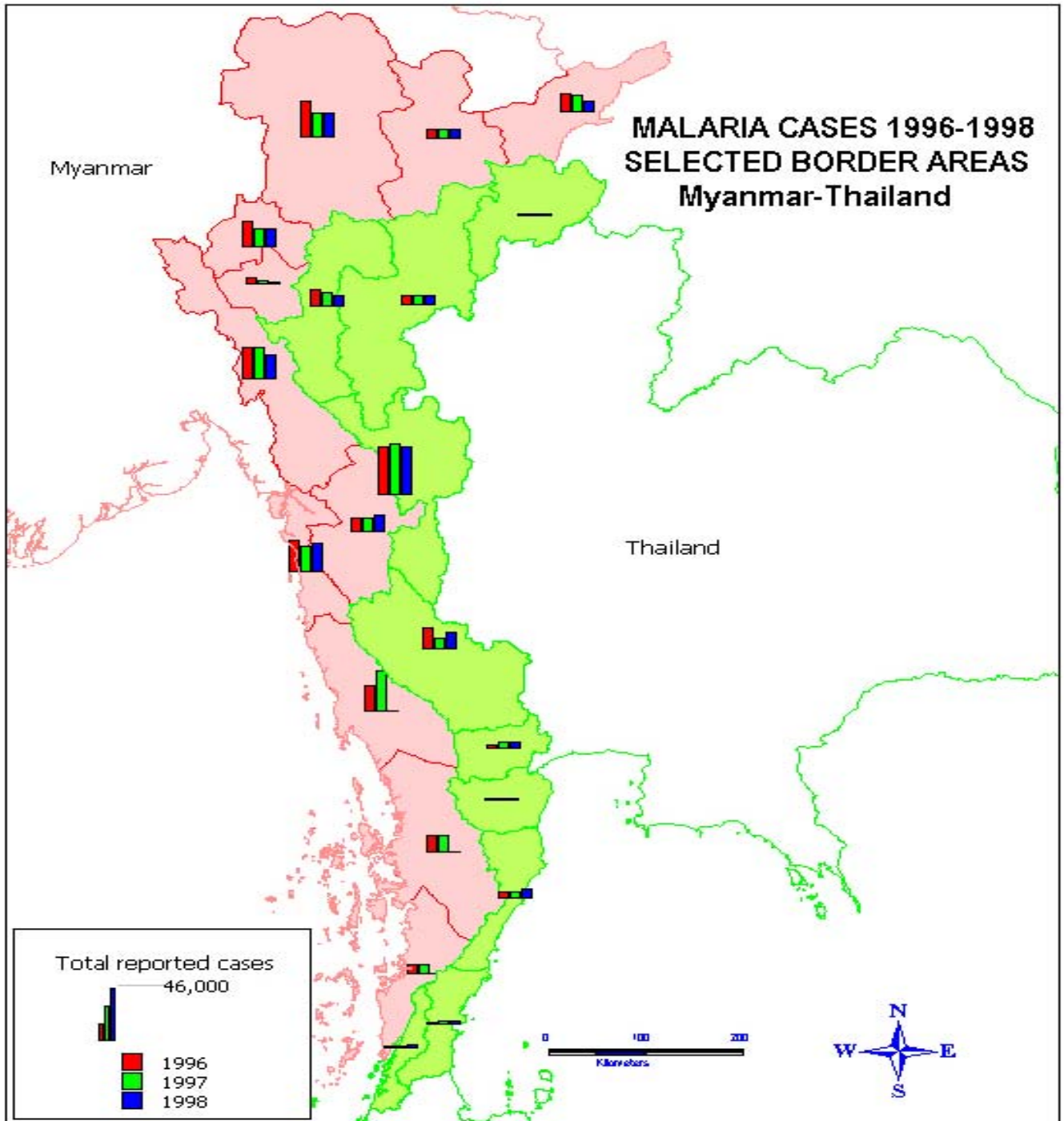

IN VITRO P. falciparum DRUG RESISTANCE
YUNNAN BORDER 1991 - 1995
Drug % R
Artesunate 16.5
Dihydroartemisinin 22.2
Arteether 11.1
Pyronaridine 20.8
Chloroquine 95.7
Amodiaquine 88.9
Quinine 0
Drug % R
Artesunate 5.6
Dihydroartemisinin 13.3
Arteether 20.6
Pyronaridine 22.2
Chloroquine 78.9
Amodiaquine 85.3
Quinine 0
Mefloquine 0
Piperaquine 72.9
Drug % R
Artesunate 12.1
Dihydroartemisinin 12.5
Arteether 6.3
Pyronaridine 34.5
Chloroquine 96.4
Amodiaquine 100
Quinine 0
Mefloquine 0
Yunnan
Myanmar
Viet Nam
Lao PDR
0
150
300
Kilometers
N
W
E
S

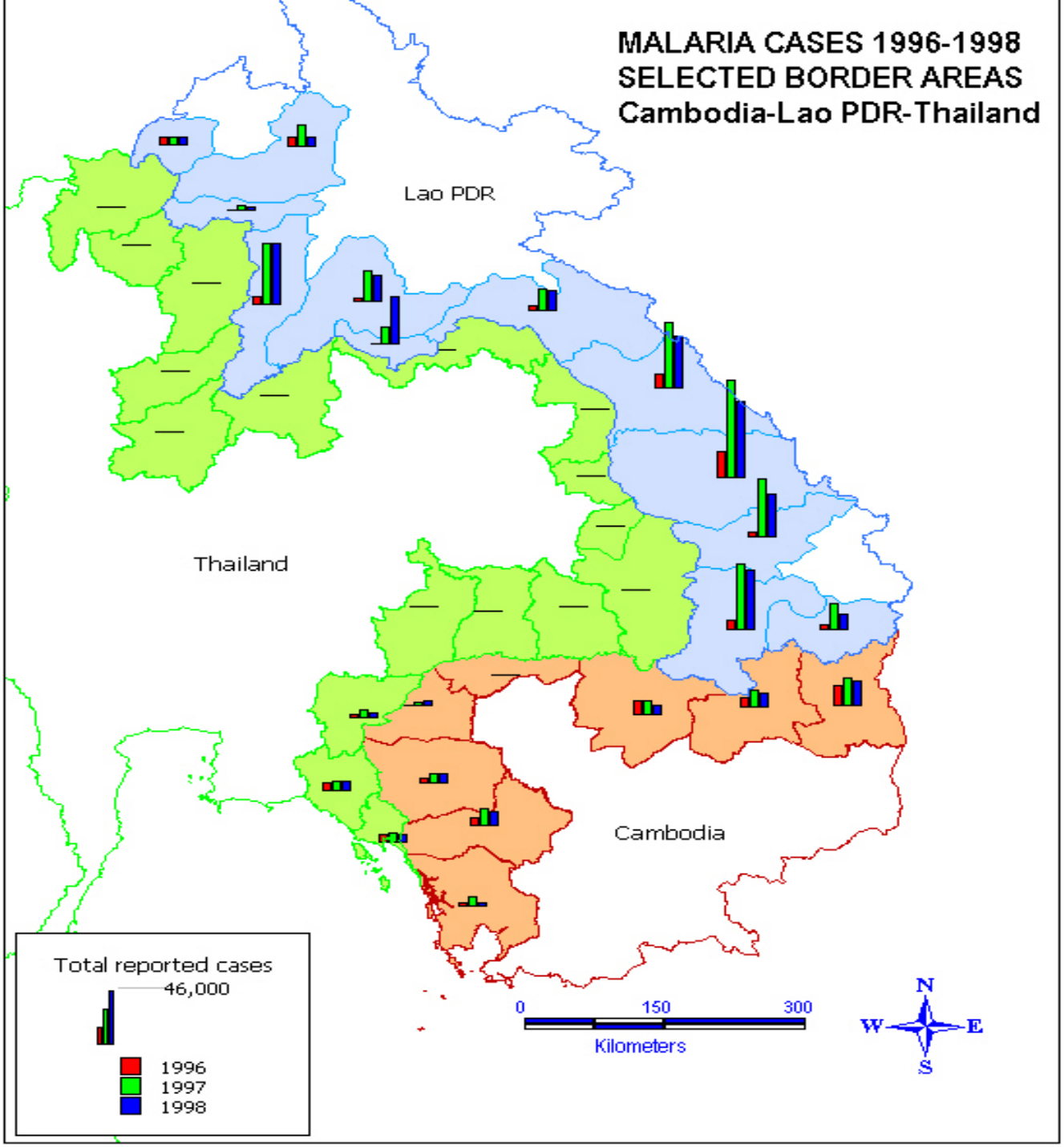

MALARIA PARASITE SPECIES IN RELATION TO THE NATIONAL DRUG POLICY
Percent
100
90
80
70
60
50
40
30
20
10
0
CHL
SP2
SP3
Q-T
M-S-P
M
M+ATS
1965
1970
1975
1980
1985
1990
1995
1998
Year
P.falciparum
P.vivax

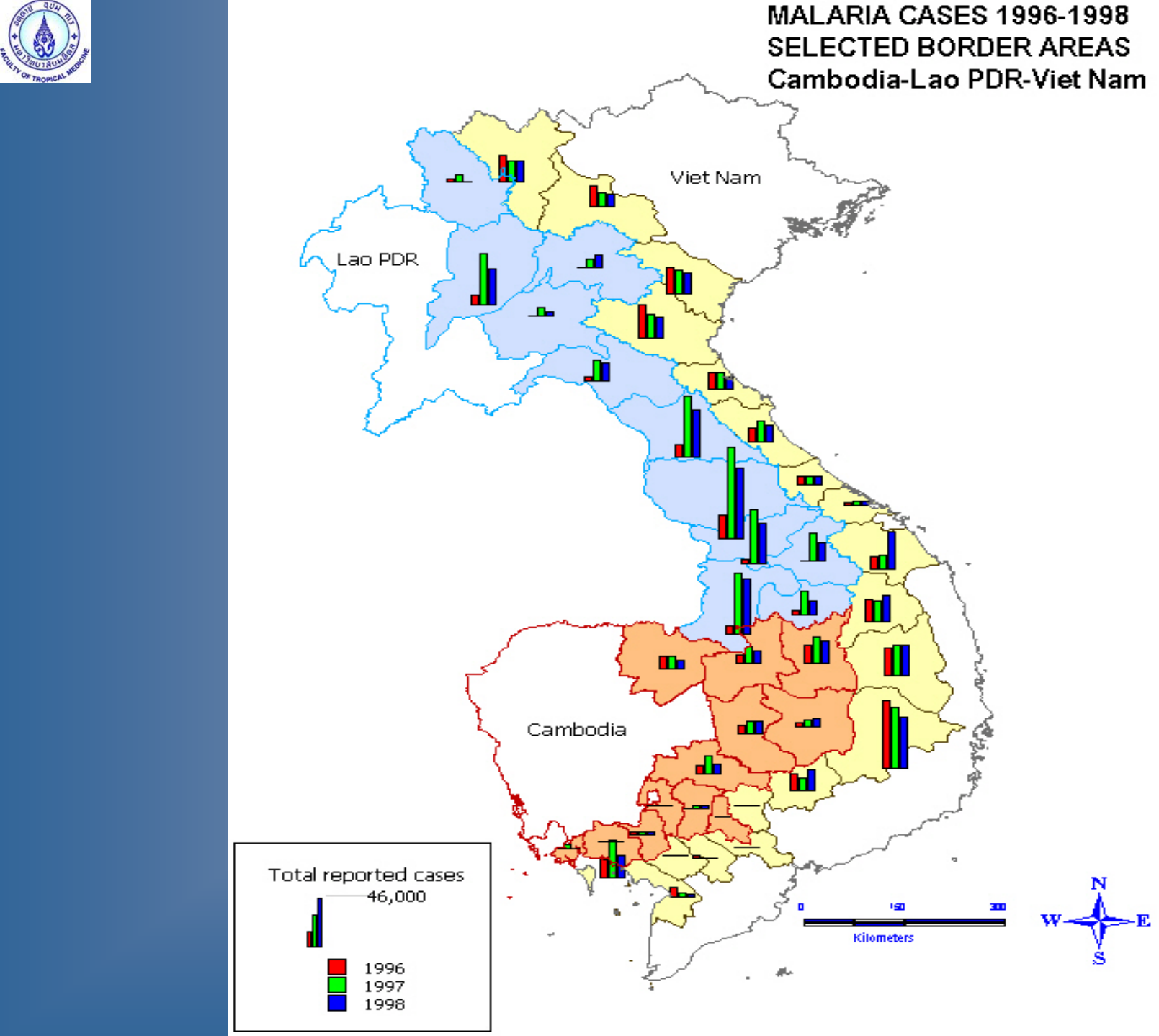

P. falciparum DRUG RESISTANCE
5 ANTIMALARIALS IN THAILAND 1993
Myanmar
Lao PDR
Cambodia
Resistance
S-P
M-S-P
Mefloquine
Chloroquine
Quinine
0
150
300
Kilometers
N
W
E
S

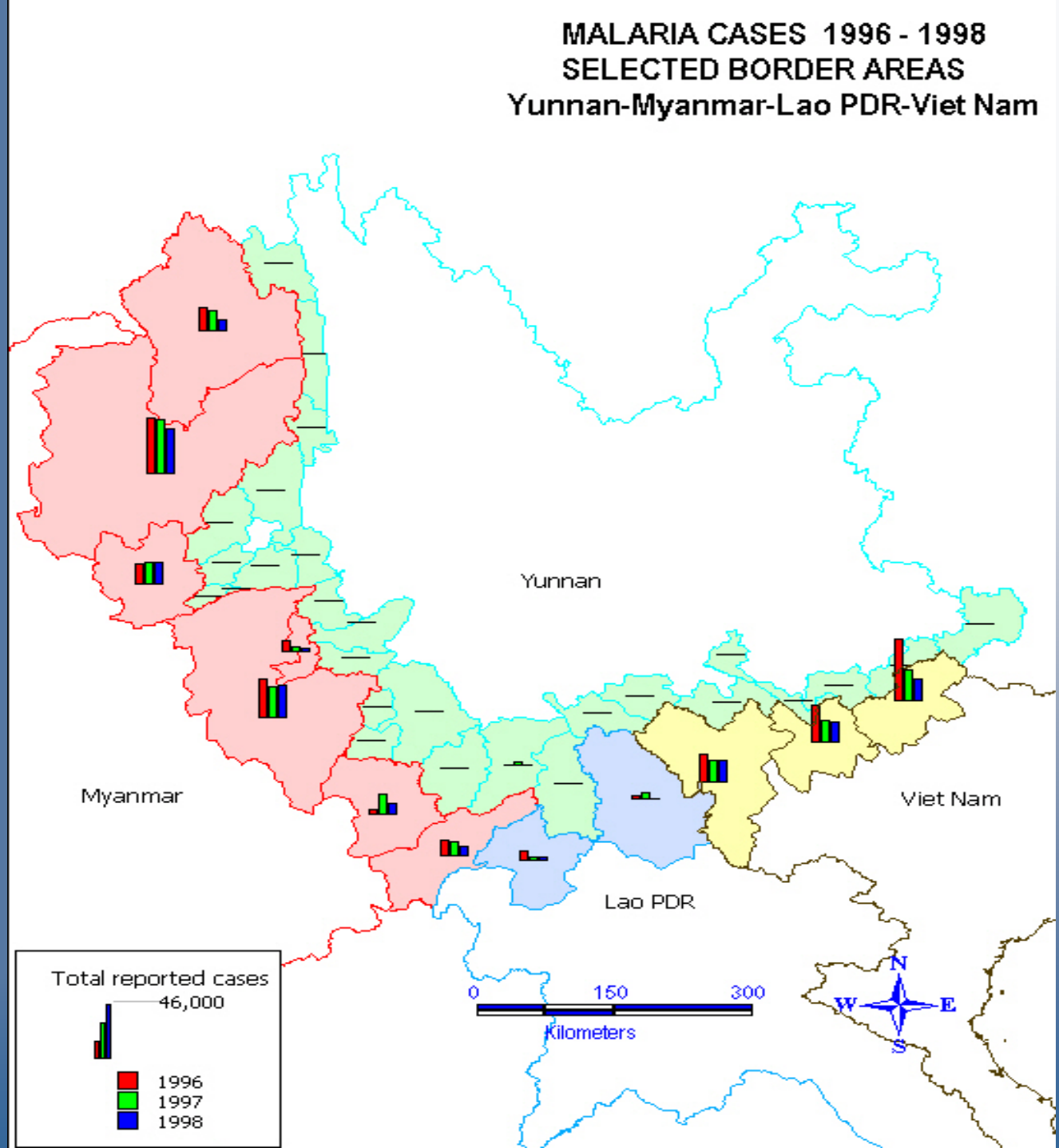
Monitoring over time

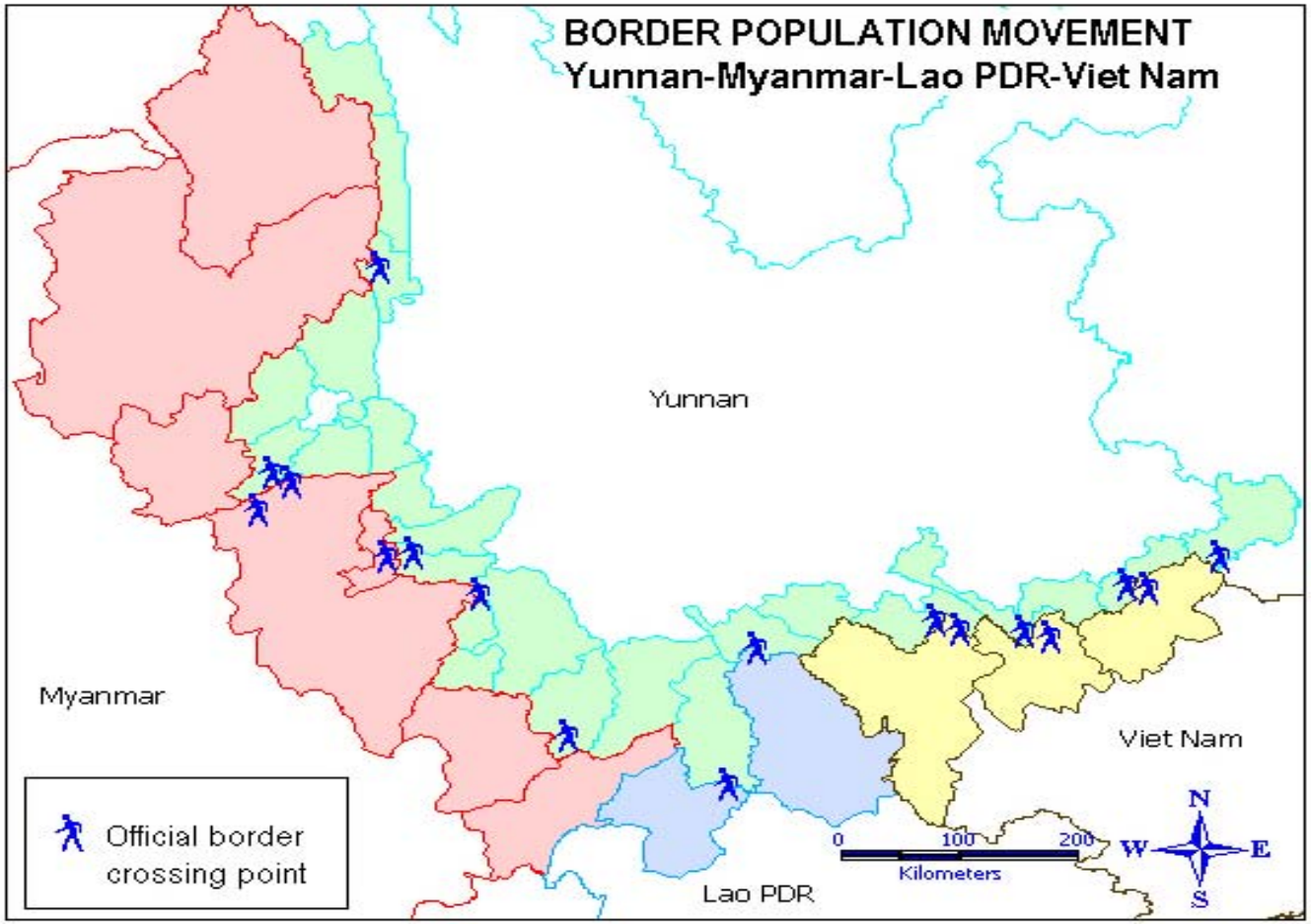

MALARIA MORTALITY
1996 - 1998
Malaria mortality rate
per 100,000 population
100
1996
1997
1998
0
250
500
Kilometers
N
W
E
S

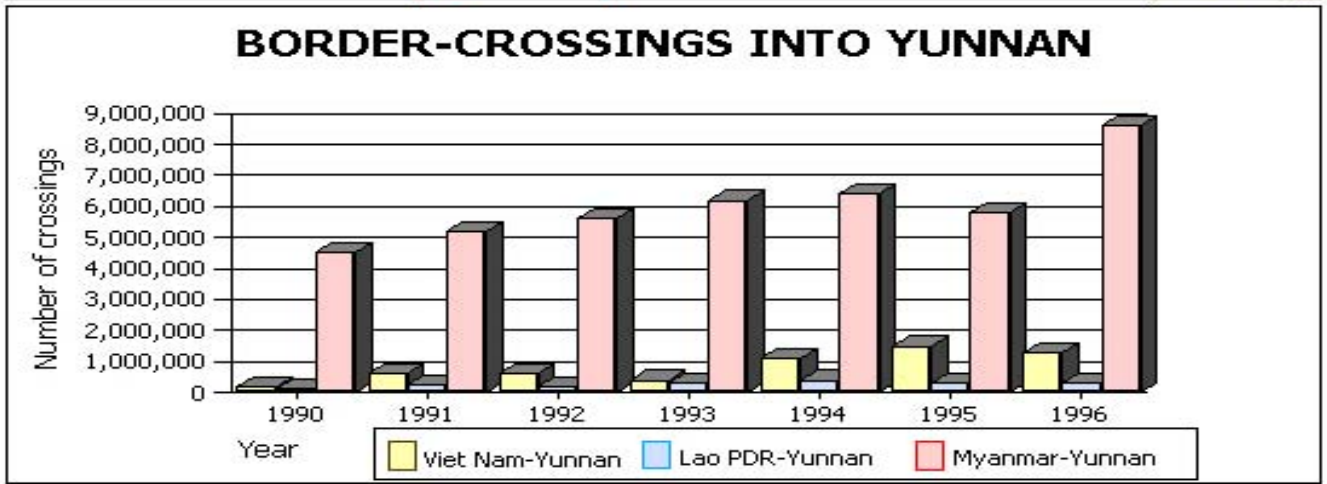

MALARIA CASES 1996-1998
SELECTED BORDER AREAS
Myanmar-Thailand
Myanmar
Thailand
Total reported cases
46,000
1996
1997
1998
0
100
200
Kilometers
N
W
E
S

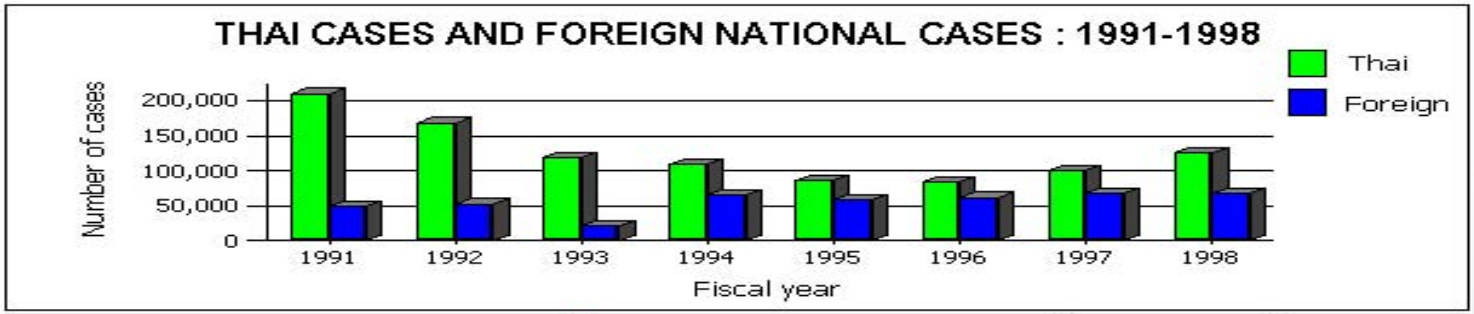

MALARIA CASES 1996-1998
SELECTED BORDER AREAS
Cambodia-Lao PDR-Thailand
Lao PDR
Thailand
Cambodia
Total reported cases
46,000
1996
1997
1998
0
150
300
Kilometers
N
W
E
S

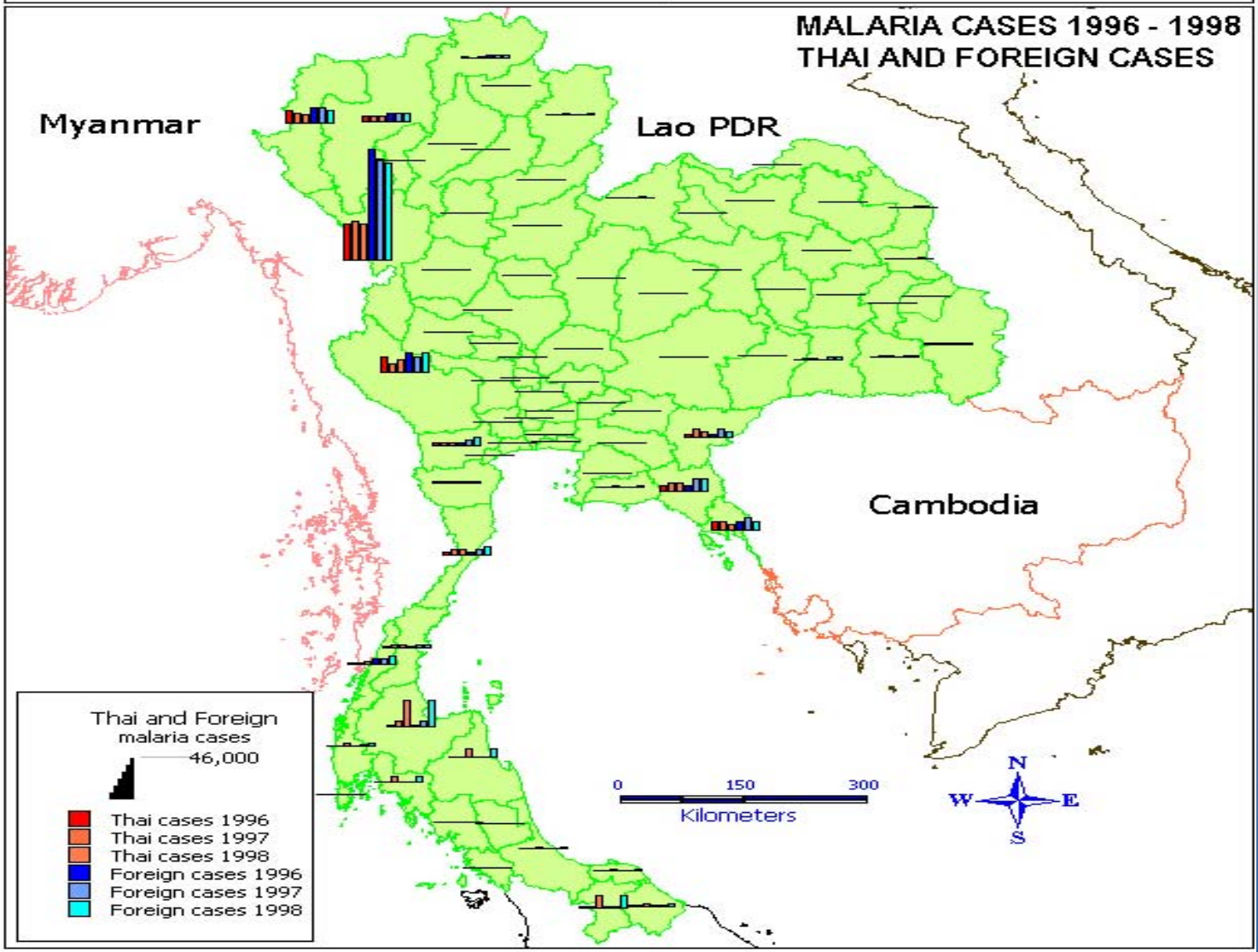

MALARIA CASES 1996-1998
SELECTED BORDER AREAS
Cambodia-Lao PDR-Viet Nam
Viet Nam
Lao PDR
Cambodia
Total reported cases
46,000
1996
1997
1998
0
150
300
Kilometers
N
W
E
S


MALARIA CASES 1996 - 1998
SELECTED BORDER AREAS
Yunnan-Myanmar-Lao PDR-Viet Nam
Yunnan
Myanmar
Viet Nam
Lao PDR
Total reported cases
46,000
1996
1997
1998
0
150
300
Kilometers
N
W
E
S

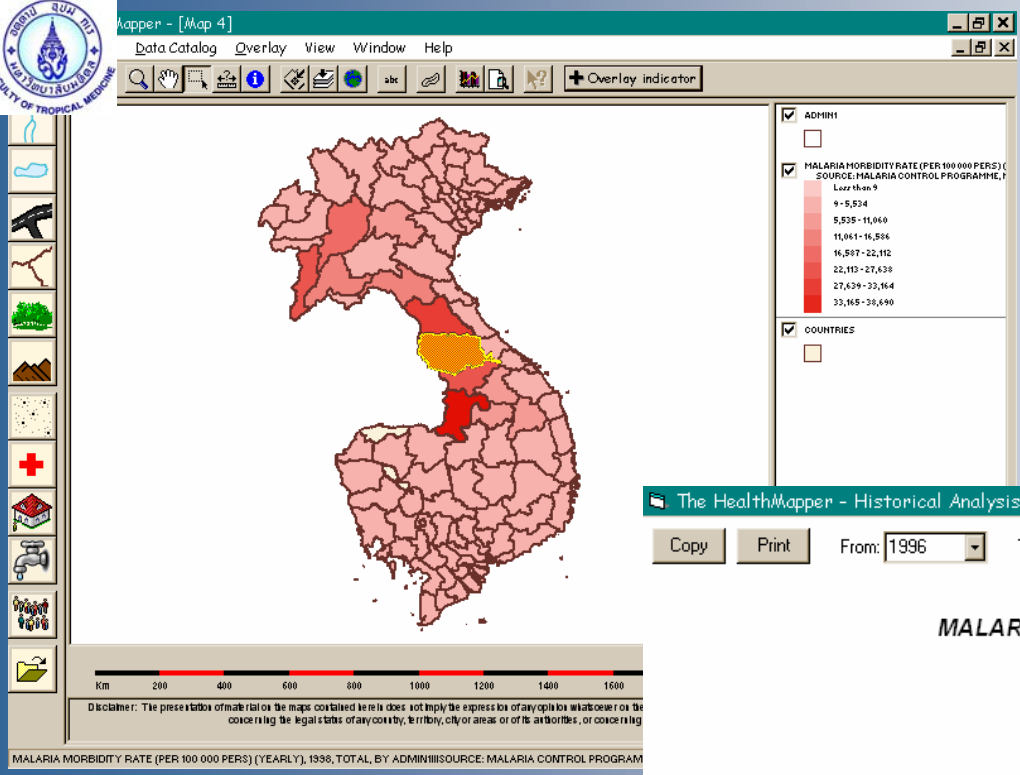

BORDER POPULATION MOVEMENT
Yunnan-Myanmar-Lao PDR-Viet Nam
Yunnan
Myanmar
Viet Nam
Lao PDR
Official border crossing point
0
100
200
Kilometers
N
W
E
S

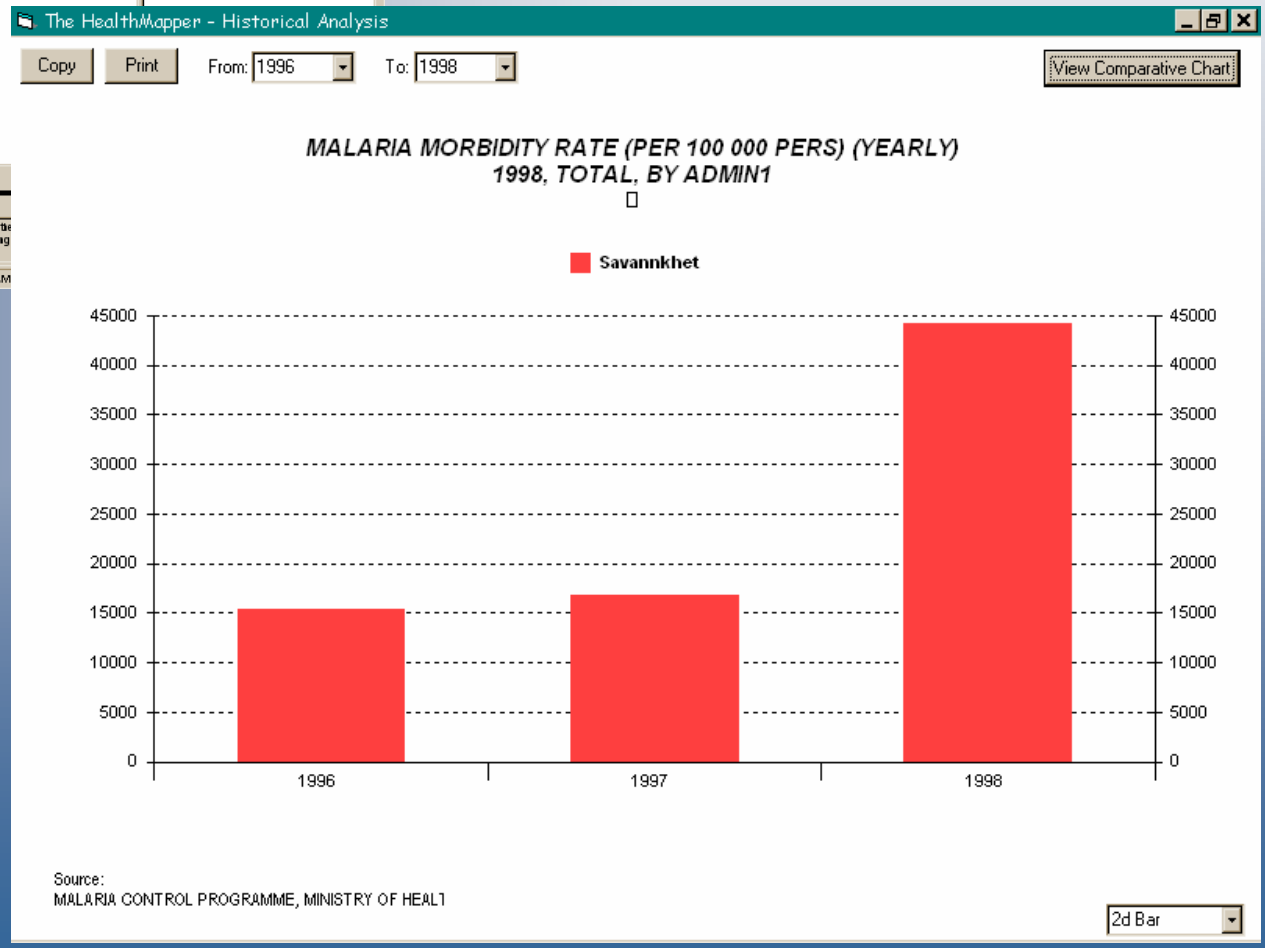

BORDER-CROSSINGS INTO YUNNAN
Number of crossings
9,000,000
8,000,000
7,000,000
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
1990
1991
1992
1993
1994
1995
1996
Year
Viet Nam-Yunnan
Lao PDR-Yunnan
Myanmar-Yunnan


THAI CASES AND FOREIGN NATIONAL CASES : 1991-1998
Thai
Foreign
Number of cases
200,000
150,000
100,000
50,000
0
1991
1992
1993
1994
1995
1996
1997
1998
Fiscal year

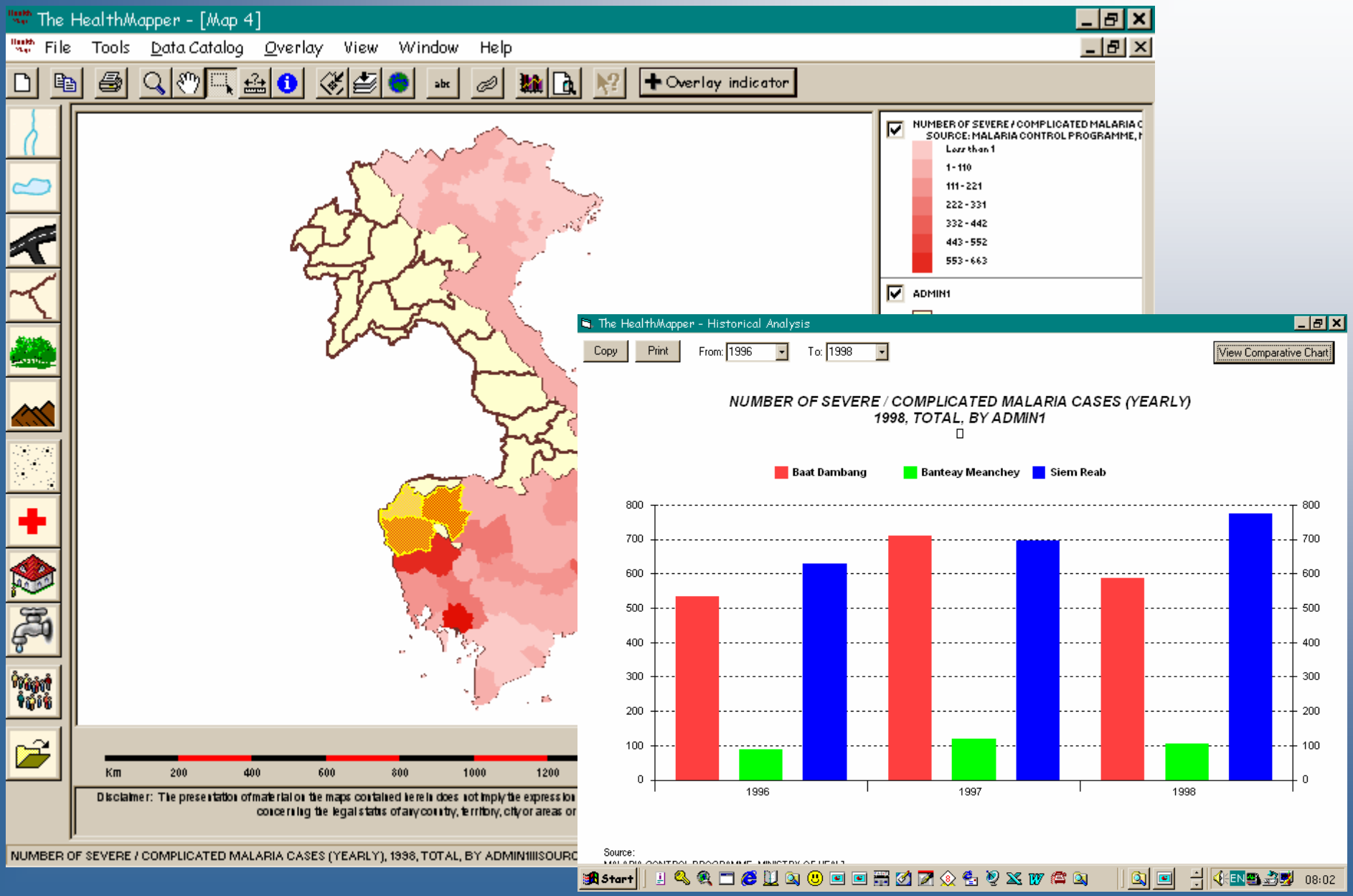

MALARIA CASES 1996 - 1998
THAI AND FOREIGN CASES
Myanmar
Lao PDR
Cambodia
Thai and Foreign
malaria cases
46,000
Thai cases 1996
Thai cases 1997
Thai cases 1998
Foreign cases 1996
Foreign cases 1997
Foreign cases 1998
0
150
300
Kilometers
N
W
E
S

Malaria morbidity 1998 Laos, Vietnam, Cambodia





Number of severe malaria cases by region (1998) Cambodia, Vietnam-



REMOTE SENSING

is the science and art of obtaining information about an object, area, or phenomenon through the analysis of data acquired by a device that is not in contact with the object, area, or phenomenon under investigation

Electro-magnetic radiation,

which is reflected or emitted from an object,

is the usual source

of remote sensing data

A device used to detect the electro-magnetic radiation reflection or emitted from an object is called

REMOTE SENSOR OR SENSOR

and vehicle carrying the sensor

is called

PLATFORM

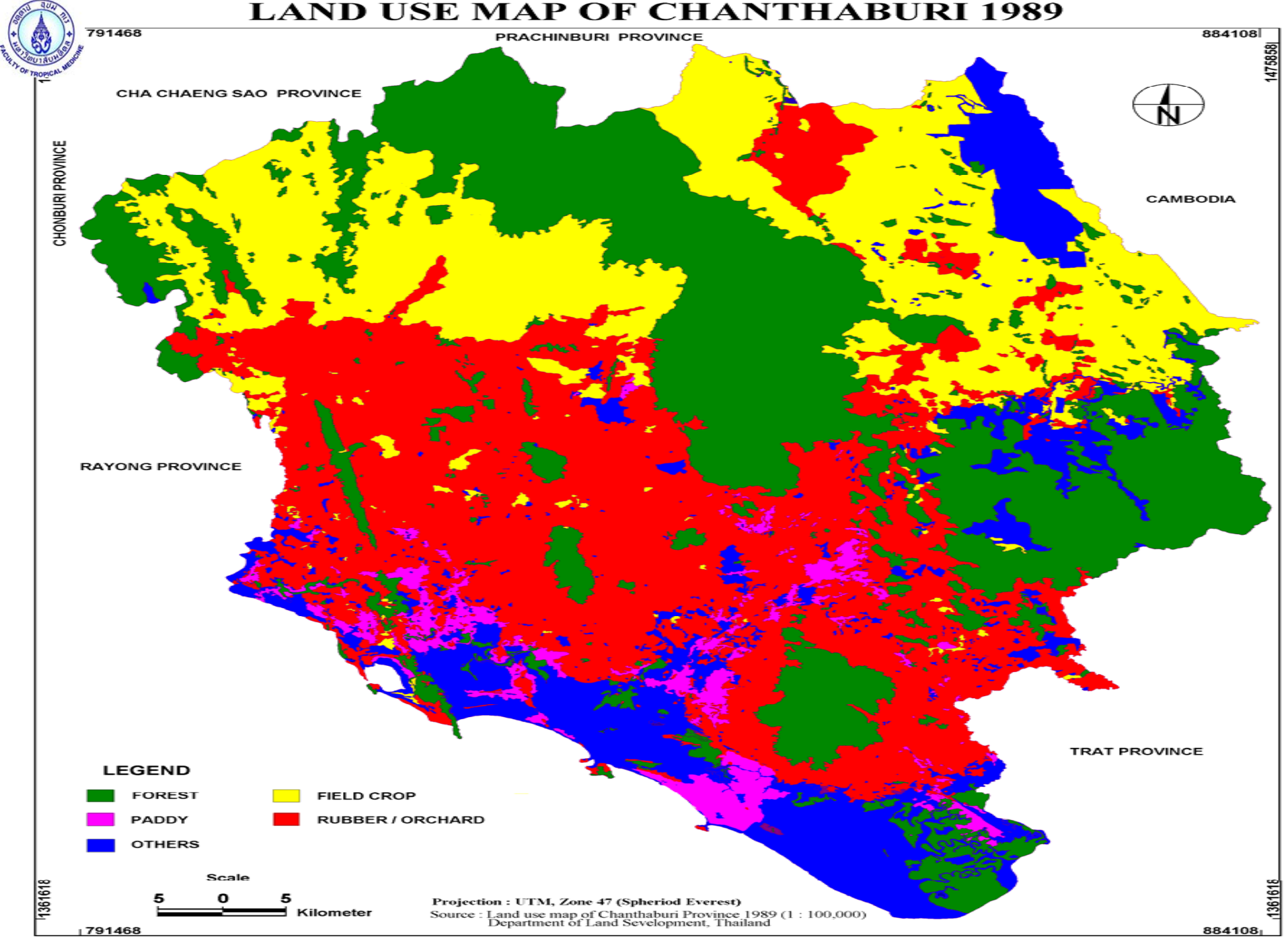


Figure 4.2 : Land use map ofChanthaburi Province1989

LAND USE MAP OF CHANTHABURI 1995

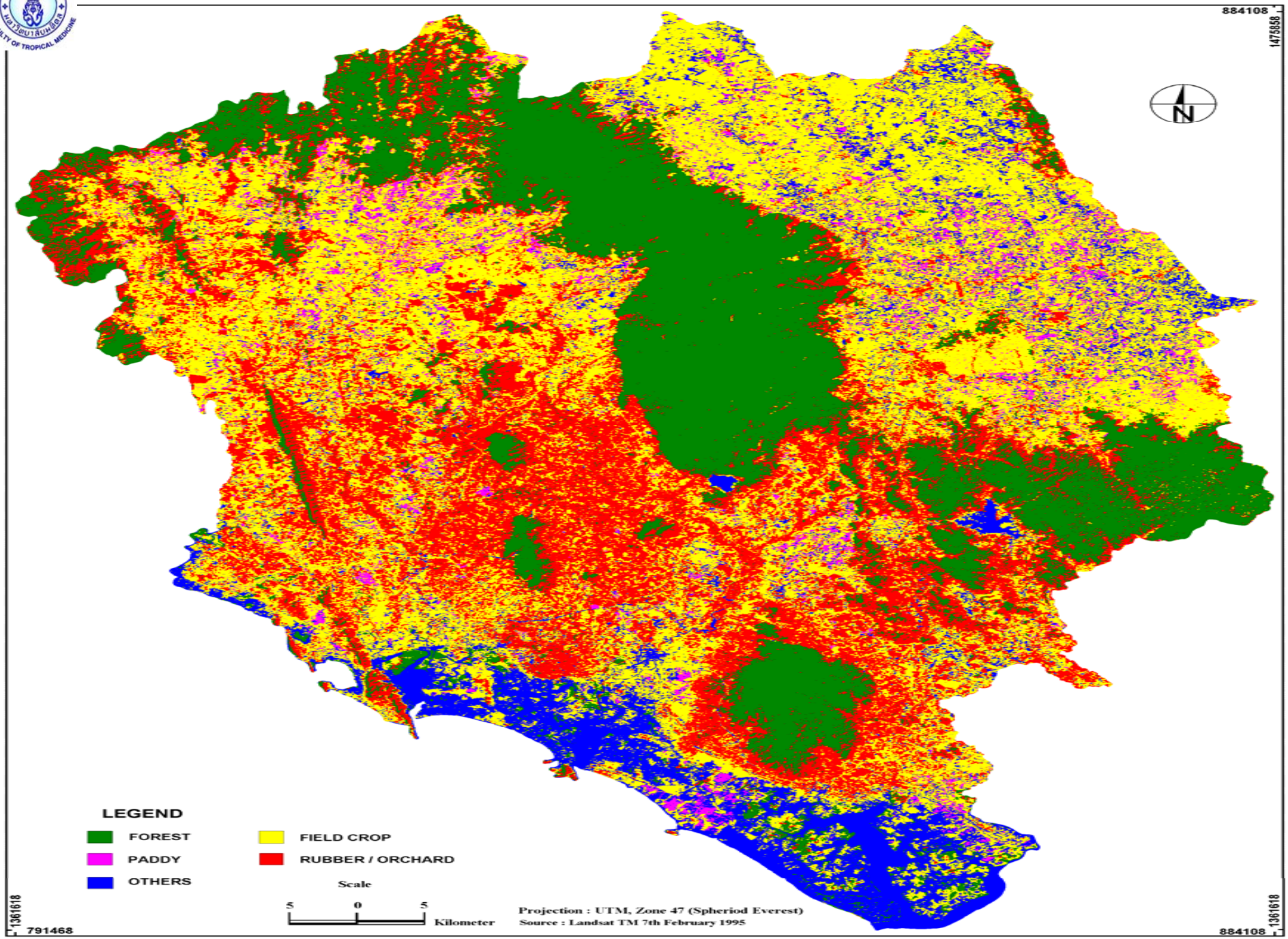


Figure 4.3 : Land use map of Chanthaburi Province1995

Lessons Learned: benefits

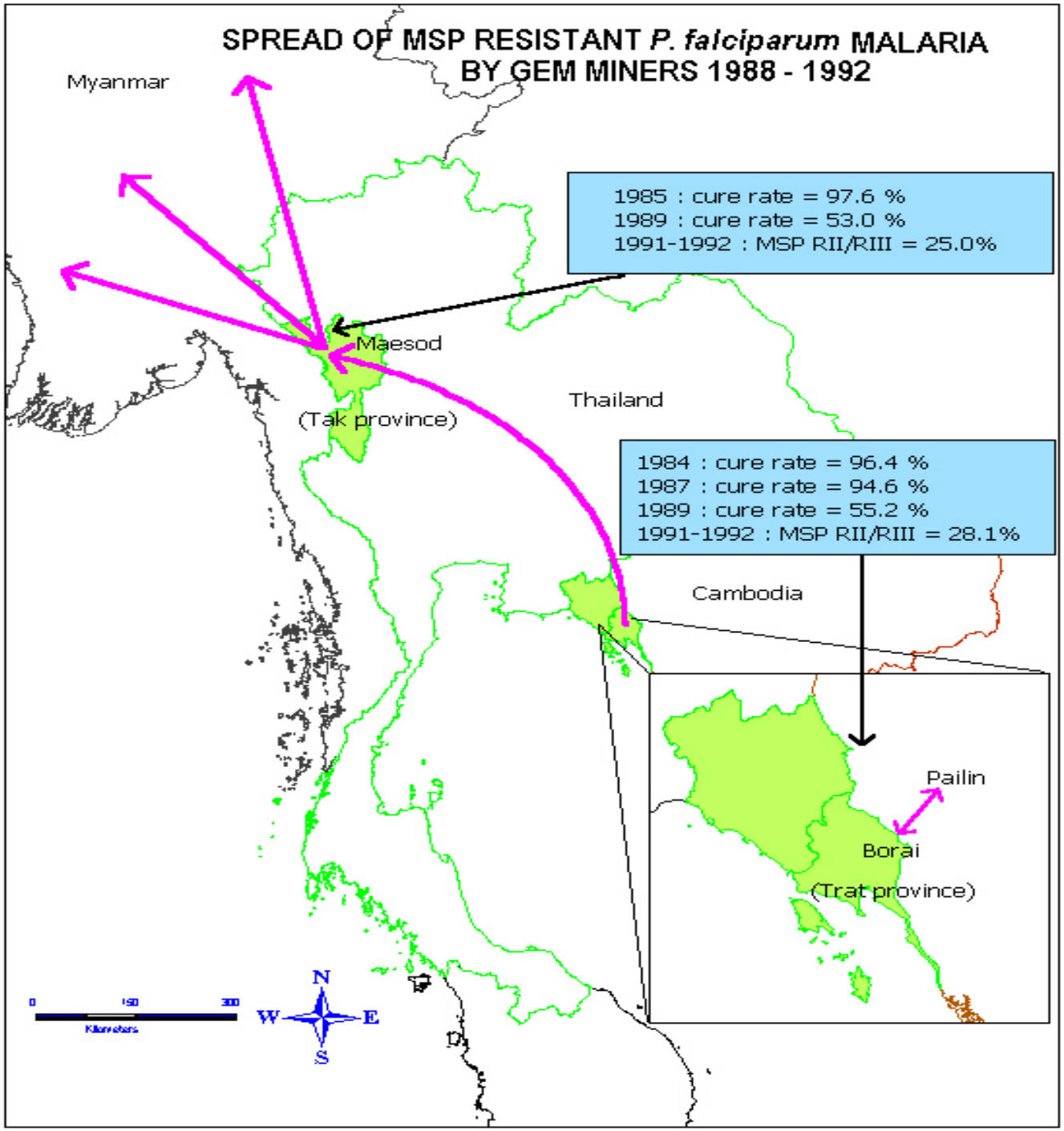
GIS powerful tool for:

- Analysing spatial trends
- Assessing resource allocation
- Planning and targeting resources
- Action oriented management
- Monitoring over time
- Advocacy / resource mobilisation

Indirect benefits

- Puts people and health care on the map
- Basic planning tool for development
- Strengthens whole process of surveillance
- Serves as common geographic platform for convergence of disease surveillance & links to HIS
- Facilitates multi-sectoral and multi agency approaches to data management
- Reconciles information needs at local level with those at global levels

Assessing health services coverage and accessibility


SPREAD OF MSP RESISTANT P. falciparum MALARIA
BY GEM MINERS 1988 - 1992
Myanmar
1985 : cure rate = 97.6 %
1989 : cure rate = 53.0 %
1991-1992 : MSP RII/RIII = 25.0%
Maesod
(Tak province)
Thailand
1984 : cure rate = 96.4 %
1987 : cure rate = 94.6 %
1989 : cure rate = 55.2 %
1991-1992 : MSP RII/RIII = 28.1%
Cambodia
Pailin
Borai
(Trat province)
0
150
300
Kilometers
N
W
E
S

Choice of GIS software/systems

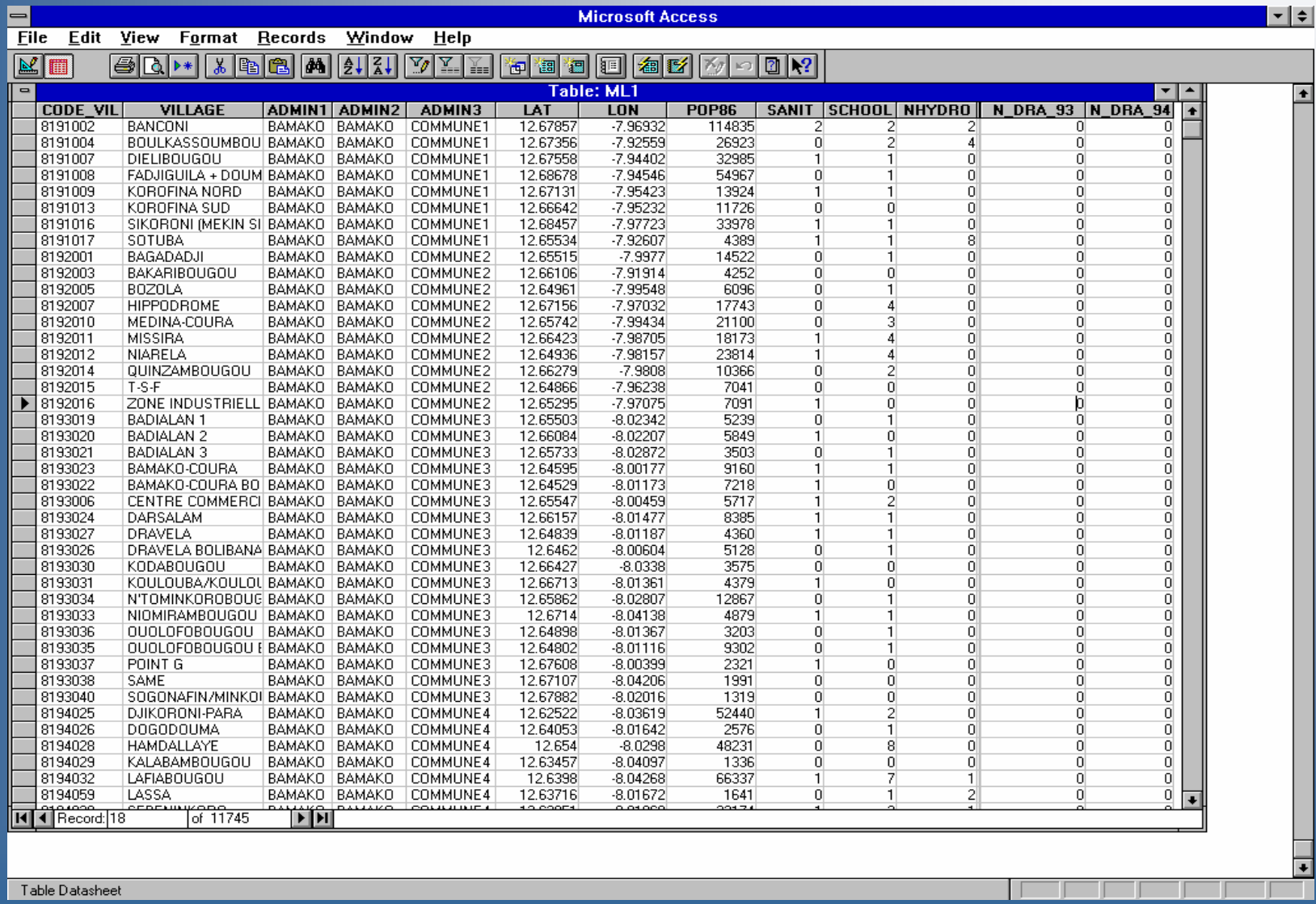
GIS systems	Target Users	Type of training (time)
EpiMap, HealthMapper	public health planners, administrators, epidemiologists, decision-makers, policy makers	Simple, self training • Days
ArcView, Mapinfo, Atlas GIS	statisticians, data managers, epidemiologists	Specialised /Complex • Weeks
Idrisi, ArcInfo, ArcView Spatial Analyst	urban planners, geographers, researchers	Specialised /very complex • Months

What GIS is not

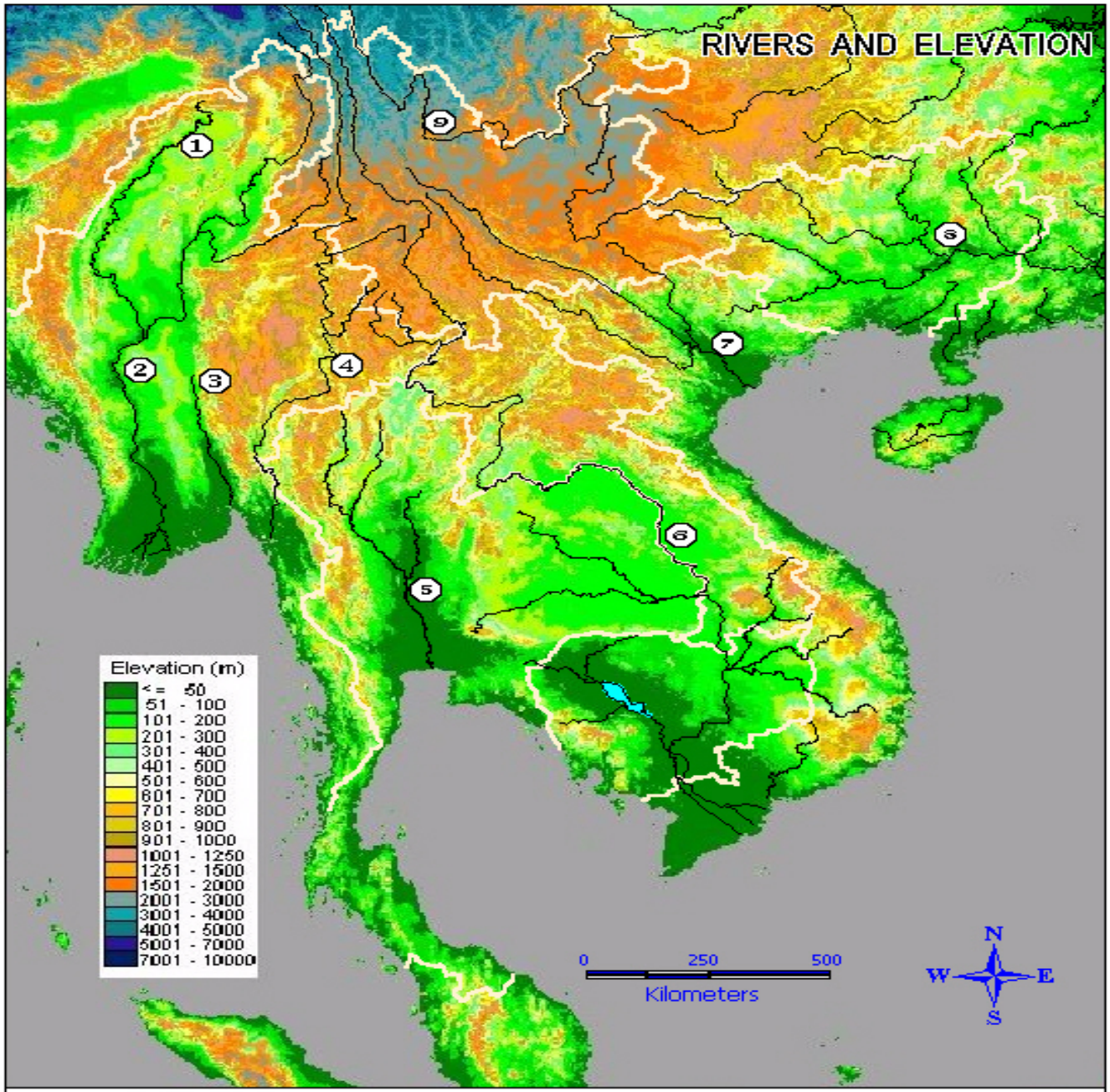
- **It is not a software for simply drawing maps.**
- **It does not just hold maps or pictures**

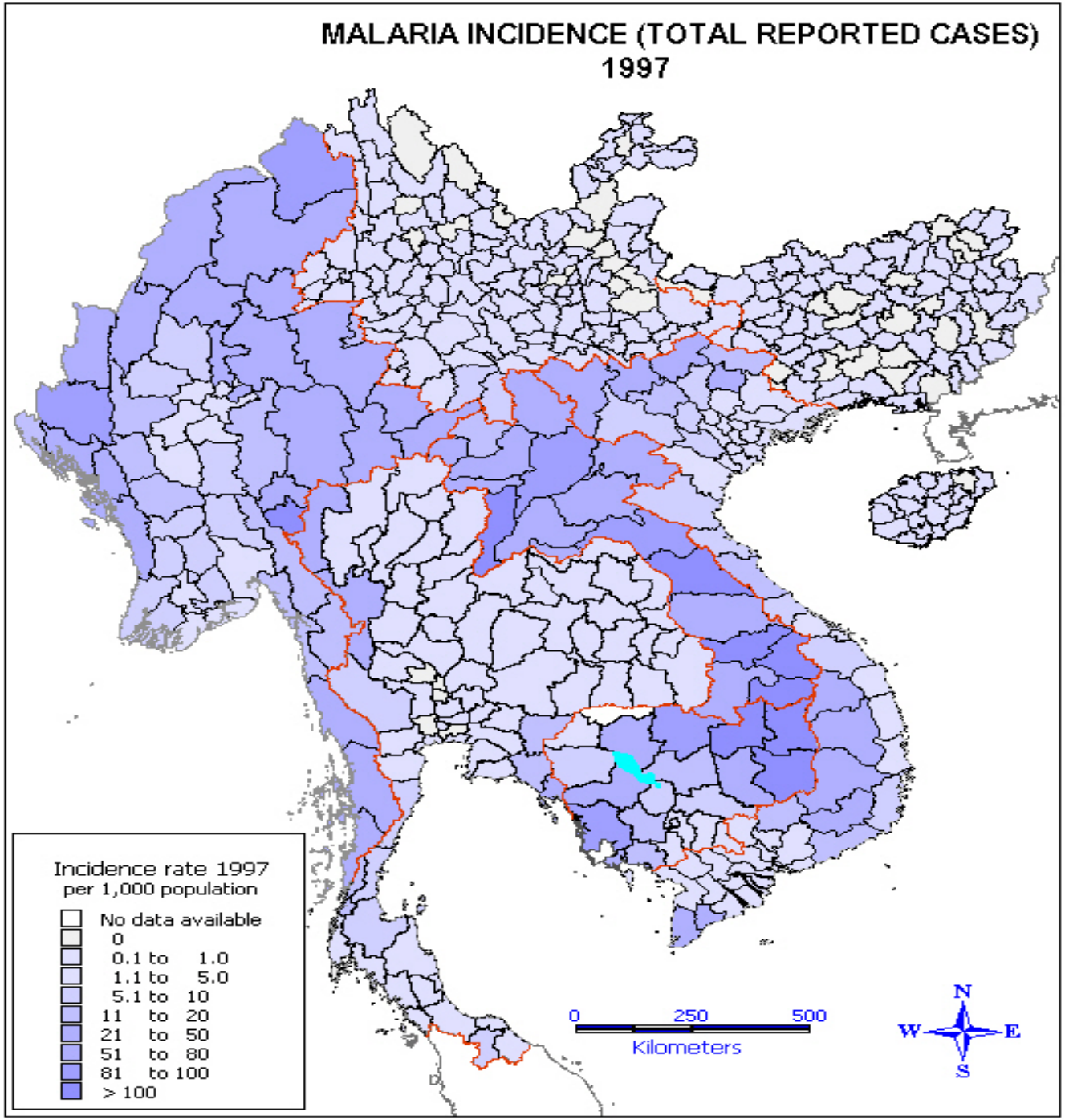
It holds a database

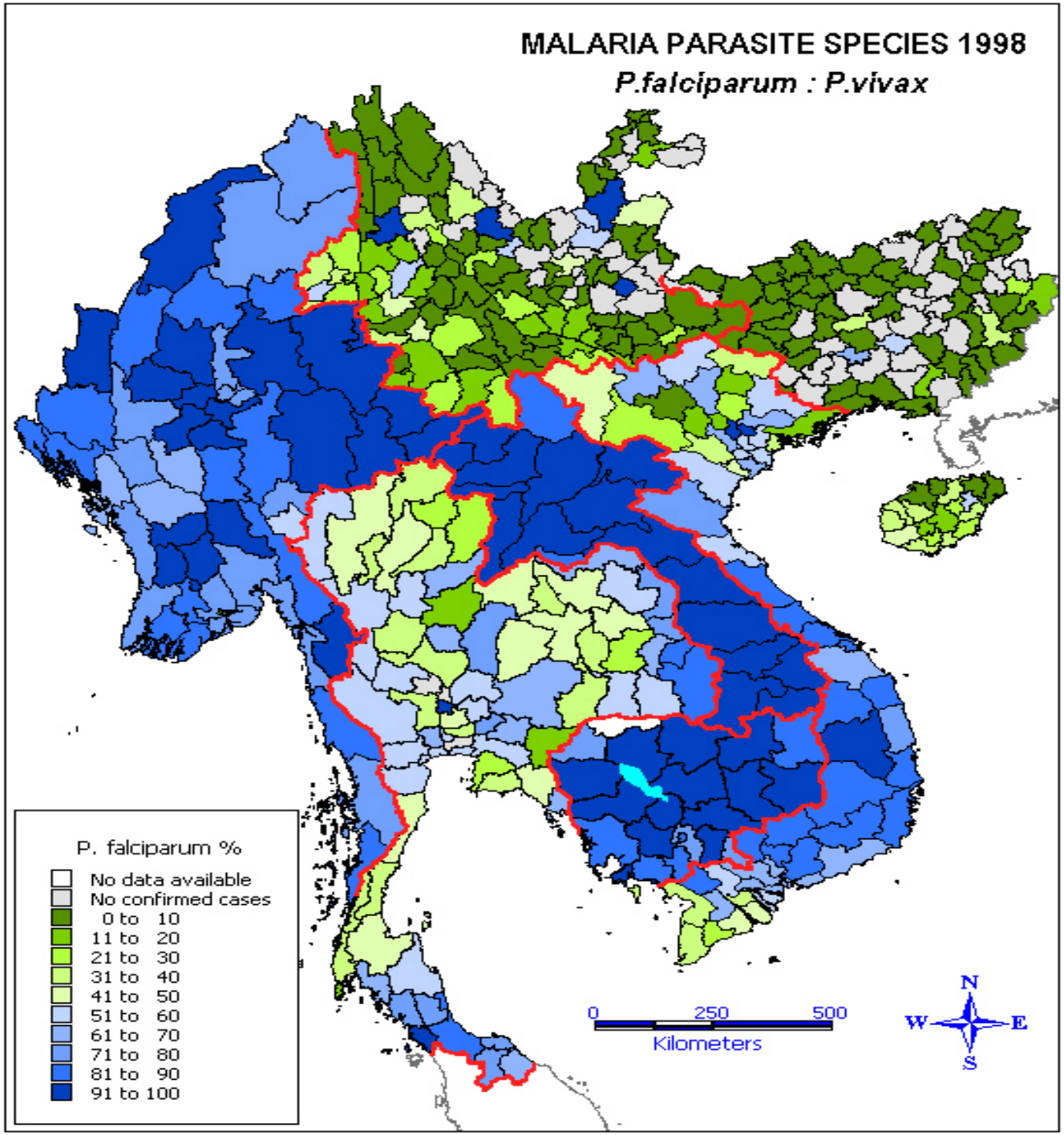
Databases that contain points (geographic coordinates)

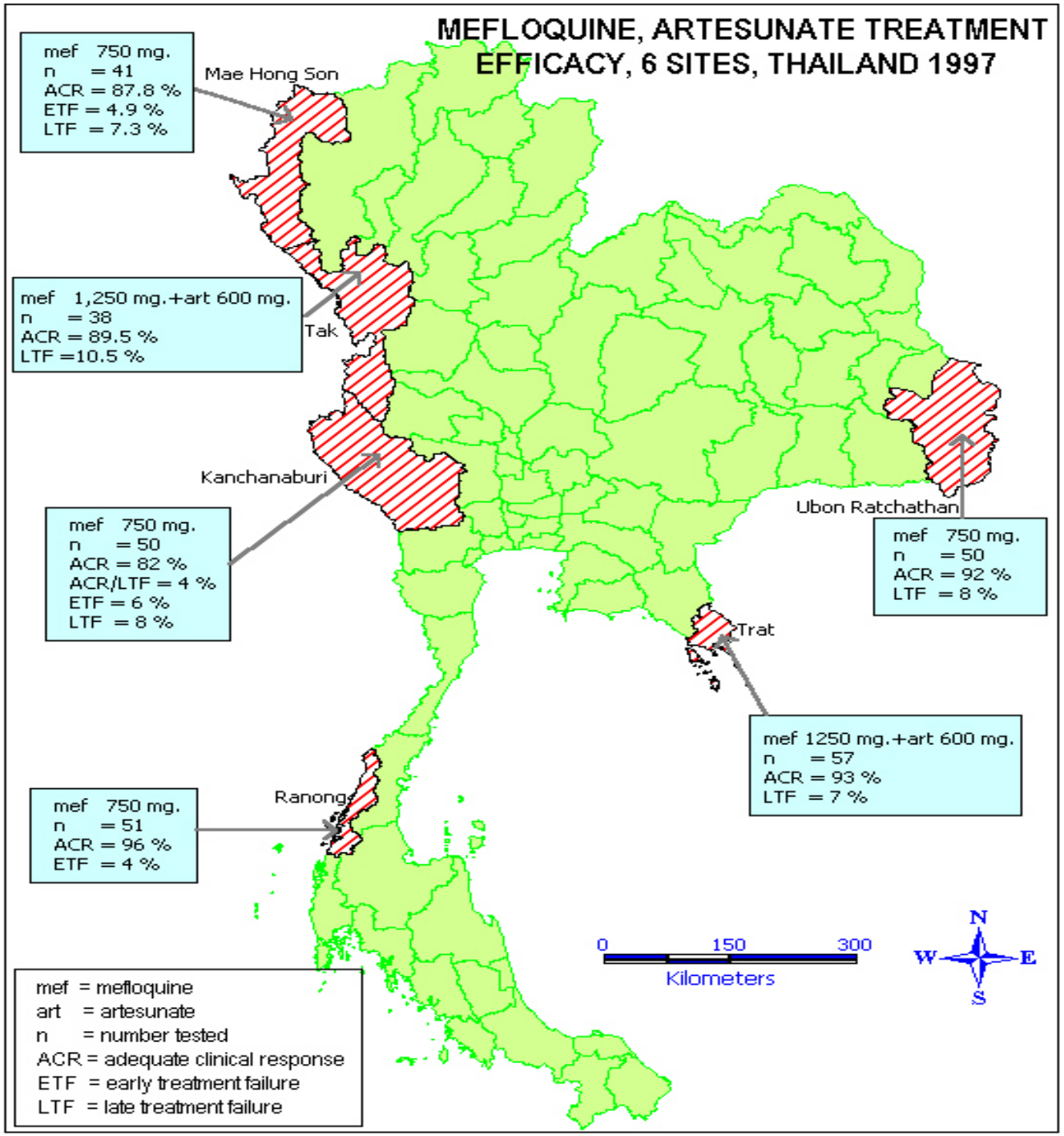


CODE_VIL	VILLAGE	ADMIN1	ADMIN2	ADMIN3	LAT	LON	POP86	SANIT	SCHOOL	NHYDRO	N_DRA_93	N_DRA_94
8191002	BANCONI	BAMAKO	BAMAKO	COMMUNE1	12.67857	-7.96932	114835	2	2	2	0	0
8191004	BOULKASSOUMBOU	BAMAKO	BAMAKO	COMMUNE1	12.67356	-7.92559	26923	0	2	4	0	0
8191007	DIELIBOUGOU	BAMAKO	BAMAKO	COMMUNE1	12.67558	-7.94402	32985	1	1	0	0	0
8191008	FADJIGUILA + DOUM	BAMAKO	BAMAKO	COMMUNE1	12.68678	-7.94546	54967	0	1	0	0	0
8191009	KOROFINA NORD	BAMAKO	BAMAKO	COMMUNE1	12.67131	-7.95423	13924	1	1	0	0	0
8191013	KOROFINA SUD	BAMAKO	BAMAKO	COMMUNE1	12.66642	-7.95232	11726	0	0	0	0	0
8191016	SIKORONI (MEKIN SI	BAMAKO	BAMAKO	COMMUNE1	12.68457	-7.97723	33978	1	1	0	0	0
8191017	SOTUBA	BAMAKO	BAMAKO	COMMUNE1	12.65534	-7.92607	4389	1	1	8	0	0
8192001	BAGADADJI	BAMAKO	BAMAKO	COMMUNE2	12.65515	-7.9977	14522	0	1	0	0	0
8192003	BAKARIBOUGOU	BAMAKO	BAMAKO	COMMUNE2	12.66106	-7.91914	4252	0	0	0	0	0
8192005	BOZOLA	BAMAKO	BAMAKO	COMMUNE2	12.64961	-7.99548	6096	0	1	0	0	0
8192007	HIPPODROME	BAMAKO	BAMAKO	COMMUNE2	12.67156	-7.97032	17743	0	4	0	0	0
8192010	MEDINA-COURA	BAMAKO	BAMAKO	COMMUNE2	12.65742	-7.99434	21100	0	3	0	0	0
8192011	MISSIRA	BAMAKO	BAMAKO	COMMUNE2	12.66423	-7.98705	18173	1	4	0	0	0
8192012	NIARELA	BAMAKO	BAMAKO	COMMUNE2	12.64936	-7.98157	23814	1	4	0	0	0
8192014	QUINZAMBOUGOU	BAMAKO	BAMAKO	COMMUNE2	12.66279	-7.9808	10366	0	2	0	0	0
8192015	T-S-F	BAMAKO	BAMAKO	COMMUNE2	12.64866	-7.96238	7041	0	0	0	0	0
8192016	ZONE INDUSTRIELL	BAMAKO	BAMAKO	COMMUNE2	12.65295	-7.97075	7091	1	0	0	0	0
8193019	BADIALAN 1	BAMAKO	BAMAKO	COMMUNE3	12.65503	-8.02342	5239	0	1	0	0	0
8193020	BADIALAN 2	BAMAKO	BAMAKO	COMMUNE3	12.66084	-8.02207	5849	1	0	0	0	0
8193021	BADIALAN 3	BAMAKO	BAMAKO	COMMUNE3	12.65733	-8.02872	3503	0	1	0	0	0
8193023	BAMAKO-COURA	BAMAKO	BAMAKO	COMMUNE3	12.64595	-8.00177	9160	1	1	0	0	0
8193022	BAMAKO-COURA BO	BAMAKO	BAMAKO	COMMUNE3	12.64529	-8.01173	7218	1	0	0	0	0
8193006	CENTRE COMMERCI	BAMAKO	BAMAKO	COMMUNE3	12.65547	-8.00459	5717	1	2	0	0	0
8193024	DARSALAM	BAMAKO	BAMAKO	COMMUNE3	12.66157	-8.01477	8385	1	1	0	0	0
8193027	DRAVELA	BAMAKO	BAMAKO	COMMUNE3	12.64839	-8.01187	4360	1	1	0	0	0
8193026	DRAVELA BOLIBANA	BAMAKO	BAMAKO	COMMUNE3	12.6462	-8.00604	5128	0	1	0	0	0
8193030	KODABOUGOU	BAMAKO	BAMAKO	COMMUNE3	12.66427	-8.0338	3575	0	0	0	0	0
8193031	KOULOUBA/KOULOU	BAMAKO	BAMAKO	COMMUNE3	12.66713	-8.01361	4379	1	0	0	0	0
8193034	N'TOMINKOROBOUG	BAMAKO	BAMAKO	COMMUNE3	12.65862	-8.02807	12867	0	1	0	0	0
8193033	NIOMIRAMBOUGOU	BAMAKO	BAMAKO	COMMUNE3	12.6714	-8.04138	4879	1	1	0	0	0
8193036	OUOLOFOBOUGOU	BAMAKO	BAMAKO	COMMUNE3	12.64898	-8.01367	3203	0	1	0	0	0
8193035	OUOLOFOBOUGOU E	BAMAKO	BAMAKO	COMMUNE3	12.64802	-8.01116	9302	0	1	0	0	0
8193037	POINT G	BAMAKO	BAMAKO	COMMUNE3	12.67608	-8.00399	2321	1	0	0	0	0
8193038	SAME	BAMAKO	BAMAKO	COMMUNE3	12.67107	-8.04206	1991	0	0	0	0	0
8193040	SOGONAFIN/MINKOI	BAMAKO	BAMAKO	COMMUNE3	12.67882	-8.02016	1319	0	0	0	0	0
8194025	DJIKORONI-PARA	BAMAKO	BAMAKO	COMMUNE4	12.62522	-8.03619	52440	1	2	0	0	0
8194026	DOGODOUMA	BAMAKO	BAMAKO	COMMUNE4	12.64053	-8.01642	2576	0	1	0	0	0
8194028	HAMDALLAYE	BAMAKO	BAMAKO	COMMUNE4	12.654	-8.0298	48231	0	8	0	0	0
8194029	KALABAMBOUGOU	BAMAKO	BAMAKO	COMMUNE4	12.63457	-8.04097	1336	0	0	0	0	0
8194032	LAFIABOUGOU	BAMAKO	BAMAKO	COMMUNE4	12.6398	-8.04268	66337	1	7	1	0	0
8194059	LASSA	BAMAKO	BAMAKO	COMMUNE4	12.63716	-8.01672	1641	0	1	2	0	0


RIVERS AND ELEVATION
Elevation (m)
<= 50
51 - 100
101 - 200
201 - 300
301 - 400
401 - 500
501 - 600
601 - 700
701 - 800
801 - 900
901 - 1000
1001 - 1250
1251 - 1500
1501 - 2000
2001 - 3000
3001 - 4000
4001 - 5000
5001 - 7000
7001 - 10000
0
250
500
Kilometers
N
W
E
S
Rivers
1. Chindwin river
2. Ayeyarwaddy river
3. Sittaung river
4. Thanlwin river
5. Chaophraya river
6. Mekong river
7. Red river
8. West river system
9. Yangzi river system


MALARIA INCIDENCE (TOTAL REPORTED CASES)
1997
Incidence rate 1997
per 1,000 population
No data available
0
0.1 to 1.0
1.1 to 5.0
5.1 to 10
11 to 20
21 to 50
51 to 80
81 to 100
> 100
0
250
500
Kilometers
N
W
E
S


MALARIA PARASITE SPECIES 1998
P.falciparum : P.vivax
P. falciparum %
No data available
No confirmed cases
0 to 10
11 to 20
21 to 30
31 to 40
41 to 50
51 to 60
61 to 70
71 to 80
81 to 90
91 to 100
0
250
500
Kilometers
N
W
E
S


MEFLOQUINE, ARTESUNATE TREATMENT EFFICACY, 6 SITES, THAILAND 1997
mef 750 mg.
n = 41
ACR = 87.8 %
ETF = 4.9 %
LTF = 7.3 %
Mae Hong Son
mef 1,250 mg.+art 600 mg.
n = 38
ACR = 89.5 %
LTF =10.5 %
Tak
Kanchanaburi
mef 750 mg.
n = 50
ACR = 82 %
ACR/LTF = 4 %
ETF = 6 %
LTF = 8 %
Ubon Ratchathan
mef 750 mg.
n = 50
ACR = 92 %
LTF = 8 %
Trat
mef 1250 mg.+art 600 mg.
n = 57
ACR = 93 %
LTF = 7 %
Ranong
mef 750 mg.
n = 51
ACR = 96 %
ETF = 4 %
0
150
300
Kilometers
N
W
E
S
mef = mefloquine
art = artesunate
n = number tested
ACR = adequate clinical response
ETF = early treatment failure
LTF = late treatment failure

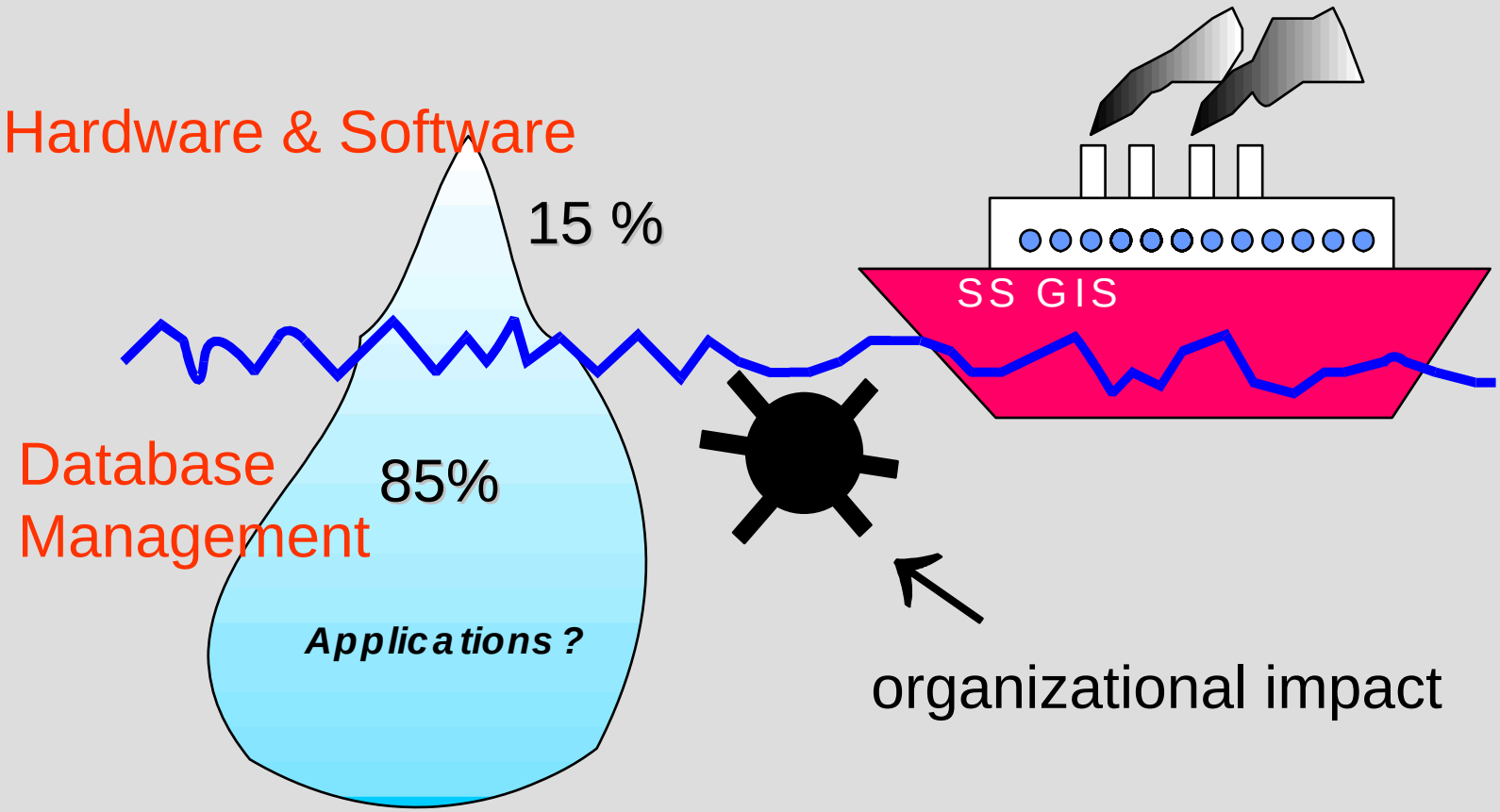
GIS

A geographical information system

is an **information system** that is designed to work with **data** referenced by spatial or geographic coordinates

GIS is a computer system capable of assembling,storing, manipulating, and displaying geographically referenced information, that is data identified according to their locations

Implementing a GIS




Mae Hra Kee
Ti Nou Day
Ti Neu Kee
Ar Saw Kaw (soldiers checkpoint)
Ta Wa Poe
Mae La Yang
Mae O Brigde
Mae La Thai
THANK YOU
Refugee camp
Mae Ok Hu
Mae Ok Pa Ru
Huai Haeng
Huai Pla Kong
0
2
4
kilometers

Uses of GIS in public health

- Determining geographic distributions of disease /health events
- Strengthening surveillance information management
- Analysing spatial trends
- Assessing resource allocation
- Planning and targeting resources & interventions
- Monitoring diseases and interventions
- Advocacy & resource mobilisation

Potential Applications

- Epidemic forecasting & preparedness
- Drug resistance monitoring
- Insecticide resistance monitoring
- Strengthening malaria surveillance
- Facilitating multi-disease surveillance
- Improving management and health information systems

Potential Applications

Community interventions

- Mapping of community health workers, chloroquine holders
- Mapping of targets for indoor residual spraying
- Mapping of NGO/partner resources and intervention areas

Database Information System

Database Concepts

1. **Non-Spatial Database**

   table, document ..

2. **Spatial Database**

   locational databases (geographic)

   + attribute databases

Geographic data models

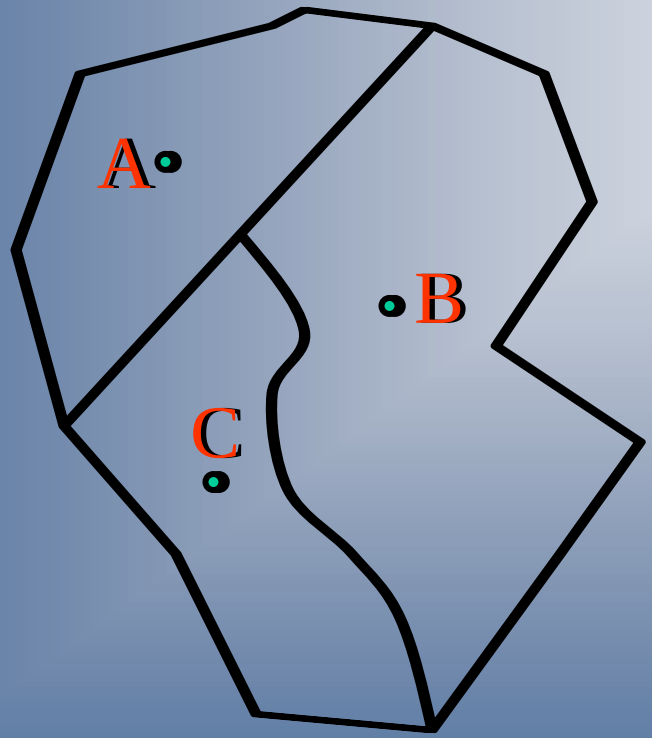
Analogue form : Maps and Drawings

Computer format :

1. Vector (points, lines and polygons)

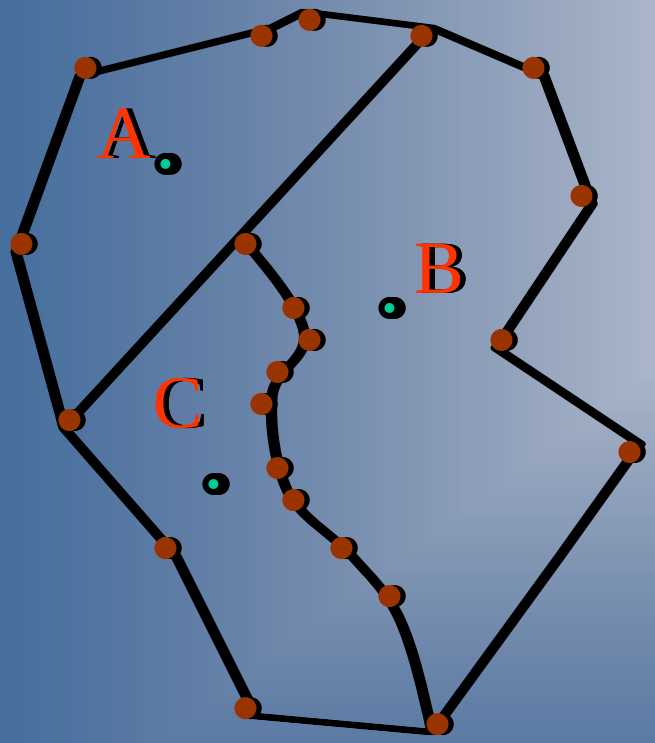
2. Raster (cells and grids)

Map 1



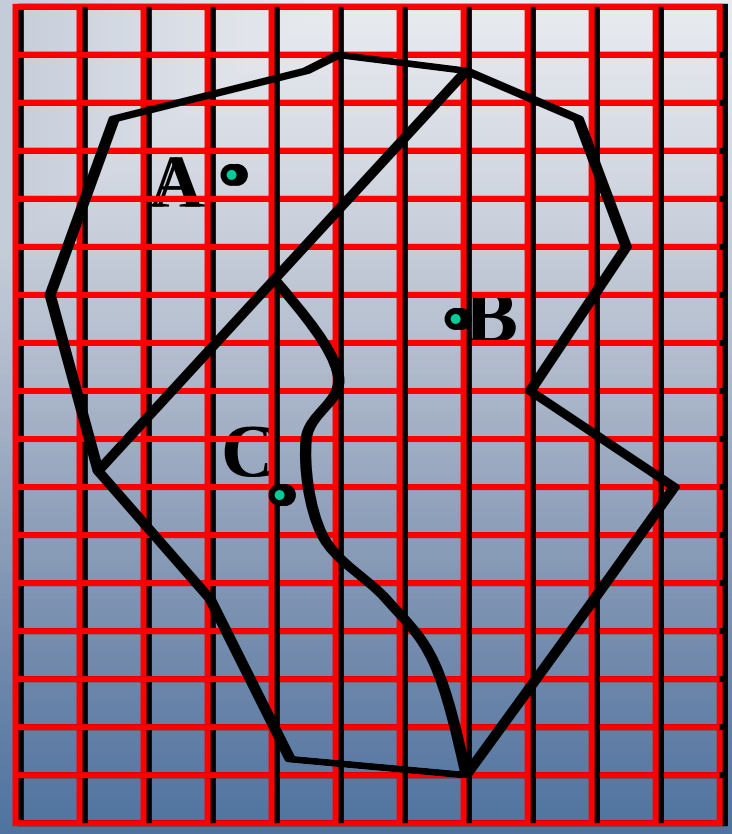
Vector base

(points, lines and polygons)



Raster base

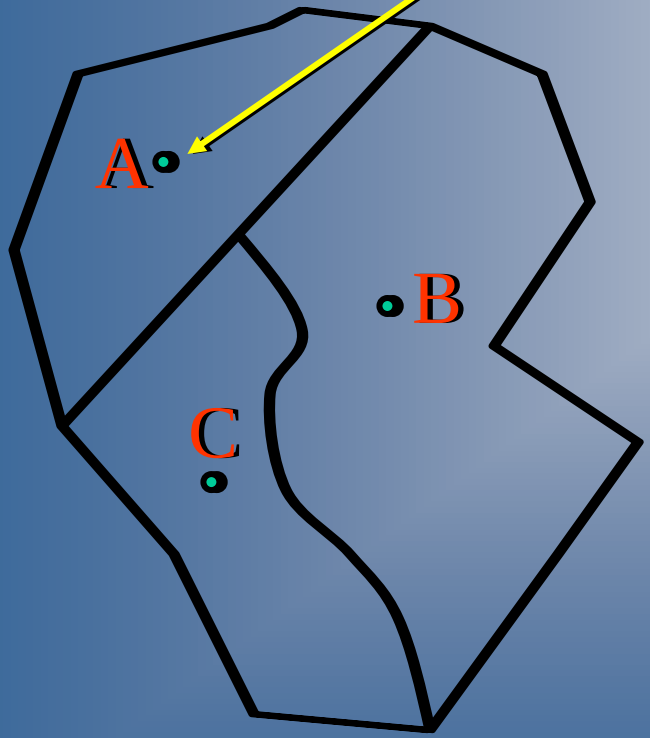
(cells and grids)



linking the information to geographic locations

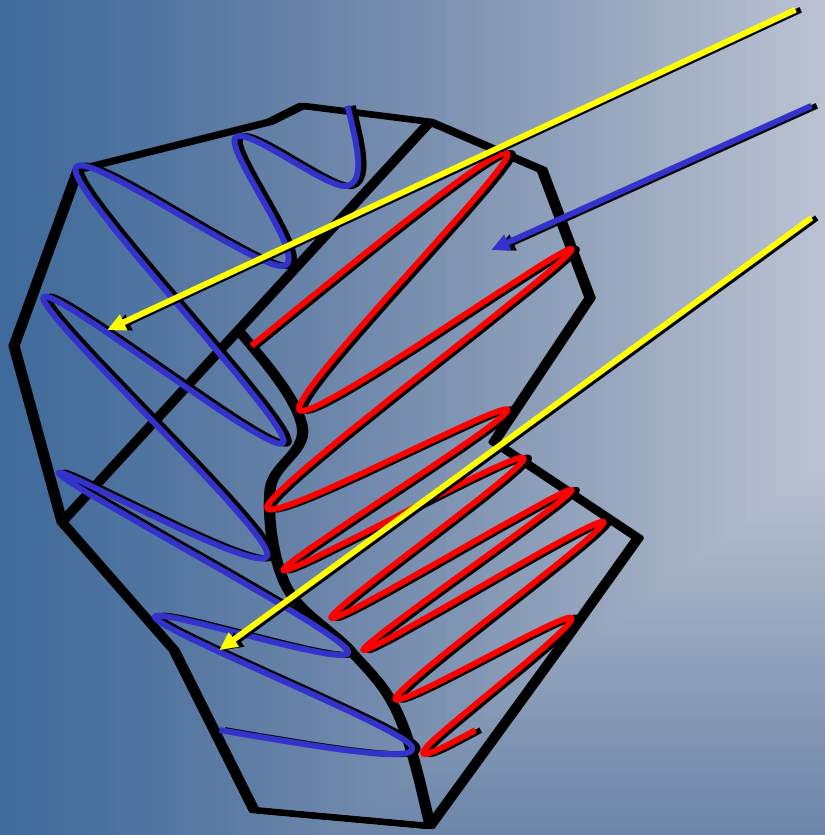
Map 1

District	pop.	Malaria cases
A	15,672	51
B	9,820	118
C	12,010	350



analysing data on a map

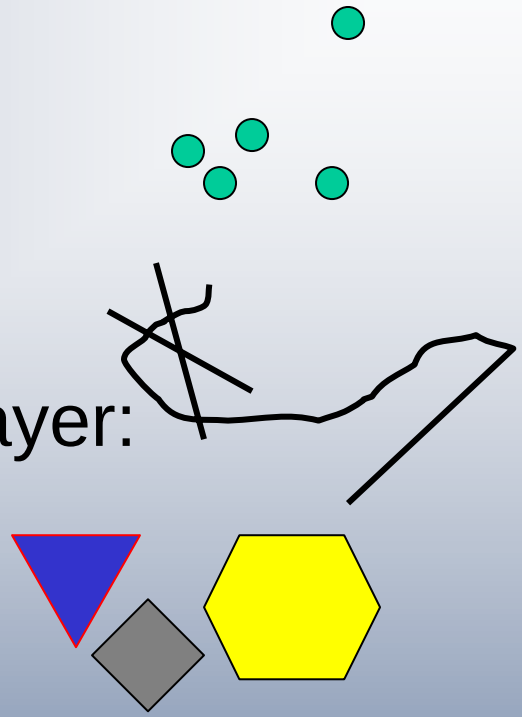
District	pop.	Malaria cases
A	15,672	51
B	9,820	118
C	12,010	350



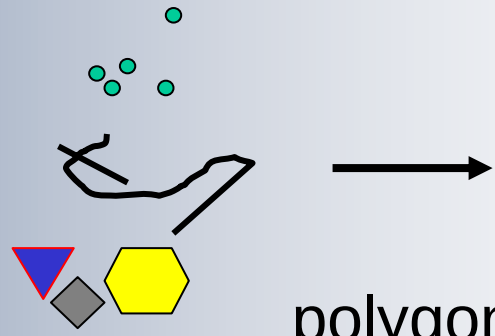
pop < 10,000

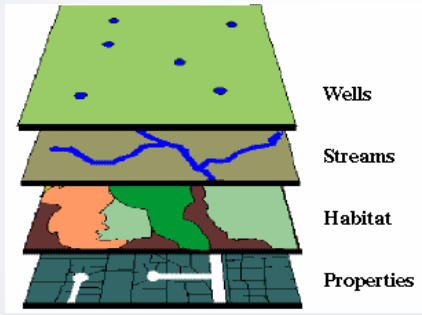
pop > 10,000

There are three types of layers:
points, lines, and areas. stored in a layer:



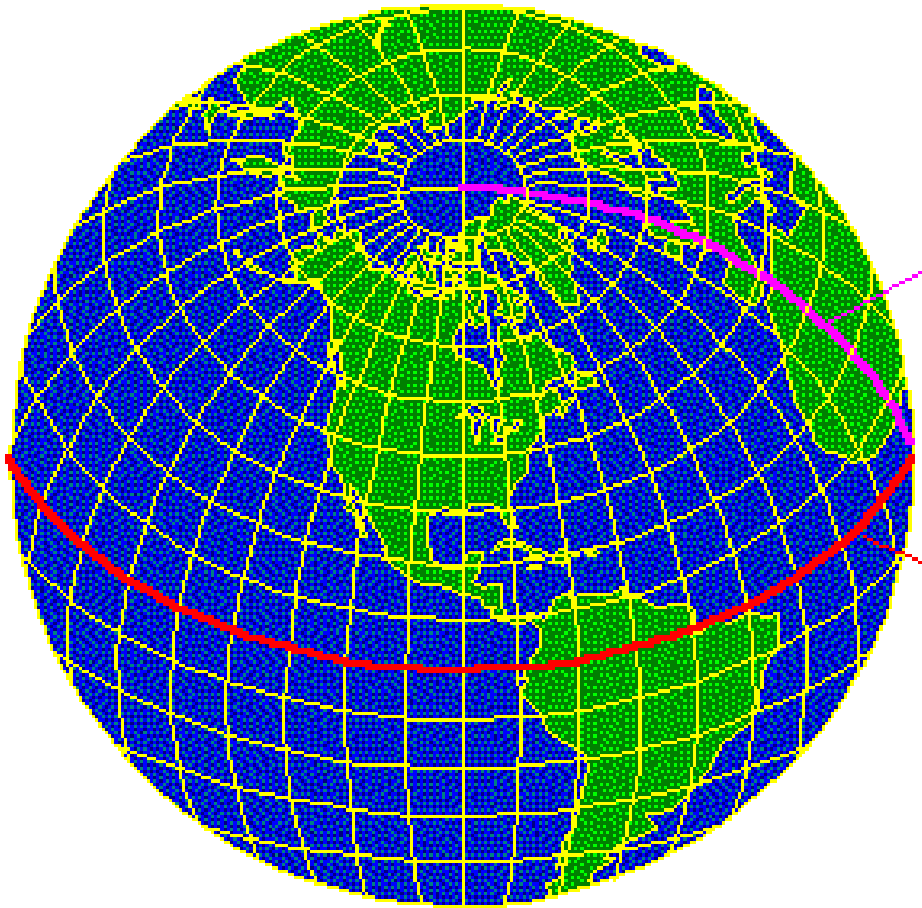
Examples of types of layers

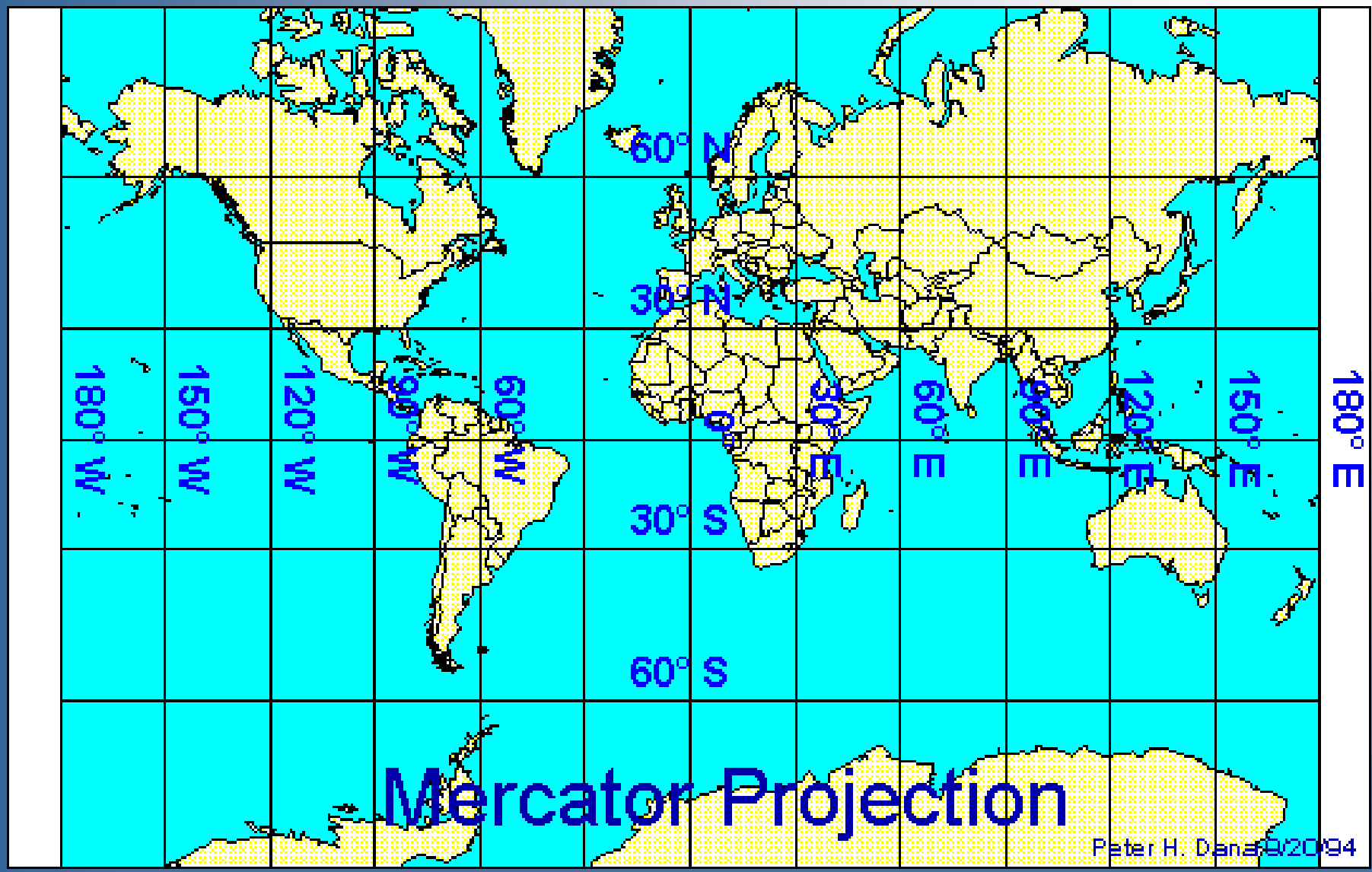




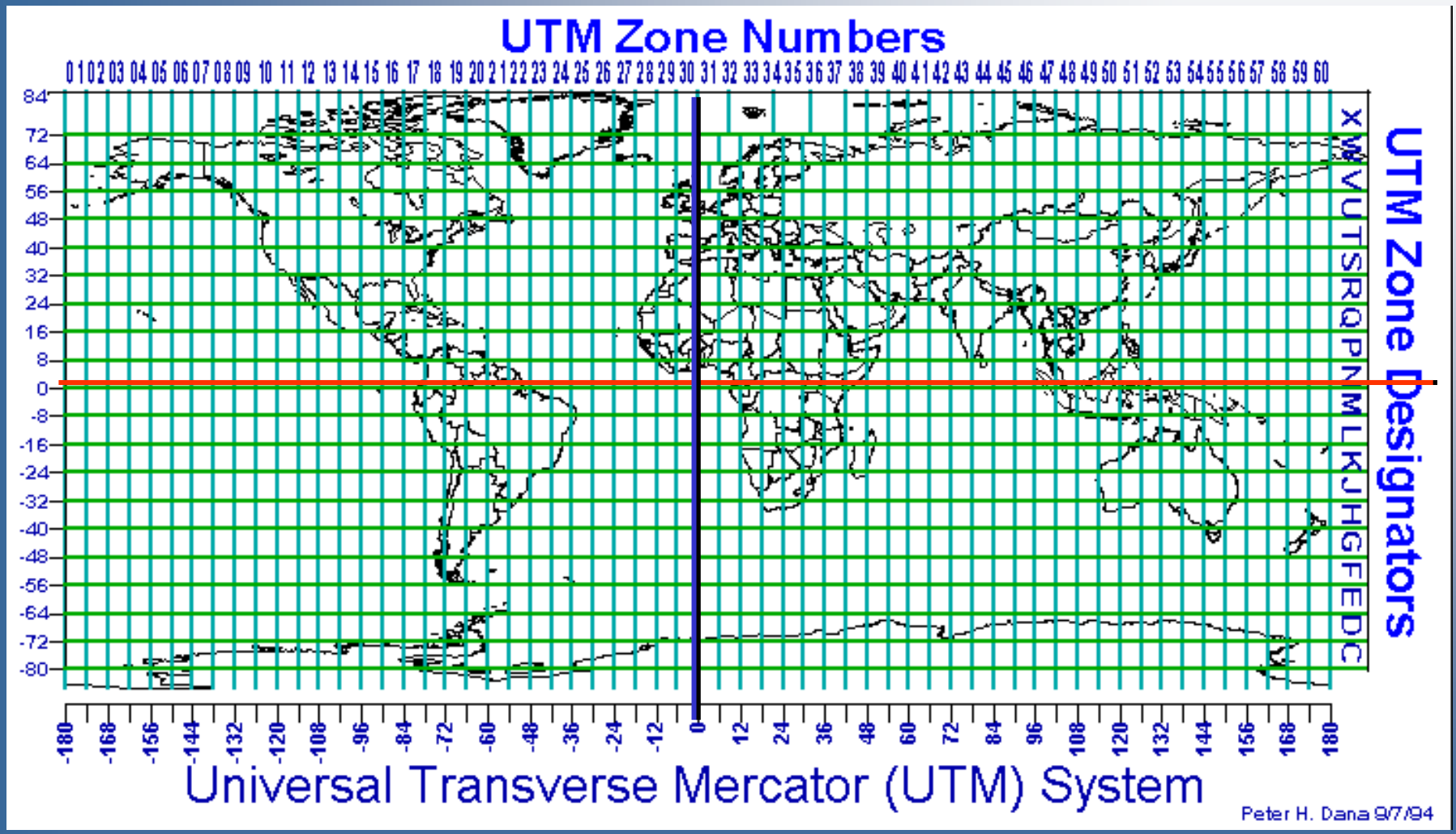
points	lines	polygons
Businesses	Highways	Countries
Cities,towns	City Streets	Postal Codes
Hospitals	Power Lines	Tax Parcels
Power Poles	Rivers	Census Tracts
Airports	Water, Sewer Lines	Voting Districts
Clinics	Railroads	Building Outlines
Warehouses	Ambulance routes	Military Installations
Customers	Bus Routes	Continents
Patients	Pipelines	School districts
Vehicles	Runways	Counties


Albers Equal Area
and
Lambert Conformal Conic
Projections
Origin 39 N, 96 W
Standard Parallels 33 N and 45 N
Albers
Equal
Area
Lambert
Conformal
Conic

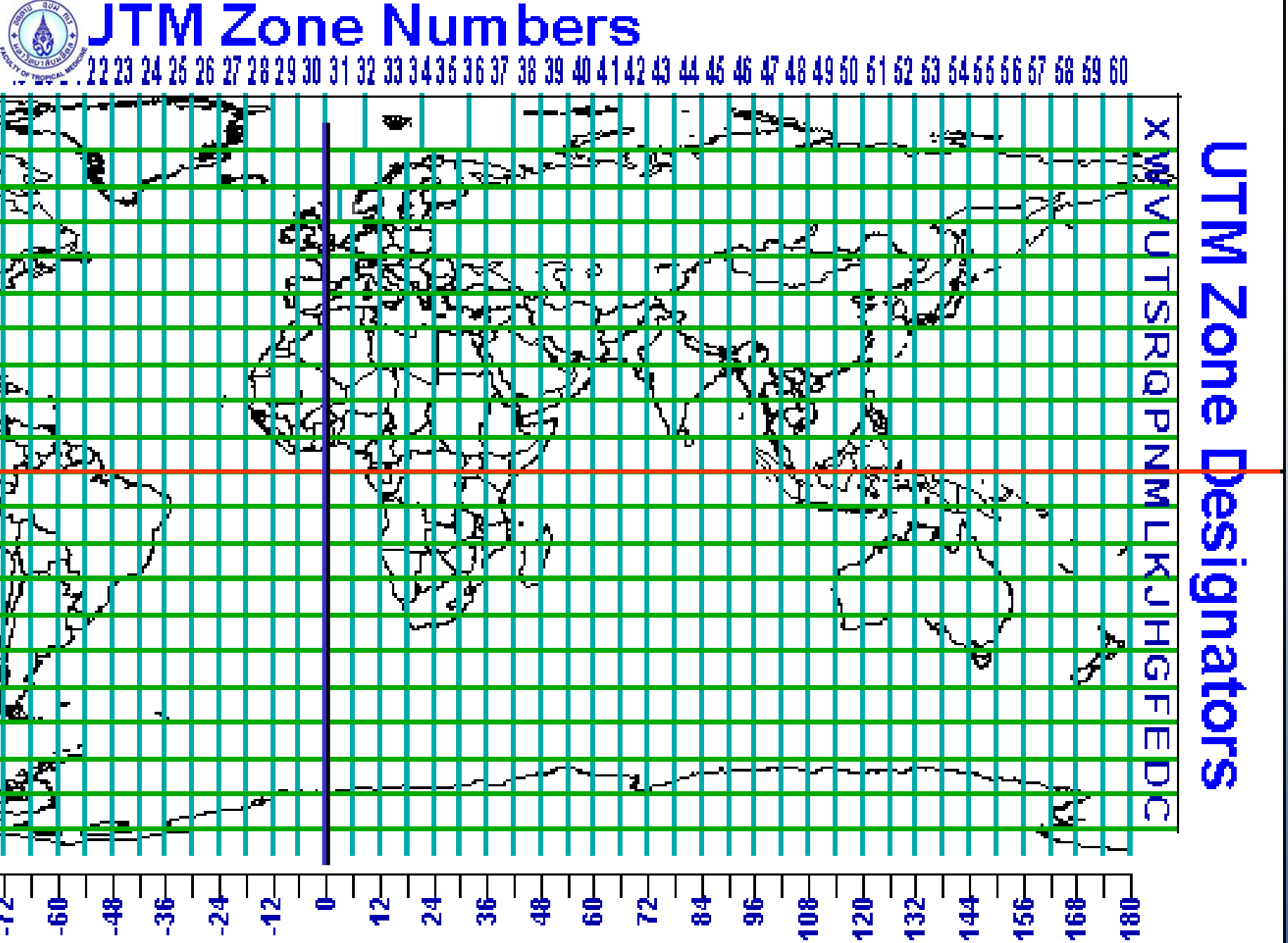

Prime Meridian
0 Degrees Longitude
Equator
0 Degrees Latitude


60° N
30° N
0°
30° S
60° S
180° W
150° W
120° W
90° W
60° W
30° E
60° E
90° E
120° E
150° E
180° E
Mercator Projection
Peter H. Dana 9/2094

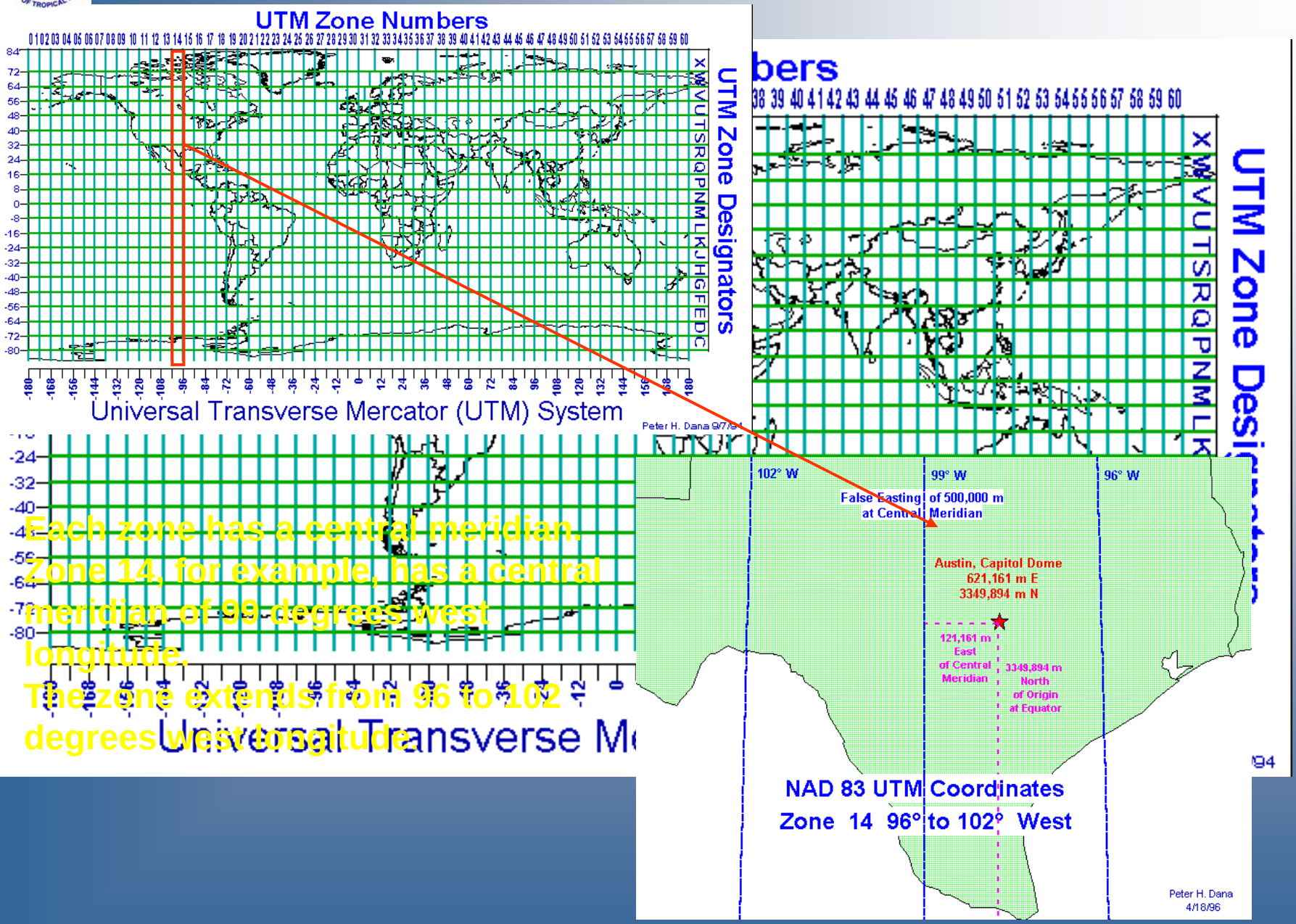
The Universal Transverse Mercator (UTM) projection



JTM Zone Numbers



ransverse Mercator (UTM) System


UTM Zone Numbers
UTM Zone Designators
Universal Transverse Mercator (UTM) System
Peter H. Dana 9/7/94
Each zone has a central meridian. Zone 14, for example, has a central meridian of 99 degrees west longitude.
The zone extends from 96 to 102 degrees west longitude.
102° W
99° W
96° W
False Easting of 500,000 m at Central Meridian
Austin, Capitol Dome
621,161 m E
3349,894 m N
121,161 m East of Central Meridian
3349,894 m North of Origin at Equator
NAD 83 UTM Coordinates
Zone 14 96° to 102° West
Peter H. Dana
4/18/96