

2

(, 2537)

(pest pathogen)

(, 2537)

(, 2540)

1.

2

1) (contact pesticide)
(nonsystemic)

2) (systemic pesticide)

2.

1) (insecticide)

2) (fungicide)

3) (herbicide)

- 4) (nematocide) (rodenticide)
- 3.
- 1) (chlorinated hydrocarbon)
- (organochlorine)**
- 2) **(organophosphate)**
- 3) (chlorophenoxy acid)
- 4) (carbamate)
- 5) (triazine)
- 6) (substituted urea)
- _____ (Herbicides)

- 2545) (,
- . . 2383
- (lime) . . 2438
- (copper sulfate) . .
- 2445 **(sodium arsenite)**
- (inorganic herbicides)**
- (organic herbicides)** . . 2485 2,4-D

(, 2545)

2
(, 2531)
1. (inorganic herbicides)

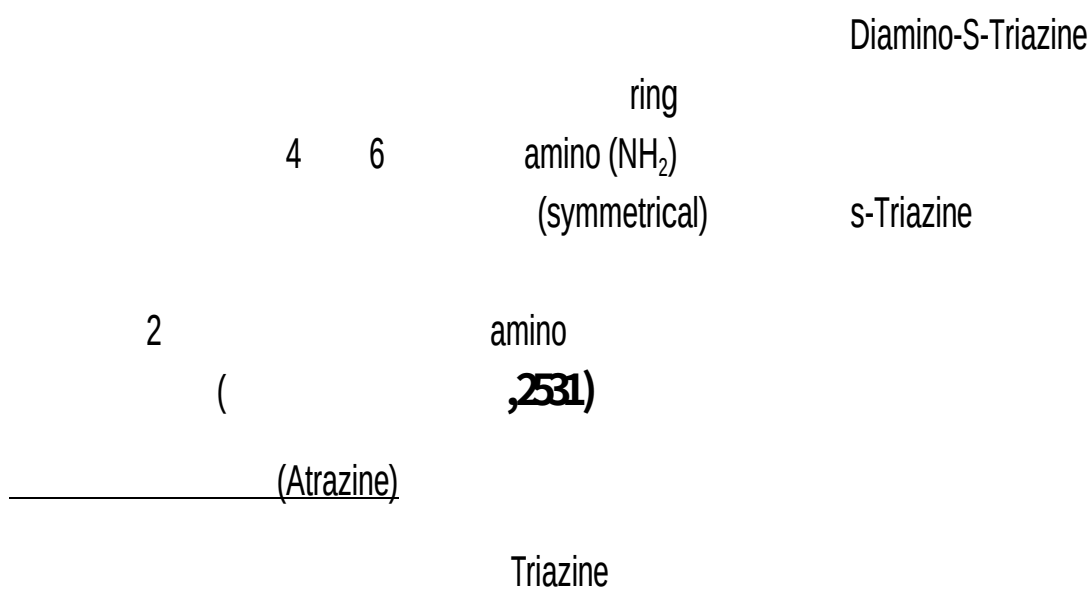
(, 2531)
2. (organic herbicides)

1

(chain) (ring)

- (1) Aliphatic-Carboxylic
- (2) Phenol
- (3) Aromatic-Carboxylic

- (4) Benzonitrile
- (5) Dinitroaniline
- (6) Diamino-S-Triazine
- (7) Urea
- (8) Carbamate
- (9) Acid amide
- (10) Diphenyl ether
- (11) Uracil
- (12) Methanearsonate
- (13) Unclassified



(Kamrin, 1997)

Environmental Protection Agency (EPA)
 . . 2537

(, 2545)

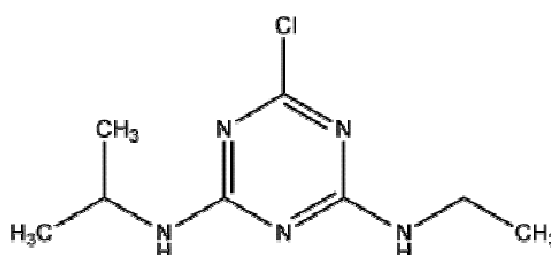
atrazine

(CAS)

2-chloro-4-ethylamine-6-isopropylamino-S-triazine

IUPAC
diamine

6-chloro-N²-ethyl-N⁴-isopropyl-1,3,5-triazine-2,4-



C₈H₁₄ClN₅

215.7

175-177 °C

dimethyl sulfoxide (183)

methanol (18),

diethylether (12), chloroform (52)

ethyl acetate (28)

(33)

	A 361; Aatrex 4L; Aatrex 80W; Aatrex Nine-O; Aktikon; Aktikon PK; Aktinit A; Aktinit PK Argezin; Atazinax; Atranex; Atrasine; Atratol A; Atrazin; Atred; Atrex; Candex; Cekuzina-T; Crisatrina; Crisazine; Cyazin; Farmco Atrazine	
CAS	1912-249 (World Health Organization, 1990)	
	1.5	20
	(	,2531)
	0.1	
(Maximum Residue Limit; MRL)		(, 2549)
		3 (U.S.
(Maximum Contaminant Level; MCL)	EPA; Environmental Protection Agency of the United States of America, 2007)	
	22	(
		, 2547)
1.		(pre-plant)
(pre-emergence)		(post-emergence) (,
2531)		
2.		
160-716		
	15	(,2531)

1

(susceptibility)

(

, 2535)

3

1. (Acute Toxicity)

24

()

2. (Subchronic Toxicity)

1-3

3. (Chronic Toxicity)

3

3.1 (tumor)
(carcinogen)

3.2 (mutagen)
(mutagen)

3.3 ()
(teratogenicity)

3.4 (immunotoxicity)

EPA (, 2545) 3 . . 2537

1.

mucous membranes

(Stevens and Sumner, 1991)

(U.S.

National Library of Medicine, 1995) LD₅₀ 3,090

13

750 hamster 1,000 LD₅₀
7,500 3,000
(Weed Science Society of America, 1994) 1 LC₅₀
0.7 4 LC₅₀ 5.2 (Kidd and
James, 1991)
2. 40 20
6
5-25 6
7.5 2
75
0.5 20
72 80
72 65
15 (Stevens and Sumner,
1991)
(U.S. National Library of Medicine, 1995)

. . 2539-2547 2.1
10 . . 2544
4 2.2

146 8

Mississippi, Ohio, Missouri 27

(Maximum Contaminant Level: MCL) EPA

3 (U.S. Department of Interior, 1991)

(2544)

. . 2543-2544

. . 2543

2.1

. . 2539-2547

	()	()	()
2539	23,535	2,444	14,040
2540	22,459	2,472	12,946
2541	15,108	2,216	8,697
2542	27,639	3,260	15,661
2543	29,715	3,841	17,726
2544	32,422	4,502	20,957
2545	36,596	4,348	22,670
2546	50,463	6,101	31,878
2547	32,971	3,400	20,779

:

~~2548~~

2.2
10 . . 2544

		()	()
1		16,252,082	1,191,883,518
2	2,4-	2,994,291	219,321,859
3		2,102,707	583,377,490
4		1,568,020	192,298,126
5		823,903	168,273,883
6		776,391	108,750,073
7		643,984	90,879,766
8		627,020	126,499,222
9		597,755	49,393,884
10	+	525,780	75,916,322
:		, 2545	

2,4-
0.02-18.9
 . . 2544
0.5-4.0
(2550)
(2547) 1.83
(2548) 0.13
0.62
0.53

60

1

(,

2545)

(, 2545)

3

(,

2547)

(Scheunert, 1993)

-

(Mirsal, 2004)

desorption (water solubility) (formulation) adsorption-
(, 2540)

(Brady and Ray, 2002)

. .2528-2533

	97	. .2534	
78	. .1985-1988	0.56 1.0 1.24	0.84

3. (soil erosion)

(, 2548)

4. (runoff)

(, 2548)

5.

(Brady and Ray, 2002)

1.

40-4000 Å (angstroms)

(, 2545)

2. (adsorption)

2:1 (montmorillonite)

1:1 (kaolinite) (Wild, 1993)

(2547)

-

2 1 (

) 2 () 1

0.95 2

0.60 - 1 -

7.82 2 7.08

1

2 1

- 5.5-8.5 -

3.

()

(soil solution)

(, 2547)

4.

(chemical transformations)

abiotic transformation

-

- (, 2540)

20

30

3

(, 2547)

Erickson, Larry and Lee (1989)

(Sparks, 1998)

20,125 ()

11

-

2

13 30 16 05
99 30 101 00
(,2547)

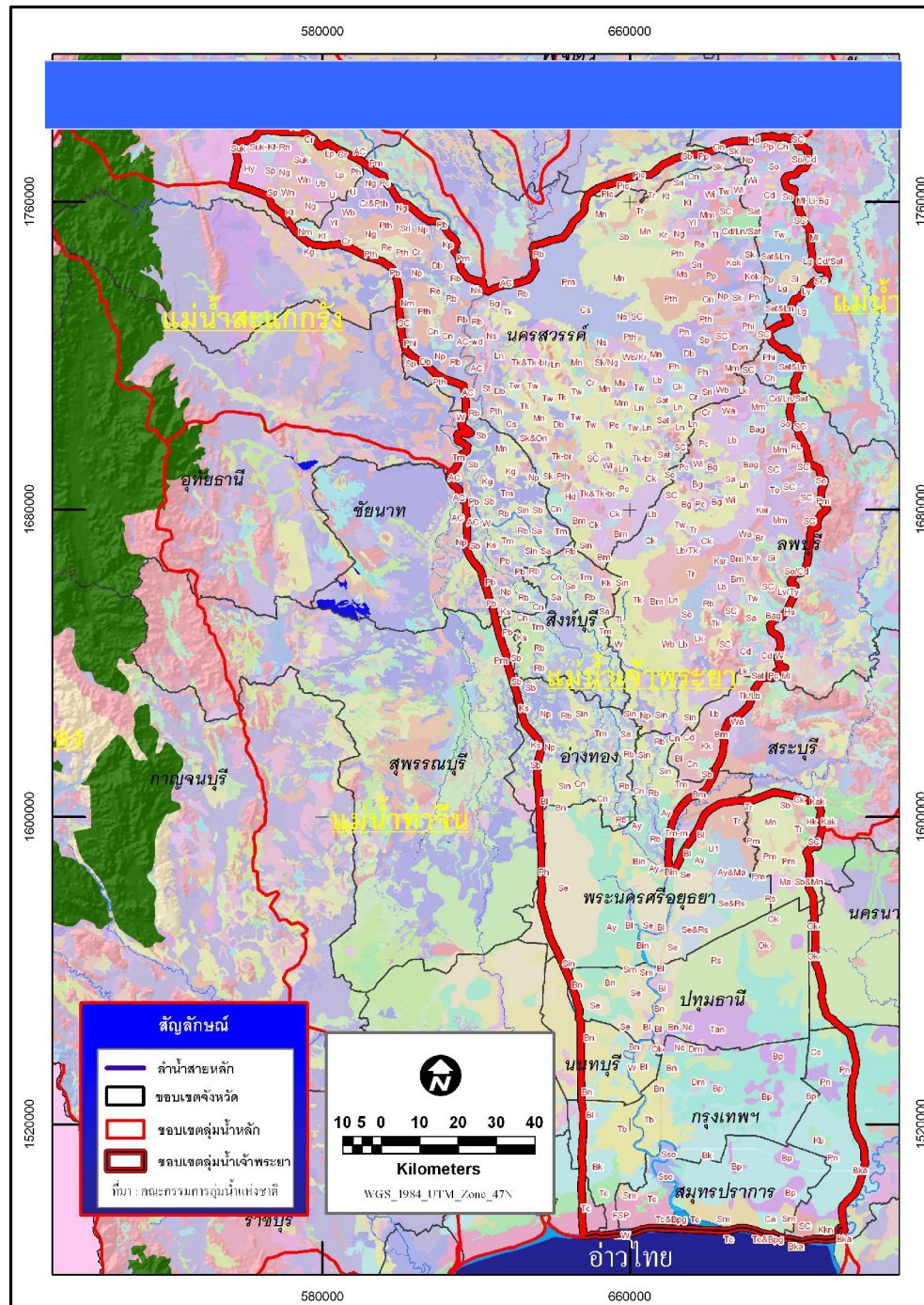
(,2547)
2.1

30.6 28.3-
48-52 70-74
2,070.7 1,585.2-

3

1.

2.1



2.

3.

(, 2541

, 2540)

30

1,120.80-1,244.20

231.60-275.50

6.70-9.80

102-114

85-90

1,033

(, 2546)

. . 2537-2542

2

(
2546)

5
7,201,390.4 **1,346,157** **422,676**
315,571.7 73,312.9 (2.2)

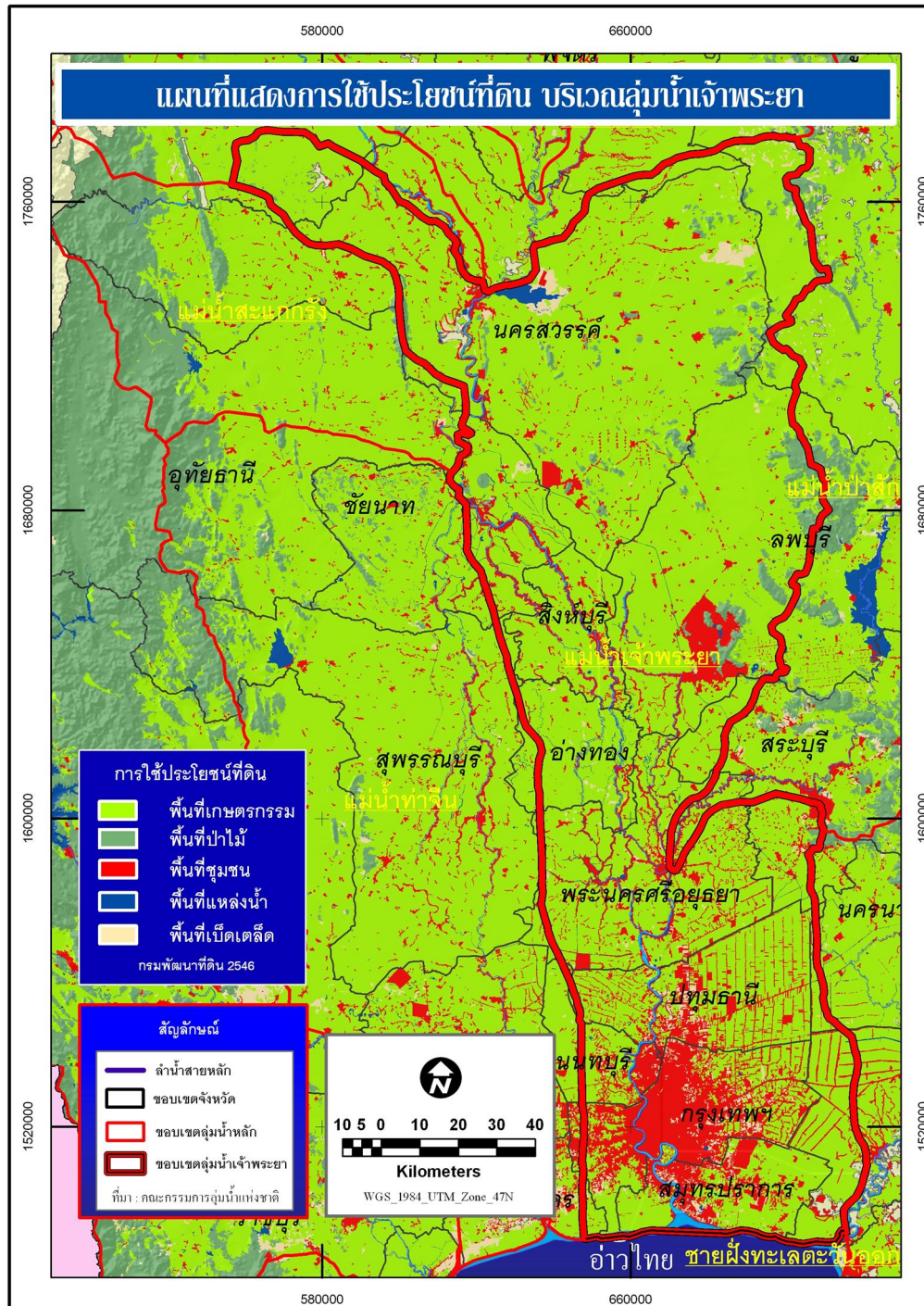
(5)
- 1.2
44,000

3.3
4.0 (, 2546)

- (7.34)

6.25
2 (6.0) (, 2549)

2.2



5,192 3
—

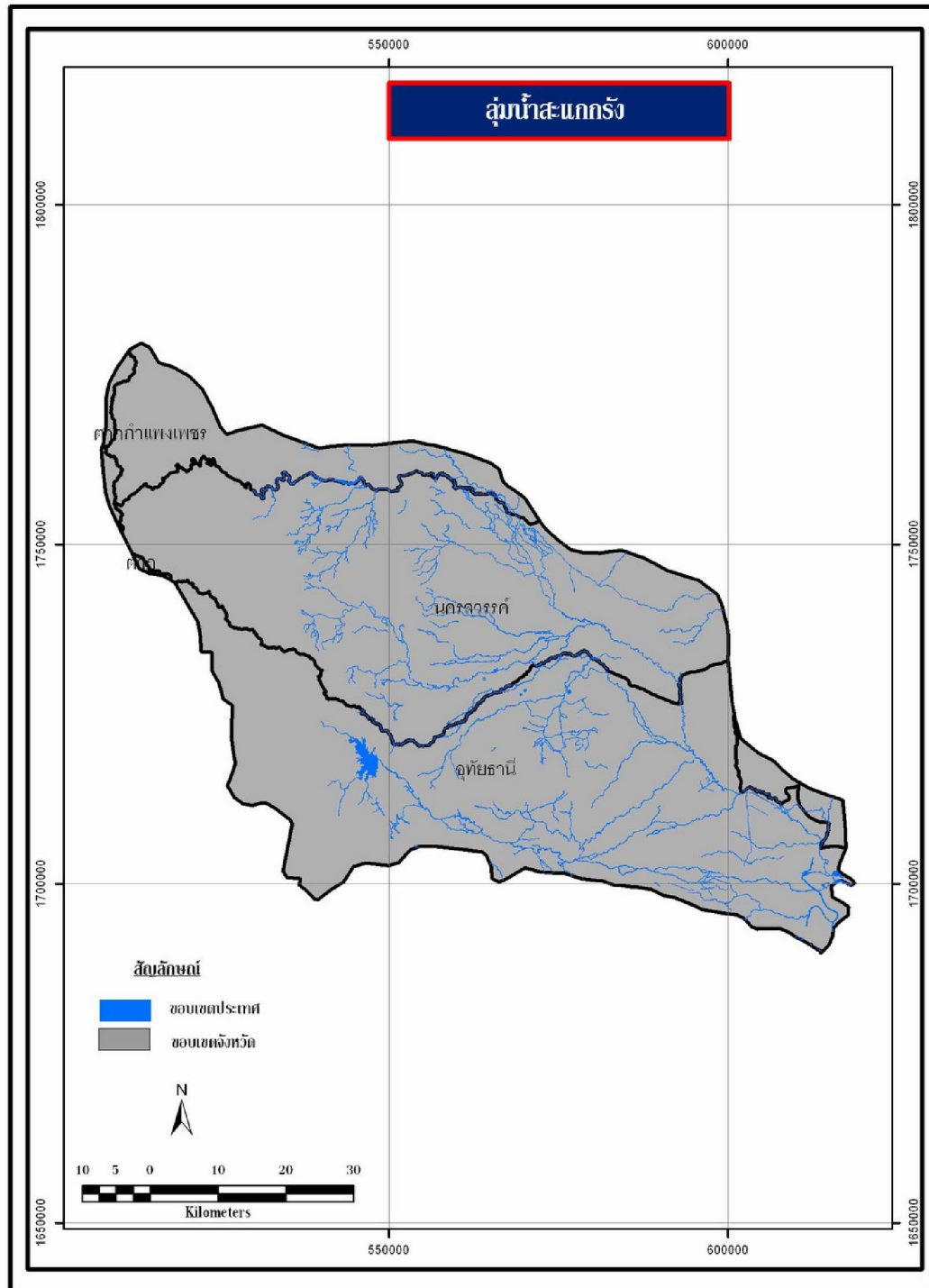
14 25 15 08
99 05 100 05
(

, 2549)

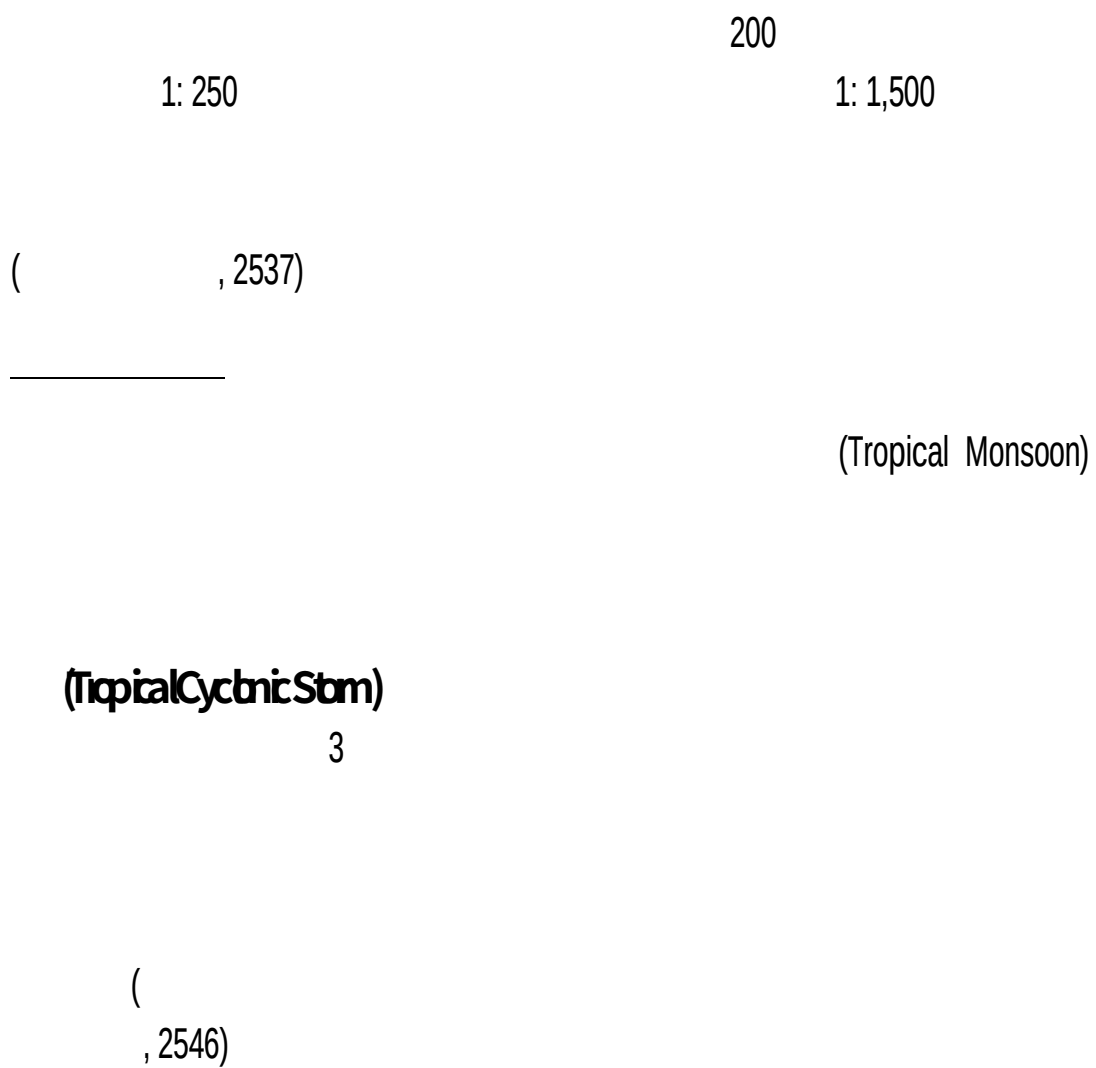
(2.3)

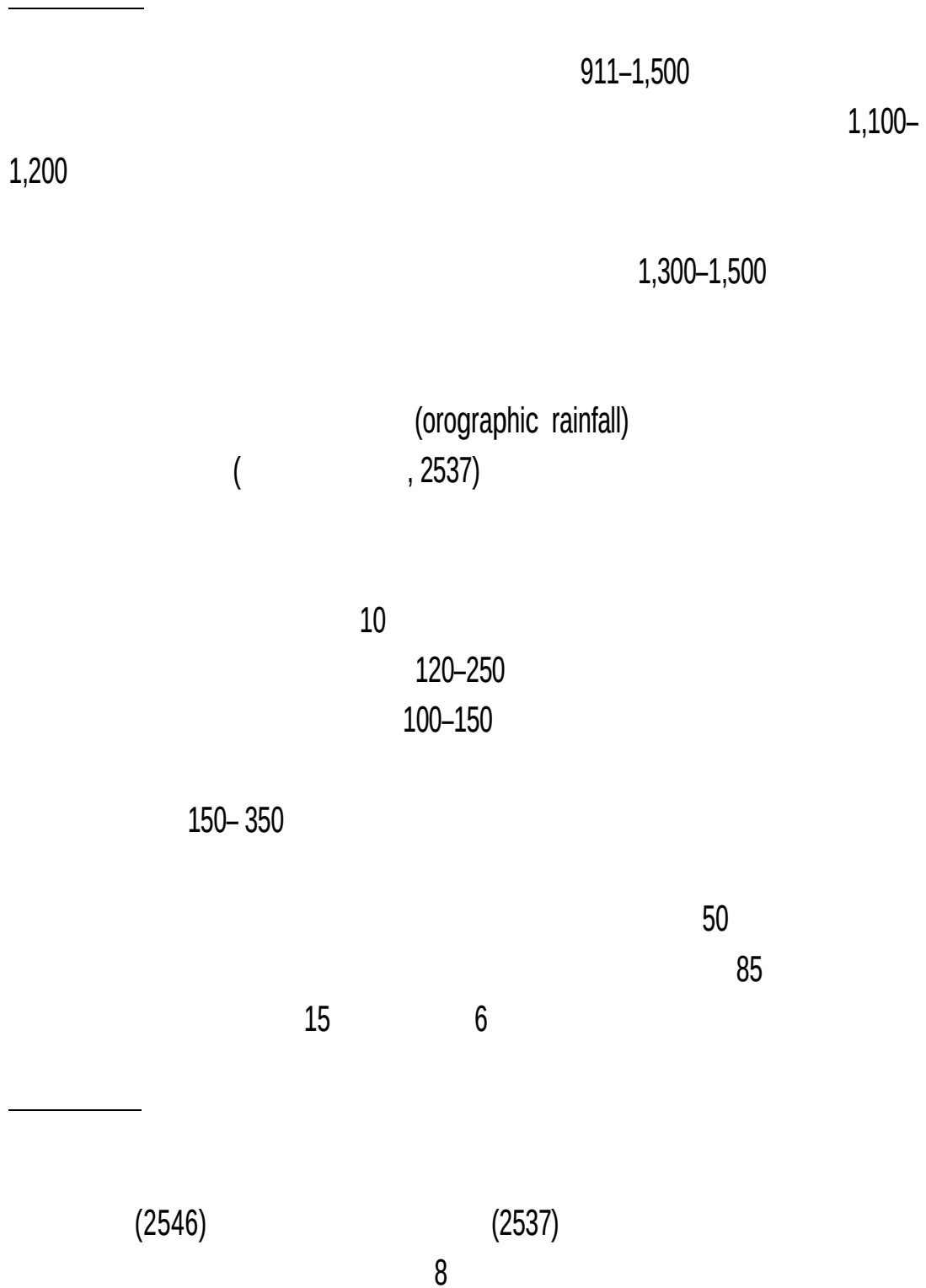
1,960

2.3



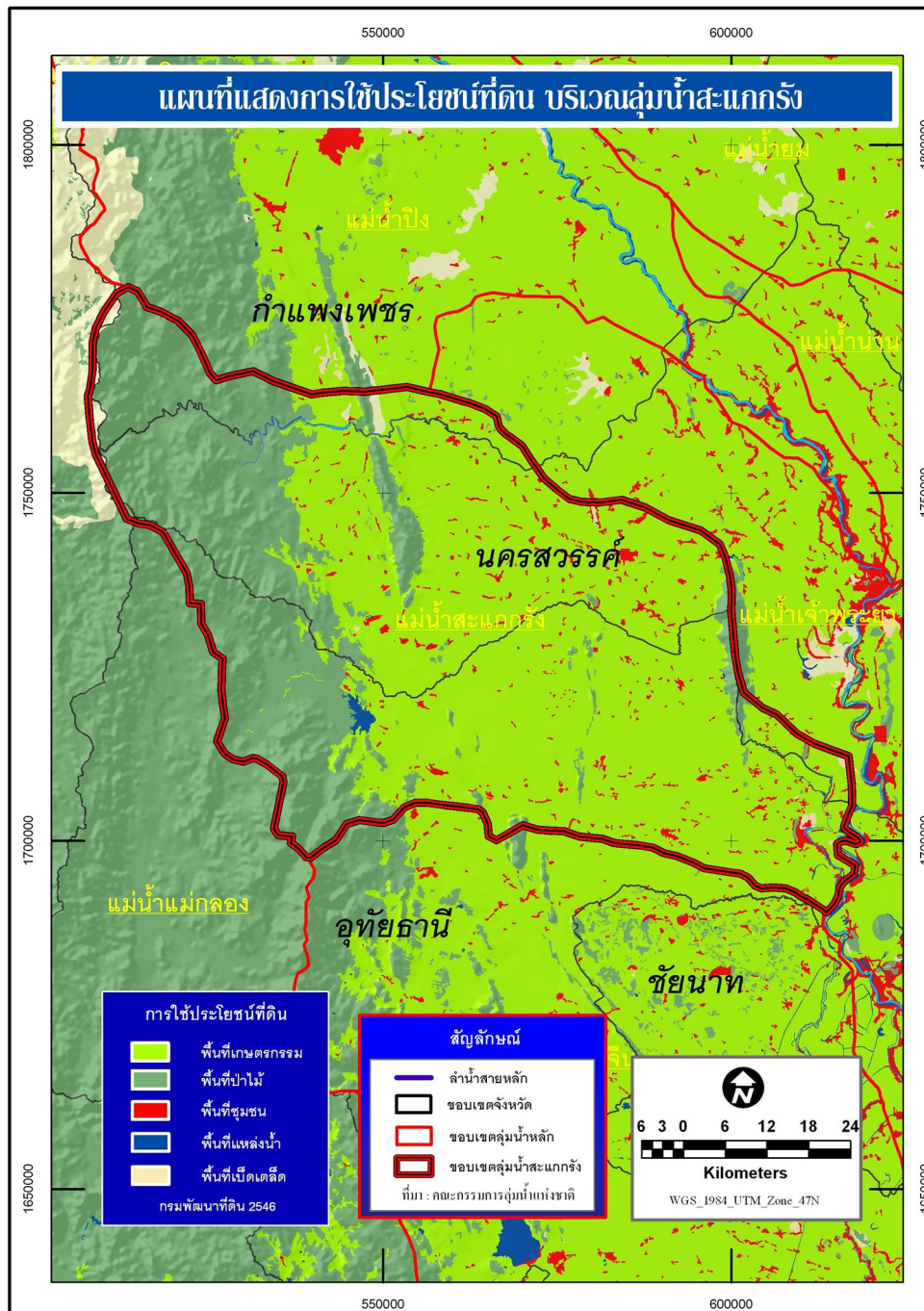
, 2546





			5	
			946,297.4	809,781.6
88,754	64,344	37,774.4	(2.4)	
			(	
	3)		2.0	
		1,000		
			2,000	
		2541		
		(		
	, 2548)			
	-		(	6.78)
		2.89		
	4 (	2.0	) (	
			, 2549)	
		15,402.66		
7				
		14	15	17
	100	30	101	30
				20

2.4



(
, 2543) (2.5)

513

2

+700 ()

4

3

114 ()

8-10 ()

3.5 () (, 2544)

26.7-28.1 70.6-74.7 1.2-2.4
1,596.3-1,905.8 (, 2546)

(, 2546)

1,800 900 1,213.2
1,058.8 87.28
(, 2546)

-

-

. . 2457-2538

2.08-4.94

8.49

3.33–7.72 5.21–9.94 5.13
6.82 (, 2546)

3

(1)

(2)

(3)

$$(\quad , 2546)$$

. . 2545

432.41 5,958.63 2,912.44 970.50 4,669.58 188.59 113.59

2.81 36.68 18.91 6.30 30.32 1.22 0.74

$$(2.3) \quad (, 2547)$$

2.3

. . 2545

1	432.41	2.18
2	5,958.63	36.68
3	2,912.44	18.91
4	970.50	6.30
5	4,669.58	30.32
6	188.59	1.22
7	113.59	0.74
	15,245.74	96.35

: , 2547

(1,000 ()
(, 2547)

(
3)
6.0
2.8
11,400
(,
2546)
- (7.42)
7.66
2 (6.0) (, 2549)