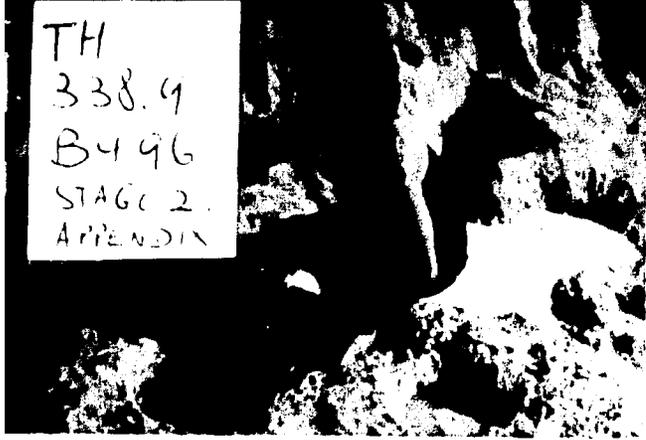


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# NORTHEAST ECONOMIC DEVELOPMENT PLANNING ADVISORY GROUP

PD-AAF-060-A1



# STAGE 2

# PLANNING REPORT

A.I.D.  
Reference Center  
Room 1656 NS

# APPENDIX

## **APPENDIX TO STAGE 2 PLANNING REPORT**

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         THAILAND, 1960 - 1969**
- 2 - B    REGIONAL DOMESTIC PRODUCT, 1960-1968**
- 2 - C    REGIONAL ECONOMIC INDEX COMPONENTS**
- 2 - D    BUSINESS AND MUNICIPAL TAXES BY  
         NORTHEASTERN CHANGWATS**
- 2 - E    SUMMARY OF SELECTED REGIONAL  
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**PRODUCTION OF PADDY**  
**NORTHEAST THAILAND 1940 - 1949**

FIRST LINE - PRODUCTION IN METRIC TONS  
 SECOND LINE - PERCENTAGE OF NORTHEAST

	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	10 YEARS AVERAGE
1. LOEI	32,426 3.0	33,292 3.3	44,659 3.5	31,430 2.8	30,664 2.6	8,201 1.0	2,339 0.2	22,256 1.5	31,675 1.7	30,871 1.9	26,780 2.0
2. UDORN	89,330 8.3	98,681 9.7	77,983 6.2	118,829 10.5	134,997 11.7	75,774 9.0	48,201 4.9	144,378 9.8	203,178 10.8	169,075 10.2	116,103 8.7
3. NONGKAI	14,481 1.3	18,483 1.8	13,920 1.1	18,551 1.6	32,261 2.8	26,637 3.2	9,989 1.0	65,503 4.4	65,043 3.5	46,358 2.8	31,123 2.3
4. SAKOLNAKORN	36,748 3.4	72,050 7.1	57,209 4.5	38,688 3.4	43,493 3.8	78,069 9.3	96,960 9.8	118,621 8.0	179,206 9.5	92,980 5.6	81,420 6.1
5. NAKORN PHANOM	70,362 6.5	56,616 5.6	52,540 4.1	59,598 5.2	55,270 4.8	60,276 7.2	60,018 6.1	86,935 5.9	82,030 4.4	49,782 3.0	63,352 4.8
6. UBOL	245,507 22.6	170,709 16.8	219,541 17.3	228,802 20.1	189,897 16.4	146,818 17.5	247,714 25.0	289,682 19.6	358,509 19.1	295,753 17.8	239,293 18.0
7. SISAKET	70,700 6.5	62,333 6.1	119,399 9.4	97,505 8.6	70,114 6.1	22,885 2.7	21,563 2.2	28,707 1.9	71,206 3.8	53,658 3.2	61,807 4.6
8. SURIN	26,762 2.5	51,460 5.1	43,760 3.5	49,965 4.4	40,445 3.5	25,269 3.0	96,129 9.7	31,391 2.1	40,921 2.2	99,380 6.0	50,548 3.8
9. ROI-ED	128,031 11.8	127,321 12.5	107,547 8.5	102,079 9.0	93,465 8.1	96,683 11.5	108,729 11.0	127,347 8.6	151,106 8.0	52,625 3.2	109,493 8.2
10. KALASIN	( NO DATA REPORTED )			-	-	-	-	43,626 3.0	166,843 8.9	124,419 7.5	111,629 8.4
11. MAHASARAKARM	126,365 11.7	118,530 11.7	88,200 7.0	99,409 8.8	142,689 12.3	104,039 12.4	86,042 8.7	68,228 4.6	86,924 4.6	89,840 5.4	101,027 7.6
12. KHONKAEN	84,823 7.8	47,639 4.7	134,135 10.6	55,265 4.9	100,999 8.7	60,996 7.3	65,108 6.6	151,971 10.3	161,149 8.6	143,900 8.7	100,598 7.6
13. CHAYAPHUM	77,243 7.1	53,461 5.3	73,444 5.8	37,867 3.3	80,022 6.9	60,582 7.2	30,079 3.0	20,163 1.4	30,855 1.6	128,075 7.7	59,179 4.5
14. NAKORNRAJSIMA	61,738 5.7	81,155 8.0	163,627 12.9	154,466 13.6	121,061 10.4	52,731 6.3	81,510 8.2	214,810 14.5	133,675 7.1	217,559 13.1	128,233 9.6
15. BURIRAM	19,086 1.8	24,765 2.4	71,696 5.7	43,295 3.8	23,174 2.0	22,081 2.6	35,040 3.5	64,667 4.4	115,206 6.1	65,777 4.0	48,479 3.6
<b>TOTAL NORTHEAST</b>	<b>1,084,202</b>	<b>1,016,495</b>	<b>1,267,660</b>	<b>1,135,749</b>	<b>1,158,551</b>	<b>841,041</b>	<b>989,421</b>	<b>1,478,285</b>	<b>1,877,508</b>	<b>1,660,052</b>	<b>1,329,046</b>
<b>TOTAL W.K.</b>	<b>4,923,349</b>	<b>5,120,097</b>	<b>3,854,151</b>	<b>5,535,542</b>	<b>4,927,687</b>	<b>3,571,891</b>	<b>4,442,271</b>	<b>5,506,432</b>	<b>6,835,172</b>	<b>6,683,760</b>	<b>5,140,035</b>
<b>PERCENTAGE NE/W.K.</b>	<b>22.02</b>	<b>19.85</b>	<b>32.89</b>	<b>20.52</b>	<b>23.51</b>	<b>23.55</b>	<b>22.38</b>	<b>26.85</b>	<b>27.47</b>	<b>24.84</b>	<b>25.9</b>

SOURCE : DEPARTMENT OF RICE, MINISTRY OF AGRICULTURE

COMPILED BY : NATIONAL ACCOUNTS DIVISION, - N.E.D.B.

2-AI (PART a)

**APPENDIX 2-AI (PART b)  
PRODUCTION OF PADDY**

**NORTHEAST THAILAND 1950 - 1959**

FIRST LINE - PRODUCTION IN METRIC TONS  
SECOND LINE - PERCENTAGE OF NORTHEAST

	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	10 YEARS AVERAGE
1. LOEI	20,944 1.1	25,072 1.1	22,788 1.3	35,544 1.3	14,405 1.0	31,319 1.5	35,136 1.3	20,396 1.3	25,325 1.3	30,468 1.5	26,140 1.3
2. UDORN	234,982 12.7	201,083 8.6	198,824 11.0	219,251 8.1	223,898 15.2	251,689 11.7	277,983 10.6	244,369 15.5	133,970 6.8	253,151 12.5	223,920 10.9
3. NONGKAI	58,527 3.2	62,489 2.7	54,688 3.0	59,040 2.2	50,916 3.5	46,936 2.2	55,918 2.1	66,475 4.2	69,181 3.5	64,988 3.2	58,916 2.9
4. SAKOLNAKORN	163,132 8.8	196,177 8.4	178,852 9.9	217,246 8.0	198,031 13.5	188,718 8.8	181,908 7.0	203,007 12.9	198,911 10.1	98,378 4.9	182,436 8.9
5. NAKORN PHANOM	90,998 4.9	85,254 3.7	95,202 5.3	118,998 4.4	119,289 8.1	83,682 3.9	103,796 4.0	98,985 6.3	106,964 5.4	45,812 2.3	94,898 4.6
6. UBOL	316,156 17.1	353,231 15.1	378,987 21.0	324,622 12.0	169,924 11.6	341,355 15.9	419,783 16.1	236,796 15.1	312,986 15.8	310,097 15.3	316,394 15.4
7. SISAKET	64,063 3.5	82,718 3.5	91,393 5.1	105,330 3.9	30,261 2.1	62,701 2.9	92,768 3.5	38,195 2.4	63,242 3.2	85,749 4.2	71,642 3.5
8. SURIN	93,917 5.1	79,492 3.4	30,031 1.7	123,945 4.6	6,204 0.4	81,845 3.8	82,300 3.1	31,373 2.0	83,757 4.2	111,651 5.5	72,452 3.5
9. ROI-ED	111,588 6.0	226,728 9.7	132,180 7.3	170,609 6.5	62,115 4.2	139,773 6.5	172,512 6.6	75,430 4.8	101,043 5.1	148,759 7.4	134,674 6.6
10. KALASIN	206,028 11.2	162,258 6.9	149,949 8.3	148,287 5.5	87,106 5.9	136,366 6.3	144,612 5.5	80,151 5.1	86,435 4.4	103,012 5.1	130,420 6.4
11. MAHASARAKARM	77,655 4.2	163,806 7.0	77,498 4.3	251,994 9.3	43,705 3.0	76,157 3.5	151,388 5.8	29,152 1.5	85,242 4.3	124,044 6.1	108,064 5.3
12. KHONKAEN	75,553 4.1	169,932 7.3	152,991 8.5	247,731 9.2	157,249 10.7	180,842 8.4	213,864 8.2	190,152 12.1	190,127 9.6	201,752 10.0	178,019 8.7
13. CHAIYAPHUM	78,327 4.2	138,921 6.0	72,776 4.0	188,559 7.0	168,517 11.5	187,025 8.7	210,241 8.0	150,358 9.6	186,582 9.4	216,914 10.7	159,822 7.8
14. NAKORNRAJSIMA	146,506 7.9	234,885 10.1	105,226 5.8	303,038 11.2	96,079 6.5	254,482 11.8	360,940 13.8	79,270 5.0	174,445 8.8	110,849 5.5	186,472 9.1
15. BURIRAM	107,893 5.8	152,724 6.5	58,233 3.2	184,540 6.8	41,916 2.9	86,623 4.0	110,217 4.2	29,284 1.9	159,776 8.1	114,814 5.7	104,602 5.1
<b>TOTAL NORTHEAST</b>	<b>1,846,269</b>	<b>2,334,770</b>	<b>1,799,618</b>	<b>2,704,734</b>	<b>1,469,615</b>	<b>2,149,513</b>	<b>2,613,366</b>	<b>1,572,393</b>	<b>1,977,986</b>	<b>2,020,438</b>	<b>2,048,871</b>
<b>TOTAL W.K.</b>	<b>6,781,616</b>	<b>7,325,396</b>	<b>6,602,089</b>	<b>8,239,402</b>	<b>5,708,998</b>	<b>7,333,611</b>	<b>8,296,782</b>	<b>5,570,110</b>	<b>7,053,185</b>	<b>6,769,766</b>	<b>6,968,096</b>
<b>PERCENTAGE NE/W.K.</b>	<b>27.22</b>	<b>31.87</b>	<b>27.26</b>	<b>32.83</b>	<b>25.74</b>	<b>29.31</b>	<b>31.50</b>	<b>28.23</b>	<b>28.04</b>	<b>29.85</b>	<b>29.40</b>

SOURCE : DEPARTMENT OF RICE, MINISTRY OF AGRICULTURE.  
COMPILED BY : NATIONAL ACCOUNTS DIVISION - N.E.D.B.

2-AI(PART b)

**APPENDIX 2 - A1 ( PART c )**  
**PRODUCTION OF PADDY**  
**NORTHEAST THAILAND 1960 - 1968**

FIRST LINE - PRODUCTION IN METRIC TONS  
 SECOND LINE - PERCENTAGE OF NORTHEAST

	1960	1961	1962	1963	1964	1965	1966	1967	1968		9 YEARS AVERAGE
1. LOEI	47,102 1.8	46,036 1.7	41,394 1.3	64,798 1.8	49,402 1.7	51,507 2.2	72,209 1.8	18,194 0.8	61,429 1.8		50,230 1.6
2. UDORN	338,769 12.8	293,482 10.8	345,932 10.6	330,470 9.4	288,179 9.9	330,831 13.8	318,494 8.1	173,379 7.1	404,499 11.9		313,782 10.2
3. NONGKAI	88,768 3.3	100,704 3.7	108,412 3.3	92,877 2.6	135,856 4.7	104,994 4.4	25,789 0.7	141,272 5.8	180,604 5.3		108,808 3.5
4. SAKOLNAKORN	219,204 8.3	202,368 7.4	213,867 6.5	273,232 7.8	250,098 8.6	185,226 7.7	224,364 5.7	310,371 12.8	288,466 8.5		240,800 7.9
5. NAKORN PHANOM	108,696 4.1	96,868 3.6	116,296 3.6	84,238 2.4	122,476 4.2	97,070 4.1	96,709 2.5	147,694 6.1	153,207 4.5		113,695 3.7
6. UBOL	357,791 13.5	440,222 16.2	441,531 13.5	428,748 12.2	356,107 12.3	419,978 17.6	425,519 10.8	454,853 18.8	347,100 10.2		407,983 13.3
7. SISAKET	100,544 3.8	188,941 6.9	170,502 5.2	184,675 5.3	164,674 5.7	110,937 4.6	278,521 7.1	161,607 6.7	241,666 7.1		178,007 5.8
8. SURIN	150,363 5.7	167,841 6.2	264,130 8.1	194,395 5.5	185,258 6.4	93,108 2.9	354,599 9.0	117,727 4.9	326,049 9.6		205,941 6.7
9. ROI - ED	240,037 9.1	146,741 5.4	207,953 6.3	236,513 6.7	156,440 5.4	190,179 8.0	281,100 7.1	123,078 5.1	178,962 5.3		218,549 7.1
10. KALASIN	174,819 6.6	173,595 6.4	182,329 5.6	157,677 4.5	102,921 3.5	154,520 6.5	211,470 5.4	113,446 4.7	198,591 5.8		163,263 5.3
11. MAHASARAKARM	139,493 5.3	117,009 4.3	175,429 5.4	153,356 4.4	85,425 2.9	63,393 2.7	251,443 6.4	39,599 1.6	237,945 7.0		158,484 5.2
12. KHONKAEN	214,675 8.1	197,573 7.3	291,726 8.9	411,469 11.7	198,638 6.8	101,032 4.2	375,230 9.5	43,880 1.6	159,022 4.7		221,472 7.2
13. CHAYAPHUM	164,856 6.2	229,222 8.4	236,534 7.2	329,391 9.4	200,696 6.9	165,416 6.9	301,731 7.7	207,627 8.6	253,981 7.5		232,162 7.6
14. NAKORNRAJSIMA	114,131 4.3	191,818 7.0	239,697 9.0	245,153 7.0	402,422 13.9	260,505 10.9	408,756 10.4	190,503 7.9	229,234 6.7		259,579 8.5
15. BURIRAM	191,124 7.2	130,436 4.8	185,285 5.7	326,151 9.3	202,755 7.0	62,402 2.6	315,915 8.0	181,941 7.5	135,389 4.0		192,378 6.3
TOTAL NORTHEAST TOTAL W.K. PERCENTAGE NE/W.K.	2,650,372 9,058,000 29.3	2,722,856 9,590,900 28.4	3,275,017 9,855,600 33.2	3,513,143 10,799,700 32.5	2,901,347 10,292,114 28.2	2,391,098 9,905,131 24.1	3,941,849 12,894,500 30.6	2,425,171 10,702,435 22.7	3,396,144 11,858,298 28.6		3,065,133 10,550,742 29.1

SOURCE : DEPARTMENT OF RICE, MINISTRY OF AGRICULTURE  
 COMPILED BY : NATIONAL ACCOUNTS DIVISION, - NED.B.

2-A1(PART c)

**APPENDIX 2-A2**  
**PRODUCTION OF KENAF**  
**NORTHEAST THAILAND 1960 - 1969**

FIRST LINE - PRODUCTION IN METRIC TONS  
SECOND LINE - GROWTH RATE IN %

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	AVERAGE GROWTH RATE
1. LOEI	352 -	228 -35.23	186 -18.43	140 -24.73	1,234 781.42	6,043 389.70	7,264 20.20	3,285 -54.78	228 -93.06	2,154 844.73	
2. UDORN	4,936 -	7,025 42.32	4,466 -36.43	5,582 24.98	9,157 64.04	19,325 111.04	31,127 61.07	23,153 -25.62	11,014 -52.43	12,000 8.95	201.10
3. NONGKAI	106 -	3,865 3,546.22	460 -88.10	1,000 117.39	500 -50.00	850 70.00	4,203 394.47	2,486 -40.85	432 -82.63	960 122.22	21.99
4. SAKOLNAKORN	529 -	1,765 233.64	652 -63.06	241 -63.04	192 -20.34	972 406.25	1,404 44.44	2,534 80.48	844 66.70	1,046 23.93	443.19
5. NAKORN PHANOM	2,293 -	5,838 154.60	2,166 -62.90	2,207 1.89	2,021 -8.43	6,070 200.34	4,444 -26.79	12,555 182.51	6,288 -49.92	6,288 0	63.96
6. UBOL	15,347 -	46,297 201.66	1,562 -96.76	16,251 940.39	33,038 103.29	47,328 43.25	52,864 11.69	46,400 -12.23	23,510 -49.34	45,586 93.90	43.48
7. SISAKET	8,997 -	20,975 133.13	6,974 -66.76	7,808 11.95	13,964 178.84	17,053 22.12	16,065 -5.80	10,006 -37.72	42,256 322.30	36,596 -13.40	137.32
8. SURIN	1,940 -	1,390 -28.36	2,338 68.20	1,300 -44.40	5,263 304.84	12,692 141.15	35,064 176.26	11,612 -66.89	2,360 -79.68	2,250 -4.67	60.52
9. ROI - ED	5,116 -	11,113 117.22	2,875 -74.13	6,846 138.12	7,720 12.76	15,689 103.22	24,351 55.21	33,401 37.16	15,712 -52.96	24,000 52.74	51.38
10. KALASIN	16,582 -	34,953 110.78	20,370 -41.73	14,293 -29.84	12,686 -11.25	25,796 103.34	39,334 52.48	27,852 -29.20	8,050 -71.10	10,514 30.60	43.26
11. MAHASARAKARM	31,929 -	67,278 110.71	22,639 -66.36	42,318 86.92	40,000 -5.48	81,827 104.56	98,181 19.98	68,424 -30.31	36,333 -46.91	79,620 119.13	12.68
12. KHONKAEN	29,459 -	27,402 -6.99	23,259 -15.12	31,548 35.63	74,837 137.21	120,949 61.61	134,337 11.06	70,483 -47.54	41,349 -41.34	48,962 18.41	32.47
13. CHAIYAPHUM	21,874 -	32,714 49.55	15,878 -51.47	31,604 99.04	35,334 11.80	92,604 162.08	90,747 -2.01	98,072 8.07	50,806 -48.20	50,906 0.19	16.99
14. NAKORNRAJSIMA	21,168 -	36,897 74.30	11,003 -70.18	23,753 161.31	42,096 46.40	49,918 18.58	74,273 48.79	63,380 -14.67	11,771 -81.43	42,601 261.91	25.45
15. BURIRAM	14,818 -	26,333 77.70	15,647 -40.59	14,400 -7.97	19,040 32.22	23,963 25.85	35,483 48.07	11,433 -67.78	3,760 -67.12	20,000 431.91	49.45
TOTAL NORTHEAST	176,402	324,071	130,473	204,290	297,083	521,078	649,141	485,076	254,713	383,483	
GROWTH RATE OF NE.	-	83.71	-58.64	56.57	45.42	75.39	24.57	-25.28	-47.50	50.55	22.75
TOTAL WHOLE KINGDOM	181,306	333,284	134,048	211,696	303,091	528,598	661,371	498,178	258,273	388,706	
PERCENTAGE NE./W.K.	97.29	97.23	97.33	96.50	98.02	98.58	98.15	97.37	98.62	98.65	

NOTE : THE YIELDS FOR THE YEAR 1961 INCREASED MORE RAPIDLY THAN IN THE YEAR 1960 DUE TO THE HIGHER 1961 PRICE (ABOUT 400 BAHT PER METRIC TON) WHICH CAUSED FARMERS TO EXPAND PLANTING AREA FOR THIS CROP.

SOURCE : DEPARTMENT OF AGRICULTURE; AND DIVISION OF AGRICULTURAL ECONOMICS MINISTRY OF AGRICULTURE.

**APPENDIX 2-A3**  
**PRODUCTION OF MAIZE**  
**NORTHEAST THAILAND 1960-1969**

FIRST LINE - PRODUCTION IN METRIC TONS  
SECOND LINE - ANNUAL CHANGE IN %

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	AVERAGE GROWTH RATE
1. LOEI	3,084	2,174	1,236	750	1,364	3,656	4,157	12,639	7,328	12,770	
	-	-29.51	-43.15	-39.33	81.86	168.03	13.70	204.04	-42.02	74.26	43.09
2. UDORN	3,084	1,219	2,226	1,266	849	2,523	1,927	1,787	2,064	1,430	
	-	-60.48	82.60	-43.13	-32.94	197.17	-23.63	-7.27	15.50	-30.72	10.79
3. NONGKAI	5,860	5,375	1,675	1,593	1,972	2,076	2,074	2,004	3,929	4,500	
	-	-9.28	-68.84	-4.90	23.79	5.27	-0.09	-3.38	96.05	14.53	5.32
4. SAKOLNAKORN	4,472	3,965	3,663	361	209	421	796	1,307	435	475	
	-	-11.34	-7.50	-90.16	-42.11	101.43	89.07	64.19	66.72	9.19	5.12
5. NAKORN PHANOM	3,238	2,420	553	1,939	903	1,741	1,018	1,467	888	888	
	-	-25.27	-77.15	250.63	-53.43	92.80	-41.53	44.10	-39.47	0	16.74
6. UBOL	15,420	8,312	8,763	6,871	3,403	4,009	1,614	2,406	1,224	2,000	
	-	-46.10	5.42	-21.60	-50.48	17.80	-59.75	49.07	-49.13	63.39	-10.15
7. SISAKET	10,640	2,988	4,075	3,861	7,514	5,422	5,419	3,337	26,080	31,484	
	-	-71.92	36.37	-5.26	94.61	-27.85	-0.06	-38.43	681.54	20.72	76.64
8. SURIN	3,392	5,375	451	198	175	963	1,009	862	164	164	
	-	58.47	-91.61	-56.10	-11.62	450.28	4.77	-14.57	-80.98	0	28.74
9. ROI-ED	3,701	2,276	2,344	919	1,075	726	1,132	1,421	1,751	2,000	
	-	-38.51	2.98	-70.80	16.97	-32.47	55.92	25.53	23.22	14.22	-0.33
10. KALASIN	1,234	666	680	111	371	257	2,638	791	120	553	
	-	-46.13	2.10	-83.68	234.23	-30.73	926.45	-70.02	-84.83	360.83	134.25
11. MAHASARAKARM	5,551	3,267	1,735	3,451	1,561	1,085	1,561	1,099	2,672	1,244	
	-	-41.15	-46.90	98.90	-54.77	-30.50	43.87	-29.60	143.13	-53.45	3.28
12. KHONKAEN	8,481	4,075	5,025	2,893	3,290	3,152	3,538	5,016	4,266	6,529	
	-	-51.96	23.31	-42.43	13.72	-4.20	12.24	41.77	-14.96	53.04	3.39
13. CHAIYAPHUM	6,631	4,001	2,898	2,271	2,569	3,627	3,172	6,413	4,815	5,000	
	-	-39.67	-27.57	-21.64	13.12	41.18	-12.55	102.17	-24.92	3.84	3.77
14. NAKORNRAJSIMA	76,637	27,777	30,939	37,426	37,127	38,212	79,246	80,095	80,504	177,419	
	-	-63.76	11.38	20.96	-0.80	2.92	107.38	1.07	0.51	120.38	22.27
15. BURIRAM	2,776	1,719	1,750	548	1,002	1,359	1,500	2,071	3,255	3,600	
	-	-38.08	1.80	-69.69	82.84	35.62	10.37	38.06	57.16	10.59	14.30
TOTAL NORTHEAST	154,200	75,607	68,017	64,459	63,384	69,228	110,802	122,715	139,495	250,056	
ANNUAL CHANGE, NE. %	-	-50.97	-10.04	-5.24	-1.67	9.21	60.05	10.75	13.67	79.25	11.67
TOTAL WHOLE KINGDOM	543,935	598,276	665,429	857,743	953,125	1,021,286	1,122,399	1,150,000	1,217,455	1,407,152	
PERCENTAGE NE./W.K.	28.34	12.63	10.22	7.52	6.65	6.77	9.87	10.67	11.46	17.77	

SOURCE : DEPARTMENT OF AGRICULTURE ; AND DIVISION OF AGRICULTURAL ECONOMICS MINISTRY OF AGRICULTURE.

**APPENDIX 2-A4  
PRODUCTION OF CASSAVA  
NORTHEAST THAILAND 1960-1969**

FIRST LINE.- PRODUCTION IN METRIC TONS  
SECOND LINE - PERCENTAGE OF NORTHEAST

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	AVERAGE GROWTH RATE
1. LOEI	481	1,367	213	150	132	454	604	47	368	357	
	-	184.19	-84.42	-29.58	-12.00	243.93	33.03	-92.22	682.97	-2.99	102.54
2. UDORN	2,104	1,880	3,398	2,044	2,965	1,774	1,112	3,770	13,986	15,000	
	-	-10.65	80.74	-39.85	45.05	-40.17	-37.32	239.02	270.98	7.25	57.28
3. NONGKAI	1,623	2,800	1,200	2,250	1,560	1,624	122	434	122	122	
	-	72.52	-57.15	87.50	-30.67	4.10	-92.49	255.73	-71.89	0	18.63
4. SAKOLNAKORN	240	350	411	97	29	23	65	473	65	65	
	-	45.83	17.42	-76.40	-70.11	-20.69	182.60	627.69	-86.26	0	68.89
5. NAKORN PHANOM	781	769	576	1,622	1,016	1,866	820	1,290	136	136	
	-	-1.53	-25.10	181.59	-37.37	83.66	-56.05	57.31	-89.46	0	12.56
6. UBOL	962	804	821	2,637	995	541	368	794	822	750	
	-	-16.43	2.11	221.19	-62.27	-45.63	-31.98	115.72	3.52	-8.76	19.19
7. SISAKET	1,202	2,441	2,016	561	395	1,109	704	779	522	672	
	-	103.07	-17.42	-72.12	-29.60	180.75	-36.52	10.65	-32.00	28.73	15.06
8. SURIN	8,534	10,862	7,647	4,612	2,644	3,002	576	309	296	-	
	-	27.28	-29.60	-39.69	-42.68	13.54	-90.82	-46.36	-4.21	-100	-34.72
9. ROI-ED	601	912	309	988	600	2,256	712	551	627	640	
	-	51.74	-66.12	219.74	-39.28	276.00	-68.44	-22.62	13.79	2.07	40.76
10. KALASIN	60	6	31	87	338	200	1,044	216	427	594	
	-	-90.00	416.66	180.64	288.50	-40.83	422.00	-79.32	97.68	39.11	26.04
11. MAHASARAKARM	481	1,148	140	205	605	238	381	455	380	380	
	-	138.66	-87.81	46.42	195.12	-60.67	60.08	19.42	-17.49	0	26.66
12. KHONKAEN	1,442	2,106	2,131	1,468	1,010	758	833	833	764	1,872	
	-	46.04	1.18	-30.30	-31.20	-24.96	9.89	0	-8.29	145.02	11.93
13. CHAYAPHUM	781	600	379	2,111	1,175	1,530	10,896	8,000	5,721	6,000	
	-	-23.18	-36.84	456.99	-44.34	30.21	612.15	-26.58	-28.49	4.87	104.98
14. NAKORNRAJSIMA	39,005	28,999	39,317	71,161	85,226	151,204	107,262	138,798	184,929	195,103	
	-	-25.66	35.58	80.99	19.76	77.41	-29.07	29.40	33.23	5.50	25.24
15. BURIRAM	1,743	1,529	2,865	2,270	1,624	900	1,000	550	710	355	
	-	-12.28	87.37	-20.77	-28.46	-44.59	11.11	-45.00	29.09	-50.00	-8.17
TOTAL NORTHEAST	60,100	56,571	61,454	92,262	100,333	167,487	126,498	157,298	209,875	222,046	
ANNUAL CHANGE NE%		-5.88	8.63	50.13	8.74	66.92	-24.47	24.34	33.42	5.79	18.62
TOTAL W.K.	1,222,337	1,726,159	2,077,000	2,111,052	1,556,750	1,474,669	1,891,701	1,800,000	2,527,428	2,767,051	
PERCENTAGE NE/W.K.	4.91	3.72	2.96	4.37	6.44	11.35	6.68	6.22	8.30	8.02	

SOURCE : DEPARTMENT OF AGRICULTURE, MINISTRY OF AGRICULTURE  
COMPILED BY : DEPARTMENT OF AGRICULTURAL ECONOMICS

2-A4

APPENDIX 2 - B

GROSS DOMESTIC PRODUCT, NORTHEAST THAILAND, 1960 - 1968

Note: The Tables following have been prepared by the National Accounts Division, NEDB and the data therein are preliminary. As such only limited use of these has been made to date. After they have been appropriately revised, a more refined analysis will be attempted.

## APPENDIX 2 - B1a

## GROSS DOMESTIC PRODUCT

NORTHEAST THAILAND, 1960 - 1968

(Million Baht)

At  
Current  
Prices

Industrial Origin	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
Agriculture	5,623.9	6,970.2	6,427.6	6,989.9	6,439.6	7,309.1	9,915.0	7,793.1	9,732.2	
Crops	4,128.0	5,435.4	4,766.7	5,181.7	4,628.3	5,329.0	7,090.0	5,742.1	6,839.4	
Livestock	940.3	9,959.6	1,043.1	1,154.1	1,111.5	1,171.4	1,350.8	1,551.7	1,716.0	
Fisheries	201.3	181.0	175.5	196.4	231.3	324.1	373.5	448.9	509.0	
Forestry	354.2	394.2	442.3	457.8	468.5	484.6	500.7	550.2	667.8	
Mining and Quarrying	19.1	19.6	21.9	28.1	52.0	82.0	134.0	198.3	220.7	
Manufacturing	841.7	998.7	1,248.9	1,279.8	1,338.8	1,233.4	1,351.4	1,560.8	1,941.6	
Construction	314.6	342.6	407.7	505.4	681.4	892.4	1,166.7	1,454.1	1,558.7	
Electricity and Water Supply	14.6	16.8	22.1	22.6	26.2	36.8	41.4	56.7	70.8	
Transportation and Communication	318.0	381.9	447.8	450.3	479.6	562.5	625.8	713.6	791.7	
Wholesale and Retail Trade	1,225.5	1,348.8	1,373.2	1,554.5	1,611.3	1,628.9	2,286.4	2,246.4	2,434.2	
Banking, Insurance and Real Estate	25.9	32.3	41.5	47.7	56.7	70.2	102.3	141.7	167.4	
Ownership of Dwellings	239.3	247.8	257.4	270.0	287.8	308.4	338.7	367.5	384.7	
Public Administration and Defence	428.4	457.2	487.8	536.3	562.5	613.1	649.2	731.6	860.7	
Services	768.1	831.8	914.7	996.7	1,098.7	1,185.9	1,349.8	1,524.0	1,678.9	
NE - Gross Domestic Product, (GDP)	9,819.0	11,647.7	11,650.6	12,681.4	12,634.6	14,122.7	17,960.7	16,787.6	19,931.6	
NE - GDP per Capita	1,058	1,214	1,175	1,236	1,192	1,288	1,585	1,433	1,647	
Whole Kingdom	53,975.9	59,103.6	63,660.8	67,881.1	74,467.5	83,683.6	100,594.8	106,698.6	116,129.3	
% N.E./W.K.	18.19	19.71	18.30	18.68	16.97	16.88	17.85	15.73	17.16	

## APPENDIX 2 - B1b

## GROSS DOMESTIC PRODUCT

NORTHEAST THAILAND, 1960 - 1968

(Million Baht)

Constant  
1962  
Prices

Industrial Origin	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969 <sup>E</sup>
Agriculture	5,671.3	6,896.5	6,427.6	7,440.1	7,045.3	6,785.1	8,472.0	6,791.1	7,665.6	
Crops	4,212.7	5,369.3	4,766.7	5,677.7	5,270.6	4,931.3	6,499.1	4,767.9	5,451.8	
Livestock	948.0	984.8	1,043.1	1,113.3	1,073.1	1,078.1	1,198.8	1,238.0	1,300.0	
Fisheries	153.1	156.0	175.5	168.3	189.4	255.9	275.7	268.1	290.1	
Forestry	357.5	386.4	442.3	480.8	512.2	519.8	498.4	517.1	613.7	
Mining and Quarrying	17.2	17.7	21.9	17.8	51.8	81.6	133.5	197.7	219.3	
Manufacturing	922.1	1,034.0	1,249.2	1,372.3	1,323.6	1,332.7	1,663.2	1,463.4	1,725.9	
Construction	347.3	360.2	407.7	502.7	671.4	870.2	1,057.6	1,297.8	1,377.2	
Electricity and Water Supply	13.2	16.9	22.1	23.9	30.8	41.1	52.7	72.1	117.3	162.3
Transportation and Communication	315.8	379.3	447.8	450.3	477.3	553.6	615.7	702.2	778.7	802.5
Wholesale and Retail Trade	1,233.5	1,362.7	1,373.2	1,545.1	1,594.3	1,766.3	2,098.9	2,239.2	2,331.2	
Banking, Insurance and Real Estate	26.8	33.1	41.5	47.2	55.1	67.6	93.1	125.4	144.6	161.0
Ownership of Dwellings	250.0	253.9	257.4	264.2	271.3	278.6	285.8	294.0	301.9	310.1
Public Administration and Defence	444.4	468.4	487.8	531.5	546.6	590.7	590.7	647.4	743.3	809.5
Services	794.8	850.5	914.7	990.1	1,068.3	1,144.9	1,228.0	1,348.4	1,520.7	
NE - Gross Domestic Product, (GDP)	10,036.4	11,673.2	11,650.9	13,295.2	13,135.8	13,512.4	16,291.2	15,178.7	16,915.7	
NE - GDP per Capita	1,082	1,217	1,175	1,287	1,239	1,233	1,438	1,296	1,398	
Whole Kingdom	55,693.1	59,110.6	63,660.8	69,085.1	73,785.4	79,188.9	89,231.3	94,191.7	103,355.1	
% N.E./W.K.	18.02	19.75	18.30	19.10	17.78	17.06	18.26	16.11	16.37	

E Estimated

## APPENDIX 2 - B7a

## GROSS DOMESTIC PRODUCT ORIGINATING FROM CROPS

(Million Baht)

NORTHEAST THAILAND, 1960 - 1968

At  
Current  
Prices

	1960	1961	1962	1963	1964	1965	1966	1967	1968
Paddy	1,937.7	3,231.6	3,172.2	3,103.1	2,499.7	2,494.9	4,633.3	3,557.8	4,600.3
Rubber	-	-	-	-	-	-	-	-	-
Coconut	33.6	39.3	44.3	57.6	78.1	64.0	48.6	69.4	50.8
Sugarcane	75.3	73.2	56.4	108.7	90.9	54.2	58.9	68.2	82.6
Maize and Sorghum	116.8	59.9	48.3	50.8	53.2	66.2	112.4	110.9	117.0
Groundnut	128.2	76.5	56.8	83.9	75.5	90.1	73.3	69.3	68.6
Mung Bean	13.9	13.6	11.1	7.3	6.7	7.7	6.8	11.9	9.3
Castor Bean	28.4	21.1	21.3	26.4	27.3	16.3	19.5	14.8	16.4
Soy Bean	1.8	1.3	1.1	1.1	0.7	1.7	1.9	1.0	0.8
Cassava	10.9	17.9	13.8	13.7	26.6	43.2	27.6	28.3	35.2
Tobacco	163.5	152.5	72.5	115.4	90.1	88.8	121.3	117.8	118.9
Cotton	91.6	48.7	42.0	36.2	55.1	46.8	52.6	79.5	96.5
Kenaf, Jute and Ramie	531.6	645.3	315.3	405.9	696.3	1,329.3	1,390.0	254.9	350.3
Kapok	67.0	58.5	52.0	90.4	95.3	86.1	61.9	46.7	52.1
Sesame	29.1	16.9	8.9	10.7	10.8	15.9	14.2	8.9	7.6
Garlic, Onion, Shallot and Chilli	189.7	208.3	196.1	312.1	200.4	232.9	268.9	256.2	263.6
Vegetables	27.5	38.1	49.2	74.2	77.4	82.0	135.4	151.9	172.9
Fruits and Others	681.4	732.8	599.4	684.0	544.3	608.9	663.5	722.7	793.7
Other Crops Subtotal (Excluding Paddy)	2,190.3	2,203.8	1,588.5	2,078.5	2,128.6	2,834.1	3,056.7	2,014.4	2,728.1
Total Value Added	4,128.0	5,435.4	4,766.7	5,181.7	4,628.3	5,329.0	7,690.0	5,572.1	6,828.4
Annual Change (%)		31.7	-12.29	8.7	-10.7	15.1	44.3	-31.8	30.5
Whole Kingdom	15,765.2	17,430.9	17,728.4	18,104.1	18,009.3	21,947.4	29,111.9	25,054.2	25,153.8
Annual Change (%)		10.6	1.7	2.1	-0.5	21.9	32.6	-13.9	0.4
% N.E./W.K.	26.18	31.18	26.89	28.62	25.70	24.28	26.42	20.92	27.19

## APPENDIX 2 - B2b

## GROSS DOMESTIC PRODUCT ORIGINATING FROM CROPS

NORTHEAST THAILAND, 1960 - 1968

Constant  
1962  
Prices

(Million Baht)

	1960	1961	1962	1963	1964	1965	1966	1967	1968
Paddy	2,262.4	3,114.5	3,178.2	3,641.3	3,286.9	2,366.6	3,586.2	2,449.6	2,217.0
Rubber	-	-	-	-	-	-	-	-	-
Coconut	31.0	33.2	44.3	47.7	48.1	48.5	44.6	42.6	42.8
Sugarcane	93.2	74.2	56.4	89.3	91.5	67.9	49.8	46.5	54.0
Maize and Sorghum	109.5	53.7	48.3	45.9	45.1	53.2	84.5	88.0	102.8
Groundnut	91.4	75.3	56.8	82.9	70.8	77.2	73.4	69.1	68.6
Mung Bean	21.2	13.8	11.2	7.8	8.5	10.5	7.2	11.5	10.6
Castor Bean	21.0	22.6	21.3	25.4	26.0	17.8	20.2	10.0	11.1
Soy Bean	2.0	1.2	1.1	1.3	0.7	1.3	1.6	0.9	0.7
Cassava	13.5	12.7	13.8	20.8	22.6	37.7	28.5	35.4	47.2
Tobacco	159.0	132.0	72.5	108.1	86.9	107.1	122.1	127.9	129.2
Cotton	73.8	43.4	42.0	38.7	44.6	45.5	49.6	60.0	72.1
Kenaf, Jute and Ramie	415.1	757.8	315.3	472.7	688.2	1,202.0	1,491.2	863.2	570.8
Kapok	70.2	65.0	52.0	79.5	83.0	83.3	61.6	52.1	55.4
Sesame	21.6	16.0	8.9	8.1	7.6	12.0	10.5	5.9	5.6
Garlic, Onion, Shallot and Chilli	147.5	212.6	196.1	244.3	174.5	172.1	181.4	172.2	180.1
Vegetables	30.1	39.2	49.2	70.5	72.7	74.1	111.8	120.3	131.9
Fruits and Others	650.2	701.9	599.4	693.5	513.0	554.6	585.1	611.4	646.9
Subtotal (Excluded Paddy)	1,950.3	2,254.8	1,588.5	2,036.4	1,983.7	2,564.7	2,912.9	2,318.3	2,134.8
Total Value Added	4,212.7	5,369.3	4,766.7	5,677.7	5,270.6	4,931.3	6,499.1	4,767.9	5,451.8
Growth Rate (N.E.)		27.4	-11.3	19.1	-7.2	-6.5	31.7	-26.7	14.3
Whole Kingdom	15,947.0	16,646.3	17,728.4	19,389.8	19,272.5	19,803.6	23,341.4	20,686.1	21,892.2
Growth Rate (W.K.)		4.4	6.5	9.4	-0.6	2.8	17.9	-11.4	5.8
% N.E./W.K.	26.4	32.2	26.8	29.2	27.3	24.8	27.8	23.0	24.9

## APPENDIX 2 - B3a

## GROSS DOMESTIC PRODUCT ORIGINATING FROM LIVESTOCK

NORTHEAST THAILAND, 1960 - 1968

(Million Baht)

at  
Current  
Prices

	1960	1961	1962	1963	1964	1965	1966	1967	1968
Cattle and Buffalo	299.6	310.5	378.5	413.2	382.6	402.9	487.5	565.2	611.5
Swine	148.7	173.6	187.5	214.2	217.4	232.0	287.5	363.3	455.2
Hens, Duck and Other Poultry	296.5	272.5	281.3	326.3	338.5	357.3	364.8	400.5	447.1
Eggs	190.3	196.6	191.7	198.0	170.3	174.4	205.6	216.7	195.9
Dairy Products	-	-	-	-	0.3	0.4	0.4	0.4	0.4
Others	5.3	6.6	4.1	2.4	2.3	4.5	5.0	5.7	5.9
Total Value Added	940.3	959.6	1,043.1	1,154.1	1,111.5	1,171.4	1,350.8	1,551.7	1,716.0
Annual Change (%)		2.1	8.7	10.6	-3.7	5.4	15.3	14.9	10.6
Whole Kingdom	2,972.6	3,001.3	3,099.2	3,244.5	3,374.5	3,659.1	3,865.4	4,420.6	5,000.5
Annual Change (%)		0.7	3.3	4.7	4.0	8.4	5.6	14.4	13.1
% N.E./W.K.	31.63	31.97	33.66	35.57	32.94	32.01	34.95	35.10	34.32

## APPENDIX 2 - B3b

## GROSS DOMESTIC PRODUCT ORIGINATING FROM LIVESTOCK

(Million Baht)

NORTHEAST THAILAND, 1960 - 1968

Constant  
1962  
Prices

	1960	1961	1962	1963	1964	1965	1966	1967	1968
Cattle and Buffalo	322.8	329.2	378.5	407.1	384.7	383.0	425.7	425.8	445.1
Swine	156.4	170.4	187.5	219.0	180.3	169.4	235.5	255.9	278.4
Hen, Duck and Other Poultry	265.6	271.1	281.3	289.9	300.5	309.1	320.1	331.2	342.3
Eggs	198.1	207.8	191.7	194.9	205.4	213.1	213.6	221.3	230.4
Dairy Products	-	-	-	-	0.3	0.4	0.4	0.4	0.4
Others	5.1	6.3	4.1	2.4	1.8	3.2	3.4	2.3	2.4
<b>Total Value Added</b>	<b>948.0</b>	<b>984.8</b>	<b>1,043.1</b>	<b>1,113.3</b>	<b>1,073.1</b>	<b>1,078.1</b>	<b>1,198.8</b>	<b>1,238.0</b>	<b>1,300.0</b>
Growth Rate (N.E.)		3.9	5.9	6.7	-3.6	0.5	11.2	3.3	5.0
<b>Whole Kingdom</b>	<b>2,936.2</b>	<b>3,039.9</b>	<b>3,099.2</b>	<b>3,164.9</b>	<b>3,250.9</b>	<b>3,341.1</b>	<b>3,509.6</b>	<b>3,625.6</b>	<b>3,734.0</b>
Growth Rate (W.K.)		3.5	2.0	2.1	2.7	2.8	5.0	3.3	3.0
% N.E./W.K.	32.29	32.40	33.66	35.18	33.01	32.27	34.15	34.15	34.82

## APPENDIX 2 - B4a

## GROSS DOMESTIC PRODUCT ORIGINATING FROM FISHERIES

NORTHEAST THAILAND, 1960 - 1968

(Million Baht)

at  
Current  
Prices

	1960	1961	1962	1963	1964	1965	1966	1967	1968
Marine Fish									
Fresh Water Fish	204.8	184.2	179.4	200.5	235.1	330.6	380.6	457.8	520.3
Less: Intermediate Cost	3.5	3.2	3.9	4.1	3.7	6.5	7.1	8.8	11.3
Total Value Added	201.3	181.0	175.5	196.4	231.3	324.1	373.5	448.9	509.0
Annual Change (%)		-10.1	-3.0	11.9	17.8	40.1	15.3	20.2	13.4
Whole Kingdom	985.7	1,049.7	980.7	1,259.7	1,597.1	1,651.6	1,998.7	2,773.6	3,609.7
Annual Change (%)		6.5	-6.6	28.4	26.8	3.4	21.0	38.8	30.1
% N.E./W.K.	20.42	17.24	17.90	15.59	14.48	19.62	18.69	16.18	14.10

## APPENDIX 2 - B4b

## GROSS DOMESTIC PRODUCT ORIGINATING FROM FISHERIES

(Million Baht)	NORTHEAST THAILAND, 1960 - 1968									Constant 1962 Prices
	1960	1961	1962	1963	1964	1965	1966	1967	1968	
Marine Fish										
Fresh Water Fish	156.6	159.5	179.4	172.6	195.1	265.1	284.7	270.8	304.5	
Less: Intermediate Cost	3.5	3.4	3.9	4.3	5.6	9.1	9.0	11.7	14.5	
Total Value Added	153.1	156.0	175.5	168.3	189.4	255.9	275.7	259.1	290.1	
Growth Rate (N.E.)		1.9	12.5	-4.1	12.6	35.1	7.7	-7.8	8.2	
Whole Kingdom	738.0	841.5	980.7	1,256.8	1,528.0	1,702.0	1,975.5	2,211.7	2,807.0	
Growth Rate (W.K.)		14.0	16.5	28.2	21.6	11.4	16.1	12.0	26.9	
% N.E./W.K.	20.74	18.54	17.90	13.39	12.40	15.04	13.95	11.12	10.33	

## APPENDIX 2 - B5a

## GROSS DOMESTIC PRODUCT ORIGINATING FROM FOREST PRODUCTS

NORTHEAST THAILAND, 1960 - 1968

At  
Current  
Prices

(Million Baht)

	1960	1961	1962	1963	1964	1965	1966	1967	1968
Teak	-	-	-	-	-	-	-	-	-
Yang	8.4	12.9	16.5	25.3	17.7	30.6	38.5	51.9	62.5
Teng and Rung	19.7	18.0	17.2	19.2	20.3	25.4	22.5	25.7	37.0
Takien	9.9	11.5	15.1	20.4	15.7	15.8	11.6	17.2	21.5
Daeng	2.8	4.9	6.8	12.7	5.8	7.2	8.8	17.9	12.7
Pluang	5.1	8.7	6.5	6.4	9.8	9.1	10.5	12.0	12.9
Pra-du	0.8	1.3	0.7	1.5	1.9	2.9	3.7	6.6	8.5
Tabek	1.2	2.0	1.9	1.6	1.5	2.3	2.2	6.2	6.5
Inthanin	-	-	-	-	-	-	-	-	-
All Other Timber	14.9	21.6	29.6	41.8	52.9	64.3	85.9	110.1	115.8
Charcoal and Firewood	233.5	251.0	280.5	291.0	277.1	270.3	275.9	251.2	262.8
Other Forest Products	57.9	62.3	67.5	37.9	66.0	56.7	41.1	51.5	127.7
Total Value Added	354.2	394.2	442.3	457.8	468.5	484.6	500.7	550.2	667.8
Annual Change (%)		11.3	12.2	3.5	2.3	3.4	3.3	9.9	12.1
Whole Kingdom	1,848.2	1,911.2	1,942.4	2,077.3	2,184.1	2,486.7	2,368.8	2,663.3	3,029.6
Annual Change (%)		3.4	1.6	6.9	5.1	13.9	-4.7	12.4	13.8
% N.E./W.K.	19.16	20.63	22.77	22.04	21.45	19.49	21.14	20.66	22.04

APPENDIX 2 - B5b

GROSS DOMESTIC PRODUCT ORIGINATING FROM FOREST PRODUCTS

NORTHEAST THAILAND, 1960 - 1968

(Million Baht)

Constant  
1962  
Prices

	1960	1961	1962	1963	1964	1965	1966	1967	1968
Teak	-	-	-	-	-	-	-	-	-
Yang	10.5	11.5	11.5	23.2	18.8	32.4	38.2	47.5	55.1
Teng and Rung	19.5	16.9	17.2	18.4	19.5	24.3	20.0	20.5	26.1
Takien	9.2	10.4	10.1	18.7	14.7	14.9	10.0	12.9	14.2
Daeng	2.8	4.6	6.8	12.2	5.5	6.9	7.9	14.4	9.0
Pluang	6.9	7.8	6.5	6.7	10.1	9.4	9.2	11.0	11.4
Pra-du	0.8	1.2	0.7	1.4	1.8	2.8	3.2	5.0	5.5
Tabek	1.1	1.4	1.9	1.6	1.5	2.3	2.0	4.4	5.0
Inthanin	-	-	-	-	-	-	-	-	-
All Other Timber	14.6	18.4	29.6	38.5	50.6	61.6	74.8	84.4	85.8
Charcoal and Firewood	234.7	251.5	280.5	290.7	277.9	271.1	276.7	250.7	262.0
Other Forest Product	57.5	62.8	67.5	69.4	111.6	94.1	56.5	66.3	138.7
Total Value Added	357.5	386.4	442.3	480.8	512.2	519.8	498.4	517.1	613.7
Growth Rate (N.E.)		8.1	14.5	8.7	6.5	1.5	-4.1	3.8	18.7
Whole Kingdom	1,859.2	1,873.6	1,942.4	2,081.4	2,208.1	2,448.8	2,262.7	2,434.1	2,738.0
Growth Rate (W.K.)		0.8	3.7	7.4	6.1	10.9	-7.6	7.6	12.5
% N.E./W.K.	19.23	20.62	22.77	22.63	23.90	21.23	22.03	21.24	22.41

## APPENDIX 2 - R6a

## GROSS DOMESTIC PRODUCT ORIGINATING FROM MINING AND QUARRYING

NORTHEAST THAILAND, 1960 - 1968

At  
Current  
Prices

(Million Baht)

	1960	1961	1962	1963	1964	1965	1966	1967	1968
Manganese	.65	.47	.56	-	.03	-	-	-	-
All Other Non-Metallic	18.37	19.08	21.37	22.08	51.99	81.95	133.98	198.27	220.65
Total Value Added	19.02	19.55	21.93	22.08	52.02	81.95	133.98	198.27	220.65
Annual Change (%)		2.79	12.17	22.04	85.26	57.54	63.49	47.98	11.29
Whole Kingdom	564.9	681.7	755.7	818.2	1,248.4	1,758.2	1,945.8	2,059.0	2,114.6
Annual Change (%)		20.7	10.8	8.3	52.6	40.8	10.7	5.8	2.7
% N.E./N.K.	3.36	2.86	2.90	3.43	4.17	4.66	6.89	9.63	10.44

## APPENDIX 2 - B6b

## GROSS DOMESTIC PRODUCT ORIGINATING FROM MINING AND QUARRYING

NORTHEAST THAILAND, 1960 - 1968

Constant  
1962  
Prices

(Million Baht)

	1960	1961	1962	1963	1964	1965	1966	1967	1968
Manganese	.66	.47	.56	-	.03	-	-	-	-
All Other Non-Metallic	16.55	17.21	21.37	27.82	51.81	81.57	133.49	197.69	219.34
Total Value Added	17.21	17.68	21.93	27.82	51.84	81.57	133.49	197.69	219.34
Growth Rate (N.E.)		2.73	24.05	26.85	86.32	57.37	63.64	48.10	10.95
Whole Kingdom	609.9	659.0	755.7	807.8	941.0	1,193.3	1,417.8	1,629.6	1,779.5
Growth Rate (W.K.)		8.0	14.7	6.9	16.5	26.8	18.8	14.9	9.2
% N.E./W.K.	2.82	2.68	2.90	3.44	5.51	6.84	9.42	12.13	12.33

## APPENDIX 2 - B7a

## GROSS DOMESTIC PRODUCT ORIGINATING FROM MANUFACTURING

NORTHEAST THAILAND, 1960 - 1968

(Million Baht)

At  
Current  
Prices

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
Food	469.7	548.0	756.5	711.5	711.2	530.0	539.4	678.6	1,003.4	
Beverages	22.2	36.4	49.8	53.0	55.5	57.8	64.0	59.9	47.2	
Tobacco & Snuff	56.1	67.0	48.3	67.0	59.7	44.9	55.7	52.2	56.7	
Textiles	139.2	169.6	177.7	196.7	242.5	295.1	333.0	354.0	342.0	
Wearing apparel and made-up textile goods	41.4	44.5	46.3	49.2	50.9	63.0	67.0	74.4	80.1	
Wood and cork	34.0	43.5	65.4	82.0	83.0	94.2	117.1	146.5	182.0	
Furniture and fixtures	6.3	7.1	9.3	12.3	13.0	15.0	18.0	18.1	21.0	
Paper and paper products	-	-	-	-	0.1	0.1	0.1	0.1	0.1	
Printing, publishing and allied industries	1.8	2.1	2.3	2.4	2.7	2.7	3.5	3.7	4.1	
Leather and leather products, Not footwear	6.2	6.2	5.9	6.1	6.4	6.8	9.7	9.0	10.5	
Rubber & Rubber products	0.6	0.6	0.7	0.8	0.8	0.8	0.9	1.0	1.1	
Chemicals and chemical products	4.6	5.0	4.8	4.9	6.5	6.2	4.8	5.6	6.3	
Petroleum refining and coal	-	-	-	-	-	-	-	-	-	
Non-metallic mineral products	27.2	29.1	31.6	34.0	36.2	38.8	41.9	45.4	49.9	
Basic metal industries	-	-	-	-	-	-	-	-	-	
Metal products not machinery and Transport Equipments	7.4	9.3	12.4	15.8	18.9	22.5	27.1	31.9	38.3	
Repairing of Non Electrical Mach.	2.3	2.8	3.9	5.2	6.3	8.3	11.3	15.3	20.6	
Electrical machineries and supplies	1.5	1.7	1.9	2.3	2.9	3.6	4.5	5.4	6.7	
Transport equipments	17.3	21.9	27.9	32.2	37.5	38.4	47.7	54.3	64.4	
Miscellaneous n.e.c.	3.9	3.9	4.2	4.4	4.7	5.2	5.7	6.4	7.2	
TOTAL VALUE ADDED	841.7	998.7	1,248.9	1,279.8	1,338.8	1,233.4	1,351.4	1,560.8	1,841.6	
Growth Rate		18.7	25.1	2.5	4.6	-8.5	9.6	15.5	24.4	
Whole Kingdom	6,655.0	7,640.5	8,851.1	9,515.8	10,297.5	11,712.7	13,404.9	15,464.3	17,291.2	
Growth Rate		14.8	15.8	7.5	8.2	13.7	14.4	15.4	11.8	
% N.E./W.K.	12.65	13.07	14.11	13.45	13.00	10.53	10.08	10.09	11.23	

## APPENDIX 2 - B7b

## GROSS DOMESTIC PRODUCT ORIGINATING FROM MANUFACTURING

NORTHEAST THAILAND, 1960 - 1968

Constant  
1962  
Prices

(Million Baht)

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
Food	540.1	578.0	756.5	802.0	672.0	597.5	876.0	594.3	805.0	
Beverages	22.2	36.4	49.8	53.0	55.6	67.9	64.1	58.9	47.2	
Tobacco & Snuff	56.1	67.1	48.3	58.5	59.7	44.9	55.7	52.0	56.3	
Textiles	148.2	173.1	177.7	205.8	265.6	324.7	319.1	361.4	359.2	
Wearing apparel and made-up textile goods	43.5	45.9	46.3	49.3	52.4	65.6	68.8	75.6	78.0	
Wood and cork	34.6	44.2	65.4	81.5	82.1	92.5	108.8	132.6	161.0	
Furniture and fixtures	6.0	6.9	9.3	12.6	13.4	16.3	19.7	19.8	22.7	
Paper and paper products	0.01	0.02	0.03	0.04	0.07	0.07	0.06	0.07	0.12	
Printing, publishing and allied industries	1.8	2.1	2.3	2.4	2.6	2.6	3.2	3.2	3.5	
Leather and leather products, Not footwear	5.5	5.7	5.9	6.1	6.4	6.7	7.0	7.3	8.0	
Rubber & Rubber products	0.6	0.6	0.7	0.8	0.7	0.8	0.9	0.9	0.9	
Chemicals and chemical products	4.5	5.1	4.8	5.4	6.3	6.3	5.4	6.0	6.5	
Petroleum refining and coal	-	-	-	-	-	-	-	-	-	
Non-metallic mineral products	26.5	29.0	31.6	34.5	37.6	40.9	44.0	47.1	51.6	
Basic metal industries	-	-	-	-	-	-	-	-	-	
Metal products not machinery and Transport Equipments	6.9	8.9	12.4	16.0	18.5	21.6	25.7	29.7	36.0	
Repairing of Non Electrical Mach.	2.1	2.7	3.9	5.4	6.2	8.0	10.9	14.5	19.7	
Electrical machineries and supplies	1.5	1.7	1.9	2.3	2.9	3.7	4.5	5.4	6.6	
Transport equipments	17.8	22.4	27.9	32.0	36.4	37.0	43.6	48.3	56.1	
Miscellaneous n.e.c.	4.1	4.0	4.2	4.3	4.5	5.0	5.2	5.7	6.4	
TOTAL VALUE ADDED	922.1	1,034.0	1,249.2	1,372.3	1,323.6	1,332.7	1,663.2	1,463.4	1,725.9	
Growth Rate		12.1	20.8	9.9	-3.7	0.7	24.8	-13.7	17.9	
Whole Kingdom	7,131.1	7,862.7	8,851.1	9,651.2	10,524.5	12,036.1	13,463.7	14,861.4	16,378.3	
Growth Rate		10.3	12.6	9.0	9.0	14.4	11.9	10.4	10.2	
% N.E./W.K.	12.93	13.15	14.11	14.22	12.58	11.07	12.35	9.80	10.54	

## APPENDIX 2 - B8a

## GROSS DOMESTIC PRODUCT ORIGINATING FROM CONSTRUCTION

NORTHEAST THAILAND, 1960 - 1968

(Million Baht)

At  
Current  
Prices

	1960	1961	1962	1963	1964	1965	1966	1967	1968
Private	294.8	317.5	367.5	445.0	480.6	597.3	611.1	654.3	720.0
Public	19.8	25.1	40.4	60.8	201.9	296.5	556.7	800.2	839.2
Total Value Added	314.6	342.6	408.0	505.8	682.5	893.8	1,167.9	1,454.4	1,559.2
Annual Change (%)		8.9	19.1	24.0	34.9	31.0	30.7	24.5	7.2
Whole Kingdom	2,411.6	2,644.6	3,213.1	3,579.4	4,130.6	4,573.3	6,162.1	7,383.0	8,137.0
Annual Change (%)		9.7	21.5	11.4	15.4	10.7	34.7	19.8	10.2
% N.E./W.K.	13.0	12.9	12.7	14.1	16.5	19.5	18.9	19.7	19.2

APPENDIX 2 - BAb

GROSS DOMESTIC PRODUCT ORIGINATING FROM CONSTRUCTION

(Million Baht)	NORTHEAST THAILAND, 1960 - 1968									Constant 1962 Prices
	1960	1961	1962	1963	1964	1965	1966	1967	1968	
Private	325.5	333.4	367.5	442.6	475.0	581.0	551.1	572.7	672.7	
Public	22.3	27.4	40.4	60.4	200.3	289.5	498.7	710.4	747.4	
Total Value Added (N.E.)	347.8	360.8	408.0	503.0	675.3	870.5	1,049.9	1,283.1	1,375.3	
Growth Rate		3.7	13.1	23.3	34.3	28.9	20.6	22.2	7.2	
Whole Kingdom	2,690.3	2,836.8	3,213.1	3,561.9	4,095.9	4,471.8	5,519.5	6,547.8	7,226.1	
Growth Rate		5.4	13.3	10.9	15.0	9.2	23.4	18.6	10.5	
% N.E./W.K.	12.93	12.73	12.70	14.12	16.49	19.47	19.02	19.60	19.01	

## APPENDIX 2 - B9a

## GROSS DOMESTIC PRODUCT ORIGINATING FROM ELECTRICITY AND WATER SUPPLY

NORTHEAST THAILAND, 1960 - 1969

(Million Baht)

At  
Current  
Prices

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969 <sup>E</sup>
Electricity	12.8	14.7	18.5	18.6	21.7	30.7	32.5	44.3	55.6	71.8
Water Supply	1.8	2.1	3.6	4.0	4.5	6.1	8.9	17.4	15.2	19.6
Total Value Added	14.6	16.8	22.1	22.6	26.2	36.8	41.4	56.7	70.8	91.4
Annual Change (%)		15.0	31.4	2.1	16.0	40.2	12.8	36.9	24.8	29.1
Whole Kingdom	227.1	304.4	377.6	426.5	527.5	672.6	891.7	1,077.7	1,303.3	1,556.5
Annual Change (%)		34.0	24.0	13.0	23.7	27.5	32.6	20.9	20.9	19.4
% N.E./W.K.	6.43	5.55	5.85	5.30	4.97	5.47	4.64	5.26	5.43	5.87

E Estimated

## APPENDIX 2 - R9b

## GROSS DOMESTIC PRODUCT ORIGINATING FROM ELECTRICITY AND WATER SUPPLY

(Million Baht)	NORTHEAST THAILAND, 1960 - 1969										Constant 1962 Prices
	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969 <sup>E</sup>	
Electricity	11.3	14.6	18.5	19.7	25.7	33.6	42.3	58.4	100.6	130.3	
Water Supply	1.9	2.3	3.6	4.2	5.1	7.5	10.4	13.7	16.6	23.0	
		19.4	56.4	17.0	20.0	47.7	38.9	31.6	21.3	28.6	
Total Value Added	13.2	16.9	22.1	23.9	30.8	41.1	52.7	72.1	117.2	162.3	
Whole Kingdom	241.3	27.9	31.3	8.0	28.6	33.7	28.2	36.8	62.6	28.5	
Growth Rate		35.0	15.9	2.2	23.8	27.4	32.9	21.4	21.0	20.1	
% N.E./W.K.	5.47	5.19	5.85	6.19	6.43	6.75	6.51	7.34	9.87	11.4	

E Estimated

APPENDIX 2 - B10a

GROSS DOMESTIC PRODUCT ORIGINATING FROM TRANSPORTATION AND COMMUNICATION

NORTHEAST THAILAND, 1960 - 1968

(Million Baht)

at  
Current  
Prices

	1960	1961	1962	1963	1964	1965	1966	1967	1968	(1969) <sup>E</sup>
<u>Private</u> Transportation	250.3	305.2	346.7	354.4	382.3	467.8	523.8	589.8	658.3	
<u>Public</u>	67.6	76.7	101.1	95.9	97.3	94.7	102.0	123.7	133.3	
Transportation	56.7	65.0	88.1	83.5	82.2	72.5	71.6	84.9	94.0	
Communication	10.9	11.7	13.0	12.4	15.1	22.2	30.4	38.8	39.3	
Value Added, Transportation and Communication	317.9	381.9	447.8	450.3	479.6	562.5	625.8	713.5	791.6	844.2
Annual Change (%)		20.1	17.3	0.6	6.5	17.3	11.3	14.0	10.9	6.7
Whole Kingdom	4,043.9	4,257.9	4,632.9	4,788.7	5,469.2	5,977.4	6,235.6	6,812.4	7,327.8	
Annual Change (%)		5.3	8.8	3.4	14.2	9.3	5.8	7.7	7.5	
% N.E./W.K.	7.86	8.97	9.67	9.40	8.77	9.41	10.05	10.48	10.81	

E Estimated

## APPENDIX 2 - B10b

## GROSS DOMESTIC PRODUCT ORIGINATING FROM TRANSPORTATION AND COMMUNICATION

(Million Baht)	NORTHEAST THAILAND, 1960 - 1968									Constant 1962 Prices
	1960	1961	1962	1963	1964	1965	1966	1967	1968	(1969) <sup>E</sup>
<u>Private</u> Transportation	248.3	302.8	346.7	354.4	380.1	459.2	514.1	579.4	646.0	
<u>Public</u>	67.5	76.5	101.1	95.9	97.2	94.4	101.6	122.8	132.7	
Transportation	56.7	64.9	88.1	83.6	82.2	72.5	71.6	84.9	92.9	
Communication	10.8	11.6	13.0	12.3	15.0	21.9	30.0	37.9	39.8	
Value Added, Transportation and Communication	315.8	379.3	447.8	450.3	477.2	553.6	615.7	707.2	778.7	902.5
Growth Rate		20.1	18.0	0.6	6.0	16.0	11.2	14.0	10.9	2.1
Whole Kingdom	4,224.1	4,248.5	4,632.9	4,795.5	5,353.2	5,608.2	6,013.2	6,523.8	6,865.3	
Growth Rate		0.6	9.0	3.5	11.6	4.8	7.2	21.4	21.0	
% N.E./W.K.	7.48	8.93	9.57	9.39	8.92	9.87	10.24	10.76	11.34	

E Estimated

APPENDIX 2 - B11a

GDP ORIGINATING FROM WHOLESALE AND RETAIL TRADE

NORTHEAST THAILAND, 1960 - 1968

At  
Current  
Prices

(Million Baht)

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
Import	610.3	655.0	729.6	786.3	811.6	898.5	1,058.8	1,209.1	1,340.7	
Intermediate Goods	63.8	72.8	78.9	108.4	168.7	70.3	75.6	111.3	118.2	
Capital Goods	99.2	123.1	150.7	190.6	205.9	233.8	339.2	375.5	451.3	
Consumer Goods	447.3	459.1	500.0	487.3	547.0	594.4	644.0	721.3	771.2	
Domestic	615.2	693.8	643.6	768.2	789.7	930.4	1,227.6	1,046.3	1,093.5	
Agriculture	375.9	387.9	437.4	390.6	403.0	517.2	634.1	398.4	454.6	
Manufacturing & Mining	239.3	305.9	206.2	377.6	386.7	413.2	593.5	647.9	638.9	
Total Value Added	1,225.5	1,348.8	1,373.2	1,554.5	1,611.3	1,828.9	2,286.4	2,246.4	2,434.2	
Growth Rate		10.0	1.9	13.2	3.7	13.5	25.1	-1.8	8.4	
Whole Kingdom	8,342.8	9,202.5	10,065.8	11,103.9	13,458.3	13,528.0	16,639.3	18,538.3	19,945.5	
Growth Rate		10.5	9.4	10.3	21.2	0.5	23.0	11.4	7.6	
% N.E./W.K.	14.68	14.65	13.64	14.00	11.97	13.51	13.74	12.12	12.20	

## APPENDIX 2 - B11b

## GDP ORIGINATING FROM WHOLESALE AND RETAIL TRADE

NORTHEAST THAILAND, 1960 - 1968

(Million Baht)

Constant  
1962  
Prices

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
Import	603.6	648.1	729.6	776.8	827.4	888.5	1,047.5	1,223.8	1,343.1	
Intermediate Goods	60.7	68.4	78.9	109.7	69.4	70.6	77.6	106.7	128.3	
Capital Goods	96.3	116.0	150.7	179.5	207.7	224.6	348.6	413.3	463.7	
Consumer Goods	446.6	463.7	500.0	487.6	550.3	593.3	621.7	703.8	751.1	
Domestic	629.9	714.6	643.6	768.3	766.9	877.8	1,051.4	1,015.4	988.1	
Agriculture	382.8	418.4	297.4	405.5	399.6	487.6	539.8	454.6	428.7	
Manufacturing & Mining	247.1	296.2	346.2	362.8	367.3	390.2	511.6	560.8	559.4	
Total Value Added	1,233.5	1,362.7	1,373.2	1,545.1	1,594.3	1,766.3	2,098.9	2,239.2	2,331.2	
Growth Rate		10.5	0.8	12.6	3.2	10.8	18.8	6.7	4.1	
Whole Kingdom	8,755.7	9,540.1	10,065.8	11,126.4	12,502.8	12,944.7	14,501.8	16,629.0	18,462.7	
Growth Rate		9.0	5.5	10.5	12.4	3.5	12.0	14.7	11.0	
% N.E./W.K.	13.80	17.02	13.45	13.72	12.60	13.50	14.32	13.32	12.49	

## APPENDIX 2 - B12a

## GDP ORIGINATING FROM BANKING, INSURANCE AND REAL ESTATE

NORTHEAST THAILAND, 1960 - 1968

(Million Baht)

At  
Current  
Prices

	1960	1961	1962	1963	1964	1965	1966	1967	1968	(1969) <sup>E</sup>
Banks & other Financial Ins.	21.1	26.3	32.9	37.8	43.6	54.2	70.1	90.1	108.6	
Insurance & Real Estate	4.8	5.9	8.6	9.9	13.2	15.9	32.2	51.6	58.9	
Total Value Added	25.9	32.3	41.5	47.7	56.8	70.2	102.3	141.7	167.4	191.3
Annual Change (%)		25.1	28.6	14.9	19.0	23.7	45.9	38.5	18.1	14.2
Whole Kingdom	1,049.5	1,245.3	1,480.3	1,628.1	1,914.6	2,217.5	2,822.1	3,435.6	4,053.9	
Annual Change (%)		18.7	18.9	10.0	17.6	15.8	27.3	21.7	18.0	
% N.W./W.K.	2.46	2.59	2.80	2.92	2.96	3.16	3.62	4.12	4.12	

E Estimated

## APPENDIX 2 - B12b

## GDP ORIGINATING FROM BANKING, INSURANCE AND REAL ESTATE

(Million Baht)

NORTHEAST THAILAND, 1960 - 1968

Constant  
1962  
Prices

	1960	1961	1962	1963	1964	1965	1966	1967	1968	(1969) <sup>E</sup>
Banks and Other Financial Ins.	21.8	27.0	32.9	37.4	42.3	52.2	63.8	79.8	93.7	
Insurance and Real Estate	4.9	6.1	8.6	9.8	12.8	15.4	29.3	45.7	50.8	
Total Value Added	26.8	33.1	41.5	47.2	55.1	67.6	93.1	125.4	144.6	161.9
Growth Rate		23.5	25.4	13.9	16.7	22.6	37.7	34.7	15.3	12.0
Whole Kingdom	1,088.6	1,275.9	1,480.3	1,613.5	1,860.7	2,136.3	2,620.3	3,067.5	3,556.1	
Growth Rate		17.2	16.0	9.0	15.3	14.8	22.7	17.1	15.9	
% N.E./W.K.	2.46	2.59	2.80	2.93	2.96	3.16	3.55	4.09	4.07	

E Estimated

APPENDIX 2 - B13a

GROSS DOMESTIC PRODUCT ORIGINATING FROM OWNERSHIP OF DWELLINGS

NORTHEAST THAILAND, 1960 - 1968

(Million Baht)

At  
Current  
Prices

	1960	1961	1962	1963	1964	1965	1966	1967	1968	(1969) <sup>E</sup>
Ownership of Dwellings	239.3	247.8	257.4	270.0	287.8	308.4	338.7	367.5	384.7	414.9
Growth Rate (%)		3.6	3.9	4.9	6.6	7.2	9.8	8.5	4.7	
Whole Kingdom	1,541.5	1,615.2	1,703.1	1,788.1	1,912.7	2,058.3	2,232.5	2,344.2	2,461.4	
Growth Rate (%)		4.8	5.4	5.0	7.0	7.6	8.5	5.0	5.0	
% N.E./W.K.	15.5	15.3	15.1	15.1	15.0	15.0	15.2	15.7	15.6	15.5

E Estimated

## APPENDIX 2 - B13b

## GROSS DOMESTIC PRODUCT ORIGINATING FROM OWNERSHIP OF DWELLINGS

(Million Baht)

NORTHEAST THAILAND, 1960 - 1968

Constant  
1962  
Prices

	1960	1961	1962	1963	1964	1965	1966	1967	1968	(1969) <sup>E</sup>
Ownership of Dwellings	250.0	253.9	257.4	264.2	271.3	278.6	285.8	294.0	301.9	310.1
Growth Rate		1.6	1.4	2.7	2.7	2.7	2.6	2.9	2.7	2.8
Whole Kingdom	1,610.8	1,655.0	1,703.1	1,749.6	1,802.7	1,859.3	1,931.3	2,008.7	2,082.4	
Growth Rate		2.7	2.9	2.7	3.0	3.1	3.9	4.0	3.7	
% N.E./W.K.	15.5	15.3	15.1	15.1	15.0	15.0	14.8	14.6	14.5	

E Estimated

## APPENDIX 2 - B14a

## GDP ORIGINATING FROM PUBLIC ADMINISTRATION AND DEFENCE

NORTHEAST THAILAND, 1960 - 1969

(Million Baht)

At  
Current  
Prices

	1960	1961	1962	1963	1964	1965	1966	1967	1968 <sup>E</sup>	1969 <sup>E</sup>
Public Administration and Defence	428.4	457.2	487.8	536.3	562.5	613.1	649.2	731.6	860.7	956.0
Annual Change (%)		6.7	6.7	9.9	4.9	9.0	5.9	12.7	17.6	11.1
Whole Kingdom	2,493.3	2,648.5	2,847.5	3,149.5	3,301.3	3,589.2	3,814.2	4,286.6	5,033.8	5,591.0
Annual Change (%)		6.2	7.5	10.6	4.8	8.7	6.3	12.4	17.4	11.1
% N.E./W.K.	17.18	17.26	17.13	17.03	17.04	17.08	17.02	17.07	17.10	17.10

E Estimated

## APPENDIX 2 - B14b

## GDP ORIGINATING FROM PUBLIC ADMINISTRATION AND DEFENCE

(Million Baht)

NORTHEAST THAILAND, 1960 - 1969

Constant  
1962  
Prices

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969 <sup>E</sup>
Public Administration and Defence	444.4	468.4	487.8	531.5	546.6	590.7	590.7	647.4	743.3	809.5
Growth Rate		5.4	4.1	9.0	2.9	8.1	-	9.6	14.8	8.9
Whole Kingdom	2,586.4	2,713.6	2,847.5	3,121.4	3,208.3	3,457.8	3,541.5	3,827.3	4,415.6	
Growth Rate		4.9	4.9	9.6	2.8	7.8	2.4	8.1	15.4	
% N.E./W.K.	17.18	17.26	17.13	17.03	17.04	17.08	16.68	16.92	16.83	

E Estimated

## APPENDIX 2 - B15a

## GROSS DOMESTIC PRODUCT ORIGINATING FROM SERVICES

(Million Baht)

NORTHEAST THAILAND, 1960 - 1968

At  
Current  
Prices

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
Education	290.1	320.0	355.0	390.8	431.2	462.8	514.0	574.5	643.0	
Medical and Health	45.1	48.5	56.3	59.4	65.7	73.2	85.6	94.4	104.8	
Recreation and Entertainment	46.8	51.0	56.9	61.7	68.1	73.0	82.6	96.9	114.2	
Domestics	58.1	61.7	66.2	70.1	75.5	80.6	90.1	97.9	106.1	
Hotels and Restaurants	129.2	142.4	158.9	179.6	209.5	233.2	290.7	350.3	458.5	
Laundries, Barber Shops and Other Personal Services	54.9	57.1	60.0	65.1	68.8	73.3	77.8	97.0	104.6	
Religious Org., Welfare Inst. Legal Services, Trade Associations, etc.	144.0	151.0	161.5	169.9	179.8	189.7	209.0	221.9	237.6	
Total Value Added	768.1	831.8	914.7	996.7	1,098.7	1,185.9	1,349.8	1,524.0	1,768.9	
Growth Rate		8.3	10.0	9.0	10.2	7.9	13.8	12.9	16.1	
Whole Kingdom	5,092.6	5,469.9	5,983.0	6,397.3	7,042.4	7,851.6	9,011.8	10,382.8	11,672.2	
Growth Rate		7.4	9.4	6.9	10.1	11.5	14.8	15.2	12.4	
% N.E./W.K.	15.08	15.21	15.29	15.58	15.60	15.10	14.98	14.68	15.16	

## APPENDIX 2 - B15b

## GROSS DOMESTIC PRODUCT ORIGINATING FROM SERVICES

(Million Baht)

NORTHEAST THAILAND, 1960 - 1968

Constant  
1962  
Prices

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
Educations	300.9	327.9	355.0	387.3	419.1	445.9	467.7	508.4	555.3	
Medical and Health	45.8	48.9	56.3	59.2	64.9	71.3	81.4	89.7	97.5	
Recreation and Entertainment	46.3	50.7	56.9	62.5	68.1	73.8	83.3	97.0	114.1	
Domestics	60.3	63.2	66.2	69.5	73.4	77.6	82.0	86.6	91.6	
Hotels and Restaurants	136.4	147.1	158.9	179.8	201.1	222.6	248.9	288.6	361.0	
Laundries Barber Shops and Other Personal Services	55.8	57.8	60.0	63.5	67.0	70.6	74.6	81.7	96.0	
Religious Org., Welfare Ins. - Legal Services Trade Asso., etc.	149.3	154.8	161.5	168.4	174.8	182.8	190.2	196.3	205.2	
Total Value Added	794.8	850.5	914.7	990.1	1,068.3	1,144.9	1,228.0	1,348.4	1,520.7	
Growth Rate		7.0	7.5	8.2	7.9	7.2	7.3	9.8	12.8	
Whole Kingdom	5,274.5	5,591.8	5,983.0	6,378.9	6,849.0	7,576.9	8,323.8	9,156.7	10,078.2	
Growth Rate		6.0	7.0	6.6	7.4	10.6	9.9	10.0	10.1	
% N.E./W.K.	15.06	15.20	15.28	15.52	15.59	15.11	14.73	14.72	15.08	

APPENDIX

BASE DATA FOR COMPOSITE ECONOMIC INDEX  
WHOLE KINGDOM & PRINCIPAL REGIONS  
1960, 1965 - 1968

		1965 - 1967 - 100 %																			
		1960		1965		1966		1967		1968		1960		1965		1966		1967		1968	
I CONSTRUCTION PERMITS (NUMBER)		%	%	%	%	%	%	%	%	V COMMERCIAL BANK DEPOSITS (MILLIONS BAHT)		%	%	%	%	%	%	%	%	%	
A. WHOLE KINGDOM	515,501	79.1	624,675	95.8	651,965	100.0	679,917	104.3	713,034	109.4	A. WHOLE KINGDOM	5,064.1	28.9	14,034.7	80.2	17,676.9	101.2	20,908.9	119.5	24,616.2	140.6
B. W.K. LESS BANGKOK/THONBURI	274,227	83.5	315,381	96.2	328,710	100.2	339,731	103.5	351,289	107.1	B. W.K. LESS BANGKOK/THONBURI	-	-	3,738.1	77.6	4,974.0	103.1	5,783.7	119.4	6,666.3	138.1
C. BANGKOK/THONBURI	241,274	74.5	309,294	95.4	323,255	100.0	340,186	105.0	361,745	111.6	C. BANGKOK/THONBURI	-	-	10,296.6	81.9	12,702.9	100.0	15,145.2	119.2	17,950.0	141.3
D. NORTH	65,652	74.1	73,223	97.5	74,429	99.2	77,664	103.6	78,841	105.1	D. NORTH	-	-	918.0	78.5	1,224.9	104.7	1,368.2	117.0	1,534.8	131.1
E. NORTHEAST	53,537	79.1	63,459	94.1	68,501	101.3	71,134	105.2	75,037	110.9	E. NORTHEAST	-	-	615.8	75.1	842.0	102.7	1,001.8	122.2	1,169.7	140.2
F. CENTRAL EXCLUDED BKK/THON.	-	-	-	-	38,930	100.0	39,754	100.5	41,007	105.4	F. CENTRAL EXCLUDED BKK/THON.	-	-	1,015.5	70.0	1,488.7	102.7	1,848.2	127.4	2,343.5	161.8
G. SOUTH	57,615	80.4	67,923	94.8	72,191	100.7	74,844	104.4	79,002	110.5	G. SOUTH	-	-	1,188.8	83.8	1,418.4	102.5	1,545.4	111.6	1,638.4	119.3
II COMMERCIAL VEHICLE REGISTRATIONS (NUMBER)												VI TELEPHONES IN USE (NUMBER)									
A. WHOLE KINGDOM	65,620	60.8	99,026	91.7	111,731	103.4	114,123	105.7	120,485	111.6	A. WHOLE KINGDOM	-	-	77,669	88.9	86,007	98.5	98,376	112.6	114,430	130.1
B. W.K. LESS BANGKOK/THONBURI	35,920	49.6	63,720	88.0	75,926	104.9	77,466	107.0	78,538	108.5	B. W.K. LESS BANGKOK/THONBURI	-	-	16,302	81.1	20,357	101.3	23,958	117.2	27,008	134.4
C. BANGKOK/THONBURI	29,700	82.7	35,306	98.3	35,805	100.0	36,657	102.1	41,947	116.8	C. BANGKOK/THONBURI	-	-	61,367	91.2	65,650	97.5	74,818	111.2	87,422	130.0
D. NORTH	-	-	11,820	91.1	13,435	103.5	13,683	105.4	13,866	107.0	D. NORTH	-	-	3,978	81.1	4,956	101.0	5,782	117.9	6,275	127.9
E. NORTHEAST	-	-	13,069	90.9	14,823	103.5	15,138	105.7	15,384	107.0	E. NORTHEAST	-	-	3,422	80.0	4,249	99.5	5,137	120.3	5,950	138.4
F. CENTRAL EXCLUDED BKK/THON.	-	-	29,903	85.4	37,171	106.2	37,928	108.4	38,426	109.8	F. CENTRAL EXCLUDED BKK/THON.	-	-	4,262	81.0	5,356	101.8	6,171	117.3	7,526	143.1
G. SOUTH	-	-	8,928	88.8	10,497	104.5	10,717	106.8	10,862	108.2	G. SOUTH	-	-	4,695	83.1	5,796	102.6	6,468	114.5	7,297	128.4
III POWER CONSUMPTION (MILLIONS KWH)												VII BUSINESS TAXES (MILLIONS BAHT)									
A. WHOLE KINGDOM	-	-	874.3	71.2	892.4	94.3	1,271.9	134.4	1,609.2	170.0	A. WHOLE KINGDOM	554.1	23.7	1,996.4	85.0	2,265.9	97.0	2,753.3	117.7	3,175.9	135.7
B. W.K. LESS BANGKOK/THONBURI	-	-	85.3	61.6	142.4	102.9	187.5	135.5	283.3	204.7	B. W.K. LESS BANGKOK/THONBURI	201.2	40.4	413.1	83.0	438.4	88.0	643.4	129.2	845.1	109.4
C. BANGKOK/THONBURI	-	-	589.0	72.9	750.0	92.8	1,084.4	134.2	1,325.9	164.1	C. BANGKOK/THONBURI	352.9	19.1	1,583.3	86.0	1,827.5	99.9	2,109.9	114.7	2,630.8	143.0
D. NORTH	-	-	-	-	-	-	-	-	-	-	D. NORTH	31.7	63.8	49.2	93.6	48.6	100.8	58.8	122.0	66.2	137.3
E. NORTHEAST	-	-	-	-	11.8	78.7	18.3	122.2	35.9	239.5	E. NORTHEAST	30.3	47.7	50.7	79.2	66.1	103.3	75.4	118.1	80.7	126.1
F. CENTRAL EXCLUDED BKK/THON.	-	-	47.0	75.8	55.0	88.7	84.0	135.8	100.4	162.0	F. CENTRAL EXCLUDED BKK/THON.	55.4	22.5	181.5	74.1	184.4	73.2	370.4	151.2	266.7	109.0
G. SOUTH	-	-	38.3	49.0	75.6	96.4	121.2	134.8	147.4	188.0	G. SOUTH	83.7	60.7	135.8	98.4	139.3	101.0	138.9	100.6	131.5	93.3
IV RAILWAY FREIGHT LOADINGS ( TONS )												VIII PERSONAL INCOME TAXES ( BAHT )									
A. WHOLE KINGDOM	3,684,276	76.1	4,434,830	91.4	4,820,051	100.0	5,264,129	108.8	5,566,254	115.0	A. WHOLE KINGDOM	306,212,128	45.7	617,935,201	86.8	691,698,509	97.1	827,329,902	116.2	984,394,251	138.2
B. W.K. LESS BANGKOK/THONBURI	-	-	3,466,451	91.5	3,778,785	100.3	4,057,335	107.6	4,422,036	117.3	B. W.K. LESS BANGKOK/THONBURI	110,237,870	47.5	190,451,283	82.1	250,642,587	108.0	254,826,865	108.9	282,377,903	123.9
C. BANGKOK/THONBURI	-	-	968,379	90.3	1,041,266	97.3	1,206,794	112.8	1,144,218	106.9	C. BANGKOK/THONBURI	194,974,258	40.4	427,483,918	89.0	441,055,921	91.9	572,503,036	119.3	702,017,951	148.3
D. NORTH	-	-	1,036,758	90.0	1,125,705	97.5	1,298,331	112.5	1,368,337	118.6	D. NORTH	23,615,548	50.9	36,749,427	79.2	56,314,205	122.6	46,005,971	99.1	55,263,478	119.1
E. NORTHEAST	-	-	655,693	98.5	615,496	92.2	729,180	109.3	876,071	131.3	E. NORTHEAST	23,318,171	38.3	46,541,834	87.8	56,895,440	107.4	55,587,352	105.0	66,342,684	125.2
F. CENTRAL EXCLUDED BKK/THON.	-	-	1,147,031	91.4	1,365,484	108.8	1,253,656	100.0	1,386,870	110.5	F. CENTRAL EXCLUDED BKK/THON.	34,258,185	44.3	63,519,813	81.2	79,773,938	103.1	88,534,410	114.4	100,312,388	129.6
G. SOUTH	-	-	626,969	90.6	672,100	91.1	776,168	112.2	790,758	114.3	G. SOUTH	32,045,966	59.1	43,340,209	80.0	54,458,965	100.4	64,696,933	119.3	82,438,742	118.2

SOURCE:

COMPILED BY NATIONAL ACCOUNTS DIVISION, NEOB.

LOUIS BERGER, INC. - SYSTEMS ASSOCIATES, INC.

APPENDIX 2-D1  
 BUSINESS TAXES COLLECTED ( MILLIONS OF BAHT )  
 NORTHEAST THAILAND 1962, 1965-8

	1962 (2505)		1965 (2508)			1966 (2509)			1967 (2510)			1968 (2511)		
	NUMBER ESTAB'MT PAYING TAXES	BUSINESS TAXES COLLECTED	NUMBER ESTAB'MT PAYING TAXES	INCOME	BUSINESS TAXES COLLECTED	NUMBER ESTAB'MT PAYING TAXES	INCOME	BUSINESS TAXES COLLECTED	NUMBER ESTAB'MT PAYING TAXES	INCOME	BUSINESS TAXES COLLECTED	NUMBER ESTAB'MT PAYING TAXES	INCOME	BUSINESS TAXES COLLECTED
1. LOEI	880	0.56	1,608	30.22	0.87	1,198	38.65	1.51	3,453	46.82	1.38	5,428	60.38	1.60
2. UDORN	3,760	5.84	4,597	249.75	7.76	4,993	292.26	10.63	16,003	384.45	10.49	30,530	383.58	12.29
3. NONGKAI	1,748	1.60	1,858	83.34	2.43	2,181	99.15	2.51	4,628	133.83	3.60	8,955	149.84	4.51
4. SAKOLNAKORN	1,828	3.17	2,419	79.87	2.52	2,554	100.49	2.90	8,602	103.45	2.96	22,708	113.81	3.30
5. NAKORN PHANOM	1,744	1.36	1,757	54.05	1.95	1,902	52.67	2.11	6,515	75.42	2.75	8,874	96.25	2.84
6. UBOL	3,906	4.95	4,788	145.81	5.94	5,078	168.43	7.08	13,624	176.05	6.81	21,784	223.32	8.64
7. SISAKET	1,378	1.29	1,824	37.55	1.37	2,039	37.96	1.41	7,190	48.86	1.37	10,091	53.86	1.34
8. SURIN	1,688	2.87	2,051	56.88	2.42	2,269	73.55	3.28	2,335	63.27	2.87	12,264	96.75	3.23
9. ROI-ED	2,081	1.26	2,626	52.37	1.61	2,946	58.83	1.80	9,688	73.53	2.47	11,861	88.35	2.74
10. KALASIN	1,097	0.77	1,643	55.25	1.54	1,777	66.54	1.88	5,650	80.00	2.27	9,022	79.42	2.53
11. MAHASARAKARM	1,261	1.17	1,595	30.57	0.69	1,714	34.74	0.81	4,688	40.50	0.88	5,237	42.88	0.91
12. KHONKAEN	3,179	4.10	3,805	316.04	8.14	3,551	193.92	6.55	13,387	372.50	11.05	23,936	409.05	13.21
13. CHAYAPHUM	1,478	1.80	1,698	77.84	2.37	1,914	73.73	2.88	5,231	81.01	2.71	7,815	84.82	2.66
14. NAKORNRAJASIMA	4,085	6.47	5,970	363.85	9.06	6,832	486.87	18.59	21,471	519.97	20.18	26,474	480.78	16.93
15. BURIRAM	1,558	2.15	2,240	56.31	2.05	2,328	102.39	2.19	5,351	93.05	3.57	7,681	87.30	3.32
<b>TOTAL NORTHEAST</b>	<b>31,671</b>	<b>39.36</b>	<b>39,939</b>	<b>1,689.70</b>	<b>50.70</b>	<b>43,276</b>	<b>1,880.17</b>	<b>66.13</b>	<b>127,816</b>	<b>2,292.72</b>	<b>75.36</b>	<b>212,660</b>	<b>2,450.37</b>	<b>80.05</b>
<b>WHOLE KINGDOM</b>		<b>1,390.50</b>		<b>1,996.40</b>			<b>2,265.90</b>			<b>2,753.30</b>			<b>3,175.90</b>	
<b>PERCENTAGE NE / W.K.</b>		<b>2.80</b>		<b>2.50</b>			<b>2.90</b>			<b>2.70</b>			<b>2.50</b>	

SOURCE : REVENUE DEPARTMENT, MINISTRY OF FINANCE

COMPILED BY : NATIONAL ACCOUNTS DIVISION, N.E.D.B.

**APPENDIX 2-D2**  
**MUNICIPAL TAXES ( IN BAHT )**  
**( EXCLUDING FINES AND LICENSE TAXES )**

**NORTHEAST THAILAND 1960-1968**

FIRST LINE - MUNICIPAL TAXES ( IN BAHT )  
 SECOND LINE - % CHANGE FROM PREVIOUS YEAR

	1960	1961	1962	1963	1964	1965	1966	1967	1968
1. LOEI	95,876	127,253	180,323	220,158	244,835	230,238	315,390	404,453	438,655
	-	32.73	41.70	22.09	11.20	-6.33	36.98	28.23	8.46
2. UDORN	882,445	1,451,730	1,725,534	2,016,446	2,433,774	2,782,005	3,228,838	4,984,234	4,909,191
	-	64.51	18.87	16.80	20.73	14.29	16.06	54.35	-1.53
3. NONGKAI	675,092	509,782	607,143	707,702	1,004,782	912,415	1,058,966	1,296,528	1,351,414
	-	-32.62	19.10	16.56	41.98	-10.12	16.06	22.43	4.23
4. SAKOLNAKORN	178,445	178,110	289,145	390,032	491,427	473,347	749,910	798,724	956,722
	-	-0.19	62.34	34.93	25.96	-3.82	58.43	6.51	19.78
5. NAKORN PHANOM	381,393	549,669	549,689	605,746	533,893	745,427	864,714	981,020	1,088,258
	-	44.12	0.01	10.20	4.65	17.59	16.00	13.45	10.93
6. UBOL	865,557	1,150,469	1,996,563	2,290,778	2,482,271	2,214,733	2,582,801	4,169,117	4,390,202
	-	79.13	28.77	14.74	8.36	-12.08	16.62	61.42	5.30
7. SISAKET	238,836	316,212	509,797	890,706	692,663	633,051	761,294	913,687	1,017,084
	-	32.67	61.22	74.72	-28.59	-9.42	20.26	20.02	11.32
8. SURIN	359,060	449,548	587,667	810,916	821,438	798,173	751,693	838,864	1,113,883
	-	25.20	30.72	37.99	1.30	-2.91	-6.18	11.60	32.78
9. ROI-ED	222,300	440,595	608,825	773,856	854,490	597,090	739,897	1,276,162	1,225,764
	-	98.20	38.18	27.11	7.83	-39.76	23.92	72.48	-4.11
10. KALASIN	145,139	209,653	300,824	318,530	375,200	404,468	409,121	529,305	565,185
	-	44.45	43.49	5.88	17.79	7.80	1.15	29.38	6.78
11. MAHASARAKHAM	516,308	650,674	756,319	1,001,179	1,030,630	736,506	705,879	729,243	721,421
	-	26.02	16.24	32.37	2.94	-39.16	-4.39	3.31	-1.08
12. KHONKAEN	850,676	1,278,988	855,435	2,047,915	2,004,383	2,556,740	2,824,471	3,605,600	3,534,012
	-	50.35	-49.51	139.40	-2.17	27.56	10.47	27.65	-2.02
13. CHAIYAPHUM	171,500	303,582	580,191	805,219	648,681	1,097,973	689,898	1,349,961	1,301,814
	-	77.01	91.11	38.78	-24.13	68.49	-58.42	95.67	-3.70
14. NAKORNRAJSIMA	1,266,636	1,647,513	1,900,148	3,041,209	3,852,215	4,731,244	4,868,957	5,475,267	6,776,594
	-	30.07	15.35	60.02	26.67	4.65	20.78	12.45	23.77
15. BURIRAM	262,165	425,591	473,499	1,232,598	753,175	724,055	915,966	918,185	1,035,925
	-	62.34	11.26	160.32	-63.65	-4.02	26.50	0.24	12.82
<b>TOTAL NORTHEAST</b>	<b>7,111,928</b>	<b>10,089,369</b>	<b>11,921,460</b>	<b>17,153,090</b>	<b>18,303,857</b>	<b>18,932,965</b>	<b>21,467,825</b>	<b>28,270,350</b>	<b>30,426,124</b>
<b>% CHANGE FROM PREVIOUS YEAR</b>	<b>-</b>	<b>41.9</b>	<b>18.1</b>	<b>43.9</b>	<b>6.7</b>	<b>3.4</b>	<b>13.4</b>	<b>31.7</b>	<b>7.6</b>
<b>THREE YEARS AVE. GROWTH RATE</b>	<b>-</b>	<b>33.1</b>	<b>34.6</b>	<b>22.9</b>	<b>18.0</b>	<b>7.8</b>	<b>16.2</b>	<b>17.6</b>	<b>13.8</b>
<b>PERCENTAGE NORTHEAST/W.K.</b>	<b>4.3</b>	<b>6.1</b>	<b>5.0</b>	<b>5.7</b>	<b>5.4</b>	<b>5.1</b>	<b>5.0</b>	<b>5.6</b>	<b>-</b>

SOURCE : MUNICIPAL YEAR BOOK.  
 COMPILED BY : NATIONAL ACCOUNTS DIVISION, N.E.D.B.

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**APPENDIX 2 - E**  
**SUMMARY OF SELECTED REGIONAL STATISTICS**  
**NORTHEAST THAILAND**  
**1963 - 1969**

SUBJECT	WHOLE KINGDOM TOTAL	NORTHEAST TOTAL	KALASIN	KHON KAEN	CHAIYAPHUM	NAKHONPHANOM	NAKHON RATCHASIMA	BURIRUM	MAHASARAKHAM	ROI-ET	LOEI	SISAKET	SAKONNAKHON	SURIN	NONGKHAI	UDON THANI	UDON RATCHATHANI	
AGRICULTURAL STATIONS	1969	99	4	15	1	4	23	2	6	5	6	3	8	4	5	3	10	
IRRIGATION TANKS	1969	150	12	14	7	9	18	8	11	6	15	7	5	11	3	13	11	
IRRIGABLE AREA OF THESE TANKS	1968	74,492	10,607	3,476	915	9,152	7,848	4,835	8,595	2,167	7,149	3,827	696	6,048	1,539	2,411	5,227	
POTABLE WATER PROJECTS	1968	135	-	11	3	16	2	8	8	21	4	2	16	6	19	1	18	
INDUSTRIAL CENSUS 1964	A) NUMBERS OF ESTABLISHMENT	164,002	76,687	2,817	11,831	1,939	9,468	7,622	3,371	12,027	2,967	1,492	1,826	3,453	3,327	2,647	4,995	6,902
	B) NUMBERS EMPLOYED	481,213	107,894	7,220	23,372	4,784	15,373	24,453	9,755	29,918	6,119	2,825	3,756	6,055	6,973	5,066	13,037	12,168
NUMBER OF DOCTORS	1963	-	229	6	19	7	9	65	10	7	10	6	6	7	14	10	16	35
	1964	-	207	6	28	8	11	50	10	6	9	7	7	10	-	15	21	
	1965	-	236	7	29	10	13	49	13	8	12	8	7	11	11	15	20	
	1966	-	233	7	31	10	10	46	12	6	11	8	7	8	14	11	17	35
	1967	5,000 <sup>a</sup>	229	7	31	11	13	45	11	7	10	9	7	11	13	12	16	26
NUMBER OF DENTISTS	1963	-	40	1	2	3	2	12	2	1	2	-	1	2	1	2	2	7
	1964	-	28	2	-	2	2	8	2	1	2	-	1	-	-	3	4	
	1965	-	30	2	2	2	1	6	2	1	2	-	1	1	2	3	3	
	1966	-	28	2	2	2	1	3	2	1	2	-	2	2	1	2	3	
	1967	500 <sup>a</sup>	32	2	2	1	2	4	2	2	2	-	2	2	1	1	4	5
NUMBER OF PHARMACISTS	1963	-	36	1	2	1	1	9	3	1	1	-	4	2	3	1	4	3
	1964	-	19	1	2	1	1	4	1	1	1	1	1	1	-	1	2	
	1965	-	21	1	2	1	2	5	1	1	2	1	1	-	1	1	1	
	1966	-	21	1	2	1	2	3	1	1	1	1	1	1	1	1	2	
	1967	1,019	29	1	2	1	2	3	3	1	1	1	1	1	1	2	2	
NUMBER OF FIRST CLASS HEALTH CENTERS	1968	-	49	1	2	3	1	6	7	2	4	3	3	2	3	4	4	
NUMBER OF SECOND CLASS AND MIDWIFERY STATIONS	1968	-	432	21	41	18	26	25	14	15	23	27	18	30	55	35	36	46
TOTAL PIECES OF MAIL	1966	-	10,447,214	306,180	1,115,417	387,775	850,295	1,823,656	366,445	340,203	583,206	319,147	392,602	380,446	443,074	390,675	914,217	1,633,676
	1967	100,000,000 <sup>a</sup>	11,191,201	296,038	1,141,914	353,847	1,199,615	1,348,367	360,452	326,037	668,619	386,338	353,303	574,743	325,465	591,706	1,478,171	1,783,566
NUMBERS OF TELEGRAM MESSAGES DISPATCHED	1966	-	702,232	20,621	90,008	30,187	47,419	107,177	33,583	23,332	37,557	20,953	25,467	36,065	28,355	31,276	63,934	104,938
	1967	3,300,000 <sup>a</sup>	795,586	25,825	100,410	33,317	52,516	122,500	37,792	26,808	44,305	25,249	23,443	40,575	32,483	36,908	76,856	116,599
GENERAL HOSPITAL BEDS	1964	-	2,118	52	215	76	120	599	104	75	105	54	50	75	110	88	95	300
	1965	-	2,603	77	300	76	150	680	104	75	150	108	50	75	110	88	210	300
	1966	-	2,713	77	300	117	175	630	120	75	150	108	100	89	174	88	210	300
	1967	19,566	3,110	139	300	117	225	722	120	75	150	112	100	100	210	112	210	350
	1968	-	3,373	135	300	117	175	602	141	104	150	112	100	115	250	112	235	657

NOTE : <sup>a</sup> TOTAL KINGDOM ESTIMATES.

SOURCE : COMPILED BY REGIONAL DATA UNIT, NATIONAL STATISTICAL OFFICE.

APPENDIX 2-F  
MINERAL RESOURCES  
NORTHEAST THAILAND

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1968

<u>Resource</u>	<u>Changwat</u>	<u>General Geology &amp; Mineralogy</u>	<u>Production &amp; Reserves</u>	<u>Remarks</u>
Iron	Loei, Phu Yang, 8 km. southeast of Amphoe Chiang Khan (17°54'N., 101°40'E.)	Iron mineralization in surface, hematite-magnetite zone & a lower magnetite-pyrite zone. Deposit a bedded replacement in section of beds that strike east & have shallow dip south. Gangue mainly carbonate; deposit tabular.	Hematite-magnetite zone proven & probable reserves about 1.5 million tons 62.4% Fe; possible reserves 0.5 million tons. Magnetite-pyrite zone proven & probable reserves 9.25 million tons. 6.2% pyrite; possible reserves 3 million tons. No present production.	Deposit amenable to open-pit mining; magnetite can be separated by magnetic methods. Economic feasibility study, detailed topographic survey, additional drill holes & metallurgical testing of ore recommended by recent survey before exploitation of deposit.
	Loei, Phu Ang, 15 km. southeast of Loei (17°31'N., 101°35'E.)	Tuff, limestone, dolomite, & sandstone intruded by diorite stock. Contact metasomatic iron deposit; mainly overlapping lenses of hematite, magnetite, martite, & goethite. Average grade 56.3% Fe.	Proven & probable reserves in oxidized zone 7.6 million tons of 58.6% Fe; unoxidized zone 3.3 million tons 43% Fe in iron oxides & 6.7% pyrite. Possible reserves 0.10 million tons. No present production.	Accessibility by wheeled-vehicle precluded during wet season. Economic feasibility study, detailed topographic survey test stripping by bulldozer & additional drilling, and metallurgical testing of ore recommended by recent survey before exploitation of deposit. Discovered in 1963. Great increase in reserve expected after further study.
	Loei, Phu Hia, 14 km. east of Amphoe Chiang Khan (17°54'N., 101°40'E.)	Magnetite contact metasomatic deposit. In area of Devonian-Lower Carboniferous quartzite, shale, and marble; strike north, dip steeply west.. High grade magnetite ore.	Proven & probable reserves 1.05 million tons of 62% Fe; possible reserves of 0.50 million tons. No production data.	Drilling to delimit deposit recommended. Part of Phu Yang iron deposit. Deposit small, but high grade.
	Loei, Phu Lek; 1 km. south of Amphoe Chiang Khan (17°54'N., 101°40'E.)	Deposit relatively small, irregular, and discontinuous. Patches of hematite magnetite boulders at surface. Presence of northwest dipping zone, 6.7 m. thick, of iron mineralization.	Proven & probable reserves 400,000 tons. No production data.	Drilling to delimit deposit recommended by recent survey.
Manganese	Loei, Hual Muang Mine, 2 km. northeast of Ban Huai Spak (18°01'N., 101°46'E.)	Manganese mainly as manganese oxide pods in clayey matrix of weathered, brecciated quartzite and fracture coatings in quartzite. Psilomelane, pyrolusite, interbedded in phyllite, slate, chert, sandstone, shale and siltstone; strikes mostly north, dips mostly steeper than 50° and to the east. Run of mine ore about 50% MnO <sub>2</sub> .	Production from 1956 to 1960 12,000 metric tons. Reserves reported as about 140,000 tons of 30% MnO <sub>2</sub> ore.	Major part of all mining completed by mid-1963 all pits abandoned and caved by 1963. Ore was concentrated by hand cobbing and jig to about 80% MnO <sub>2</sub> and marketed as battery grade manganese. Further test pitting and geologic reconnaissance of deposit recommended by recent survey.
Antimony	Loei, 9 km. east of Amphoe Chiang Khan (17°54'N., 101°40'E.)	Prospect parallel to granodiorite intrusive contact; consists of area of gossan pebbles and boulders. Gossan vugs of limonite and hematite. Analysis: 0.06% Cu., 0.41% Pb., 2.31% Zn., and 59% Fe.	Production and reserves unknown.	None.

<u>Resource</u>	<u>Changwat</u>	<u>General Geology &amp; Mineralogy</u>	<u>Production &amp; Reserves</u>	<u>Remarks</u>
Copper	Loei, about 15 km. east of city of Loei (17°31'N, 101°35'E.)	Disseminated copper mineralization in steeply dipping Paleozoic tuff, sandstone, & tuffaceous sandstone. Chalcocopyrite, chalcocite, & pyrite common minerals. Zinc also present; traces of lead & molybdenum.	Production unknown. Proven & probable reserves of 15 million tons of 1% Cu., possible reserves of 50 million tons.	Additional base metal prospects probable in adjacent Phu Hin Lek Fai Mountains.
	Loei, about 12 km. east of city of Loei (17°31'N, 101°35'E.)	Low grade copper deposit in steeply dipping Paleozoic tuff or tuffaceous sandstone. Average Cu. content 0.48%; Zn content 0.34%. Gossan at surface; massive sulfide minerals in drill holes. May be "porphyry" copper type of deposit in volcanic rocks.	Production unknown. Proven & probable reserves of 1 million tons of 1% Cu., possible reserves of 11.6 million tons.	Small amounts of copper obtained in past from shallow pits.
	Nakhon Ratchasima, Amphoe Pak Chong area (14°42'N, 101°25'E.)	Quartz veins in granite. Malachite, azurite, chalcocite, & Chalcocopyrite principal copper minerals. Vein copper content of 3 to 4% reported.	Production & reserves unknown	None.
Lead	Loei, Ban Khok Na Dok Kham (17°32'W, 101°59'E.)	Limestone ridge between two granodiorite stocks. Single vein, 5 to 10 cm. wide of massive galena.	Production & reserves unknown	Further survey to delimit galena vein recommended by recent investigator.
	Loei, Ban Khok Mon (17°20'N, 101°52'E)	Sulfide mineralization along massive limestone and diorite porphyry contact with marginal intrusion breccia. Since present.	Production and reserves unknown.	Further survey recommended by recent investigator.
Barite	Loei, 7 km. south-east of Ban That (17°42'N, 101°35'E)	Extensive barite replacement of steeply dipping dolomite bed, barite massive or in scattered nodules. In Devonian-Lower Carboniferous sequence of limestone, shale, tuff, and dolomite. Strike NNW; dip steeply east.	Some small shipments of ore have been made. Proven, and probable reserve 2.5 million tons of 93% BaSO <sub>4</sub> ; possible reserves conservatively estimated as exceeding 3 million tons.	Economic development of deposit regarded as feasible. Market for ore and low cost transportation major development requirements. Deposit amenable to low-cost mining.
Salt	Khorat plateau, east-central about 15°00' to 18°00'N. and 102°00' to 105°00'E.	Halite. Cretaceous deposits 10 to about 100 meters below surface. Interfingering beds (700 meters) of sandstone, shale, salt, and gypsum. Sandstone beneath salt. Nearly flat lying, not continuous, but entire area north of Mae Nam Mum reported to be underlain with rock salt.	Production about 12,000 tons annually. Vast reserves at Chaiyaphum proven & provable reserves 660 million tons of 96.8% NaCl and 3.2% CaSO <sub>4</sub> ; possible reserves conservatively estimated at 1,500 million tons. Reserves of area possibly largest in world.	Brine spread to evaporate or boiled down in shallow, rounded, cast-iron pans during dry season. Intermixed soil gives salt reddish color. Development hindered by lack of demand for chemicals derived from salt, long distance to market, and absence of industrial water supply.

Source: Lower Me Kong Development Committee Survey.

**APPENDIX 2 - G**  
**FUNDING OF CURRENT RTG - USOM WATER RESOURCES PROJECTS**  
**NORTHEAST THAILAND**  
**1969-1972**

PROJECT	DEVELOPMENT LOAN OR PRO-AG NUMBER	FY 1969 FUNDING			FY 1970 FUNDING			FY 1971 FUNDING			FY 1972 FUNDING		
		US \$	CF ฿	NB ฿	US \$	CF ฿	NB ฿	US \$	CF ฿	NB ฿	US \$	CF ฿	NB ฿
LABOR INTENSIVE WATER DEVELOPMENT	P.A. 493-11-120-206 <u>2]</u>	417	-	59,235	400	-	30,800	400	-	27,400	-	-	17,500
LAM PAO & LAM PRA PLERNG RESERVOIRS	AID LOAN 493-H-010 <u>2]</u>	-	-	98,591	232.8	-	43,375	-	-	40,000	-	-	22,851
LAM NAM OON RESERVOIR <u>1]</u>	AID LOAN 493-H-013 <u>2]</u>	-	-	38,824	2,008.5	-	43,478	545.5	-	95,000	-	-	130,000
ARD WATER PROGRAM	P.A. 493-11-810-163	480	-	32,000	498	-	1,840	473	-	4,780	297	-	5,720
POTABLE WATER PROJECT	P.A. 493-11-995-186	628	10,000	10,000	300	6,000	14,000	-	-	20,000	-	-	20,000
MUN & CHEE RIVER BASIN SURVEY	P.A. 493-11-995-187	389	2,620	10,980	238	2,010	50	395	-	-	-	-	-
SOIL AND WATER DEVELOPMENT	P.A. 493-11-190-180.5	380	11,300	25,384	300	6,000	27,904	60	3,000	30,000	-	-	30,000

1] COMPLETION OF THIS PROJECT IS NOW EXPECTED TO OCCUR IN FY 1973 WITH AN ADDITIONAL ESTIMATED REQUIRED EXPENDITURE OF ABOUT 29 MILLIONS BAHT IN THAT YEAR.

2] USOM FUNDING SUPPORT APPLIES IN ITS ENTIRETY TO PHYSICAL FACILITIES CONSTRUCTION.

## APPENDIX 3-A

PROPOSAL FORFODDER DEVELOPMENT IN NORTHEAST THAILAND\*

The Consultants have become increasingly convinced of the impracticability of advocating increased livestock (bovine, beef or dairy) production in the Northeast until a reliable nutritive, and economic feed source, is found. While some special efforts are being made to study feasible forage systems, such as the experimental forage crop program of the Department of Land Development at Borabu, greater efforts are warranted because increased grassland and fodder resources are the basis of improved animal feeding.

The main resources in natural grasslands (this concept is used to refer to grazing land and is not to be confused with its ecological meaning) occur in the uplands. Grazing lands are found in two farm type sectors of these uplands, the largest of these lies in that portion of the uplands in which row crops are grown intermittently. This area covered 14,317,000 (54 per cent) of the 26,403,000 rai reported to be in farms in the region by the Census of Agriculture of 1963. The portion of the 14,317,000 rai that are devoted to crops and to grazing, vary each year; furthermore, because the vegetation that succeeds the annual croppings of kenaf, corn, cotton, water melons, etc., of the previous year, is a voluntary one, consequently, the resulting "grazing land" can be of only low nutritive value.

The second large sector of "grazing land" occurs in the 3,278,000 rai of farm lands reported as wood lots in the same 1963 census. Where the tree growth is sparse enough to permit an abundance of sunlight and where the land has not been broken by the plow, some of the region's best grazing land may be found.

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\* Based on Memorandum by George W. Hill, 16 February 1970.

However, these lands (idle upland crop and wood lands) offer very low feed value for animal grazing during the greater part of the year. Their dominant grasses 1/ have become accommodated to the short growing period (rainy season) of the region, at which time they are intensively grazed by the farmers' livestock. With ever larger portions of the poor soil being converted to the growing of rice this crowds more and more draft buffalo to graze on the diminishing grass lands.

During the major portion of the year the ungrazed grass stands can be observed as coarse, dry fibrous material, of no nutritive value, unpalatable; it serves to merely save the livestock from succumbing to complete starvation. This inadequate feed is supplemented by the consumption of edible shrubs and herbs.

The only other feed grounds are the bunds which separate the individual rice paddies, but these sources are disappearing where irrigation (controlled) is coming in because the individual plots have to be consolidated and levelled.

Too little research in range management has so far been sponsored by the government to speak about the effective carrying capacity of the uplands crop and wood lands with any degree of precision. There are huge areas where even 10 hectares could not support one head of cattle during the whole year. Some estimates suggest that 98 per cent of the cattle suffer malnutrition, brought on by under-nourishment. The six-tenths of one per cent of land in farms in the region classified as pasture land in the 1963 census, totalling only 160,000 rai, can be interpreted to indicate the futility of a livestock enterprise in a region so greatly handicapped by natural resources.

Although institutional constraints (thievery, unfavorable prices, high transport costs, corruption) have been shown to have a deleterious effect on the livestock industry, other

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1/ Whose characteristics and properties should be classified agronomically and botanically although I have not seen such a classification.

countries have suffered these same problems, but they have been overcome because either the natural resources were more favorable, effective forage programs were developed. One must conclude, therefore, that the greatest constraint to the development of a livestock enterprise in the Northeast (which would be more than the existing rudimentary draft animal raising endeavor) has been the lack of sufficient grass and forage.

Having described the natural limitations to livestock production in the Northeast, mention should also be made of the socio-cultural factors that have acted to limit the growth rates in the livestock industry. The most fundamental of the cultural factors is an attitudinal one in which livestock production has always been considered as an incidental secondary activity to rice growing. With rare exceptions, cattle and buffalo have been valued primarily as draft animals. Since the buffalo has his work days concentrated principally during the few weeks of each year when land is plowed and made ready for planting, and oxen work chiefly when the harvested grain is placed in storage or thrashed, the animals are idle the greater portion of each year. The idle time is so long it might be asked whether the buffalo and oxen work for and maintain the farmer or whether the benefit ratio favors the animals, because the farmer, in reality, works and saves to keep his draft animals?

Small farmers, such as these, will not have the capital, land, credit, or know-how to increase their herds through an expansion of the traditional system.

There may, however, be an alternative system that should be tried and the remainder of this memorandum is devoted to a discussion of that alternative. The system has to be borrowed from Brazil.

Northeast Brazil, an area 1,217,369 square kilometers in size, having a population of 19,935,345 in eight provinces, has extensive portions that have similar, if not identical ecological, climatic, and soil characteristics to those of Northeast Thailand. <sup>2/</sup> Late in the last century, livestock breeders

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<sup>2/</sup> The "Nordeste" with which this memorandum is concerned, extends from 2° 11' latitude south to 18° latitude south, and from 46° longitude west to 34° 45' longitude west in South America.

(fazendeiros) and plant breeders introduced varieties of palma, a spineless cactus, Optuntia ficus indicamill, and Nopalea cochennillefera S D, which have had enthusiastic government support. This forage palma is now the mainstay of the beef fattening and dairy industry in the States of Alagoas, Paraiba, and Pernambuco, where the livestock population in 1961 was 1,043,000, 1,969,000 and 2,367,000 animal units respectively.<sup>3/</sup>

"Nowhere in the world are the palmas (spineless cacti) used on so large a scale and with such successful results as in North-east Brazil," says a recent report of the FAO. <sup>4/</sup> It is estimated that 300,000 hectares (20,100,000 rai) are now devoted to the crop in this region I visited many dairy and beef cattle ranches in the municipalities of Batalha, Jacare dos Homens, and Major Isidoro in Alagoas; Bom Conselho, Sao Bento do Una, Limoeiro, Suribim, Salgueiro and Ararpina in Pernambuco; and Guarabira, Souzo and Cajzeiras municipalities in Paraiba. Alagoas had 18,800 livestock enterprises in 1960, Paraiba had 49,500 and Pernambuco 74,900. Ninety-seven and one-half per cent of the enterprises were classified "small" by the census, averaging 11 head each.

Geographically, the Nordeste consists of a succession of undulating peneplains divided here and there by low serras seldom more than 300 meters high. The region lies in the tropics, but except for the zona do mata, along the Atlantic coast, rainfall is minimal, averaging in much of the interior as little as 300 mm per year; nowhere does it exceed the average annual rainfall of Khon Kaen, 1000 mm. The evaporation rate is high. Rainfall occurs monthly from January to April, sometimes starting in December, and sometimes continuing until May. Temperatures in the interior, where the Palma thrives, average 28° C with maximum rarely over 40° C, and minimum around 15° C. The dry season varies from six to nine months, and 30 severe droughts have occurred in the region during the last 260 years. The main soils derive mostly from

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<sup>3/</sup> One A.U. = 1 cow = 1 horse = 5 sheep = 5 goats.

<sup>4/</sup> Grassland and Fodder Development in Northeast Brazil, Food and Agriculture Organization of the United Nations, Rome, No. 2000, 1965, p. 39.

granite and micashists. They are shallow (under 50 cm) on granite and less than one m on shist.

Ecologically, climatically, economically, and culturally, Northeast Brazil and Northeast Thailand are similar. Northeast Brazil is recognized as one of the most extensive rural problem areas in the world. Except for the usineiros (sugar plantation owners) in the zona do mata, cotton plantation owners in the agreste and sertao regions, and a few large cattle ranches in the area under consideration, the region is one of small farms. The last available agricultural census found 60 per cent of the farms in the three states of Alagoas, Pernambuco and Paraiba under 5 hectares (33.5 rai) in size, and 20 per cent from 5 to 20 hectares (33.5 to 134.0 rai). Incomes are low, illiteracy rates are high. The most prosperous of the small farmers, which I found, were those who had combination enterprises. For example, in Bom Conselho, those owning five hectares of land or less, had three-fourths of this in crops and one-fourth in cactus pasture. Farms in the next largest interval, but still small ones, 5 to 9 hectares in size, had slightly more than half in crops and slightly under one-half in pasture.

Spineless cactus is the mainstay in the diet in both beef fattening enterprises and dairies. Where the palma is the only fodder, then as much as 90 kilograms of fresh chopped cactus is fed per day, supplemented with 6 kilograms of cotton seed cake. This concentrated diet has been found to cause a semi-permanent scouring of the livestock and a loss in condition. In the dairy lots of Limoneiro, I found a more balanced daily ration of 7 loads (150 kilograms each) of chopped cane, 8 loads of chopped palma, and 200 kilograms of cotton seed cake for a herd of 20 cows. This would average about 117 kilograms of forage per animal, approximately 40 per cent cane and 60 per cent cactus. On beef fattening ranches in the same area, this ration was cut in half.

It has been proven that the cactus should not be grazed in situ, but harvested and given fresh to the livestock, once chopped. Experiments have shown that most economical results are obtained with 10,000 plants/ha. in the drier zones.

With application of 20 tons of stable manure/ha., yields of more than 140 tons/ha. of palma are obtained. This provides enough cactus forage for seven to ten milking cows if supplements (cane and sorghum or legumes) are provided.

Properly managed plantings will allow annual cuttings for 12 to 14 years. Describing the cactus plant in an earlier study, I said, "The palma varies in shape, its ears vary in number; they vary in size both between and within species. Some of the ears are ellipitical in shape, and weigh about 1.1 kilograms. Other are more elongated in shape, the ears measuring approximately 24 x 11 cm in size and weighing 0.4 kilograms. Another variety has ears that are fairly round and when well formed they measure 35 x 25 cm and weigh 1.9 kilograms." 5/

Concerning the nutritive value of the palma, it is low in comparison to other fodder plants, because of its chemical composition and its lack of digestive nutrients. Comparing the spineless cactus with other forage crops, "One kilogram of either cane, elephant grass, sorghum or corn silage, is equivalent to two, one and three-quarters, two and three kilograms of palma respectively, insofar as digestible proteins are concerned. In terms of digestible nutrients, the same ratios are, one kilogram of each of the forages to one and one-half, one and three-tenth, one and eight-tenths, and one and nine-tenths of a kilogram of palma." 6/

While, at first blush, the cactus compares unfavorably with other fodders, the cactus has advantages that make it the preferred fodder in ecological zones so niggardly endowed by nature as was Northeast Brazil and Thailand. Being cactus, its root system is a natural water reservoir so that it thrives in semiarid lands when not another blade of green food would be in sight. Its development and care allow it to grow in soils where the more demanding fodders can not thrive, unless irrigated and heavily fertilized. Therefore, under Northeast Thailand conditions the palma could be the major forage food, supplemented by smaller amounts of grass, sorghum, or corn ensilage grown under irrigation. If trials demonstrate its successful accommodation to the region, it would be an ideal uplands crop.

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5/ See my Rural Development in Northeast Brazil, Vol. XVII-F, Brazil Transport Survey Phase II, Highway Master Plan, Louis Berger, Inc., 1969, p. 103.

6/ Anton'io Santiago Pessoa, Cultura da Palma Forrageira, SUDENE, Recife, 1967, pp. 79-88.

Nordistenhos have proven the viability of small farm operations based on the integration of livestock, arable farming, fodder crops and natural grazing land. The animals become the "fertilizer machines" when chopped feeding is practiced. The Northeastern Brazilian peasant -- who, on the average, has not even had the benefit of a primary (prathom sukka) education, as has his Thai counterpart -- has learned the technique of making proper manure fertilizer pits, mixing dung and urine with dry vegetable matter and keeping it covered so as not to lose its value through leaching and evaporation. Such a manure pit, conservatively, will produce 15 kilograms daily of fertilizer per animal unit -- 5.5 metric tons yearly.

With chemical fertilizer selling for  $\text{฿}110\text{-}120/\text{sack}$  on the farm, one buffalo manure pit, with the animal corralled during non-working hours, will produce  $\text{฿}6,000$  to  $\text{฿}8,000$  worth of fertilizer yearly, at no cost to the farmer except some added labor. In addition to the chemical properties of animal manure, such as nitrogen, phosphorous and potash, adding decomposed plant remains to the pit, the physics of the soil is improved with humus. This restructuring of the soil will allow it to hold more water. In addition, therefore to its economic advantage, the manure pit has superior soil building properties not found in chemical fertilizers.

With some 1,065.67 thousand millions of baht to be invested in irrigation systems in the Northeast, according to the Second Five Year Plan, boldness and ingenuity are going to be called for to bail out the farmers of the region because the second cropping of rice, on which the "feasibility" of the irrigation projects was so heavily predicated, will fall far short of paying the costs. Rice is a losing proposition on which to plan a costly irrigation program for the Northeast. Other crops and soil building practices need to be introduced. If plant breeders can demonstrate the successful transplantation of the *Nopalea cochenillefera* S.D. there is no reason why the same integrated livestock-crop enterprise of Brazil can not be duplicated in Thailand. The palma was transplanted from Texas into Brazil. Why can it not be transplanted as successfully into Thailand?

I am not a botanist. What I have written concerning the Brazilian experience is based on socio-economic studies of the small farmer in that country. I strongly recommend that an attempt be made to try to duplicate Brazil's experience.

While there is need in Brazil for further research into the problems of production, feeding, and management of the spineless cactus, its demonstrated worth, after more than half a century of experience, prompted the agronomist of the FAO, Pierre Bonnemaison, to close his monograph, saying.

"The palmas forrageiras can remain a permanent and useful asset to livestock production in the region, through a better understanding of its requirements and limitations. When the palma is sufficiently integrated to the whole fodder production and livestock management of the fazenda, it will then probably surpass its present value and might become the real "wonder" forage of the sertao." 7/

I have discussed the potential of spineless cactus with Thai and foreign agricultural experts, none of whom were familiar with the crop. All, however, after studying the proposal and its results elsewhere, have agreed that a trial should be given the plant in Thailand. Every knowledgeable person with whom I have discussed the livestock potential of the Northeast, has agreed with me that it is useless and but a wastage of money to move on the problem until answers are found for the feed problem. The Rockefeller Foundation in Mexico has been conducting breeding experiments with many varieties of cactus in that country, seeking a suitable spineless variety for the extensive semi-arid plateau region of that country. I would recommend that breeding stock be imported and planted at the Forage Crop Research Station of the Ministry of National Development in Borabu, at the Northeast Research Center in Tha Prah, and at the Agricultural Vocational Schools in Kalasin and Surin.

A team of livestock feed experts and agronomists should be authorized to visit the areas of Brazil I have described, staying long enough to observe the experiments under way at the Departamento de Agricultura e Abastacimento of SUDENE (the development agency for the Northeast) and the Instituto de Pesquisas Agronomicas in Pernambuco. Enough time should

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7/ Op. cit., p. 41.

be allotted to permit the team members to also visit some of the major beef fattening and dairy regions that have been mentioned. And to make these visits of maximum value, the range management specialist who is employed by the Department of Land Development in Borabu, should form part of the team; he could make an on-the-ground check of the management factors I have described. The travel costs for a study team of four would be ground \$13,000 and if it returned with 1500 kilograms of raquetes (cactus ears) this would be sufficient to get a one rai experimental plot under way at the four stations.

\*This visit should be made before the end of the dry season in Thailand so that suitable plot sites could be prepared, proper drainage facilities provided, and transplanting completed before the wet season would have run its course.

Everyone has talked about crop diversification and livestock production for the Northeast. Little has yet been done for the farmer, notwithstanding the huge investments in infra-structures, prompting the Bangkok Bank to say, "The vast strides made in national development have therefore been practically meaningless for the people who most need help."§/

To paraphrase the FAO, spineless cactus might well become the wonder crop of the Northeast, if it were given a trial.

#### SUMMARY

With an investment of less than \$20,000.00 a pilot program for the growing of spineless cactus can be tried in Northeast Thailand, which, if successful, would produce enough forage crop the first year to more than pay the original investment, and that would leave a residue sufficient to multiply the trial four-fold the second year. At the end of the third year, each station would have 20 rai of palma in production; 10 rai would produce enough cactus fodder to feed 10 head of cattle, preferably buffalo to start with, and leave the other 10 rai to grow plant breeding stock for other stations, or Extension Service demonstration plots.

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§/ "Lessons from the '60s," Bangkok Bank Monthly Review, January, 1970.

\* This assumes either the raquetes or the plants can be packed for air freight shipment; otherwise, seed would have to be imported.

A package trial in the Northeast should start with raising more and better buffalo because that is the ruminant with which most Thai peasants have experience, and as it has been pointed out, buffalo feed is decreasing in supply each year. After the pilot research effort had proven itself, then the switch could be made to beef and dairy cattle.

As in Brazil, the cactus feeding enterprise is, to a great extent, in the hands of small farmers. If the experiment is limited in Thailand to the areas that will have some irrigated lands, a package program could consist of two rai of upland non-irrigated land planted to palma, and two rai irrigated land in corn and/or sorghum. This area would yield the annual fodder requirement for 4 to 6 animal units, supplemented by a concentrate of 3 kilograms daily.

The "package" will require technical guidance from the Extension Service to teach farmers how to construct trench silos and manure pits, and how to cut, feed, and plant the cactus ears. The endeavor will require no machinery, no fertilizer, and it will allow the farm family to utilize all of its labor resource.

Based on the program I have seen in operation in Brazil, and described herein, it is not unreasonable to expect Northeast Thailand to develop into the major livestock (beef cattle, dairy and buffalo) producing area for Southeast Asia.

APPENDIX 3-B

PROPOSAL FOR A FEASIBILITY ANALYSIS  
FOR FOREST PRODUCT PROMOTION  
NORTHEAST THAILAND

1. Principal Objective: Determine (a) whether or not the promotion of forestry products is economically justified and technically feasible; and (b) if found justified to ascertain the basic investment, manpower, institutional requirements for successful implementation.
2. Sub-Objectives:
  - (a) To determine present forestry development in Thailand.
  - (b) To determine the flow of forestry products to the various sectors within the economy.
  - (c) To determine present capacity and capabilities of existing transport and other facilities to accommodate a viable forestry industry.
  - (d) To determine present capacity and capabilities to develop forestry production.
  - (e) To estimate the potential market, national and international, and the economic costs, and net private and social benefits which would result from the proposed program.
3. Required Analyses:
  - (a) An economic assessment of the regions involved which will provide a basis for estimates as to the impact of a forestry development program.

- (b) A survey of existing facilities, costs of forestry development, and projections of future forestry populations, and costs.
- (c) An assessment of markets involved with particular reference to the economics and benefits associated with various levels of forestry production.
- (d) An engineering and economic analysis of the costs of typical forestry inputs.
- (e) An analysis of government policies with respect to forestry promotion and funding.
- (f) Assessment of manpower and training requirements for successful implementation.
- (g) Recommended pre-planning of all details for management of the project.

4. Forestry Data Requirements:

(a) Production Aspects

- What are the common species?
- Where are they grown?
- What is the volume/year?
- How fast does each species mature?
- What are related governmental regulations?

(b) Processing

- What is the extent of processing; i.e., is the wood reduced to lumber or is veneer, or plywood, or any other product totally produced.
- Which are the final products?
- Where are these processing units?

- What is their volume/year; are they working at full capacity?
- What is their level of technology; employees, capital, equipment investments?
- Is the operation considered to be efficient and why?

(c) Marketing

- What are the local uses for the forestry industry products, describe their processes, volumes and technology (e.g., furniture).
- How are lumber products marketed; i.e., are there a few large monopolistic organizations, or is it a defused process. Give typical prices for typical final products, wholesale lumber, wholesale final products/furniture prices.
- What are the governmental regulations; i.e., minimum prices?
- Is there considered to be a shortage or is there an abundant supply and what are the related substitution materials; i.e., is there a high elasticity of demand?
- Exports: How much of what species and final products are exported to which countries and at what prices?

Over the last 10 years, are exports increasing or decreasing -- specifying countries and varieties.

- Imports: What are the trends concerning such country sources, prices, volumes etc. for wood products?

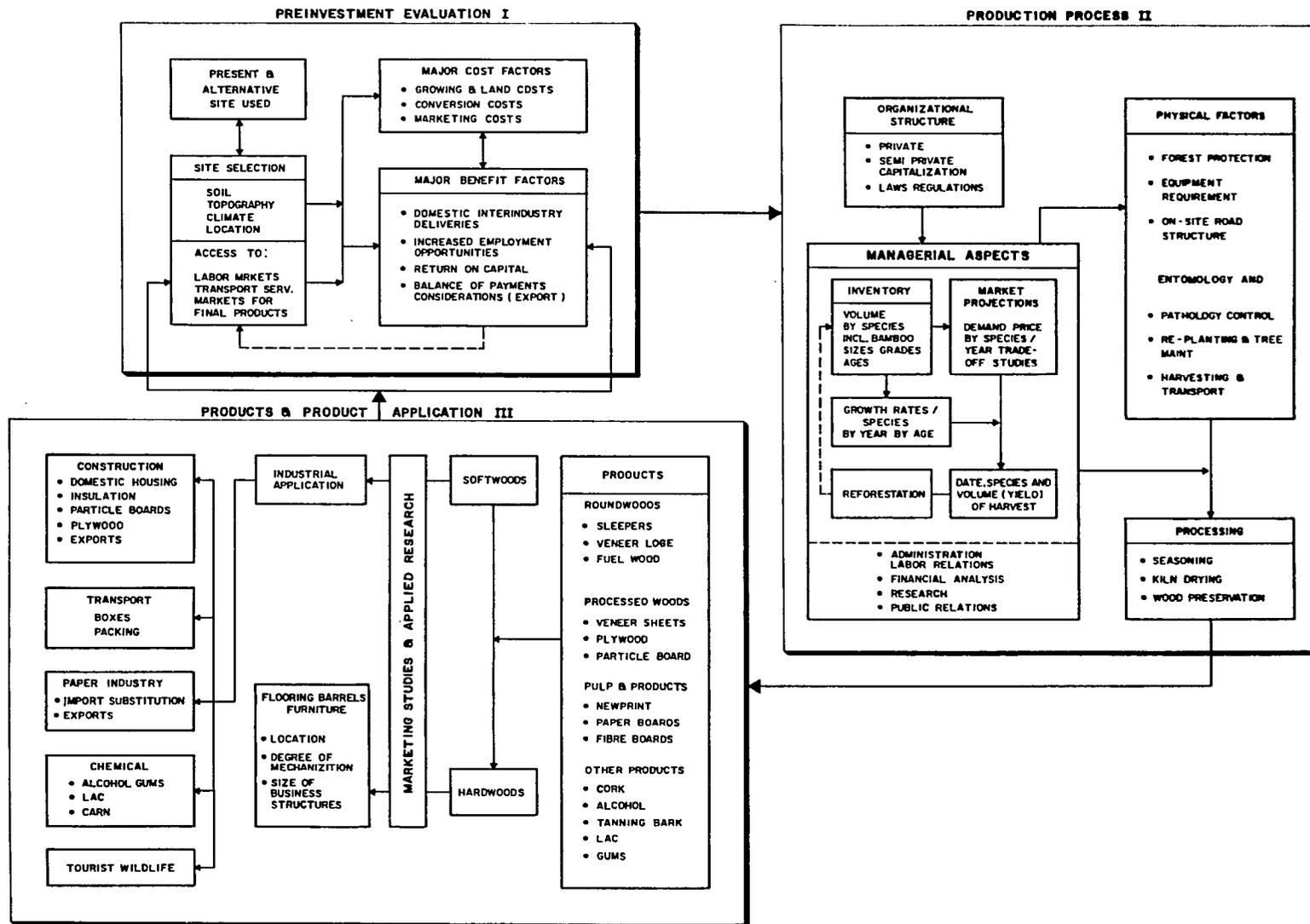
(d) Problem Areas

- What are the major problems in the production process? Are there insects, diseases, range management problems, other?

- Are the forests presently producing their maximum volume? Or can the supply be increased without much trouble. Stated differently, is the present output volume determined by the demand side or the supply side?
- Which factors of production is in scarce supply; i.e., is there a shortage of forestry land -- is it a problem of capital inflow -- is there a labor or a management problem?
- What is the present production of an acre of forestry relative to present yields of existing products; i.e., paddy - kenaf.
- What are some of the institutional limitations, e.g., manpower absorptive capacity, security problems, unsuitable land ownership pattern, special vested interest groups, etc.

The following diagram illustrates the relationships of all principal elements concerned with forestry product promotion.

# APPENDIX A SYSTEMS ANALYSIS OF THAI FORESTRY PROMOTION



APPENDIX 4-A

1. OPERATIONAL PLAN FOR CHANGWAT LEVEL DEVELOPMENT PLANNING:

NORTHEAST THAILAND CHANGWATS

1970

	<u>Stage</u>	<u>Work Operations</u>	<u>Time Period</u>
Preparation Period (January-March)	( 1.	Changwat Level Development Planning Seminar	Jan 12-17, 1970
	( 2.	Establish Changwat Committees for Project Development	Jan - Feb, 1970
	( 3.	Center Distributing Map Books & Data Books to Changwats	Jan - Mar, 1970
Changwat Econ. & Soc. conditions survey period (February-June)	( 4.	Changwat Committees forward forms pertaining to economic & social conditions and "Inventory Project" forms to Nai Amphoes and other RTG units for "filling and reporting."	Feb - Apr, 1970
	( 5.	Changwat Committees summarize the economic & social conditions and the "Felt Needs" of the people.	Apr - Jun, 1970

Source: Prepared by Pradit Daowechai, 6 February 1970.

	<u>Stage</u>	<u>Work Operations</u>	<u>Time Period</u>
Formulation of targets and development trends period (May-July)	( 6.	NEED sub-committee forwards development trends to Changwat Committees for consideration.	May 1 - May 31'70
	( 7.	Changwat Committees consider and set trends for Changwat development	Jun 1 - Jun 30'70
	( 8.	Changwat Committees send their objectives and trends statements to other RTG units concerned.	Jul 1 - Jul 31'70
Implementation of projects and plans period (Aug'70 - Mar'71)	( 9.	Nai Amphoes & Bureau Chiefs draft projects and determine projects' priority.	Aug - Dec, 1970
	( 10.	Changwat Committees consider projects and determine their priority by sectors.	Dec'70 - Jan'71
	( 11.	Draft up Changwat Level Development Plans.	Feb 14 - Mar 14'71
Plan Consideration and Approval period (Apr - May'71)	( 12.	Changwat Councils Consideration & Approval of Plans	Apr 1 - Apr 30'71
	( 13.	N.E. Development Committee Consideration & Approval of Plans	May 1 - May 31'71
Plan Readjustment period (Apr - June'71)	( 14.	Annual Projects Readjustment	Apr - May'71
	( 15.	Annual Budget Allotment	May - June'71
	16.	Plan Operations	Oct. 1971

## 2. REGIONAL CENTER PLAN OPERATIONS (in 1970)

### 1. January 20 - February 21, 1970

1. Pick up Changwat Map Books and Data Books at NSO.
2. Accelerate the Compilation and Study Economic & Social Conditions of Changwat Khon Kaen.
3. Accelerate the Compilation and begin "Work Sheet Inventory Project".
4. Study and Compile Statistical Data of Income, Budget and Expenditures of various Changwats.
5. Revise, adjust and print "Econ. & Soc. Profile" and "Inventory Project" forms for distribution to Changwats.
6. Adjust, revise and print Changwat Development Planning Operational Pert Charts for distribution to various Changwats.
7. Coordinate and follow-up with Changwats on the implementation of planned stages in accordance with set schedule.

### 2. February 22 - April 30, 1970

1. Travel to the other fourteen (14) Changwats acting in the capacity of "Technical Staff" to Changwat officials and jointly explain to Nai Amphoes and Bureau Chiefs pertaining to "Econ. & Soc. Profile" form processes for the "Inventory Project" operations. Simultaneous distribution of "Map Books" and "Data Books" to Changwats.
2. Complete the survey studies on "Econ. & Soc. Profile" and "Inventory Project" for Khon Kaen.
3. Complete the compilation of Income and Expenditure Sources for certain Changwats.

### 3. May 1 - September 30, 1970

1. During this period, Changwats may request assistance from the Center in preparation of "Econ. & Soc. Profile" and "Inventory Project" Analysis. It is the Center's duty to assist various Changwats per their request.
2. Center submits results of studies of Khon Kaen's "Econ. & Soc. Profile" and "Inventory Project" findings to Khon Kaen Changwat Committee Project Development for consideration.
3. Assist Changwats in target scheduling and development trends.
4. Complete the Compilation of Income and Expenditure Sources and submit them to Changwats concerned for study and consideration to find out size of plan.
5. Completion of Project Evaluation for Northeast Regional Development Budget.

### 3. CENTRAL ADMINISTRATION PROCEDURES IN SUPPORT OF CHANGWAT PLANNING

1. Evaluation of NEED Changwat Level Planning Seminar.
2. Consider further training for Changwat Planning Officials when necessary and appropriate.
3. Submission of Changwat Level Development Plans to the Cabinet for consideration for issuance of directives to RTG ministries, departments and agencies for support as follows:
  - 3.1 Authorizing RTG ministries, departments and agencies to issue directives to their officials to cooperate and coordinate with Changwat Committees.
  - 3.2 Directing RTG ministries, departments and agencies to think in terms of Changwat Plans when considering budget, manpower, equipment and supplies, such as:
    1. Between the period of 1972-1976, if RTG ministries, departments and agencies do not have any specific Changwat Projects or plans in the "Northeast," it is requested that they follow the guidelines of the Changwat Plans.
    2. During the period of 1972-1976, if RTG ministries, departments and agencies have tentative projects and plans in the "Northeast" Changwats but have not yet established details such as project location, duration, manpower resources and budgeting, it is requested that they incorporate the guidelines of Changwat Plans.
    3. If RTG ministries, departments and agencies have projects and plans together with program details available for implementation in "Northeast" Changwats, they can authorize their officials to submit projects and plans to Changwat Committees for acknowledgement and coordination. However, before submission of plans to the Cabinet, Bureau Chiefs will be invited to a briefing, to determine agenda, location and preparation period.
4. Consider the setting up of operational units or offices of Changwat Committees in the Central Administration at NEDB.

TO: Professor Snoh Unakul

Messrs. Kosit, Pisaek and I met in Mr. Kosit's office at 14:00 hours on Tuesday, Feb. 4, 1970. The following resulted from our discussion:

1. Work to be performed in considering the size of Changwat Level Development Plan in the Northeast are composed of:
  - 1.1 Development expenditures drawn from the Budget by Sectors - FY 1967-1969.
  - 1.2 Development expenditures drawn from Public Enterprise Incomes by Sectors FY 1967-1969.
  - 1.3 Development expenditures drawn from financial loans and assistance by Sectors - FY 1967-1969.
  - 1.4 Development expenditures drawn from income, financial loans and grant-in-aid from RTG local administrative agencies in the Northeast - FY 1967-1969.
  - 1.5 Income, grant-in-aid from RTG local administrative agencies in the Northeast - FY 1967-1969.
  - 1.6 Income - Actual expenditures drawn from Changwat Treasury budget in the N.E. - FY 1963-1969.
2. Work Accomplished
  - 2.1 Work completed in Section 1.1 (Mr. Kosit)
    1. Development expenditures for Energy Sector - 1961-1969
    2. Development expenditures for Social Development Sector - 1961-1969
    3. Development expenditures for Industrial Sector - 1961-1969
  - 2.2 Work completed in Sections 1.5 and 1.6 pertaining to income and grant-in-aid from Changwat Budget Administrative agencies in the Northeast. Remaining tasks unaccomplished belong to Municipalities and Sanitary Districts.
3. Current Work Implementation
  - 3.1 Section 1.1 is currently in operation (Mr. Kosit)

1. Development expenditures in Communications and Transportation Sectors for 1961-1969 will be completed by February 28, 1970.
2. Development expenditures in Public Health Sector for 1961-1969 will be completed by February 28, 1970.
3. Development expenditures in Public Utilities & Services Sector for 1961-1969 will be completed by February 28, 1970.
4. Development expenditures in Agricultural Sector is being performed by Mr. Amnat. The completion schedule can not be estimated as yet.

3.2 In Section 1.5 and 1.6, the remainder pertaining to Municipalities will be performed by Mr. Pisaek and me. It is scheduled to be completed by March 31, 1970.

#### 4. Work Currently Under Operations

In Section 1.4, three (3) tables have been set up for the compilation of income, loans, and grant-in-aid pertaining to assets and liabilities of local administrative agencies. Mr. Pisaek already had contacted with DOLA and will meet with responsible officials on Monday, February 9, 1970. Results of the meeting will be forwarded at a later date.

#### 5. Work Not Yet Under Operations

5.1 of Section 1.1 has not yet been performed

1. Expenditures for educational sector development.
  2. Expenditures for other development sectors.
- Work operations will commence in March, 1970. Completion schedule will be transmitted at a later date.

5.2 For Sections 1.2 and 1.3, work will commence in March, 1970. It is estimated that work performance can be completed in the same month, since the quantity is not large.

#### 6. Summary

6.1 For Sections 1.1, 1.2, 1.3 - Rough estimates in development expenditures for every sector should be received from Mr. Kosit by April 30, 1970. I will inform you after compilations have been made on areas pertaining to the NE Changwat Level Development Plan.

- 6.2 For Sections 1.4 and 1.5, Mr. Pisaek and I will perform this task by consulting with Mr. Kosit. The result of findings will be conveyed to you in every fifteen (15) days.
- 6.3 For Section 1.6, I will contact the comptroller - General's Dept., and expect that the task will be completed by March 31, 1970.

APPENDIX 4-B

LIST OF STATISTICAL CONTENTS IN CHANGWAT HANDBOOKS

15 CHANGWATS, NORTHEAST THAILAND

1970

1. Population
  - 1.1 Population Density by Amphoe (probably within and outside municipality area)
  - 1.2 Birth and Death Rate
2. Agriculture
  - 2.1 Land Use by Amphoe
  - 2.2 Number and Area of holding by tenure, by Amphoe
  - 2.3 Livestock
    - 2.3.1 Number of Livestock (1967)
    - 2.3.2 Livestock Industry (1967)
  - 2.4 Upland crop and Garden crop
    - 2.4.1 Statistics of Upland crop (5 years)
    - 2.4.2 Statistics of Garden crop (5 years)
  - 2.5 Rice (1963)
  - 2.6 Rice and Irrigation Area for Rice
  - 2.7 Major crop by Amphoe

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Source: Prepared by Miss Chanyada of the NSO Data Services for Regional Planning.

- 2.8 Monthly Producer of Agricultural Products by Commodity (1968)
- 2.9 Other activities of Agriculture Sector, i.e. Research Station, Extension Station, Pest Control Station, Livestock raising Station, Fisheries Station, etc.
- 3. Soil Classification
- 4. Water Resources Development Projects
  - 4.1 Dams, Tanks completed to the end of 1968, under construction and also planned
  - 4.2 Land covered by irrigation scheme
- 5. Ground Water Availability
- 6. Finance
  - 6.1 Commercial banks
  - 6.2 Saving banks
  - 6.3 Others finance institutions
- 7. Transportation and Communications
  - 7.1 National Highways
  - 7.2 Provincial Highways
  - 7.3 ARD Road
  - 7.4 Railways
    - 7.4.1 Passenger Statistics Fiscal Year 1968
    - 7.4.2 Freight Tonnage and Quantity of Goods Imported, Exported, by Commodity

- 7.5 Telecommunications
  - 7.5.1 Statistics of Postal Matter for Domestic Services by Amphoe
  - 7.5.2 Statistics of Domestic Telecommunication Activities by type of Telecommunication by Amphoe
  - 7.5.3 Statistics of Domestic Post and Telegraph Activities by Type of Work and Finance by Amphoe
- 7.6 Route, Number of Vehicles and Quantity of Goods Transported, by type of Vehicles Passing through Survey Station
- 7.7 Airway
  - 7.7.1 Monthly Average Traffic Flow, Northeast Route by Station
  - 7.7.2 Average Monthly Passengers Service Statistics, 1968
- 7.8 Waterways
- 8. Mineral Resources
- 9. Business, Trade or Services
  - 9.1 Business Establishment by kind of Goods Accounting for highest Value of Sale, by municipality, Wholesale Trade
  - 9.2 Business Establishment by kind of Goods Accounting for highest Value of Sale, by municipality, Retail Trade
  - 9.3 Business Establishment by kind of Services Accounting for highest Value of Sale, by municipality, Service
  - 9.4 Business Establishment by kind of Activity

- 10. Meteorology
  - 10.1 Rainfall by Chhagwat, observed by number of days with rainfall and the amount by 11 stations throughout the Northeast, for 10-year time period
- 11. Industry
  - 11.1 Summary of Basic Statistics of Manufacturing Industries by major Industry Group and Industry (1964)
  - 11.2 Establishment with 10 Employees and greater, 1964
  - 11.3 Number of Workers by Sex, Work Status, Age Function of Employee, Major Industry Group and Industry
  - 11.4 Number of Workers without any Paid Employee and with a total of Workers of less than 10
- 12. Social Capitals and Utility
  - 12.1 Energy
    - 12.1.1 Hydroelectric, with KW Capacity
    - 12.1.2 Thermal power installations, with KW capacity
    - 12.1.3 Diesel power installations, with KW capacity
    - 12.1.4 Power lines, with KW capacity
  - 12.2 Waterwork
    - 12.2.1 Record of Wells, Fiscal Year 1964-1968 (5 years)
    - 12.2.2 Community Potable Water Projects, Fiscal Year 1966-1968

- 12.2.3 Water Supply Facilities in Municipalities, Sanitary Districts and Villages, Completed up to the end of 1968
- 12.2.4 Records of Water Supply, by Provincial Water Supply Division, Completed up to the end of 1968
- 12.3 Education
  - 12.3.1 Number of schools, Teachers, Students and Teacher Student Ratio by type of institution
  - 12.3.2 Teachers by Qualification and type of institution
  - 12.3.3 Enrollment by type of Institution and Grade
- 12.4 Public Health
  - 12.4.1 Number of Hospitals, Health Facilities and Official (1963-1967)
  - 12.4.2 First Health Center, Midwifery Station and Resident Staff by Grade and Type
  - 12.4.3 Second Health Centre, Midwifery Station and Resident Staff by Grade and Type
  - 12.4.4 List of Health Centres and Midwifery Stations, 1969
- 13. Others, i.e., Cooperatives, Youth Associations, Farmer Group
  - 13.1 Number of Cooperatives by Type of Cooperative, by Amphoe