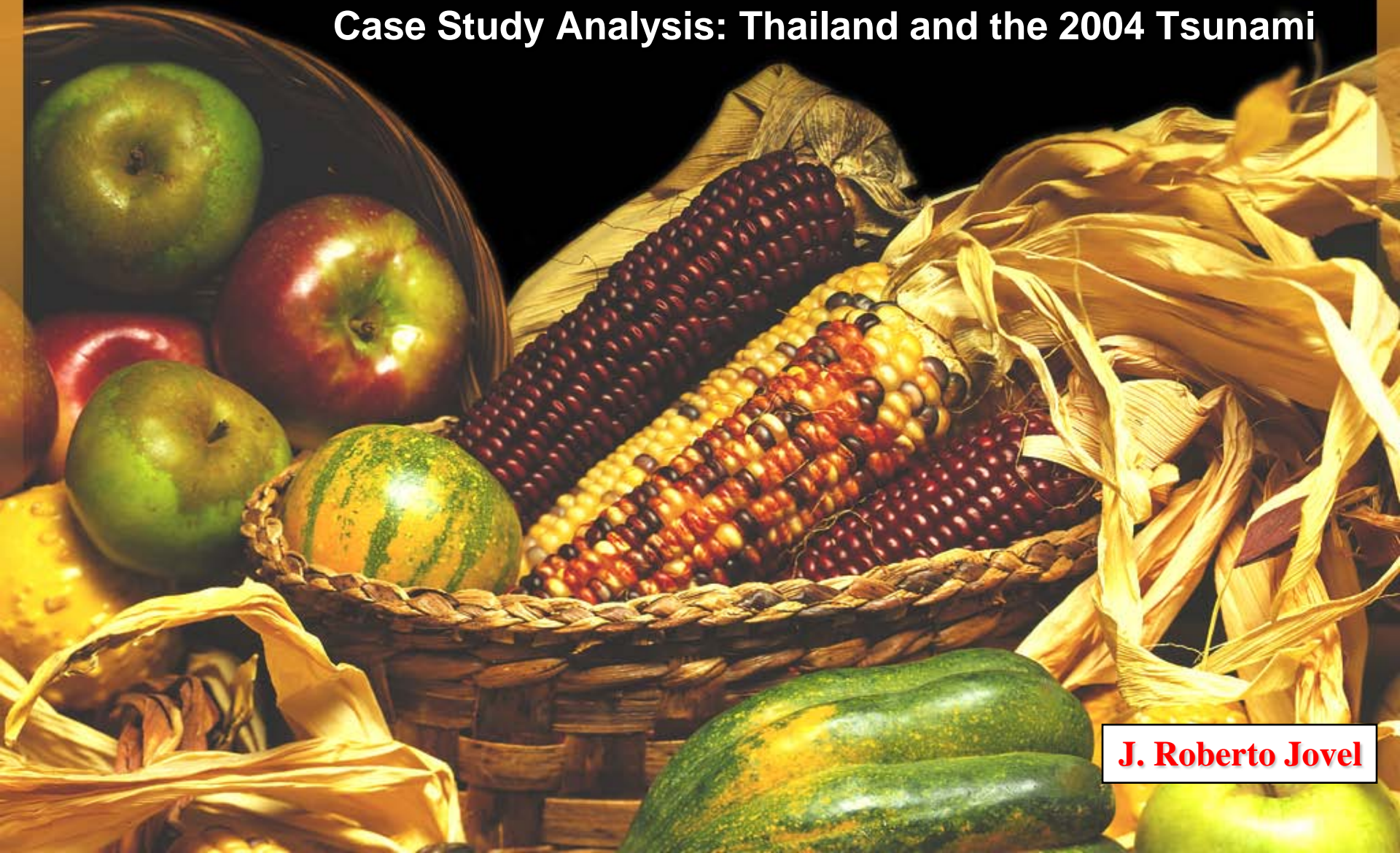


Damage and Loss Assessment in Agriculture

Case Study Analysis: Thailand and the 2004 Tsunami



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Effects of the tsunami on agriculture

- **The waves of the tsunami reached agricultural lands located in the coastal areas in six Provinces of Thailand**
- **Standing annual and permanent crops were washed away and lost**
- **Oil palm permanent plantations sustained damage due to uprooting of plants in 18% of affected area**
- **Salt water was deposited in soils and will limit future crop production until salt is leached by natural drainage**

Cultivated area flooded with salt water

Province	Rice		Maize		Oil Palm	
	Area, Rai	Area, Has.	Area, Rai	Area, Has.	Area, Rai	Area, Has
Krabi	15	2.4	5	0.8	40	6.4
Trang	100	16.0	167	26.7	21	3.4
Phang Nga	37	5.9			8,369	1,339.0
Phuket	10	1.6			80	12.8
Ranong	184	29.4	11	1.8	1,430	228.8
Satun	122	19.5			387	61.9
Total	468	74.8	183	29.3	10,327	1,652.3

Required Assessment

Damage to permanent plantation of oil palm

Production losses

- **Standing production**
 - Annual crops
 - Plantation
- **Future production**
 - Annual crops
 - Plantation



Assessment of damage

The value of the oil palms that were uprooted, and thus rendered unproductive, can be estimated from similar, on-going new plantations

An average cost for replanting of US\$ 25,000 per hectare can be used



Assessment of production losses

1. Standing crop production losses

Since the waves carried away the plants, a full crop loss may be estimated for the current year

2. Future production losses

- For annual crops, *agronomists* indicate reductions in yield due to salinity of 35 and 10 % in next two years
- For plantation crops, yield decline due to salinity expected at 15 and 5 % in next two years



Assessment of production losses ..

3. **Additional production losses in oil palm plantations**
 - a) **New oil palms require three years to mature and begin normal production**
 - b) **Thus, no production can be had until the fourth year in the case of the replanted trees (covering 18% of affected area)**

Baseline Data



Unit Yields and Farmgate Prices in all affected Provinces

		Krabi	Phang-Nga	Phuket	Ranong	Satun	Trang
Rice							
	Unit yield, Kg/ha	47.20	50.40	47.20	43.20	64.00	64.00
	Farmgate price, US\$/Kg	146.15	146.15	146.15	146.15	146.15	146.15
Maize							
	Unit yield, Kg/ha	91.20	91.20	91.20	91.20	91.20	91.20
	Farmgate price, US\$/Kg	123.08	123.08	123.08	123.08	123.08	123.08
Oil Palm							
	Unit yield, Kg/ha	480.00	480.00	480.00	480.00		432.00
	Farmgate price, US\$/Kg	58.97	58.97	58.97	58.97		58.97

Agricultural Statistics of Thailand – 2003, MOAC

Estimation of Damage and Losses



Estimated Production Losses for Annual Crops

Annual Crops	Krabi	Phang Nga	Phuket	Ranong	Satun	Trang	Total
RICE							
Area, hectares	4	5.9	1.6	29.4	19.5	16.0	
Unit yield, Kg/ha	20	50.40	47.20	43.20	64.00	64.00	
Normal production, Kgs	80	297.4	75.5	1270.1	1248.0	1024.0	
First year, 100% loss		297.4	75.5	1270.1	1248.0	1024.0	
Second year, 35% loss		104.08	26.43	444.53	436.80	358.40	
Third year, 10% loss		29.74	7.55	127.01	124.80	102.40	
Summary of losses, Kgs		431.17	109.50	1841.62	1809.60	1484.80	
Unit price, US\$/Kg		46.15	146.15	146.15	146.15	146.15	
Value of losses, US\$		19917	16004	269159	264480	217009	853677
MAIZE							
Area, hectares	0.8			29.4		26.7	
Unit yield, Kg/ha	91.20			91.20		91.20	
Normal production, Kgs	72.96			2681.28		2435.04	
First year, 100% loss	72.96			2681.28		2435.04	
Second year, 35% loss	25.54			938.45		852.26	
Third year, 10% loss	7.30			268.13		243.50	
Summary of losses, Kgs	105.79			3887.86		3530.81	
Unit price, US\$/Kg	123.08			123.08		123.08	
Value of losses, US\$	13021			478505		434561	926087
TOTAL VALUE OF LOSSES, US\$	37027	63017	16004	747665	264480	651570	1779764

Total value of losses in annual crop production US\$ 1.8 million

Estimated Production Losses for Permanent Plantations

Plantation Crops	Krabi	Phang Nga	Phuket	Ranong	Satun	Trang	Total
OIL PALM, plants not uprooted							
Area, hectares	4.6	964.1	9.2	164.7	44.6	2.4	
Unit yield, Kg/ha	480.00	480.00	480.00	480.00	480.00	432.00	
Normal production, Kgs	2211.84	462758.4	4423.68	79073.28	21392.64	1057.54	
First year, 100% loss	2211.84	462758.4	4423.68	79073.28	21392.64	1057.54	
Second year, 15% loss	331.78	69413.76	663.55	11860.99	3208.90	158.63	
Third year, 5% loss	110.59	23137.92	221.18	3953.66	1069.63	52.88	
Summary of losses, Kgs	2654.21	555310.08	5308.42	94887.94	25671.17	1269.04	
Unit price, US\$/Kg	58.97	58.97	58.97	58.97	58.97	58.97	
Value of losses, US\$	156530	32749056	313060	5595955	1513829	74841	40403272
OIL PALM, uprooted plants							
Area, hectares	1.2	241.0	2.3	41.2	11.1	0.6	
Unit yield, Kg/ha	480.00	480.00	480.00	480.00	480.00	432.00	
Normal production, Kgs	552.96	115689.60	1105.92	19768.32	5348.16	264.38	
First year, 100% loss	552.96	115689.60	1105.92	19768.32	5348.16	264.384	
Second year, 100% loss	552.96	115689.6	1105.92	19768.32	5348.16	264.384	
Third year, 100% loss	552.96	115689.6	1105.92	19768.32	5348.16	264.384	
Fourth year, 100% loss	552.96	115689.6	1105.92	19768.32	5348.16	264.384	
Summary of losses, Kgs	2211.84	462758.4	4423.68	79073.28	21392.64	1057.536	
Unit price, US\$/Kg	58.97	58.97	58.97	58.97	58.97	58.97	
Value of losses, US\$	130442	27290880	260884	4663296	1261524	62368	33669393
TOTAL VALUE OF LOSSES, US\$	286972	60039936	573944	10259251	2775353	137209	74072665

Total value of losses in plantations US\$ 74.1 million



Estimated Value of Damage in Oil Palm Plantations

Total area affected, in hectares:	<u>1,652.3</u>
Area where trees were uprooted (18% of total area affected) in hectares:	<u>297.4</u>
Unit value for replanting of oil palm trees (in US\$ per hectare):	<u>25,000</u>
Value of damage,	<u>US\$7.4 million</u>

Summary of Damage and Losses

	Krabi	Phang Nga	Phuket	Ranong	Satun	Trang	Country
Damage	28800	6025500	57600	1029600	278550	15300	7435350
Losses	323999	60102953	589949	11006916	3039833	788779	75852429
TOTAL	352799	66128453	647549	12036516	3318383	804079	83287779

	Million US\$	
Damage	7.4	
Losses	75.9	

	2004	2005	2006	2007	Total
Losses, Million US\$	43.3	13.9	10.2	8.4	75.9

Thank You !!



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