

**EXERCISE ON DAMAGE AND LOSS ASSESSMENT
IN THE AGRICULTURE SECTOR:
THE DECEMBER 2004 TSUNAMI IN THAILAND**

Exercise prepared by J. Roberto Jovel for use in Damage and Loss Assessment Training Workshop.

I. BACKGROUND

A powerful earthquake of magnitude 9.5 in the Richter scale, with epicenter located just off the Northern part of the island of Sumatra, occurred in the early hours of 26 December 2004. It created a tsunami that expanded over the Indian Ocean and affected the coastal areas of many countries in Asia and Africa.

Estimates of the economic and social impact of the disaster were undertaken under the leadership of the World Bank in Indonesia¹, Sri Lanka², Maldives Islands³, and India⁴. In Thailand, however, only individual sector assessments as well as preliminary global assessments of the macroeconomic impact were carried out by different government institutions, in some cases with assistance from international organizations⁵.

The Asian Disaster Preparedness Center (ADPC) undertook a comparative study of the economic impact of the tsunami in the entire region, with a view to identifying common vulnerabilities and risks whose solution may be best approached in a cooperative fashion and thus generating significant economies of scale for the countries.

As part of the regional study, ADPC first undertook the estimation of the total amount of damage and losses sustained by Thailand. In order to ensure the validity and accuracy of results in the comprehensive estimation for Thailand, and their compatibility with the available assessment of the other countries, ADPC resorted to the use of a damage and loss assessment methodology developed originally by the United Nations' Economic Commission for Latin America and the Caribbean (ECLAC)⁶, which was also used – to a varying extent – in the national assessments undertaken under the leadership of the World Bank.

The ECLAC methodology enables the estimation of the replacement value of destroyed physical assets as well as the estimation of economic losses arising from the temporary absence of the assets. The resulting figures are subsequently used to estimate the impact of the disaster on the macro-economic performance of the country.

Original information used in the sectoral assessments undertaken by the Government of Thailand as well as by international organizations was collected. In addition, statistical data in regard to sectoral and global development was obtained. These data were processed using the aforementioned ECLAC methodology.

¹ See World Bank and BAPPENAS, *Indonesia: Preliminary Damage and Loss Assessment; The December 26, 2004 Natural Disaster*, Bangkok, January 2005.

² See World Bank and Others, *Sri Lanka: 2005 Post-Tsunami Recovery Program, Preliminary Damage and Needs Assessment*, Colombo, January 2005.

³ See World Bank and Others, *Republic of the Maldives; Tsunami, Impact and Recovery*, February 2005.

⁴ See World Bank and Others, *India, Post-Tsunami Recovery Program; Preliminary Damage and Needs Assessment*, New Delhi, March 2005.

⁵ These references will be quoted separately in the appropriate chapters of this report.

⁶ See ECLAC, *Handbook for Estimating the Socio-Economic and Environmental Effects of Disasters, Four Volumes*, 2003.

This report provides the basic information required for the estimation of the effects caused by the tsunami on the agriculture sector of Thailand, as collected by ADPC in 2005. It also describes the basic assumptions required for the assessment.

II. THE EFFECTS OF THE TSUNAMI ON AGRICULTURE

a) Agricultural lands affected

The waves of the tsunami reached agricultural lands located near the coastline of six Provinces in Thailand. The standing crops were either washed away; and the salt content of the water deposited in the soils will have a negative effect on the unit yield of future crops. Oil palm plantations sustained similar losses, and about 18 per cent of them were uprooted by the action of the waves, and will require re-planting. The affected areal extent for each crop is given in Table 1.

Table 1
Agricultural Area Affected by Tsunami in Thailand

Province	Rice		Maize		Oil Palm	
	Area, Rai	Area, Hectares	Area, Rai	Area, Hectares	Area, Rai	Area, Hectares
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

Source: Ministry of Agriculture and Cooperatives (MOAC) and FAO

b) Effects on production and assets

The resulting effect on production includes the loss of the standing crops, as well as reductions in productivity in the following two years, especially in the case of the most salt-sensitive crops and plantations.

The replacement cost of the oil palm plantations that were uprooted must be considered as damage to assets of the sector, and the corresponding period of maturity for the new plants must be taken into consideration in the estimation of losses.

An assessment of these damage and losses must be undertaken, using available information.

III. DAMAGE AND LOSS ASSESSMENT

a) Baseline information

While the Ministry of Agriculture and Cooperatives (MOAC) did not have forecasts of production for the year when the tsunami occurred, data on average production and farm-gate prices for the previous agricultural year are available⁷. Since these have remained relatively stable in recent times, they may be used as a baseline for the preliminary estimation of losses.

Table 2.
Unit Yield and Farm-gate Prices of Affected Agriculture Products in Thailand

		Province					
		Krabi	Phang-Nga	Phuket	Ranong	Satun	Trang
Rice	Unit Yield, Kg/Rai	295	315	295	270	400	400
	Farmgate price, Baht/Ton	5,700	5,700	5,700	5,700	5,700	5,700
Maize	Unit Yield, Kg/Rai	570	570	570	570	570	570
	Farmgate price, Baht/Ton	4,800	4,800	4,800	4,800	4,800	4,800
Oil Palm	Unit Yield, Kg/Rai	3,000	3,000	3,000	3,000		2,700
	Farmgate price, Baht/Ton	2,300	2,300	2,300	2,300		2,300

Source: Ministry of Agriculture and Cooperatives (MOAC)

b) Estimates of Production Losses

Estimates are to be made of the losses in production arising from the disaster, for both annual and plantation crops. They should include:

- The loss of the standing crop at the time of the tsunami, and
- The loss of future production due to decline in unit yield due to soil salinity.

The value of the standing crop losses may be obtained through the combined use of data contained in Tables 1 and 2.

Future production losses for annual crops may be estimated assuming that unit yields will decline by 35 and 10 per cent in each of the two subsequent years (2005 and 2006, in view of declining soil salinity brought about by natural leaching through rainfall. In the case of oil palm plantations, future production may be estimated assuming a decline in unit yields of 15 and 5 per cent in 2005 and 2006, respectively. In addition, until the oil palm trees are replanted and reach maturity (estimated as three years), there will occur full losses of production in 18 per cent of the area devoted to this activity, which is where palm trees were uprooted.

⁷ See Office of Agricultural Information, *Agricultural Statistics of Thailand, 2003*, Ministry of Agriculture and Co-operatives, Bangkok.

c) Estimates of Damage

Damage to oil palm plantation assets may be estimated as the value of replanting the trees in 18 per cent of the total plantation area affected by the tsunami, as indicated in Table 1. An average cost of US\$ 25,000 per hectare may be assumed for these estimations⁸.

⁸ An exchange rate of 39 Baht per US Dollar may be assumed.