

Vetiver Grass: A Solution to Solving Soil Erosion Problems in Agricultural Areas of Thailand and How to Establish in Farmers' Field

1

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Thai Agriculture Overview

Agriculture in Thailand is highly competitive, diversified and specialized and its exports are very successful internationally.

+ Rice is the country's most important crop, with some 60 percent of Thailand's 13 million farmers growing it on almost half of Thailand's cultivated land.

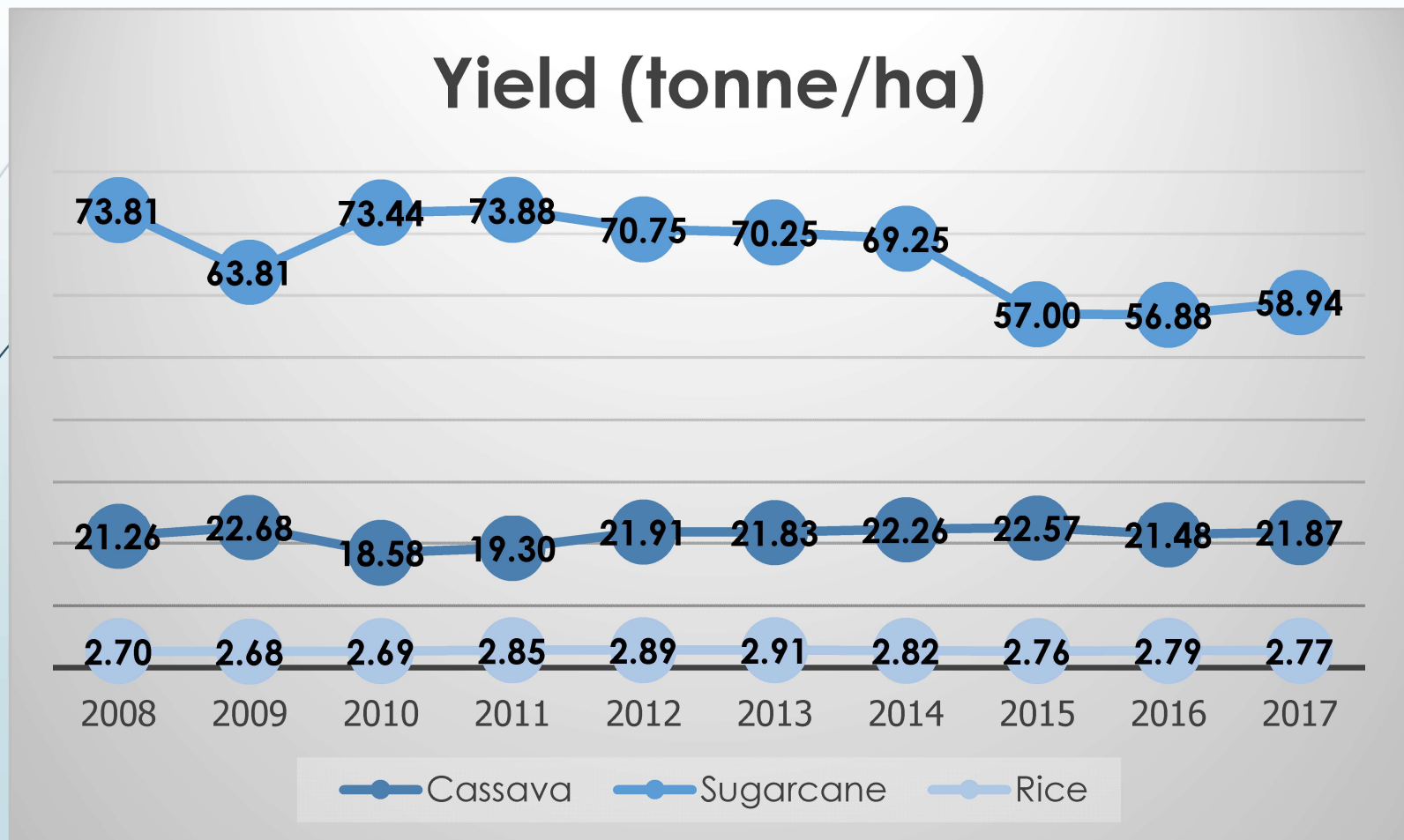
'Rice-based country'



Agricultural Production in Thailand

- +104.3 million tonnes of **sugarcane** (**4th largest producer** in the world, only behind Brazil, India and China)
- + 32.1 million tonnes of **rice** (**6th largest producer** in the world)
- + 31.6 million tonnes of **cassava** (**2nd largest producer** in the world, just behind Nigeria)
- + 15.4 million tonnes of **oil palm** (**3rd largest producer** in the world, behind Indonesia and Malaysia)
- + 4.7 million tonnes of **natural rubber** (**the largest producer** in the world)
- + 3.8 million tonnes of **mango** (including **mangosteen and guava**) (**3rd largest producer** in the world, only behind India and China)
- + 2.1 million tonnes of **pineapple** (**4th largest producer in the world**, only behind Costa Rica, Philippines and Brazil)
- + 885 thousand tonnes of **coconut** (**9th largest producer** in the world);
- + 5 million tonnes of **maize**, 1 million tonnes of **banana**, 1 million tonnes of **vegetables** and 516 thousand tonnes of **orange**

Average yield of major economic crops in Thailand: 2008-2017

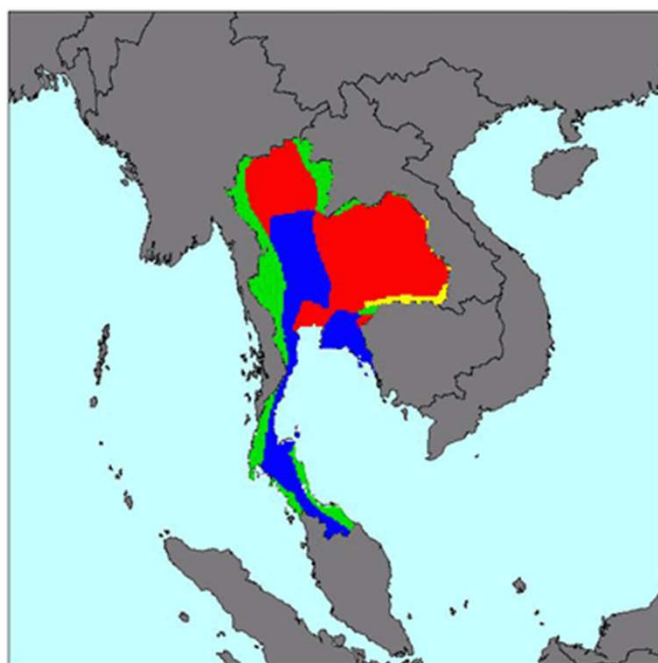


Severity of Human Induced Soil Degradation in Thailand

5

Legend

- None
- Light
- Moderate
- Severe
- Very Severe
- Not Classified



<< Problem soils >>

- + Salt affected soil
 - * Inland saline soil
 - * Coastal saline soil
- + Acid sulfate soil
- + Shallow and skeletal soils
- + Organic soil
- + Sandy soil

Actual Extent Affected Legend	
Extent	Percentage
Infrequent	0 - 5
Common	5 - 10
Frequent	10 - 25
Very Frequent	25 - 50
Dominant	> 50

Source: FAO/AGL (2005)

Why has chemical fertilizer use efficiency been poor in the last few decades?

6

<< **Soil loss through water erosion** >>

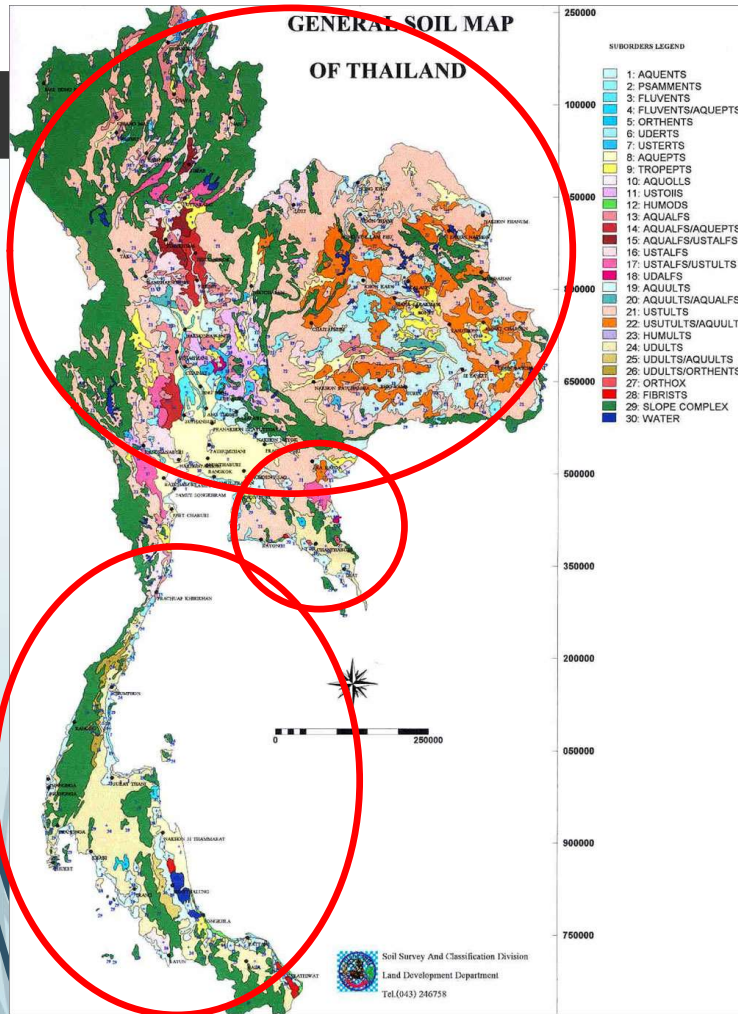
<< Soil mismanagement leading to soil compaction, soil physical deterioration >>

<< Loss of soil organic matter leading to low soil nutrient retainability against leaching >>

<< Improperly heavy fertilisation leading to nutrient imbalance >>

<< Inherently poor soil quality without proper soil improvement measures >>

<< Climate change leading to erratic rainfall >>



Lowland paddy rice areas:



Aquepts

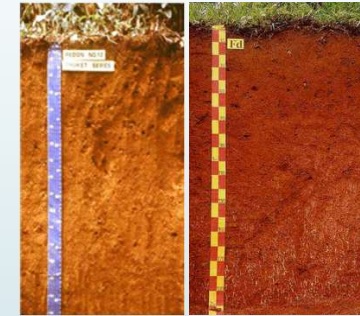


Aqualfs



Aquults

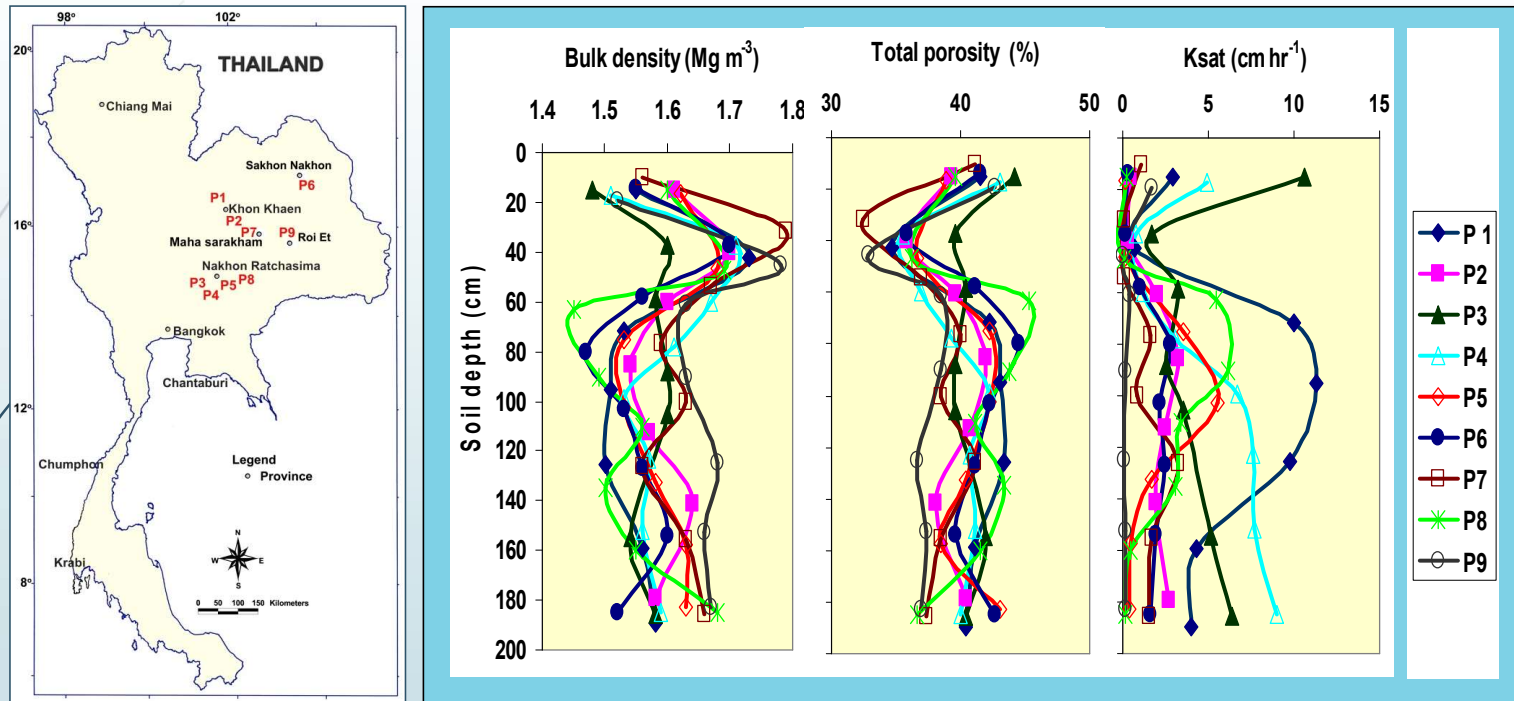
Southern peninsula and southeast coast:
Udults



Other regions: Ustults



Plough pan: Accelerating soil erosion in upland areas



Anusontpornperm et al. (2005)

Soil Erosion

The problem remains extensive in economic crops growing areas in Thailand



Vetiver grass

Four experiments on the effects of vetiver grass and leucaena in sugarcane, maize and cassava (grown early and at nearly the end of rainy season) crop practices were conducted during 1993-1995 in a farmer field, Nakhon Ratchasima province, northeast Thailand.



Anusontpornperm, S., W. Supattanakul and P. Kawilaves. 1996. Effects of Vetiver Grass and Luacaena on Soil Erosion Control in Sugarcane, Maize and Cassava Crop Practices, pp. 92-102. In Proceeding of the International Conference on Vetiver: A Miracle Grass to Commemorate the 50th Anniversary (Golden Jubilee) Celebrations of His Majesty the King of Thailand's Accession to the Throne. Chiang Rai.

Contouring vetiver grass barriers on mountainous area: Chiang Mai province, north of Thailand

11



Vetiver grass barriers along terraces Chiang Rai province, north of Thailand



Vetiver grass for stabilizing terrace walls Royal Project Foundation, Chiang Mai, north of Thailand



Vetiver grass hedgerow along local road Tak province, lower north of Thailand



Vetiver grass on the edge of broad-based terraces Pitsanulok province, lower north of Thailand



Straight vetiver grass barriers on undulating terrains Uthai Thani province, Central part of Thailand



Contouring vetiver grass hedgerows on hillside slopes Surat Thani province, South of Thailand

17



Contouring vetiver grass hedgerows on very steep mountain Ranong province, South of Thailand

18



The first 'Vetiver Grass Utilization under the Royal Initiative' master plan: 1993

The use of vetiver grass has been sporadic in an area-based wise, particularly in upland agricultural areas of Thailand, particularly on sloping surface of as little as 2% up to much steeper



Farmer Acceptance





- + Rented land: lacking motivation to conserve the land
- + Size of cultivated lands: too small for farmers to provide some areas for growing vetiver grass
- + Shape of land: unfavourable for growing vetiver grass across slopes
- + Insufficient realization of how serious soil loss can adversely be on growing plants in forthcoming times

How to change their mind?

convince



Encourage

OFFER



- + Large scale vetiver grass for soil and water conservation demonstrative plots: voluntary farmers' lands in all regions of the country for others to visit and learn
- ++ Carried out by academics, governmental officers, and others from private sectors with funding support from governmental and non-governmental sectors



<<< In each individual farmland >>>

- + Subsidization to persuade farmers to grow vetiver grass can be in different forms
- ++ Agricultural inputs, moratorium or interest reduction relating to debts owed to Bank for Agriculture and Agricultural Cooperatives etc.
- +++ Depending upon a portion of lands used for growing vetiver grass and how long the plant being established



Humanitarian Soil Scientist

5 December

26

