

## **The Vetiver Grass Cultivation Campaign and Promotion for Land Resources Rehabilitation in Thung Kula RongHai Plain: Case study in Chumphon-Buri District, Surin Province, Thailand.**

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**Abstract:** The deterioration of soil resources and environment in Thailand has been in the great concern. Thung Kula RongHai Plain, a vast prairies located in the center of Northeast Thailand, had suffered desert-like condition during dry season and flooding in rainy season. Surin Province which is a part of this plain, Surin is located in Northeast Thailand with the total area about 812,000 ha between in the Mun River in the north Dongrak mountain chain in the south. The central and northern parts of the province are undulating flood plain. Surin has a tropical savanna climate. Surin province is recorded as one of the top five provinces with the highest poverty in Thailand during 1998 to 2004 (Termpittayapaisit, 2008). Surin Land Development Station, the office of Land Development Region 3, Land Development Department, Ministry of Agriculture and Cooperative dedicated to promoting vetiver grass information and vetiver cultivation and promotion in land resources rehabilitation in this area. The aim of this paper was to demonstrate the outcome of the campaign and promotion of vetiver grass cultivation in Chumphon-Buri District, Surin Province Thailand. Vetiver grass was cultured and then distributes and gives the knowledge to farmer via training and workshops and demonstration since 2012 until now. The results revealed that the vetiver grass is the good method in land resources rehabilitation. Land resources in the project areas were improved compared to the surrounding area. Moreover, in the second years of the project, the extended project was enlarging to the neighboring area. The learning center has been built up under the collaboration between the local people and Surin Land development Station. This learning center is not only learning center for vetiver grass promotion but also the agro-tourism for students, farmers, Governments and Organizations for Soil and Water conservation with sustainable Land Resources Rehabilitation in Northeast Thailand.

Keyword: Thung Kula RongHai, Land Resources Rehabilitation, Surin Province

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## 1. INTRODUCTION

Thung Kula RongHai Plain has terrain is large pan, around the scope is basically high and gradually slopes down to the middle of the area. The deterioration of soil resources of Thung Kula Ronghai Plain is drought in the dry season and floods in the rainy season. The project of Land Development in Thung Kula Ronghai has been carried out since the fiscal year 1981. Its purpose is to relieve the poverty of 40,000 people living in 336,000 ha of 5 provinces including Surin, Maha Sarakham, Sri Sa Ket, Roi Et and Yasothon (Land Development Department, 2015). People living in areas have high poverty. Especially Surin province is recorded as one of the top five provinces with the highest poverty in Thailand during 1998 to 2004 (Termpittayapaisit, 2008). Surin Province as part of Thung Kula RongHai Plain. The total area 92,149.2 ha accounted for 27.3 percent of the area viz. Tha Toom District 28,094.8 ha (2 Sub-districts) and Chumphon-Buri District 64,064 ha (7 Sub-districts) (Land Development Department, 2010). This area is experiencing yields is relatively low, soils fertility and nutrient low. Ministry of Agriculture and Cooperatives has policy of economic restructuring of the agricultural sector. The promotion and development of the area, focus on operations in the agricultural settlement has been integrated to improve the productivity and soil fertility. Surin Land Development Station (LDD) and Agricultural Land Reform Office All rights Reserved (ALRO) organized “The rice agricultural settlement project” at Nanongphai Sub-district, Chumphon-Buri District, Surin Province, Thailand.

The aim of this paper was to demonstrate the outcome of the campaign and promotion of vetiver grass cultivation in Chumphon-Buri District, Surin Province Thailand.

## 2. METHODOLOGY

### 2.1 Targets group and Site description

Farmers in Nanongphai Sub-District, Chumphon-Buri District, and people in the nearby areas.

### 2.2 Framework for project implementation

#### 2.2.1 Study area at learning center

Address: Home ID 246, sub-district No. 3, Kra-Buang Village, Nanongphai Sub-district, Chumphon-Buri District, Surin Province, Thailand (Figure 1).

2.2.2 The project implementation was started at learning center since 2012 until now.

### 2.3 Project implementation

Mission of Land Development Department has operated soil and water conservation to prevent soil erosion by constructing soil and water conservation systems with mechanical

measures such as sediment traps and farm ponds, field terraces and hillside ditches, vegetative measures by promoting vetiver grass planting to solve soil erosion problems.

Surin Land Development Station plan organized for campaign and promotion green manure cropping and vetiver seedlings, soil and water conservation systems (Table 1), soil analysis for improve soil and construction of sediment traps and farm ponds in non-irrigated area an ongoing project since 2013 – 2015. We were built the learning center about land development and the learning center has been built up under the collaboration between the local people and Surin Land Development Station.

**Table 1** The implementation area of soil and water conservation systems.

Project / Event	2013		2014		2015	
	quantity	time	quantity	time	quantity	time
Soil analysis (sample)	100	Jan–May	150	Jan–May	150	Jan–May
campaign and promotion green manure cropping (ton)	50	Dec 2013-Jun 2014	50	Dec 2013-Jun 2014	40	Dec 2013-Jun 2014
Construction of pond (pond)	17	Jan–May	19	Jan–May	19	Jan–May
Improve acid soil by dolomite (ha)	16	Jan – Jun	16	Jan – Jun	16	Jan – Jun
soil and water conservation systems (ha)	144	Jan–May	112	Jan–May	224	Jan–May

Source: Surin Land Development Station, 2015

The implementation area of soil and water conservation systems in Nanongphai Sub-district (Figure 1).

2013: Kra Buang Village, Kwaw Kong Village and Non Ta Lan Village (160 ha)

2014: Du Nanongphai Village, Bo Kae Village and Jan Hom Village (128 ha)

2015: Thip Nuode Village, Non Ar Ram Village and Non Thad Village (240 ha)

#### 2.4 The success of the project

The concept of developing master farmer to under “The rice agricultural settlement project” by constructing the learning center model.

##### 2.4.1 Study area at learning center

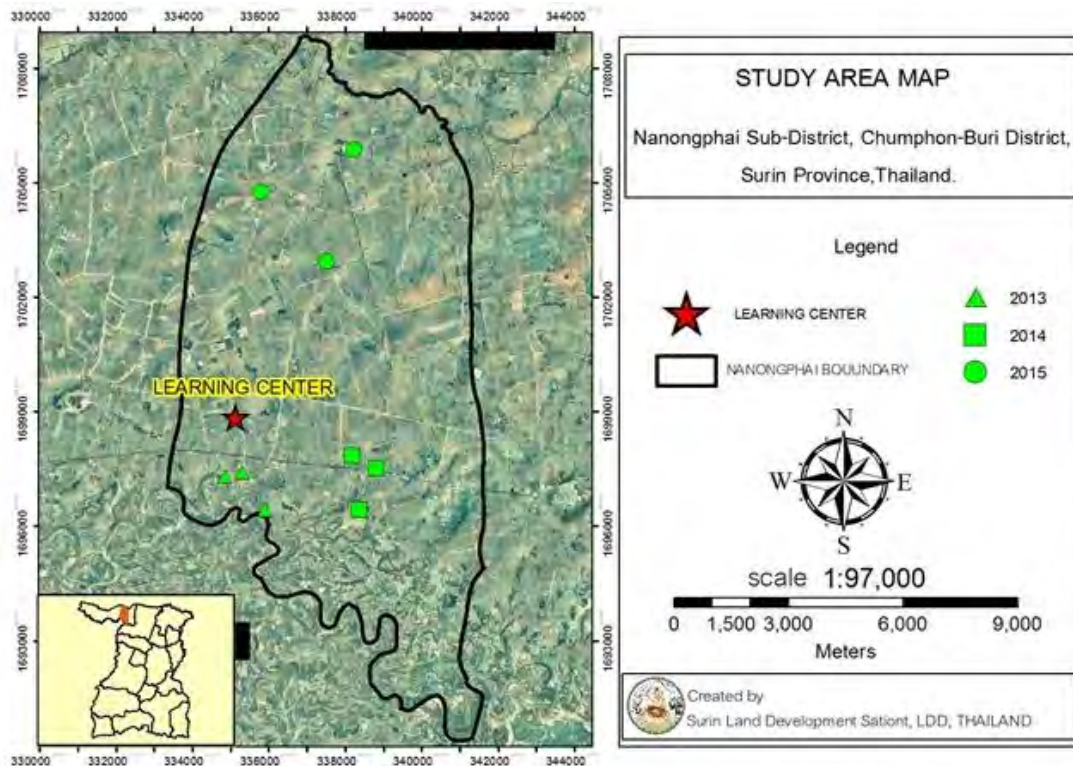
Address: Home ID 246, Sub-district No. 3, Kra-Buang Village, Nanongphai Sub-district, Chumphon-Buri District, Surin Province, Thailand (Figure 1).

2.4.2 Problem: Soil texture is sandy loam, Low soil fertility, Soil degradation from chemical fertilizers and high production costs.

##### 2.4.3 How to fix the problem for development in this study area

The project was started 2012 by leader farmer inviting lecturers from the Surin Land Development Station to provide knowledge on various aspects of vetiver grass

among farmer such as the benefit of planting vetiver grass; propagation technique, plantation, agricultural benefit. Planting vetiver grass has been accepted by farmers, it is the most easy, economical and suitable way to prevent soil erosion.



**Figure 1** Locations of implementation area and learning center point in at Nanongphai Sub-district, Chumphon-Buri District, Surin Province Thailand.

#### 2.4.4 Growing of Vetiver for improves soil and soil and water conservation

- Varieties of vetiver grass: Songkhla 3 (*Vetiveria zizanioides*)
- Time: The period for planting vetiver grass is during rainy season (June – August).
- Patterns of vetiver cultivation: Vetiver grass has been planted in the horizontal line. The interval between plants was 5-10 cm. According to soil suitability. The vertical interval between lines was 1-3 m. depending on the slope and plant types (Figure 2).
  - (1) Planting vetiver on the edges of the ponds in the area (Figure 2a).
  - (2) Planting vetiver in the fruit crop plot and around cover the base of the tree (Figure 2b).
  - (3) Planting repair and vetiver propagation by vetiver grass grown plastic bags (Figure 2c, 2d).

In addition, leaves of vetiver grass together with microbial activator super LDD 1 (group of high efficient microorganisms to decompose crop



residue such as palm bunches, sawdust which consist of hardly decompose component namely cellulose, lipid and lignin to decrease decomposition time for making the compost), molasses and manure were composted (Figure 3).



**Figure 2** Patterns of vetiver grass learning center

- (a) Planting vetiver on the edges of the ponds in the area, (b) Leaves vetiver grass covers the base of the tree, (c) and (d) Planting repair and vetiver propagation by vetiver grass grown plastic bags





**Figure 3** Composting by Leaves of vetiver grass

2.4.5 Sustainability of farmers to utilize the vetiver grass (knowledge transfer and Acceptance).

The farmer has been workshop by Land Development Department in order to conduct experiments on the benefit of planting vetiver grass. It was appeared that the vetiver grass can be preventing soil erosion. It maintains soil moisture and can be grown in infertile. In addition, the farmer want to be extended to member in the village or other people in the nearby areas for serving as an extension center to supply vetiver tillers for soil and water conservation in order that covering Nanongphai sub-district area.



**Figure 4** the learning center before start project

Two years later, soil this area have been rehabilitation explicit compared with first year. Clearly, soil this area has been moisture, plants grows well and found that planting vetiver grass prevents soil erosion (Figure 4, 5). Meanwhile, this learning center also distributed vetiver grass varieties to farmers and interested public in nearby areas too.





**Figure 5** The learning center after start project

At the same time, this learning centers also the agro-tourism for student, farmers, Governments and Organizations for publicizing the knowledge of vetiver and promotion of the knowledge on sufficient economy.



**Figure 6** This learning center have been Regional Awards "Contest of Vetiver grass cultivation excellent" organized by Land Development Department on 2014





**Figure 7** Her Royal Highness Princess Maha Chakri Sirindhorn visited here and her was met the farmers that produce royal organic rice on 27 October 2014



**Figure 8** Director of Land Development Department visited here and materials delivered in the production of organic fertilizers to member of farmers this here on 13 February 2015



Presently many students and farmer in the nearby areas have arranged study tours and visits to the learning center in order to inquire and request for support of vetiver tillers of various ecotype. In this regards, the learning center has responded to the visitors request as best as they can.



**Figure 9** Training and knowledge sharing for students, farmers, Governments and Organizations visited this here

### 3. SUMMARY

Vetiver grass can make well-structured soil with increased organisms. Its leaf cuttings can be used for mulching and maintaining and soil moisture. The research on the effect of vetiver grass on soil erosion was conducted and found that planting vetiver grass can prevent soil erosion or decrease soil erosion to not more than 1,250 kg/ha per year. Plantation can be conducted in slope areas such as agricultural area, ditch, road shoulder area and edge of pond or reservoir (Land Development Department, 2015). This here, vetiver grass help to adjust soil structure and soil moisture, It also a learning center for interested public and vetiver grass have been distributed to farmers and member group. It has been accepted by farmers that planting vetiver grass is the most easy, economical and suitable way to prevent soil erosion. It was the successful method of using natural creation to solve the problem.

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