

# **LAOS**

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# Riverbank Protection in the Lao PDR

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**Lao PDR**

## I Introduction

The Lao People's Democratic Republic (the Lao PDR) is a small developing country, which is one of the poorest countries in the world. Per capita GDP is 329US\$ (in 2001) and the growth rate is 5.7% from 1990 to 2001. Infant mortality rate is 8.2% (in 2000) and under-5 mortality rate is 10.6% (in 2000). It is said that about 40% of the population lives in poverty.

90% of the state of the Lao PDR forms part of the Mekong River Basin. Furthermore, of all the member countries of the Mekong River Commission (MRC), the Lao PDR has the greatest length of the Mekong River. Therefore the Mekong River Basin is of great importance to the Lao PDR. The presence of the river has both advantages and disadvantages. One of the disadvantages is the damage caused by the river.

Riverbank erosion is the most serious damage. This has been a serious constraint on poverty reduction and socio-economic development in the Lao PDR.

## II Riverbank Erosion

The water level of the Mekong River changes seasonally by more than 10m. When the water level is high, riverbanks are eroded by the river current and, when the water level falls at the beginning of dry seasons, many riverbanks collapse not only along the Mekong River but also along its tributaries.

The Lao PDR has been suffering from damage caused by the riverbank erosion. The damage extends to the urban lands, houses, electric cables roads and so on. The erosion has menaced National Road 13, which is the most important trunk road in the Lao PDR, with destruction.

Poor people are the main victims of the riverbank erosion. Their houses and their community facilities such as roads, temples, etc are in the danger of being destroyed by the riverbank erosion.

## III Riverbank Protection

### 1. Past Activities

In order to cope with the riverbank erosion situation, the Government of the Lao PDR (GOL) has executed riverbank protection works mainly with gabions. However, even gabion works are expensive for the Lao PDR, because iron mesh baskets must be imported.

The Lao PDR is one of the most poorest countries in the world and the budget of the GOL for riverbank protection is only about US\$100,000 / year.

With this budget, only about 60m can be protected in a year, if we use gabions.

Therefore the use of gabions is not a sustainable riverbank protection method for poor countries such as the Lao PDR. The Lao PDR has been looking for effective and low-cost riverbank protection techniques.

## **2. Transfer of Riverbank Protection Techniques from Japan**

The GOL has been introducing riverbank protection techniques using natural materials with the assistance of the Japanese Government. These techniques are effective, environment-friendly and low-cost, because the necessary materials can be secured in the country. Therefore these techniques can be sustainable for poor countries such as the Lao PDR.

### **(1) Groyne Construction in Bokeo Province**

In Bokeo province, a village near the border with Myanmar and Thailand, “the Golden Triangle”, was being seriously damaged by riverbank erosion. The GOL had planned to protect the riverbank with gabions. However the GOL followed a JICA Expert’s technical advice and changed the plan. A local labor force began to construct rock groynes with local materials in 1998.

These groynes are very effective for riverbank protection, because these slow the river current and promote sedimentation along the riverbank.

In addition, the cost is about 500US\$/m, which is almost ¼ of the cost of gabion works.

The GOL has already completed 11 groynes and is planning to construct other 30 groynes.

### **(2) Experimental Work using “SODA” mattress**

The Ministry of Land, Infrastructure and Transport of Japan and the Infrastructure Development Institute of Japan experimentally protected 80m of a riverbank using “SODA” Mattress that is a Japanese traditional riverbank protection technique.

This experimental work was implemented in 2001. The “SODA” Mattress has experienced one rainy season and is still protecting the riverbank effectively. This has proved the effectiveness of “SODA” Mattress for the protection of the Mekong Riverbank. In addition, the cost is estimated about 1,000US\$/m which is almost half of gabion works.

The GOL is planning to practice the use of “SODA” Mattress by itself in

2003 and 2004, and disseminate this technique to local governments.

**(3) JICA Development Survey on Mekong Riverbank Protection around Vientiane Municipality**

The Japan International Cooperation Agency (JICA) started its Development Survey on “Mekong Riverbank Protection around Vientiane Municipality” in 2001.

The objectives of this survey are:

1. To study practical, low-cost and sustainable riverbank protection techniques for the Lao PDR
2. To transfer such techniques to the Lao PDR through pilot works
3. To formulate a master plan for the Mekong Riverbank protection around Vientiane Municipality, based on the monitoring of the pilot works

In this dry season, pilot works will start at 3 sites as follow.

Sites	Length	Techniques
Ban Dongphosi	648m	Cobblestone with Willow Branch Work and “SODA” Mattress
Wat Chom Chen	240m	Wooden Pile Dike Groin Work with “SODA” Mattress
Wat Sibounheuang	150m	Cobblestone with Willow Branch Work and “SODA” Mattress

**IV Conclusion**

In poor countries such as the Lao PDR, effective and low-cost riverbank protection techniques are absolutely necessary to protect poor people’s lives and property.

After the on-going JICA Development Survey has finished in March of 2005, the GOL will independently use and disseminate the transferred techniques for poverty reduction and socio-economic development in the Lao PDR.

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## **Riverbank Protection in the Lao PDR**

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## **Content**

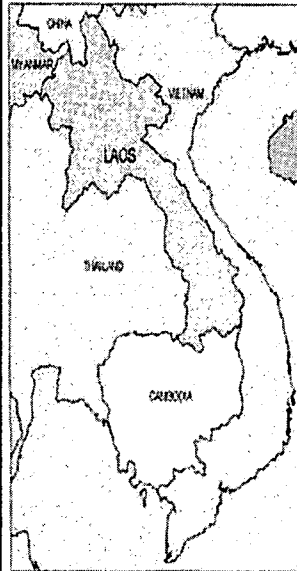
**I . Introduction**

**II . River Bank Erosion**

**III . River Bank Protection**

**IV. Conclusion**

## I. INTRODUCTION



• **Location:** A Land Lock Country in South East Asia, Sharing Border with China, Myanmar, Thailand, Cambodia and Vietnam.

• **Total Area:** 236,800 sq.km.

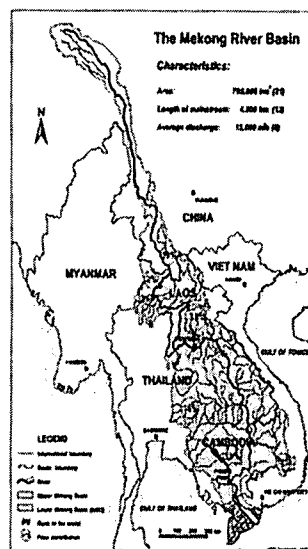
• **Population:** 5.2 million.

• **GDP :** 329US\$ ( In 2001) One of Poorest Country in the World and the growth rate is 5.7% from 1990 to 2001.

• Infant mortality rate is 8.2% and under -5 mortality rate is 10.6% in 2000.

• About 40% of the population lives in poverty.

## THE MEKONG RIVER



Annex 1 • The Mekong river is the largest river in South East Asia.

- Its runs through six riparian countries of the basin such as : China, Myanmar, Lao PDR, Thailand, Cambodia & Vietnam  
China ,it has a total length of approximately 4,800 km

•Mekong river: each year about 457,000 million m<sup>3</sup> of water flows into the sea.

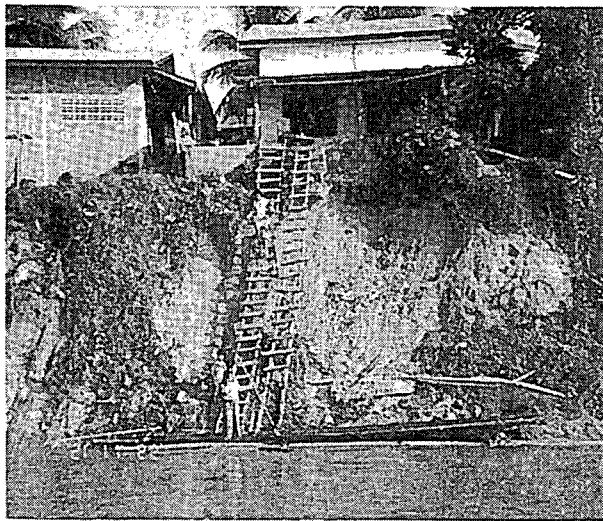
•Total Mekong river basin area of approximately 795,500 km<sup>2</sup>

•28 important tributaries on the left bank with the drainage area >1,000 km<sup>2</sup> .



## II. RIVERBANK EROSION

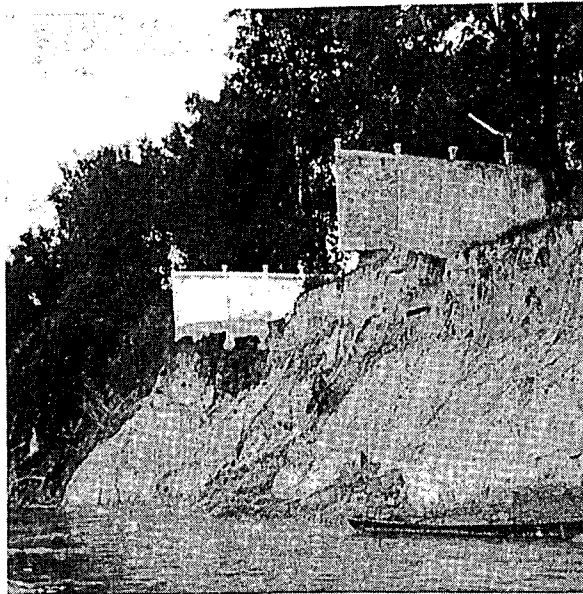
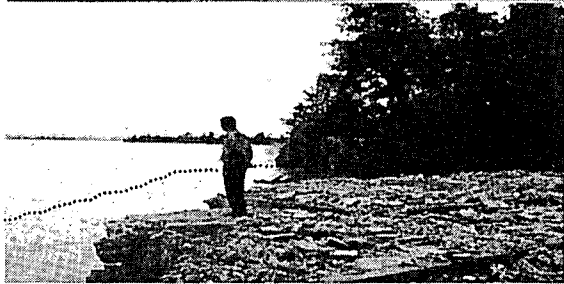
- The water level of the Mekong River changes seasonally by more than 10 m.
- Riverbank erosion is one of disadvantages of the river.
- Riverbank erosion is the most serious damages in Lao PDR.
- The damages by riverbank erosion extends to the urban lands, houses,electric cable ,agriculture lands roads and so on.
- Poor people are the main victims of the riverbank erosion.



Houses damage caused by the riverbank erosion in Vientiane City

SERIOUS RIVERBANK EROSION IN BOKEO PROVINCE

AUGUST 28, 2002



Urban land and property damage caused by riverbank erosion



Road damage caused by riverbank erosion

### **III . RIVER BANK PROTECTION**

#### **Past Activities**

- The government of Lao PDR (GOL) has executed riverbank protection works mainly with gabions.
- The gabion works are expensive for the Lao PDR.
- The budget for riverbank protection is about US\$ 100,000 per year can be protected only about 60 m in a year, if we use gabion.
- The Lao PDR has been looking for effective and low cost riverbank protection techniques.

**RIVERBANK PROTECTION  
AT WATSOP TEMPLE VIENTIANE MUNICIPALITY**



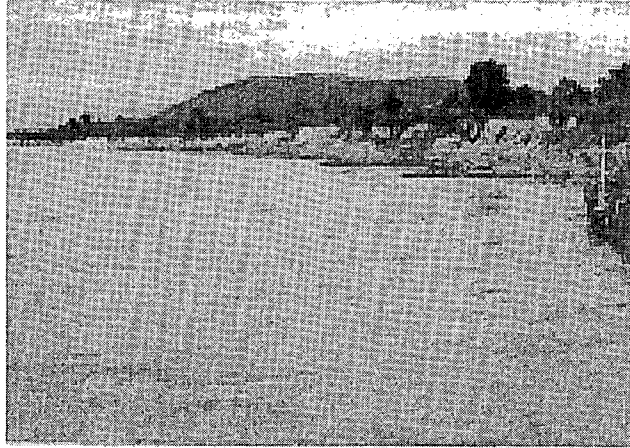
**2. TRANSFER OF RIVERBANK PROTECTION  
TECHNIQUES FROM JAPAN**

- Since 1996 the GOL has been introducing riverbank protection using local materials with the assistance of the GOJ.
- These techniques are effective, environment-friendly and low cost, because the necessary materials can be secured in the country.
- Therefore the techniques can be sustainable for poor country such as the Lao PDR.

**(1) Groynes construction in Bokeo Province**

**(Northern Part of Lao PDR)**

**Started from 1998**



**Groynes in Bokeo Province**  
**(Northern Part of Lao PDR)**



- Very effective for the riverbank protection.
- Promote sedimentation along the riverbank.
- Low cost.

## **(2) Experimental Work using**

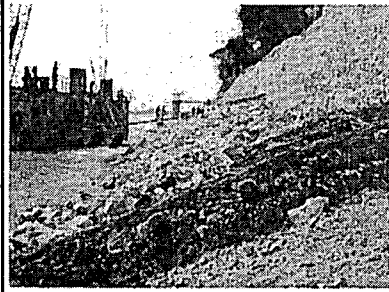
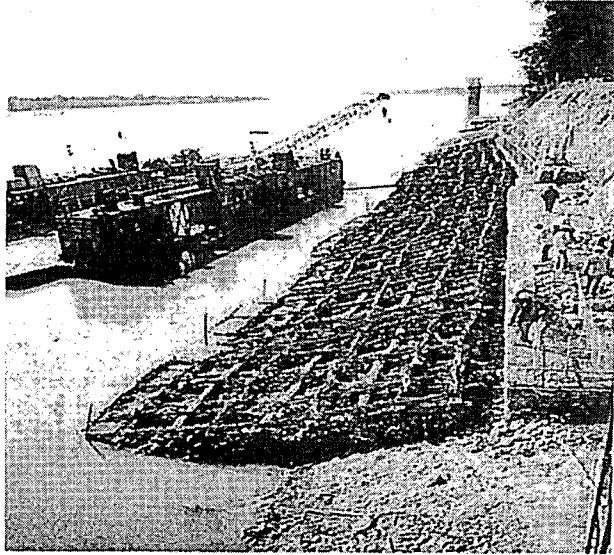
### **“SODA” mattress (Fascine mattress).**

- MLIT and IDI of Japan experimentally protected 80m of a riverbank using “SODA” mattress that is a Japanese traditional riverbank protection technique was implemented in 2001.
- This has proved the effectiveness of “SODA” mattress for the protection of the Mekong riverbank , in addition the cost is about 1000US\$/ml which is almost half of gabion works.
- The GOL is planning to practice the use of “SODA” mattress by itself in 2003 and 2004, and disseminate this technique to local government .

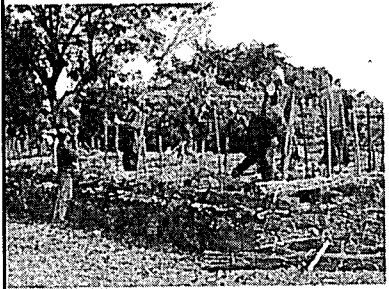
**Training course on Soda mattress system at the MCTPC, March 2000 Organized by IDI, Japan.**



**Implementation of SODA Mattress System**

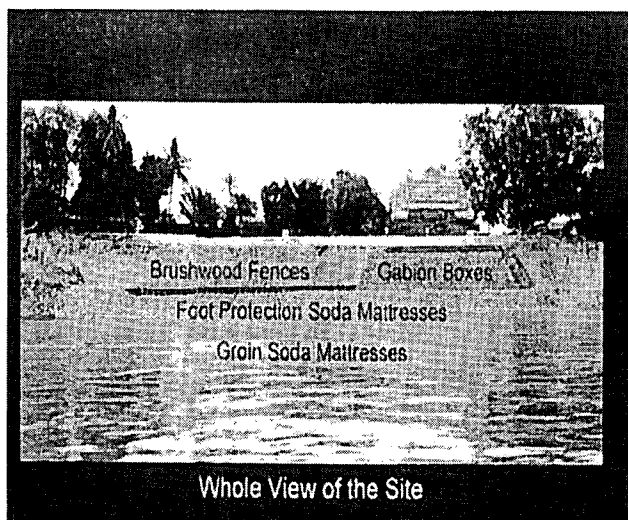


**Installation of  
SODA Mattress.**



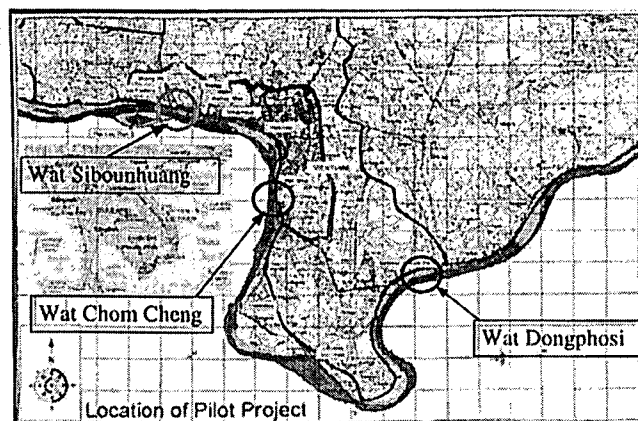
**Assembly (Fabricate)  
SODA Mattress.**

### Completion of SODA Mattress (80 ml)



### (3) JICA Development survey on Mekong riverbank protection around Vientiane Municipality.

The Japan International Cooperation Agency (JICA) has started its development survey on Mekong riverbank protection around the Vientiane Municipality in 2001.



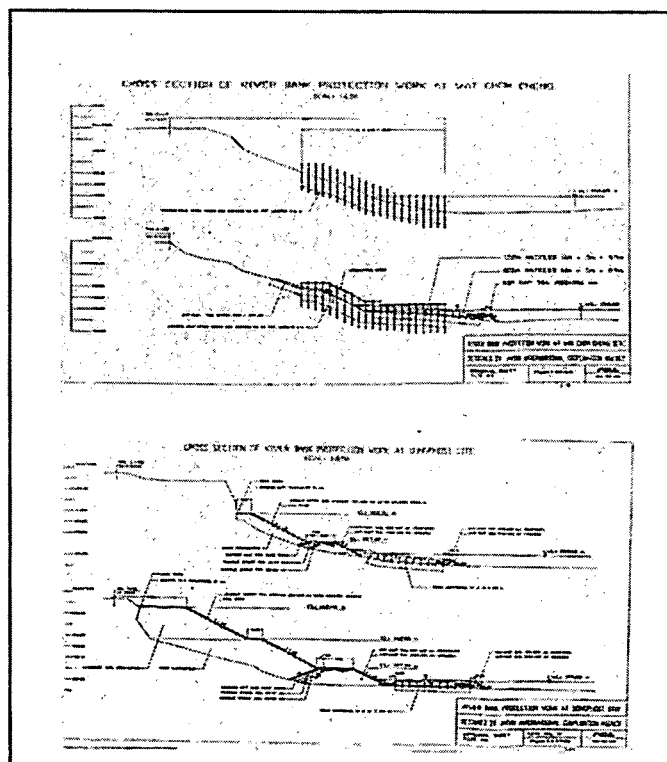


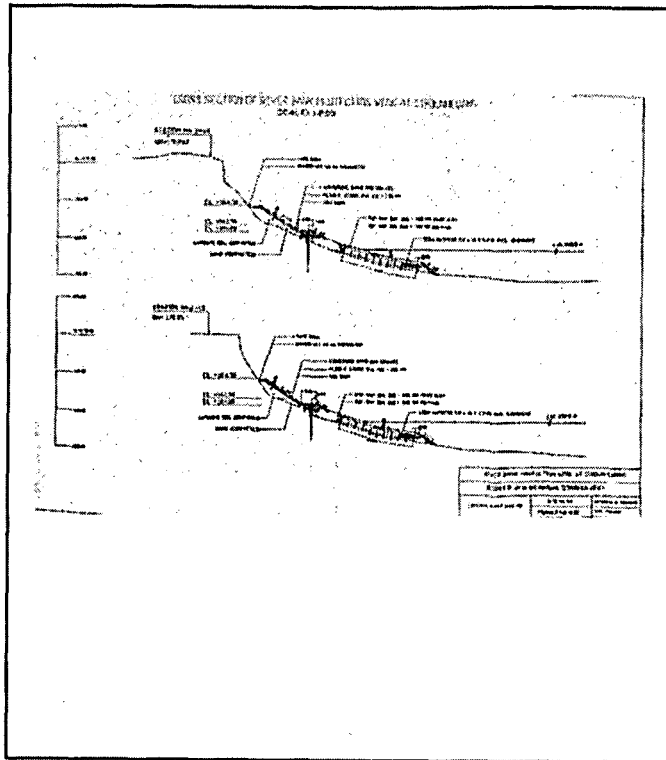
**The Objectives of this survey are:**

1. To study practical , low cost and sustainable riverbank protection works for the Lao PDR.
2. To Transfer technique concerned with the above mentioned works to the Lao PDR through pilot works.
3. To formulate a master plan for the Mekong riverbank protection around Vientiane Municipality, based on the monitoring of the pilot works.

In this dry season pilot work will start at 3 sites as follow:

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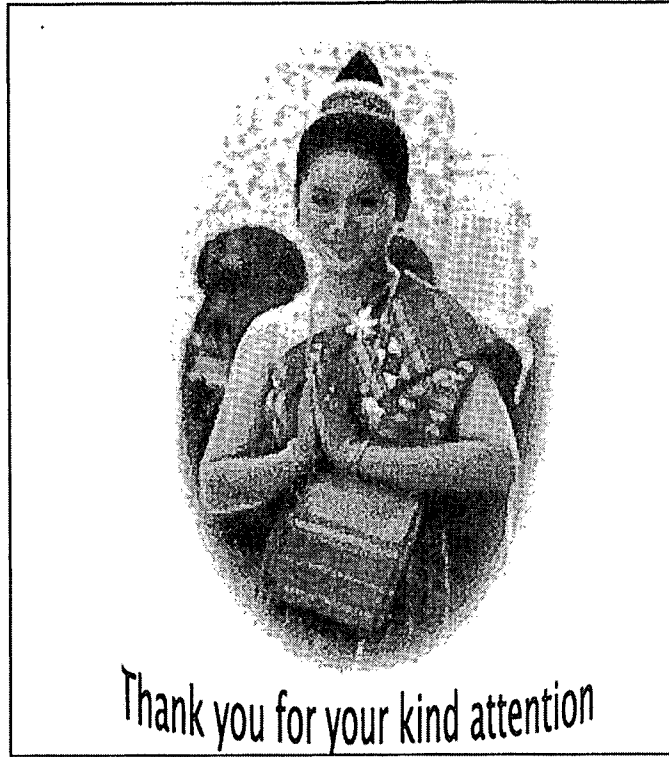




#### IV . CONCLUSION

•In poor countries such as the Lao PDR effective and low cost riverbank protection techniques are absolutely necessary to protect poor people's lives and property.

•After the on going JICA development survey has finished in march of 2005, The GOL will independently use and disseminate the transferred the techniques for poverty reduction and socio-economic development in the Lao PDR.



Thank you for your kind attention

