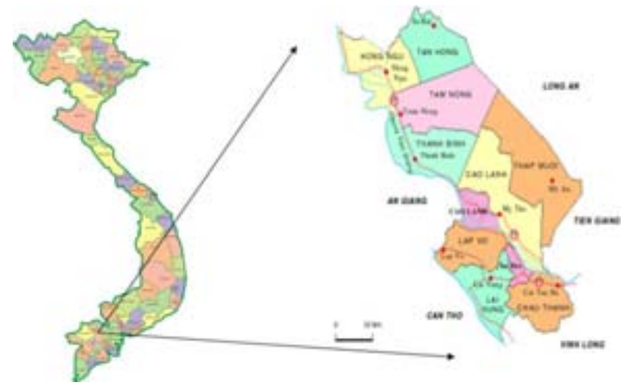
Assessment the impact of dikes on economic efficiency of models for rice farming in Dongthap, Vietnam

Huong Thi Thu Truong1, Binh Vu Thai2
1*Humboldt-Universität zu Berlin, Faculty of Life Sciences, Dept. Environmental Resources, Germany*
2*University of Nation Ho Chi Minh City, Inst. for Environment and Resources , Vietnam*

Introduction

The study was carried out in four districts Hongngu, Tanhong,Tamnong and Thanhbinh, which locate in the north area of Tiengiang river of Dongthap, where receiving annual flood from Mekong river. Because of the large influence on farms and food production, the local government tried already long time to find solutions to solve this problem. One of solutions is to set up a branched canal system and a high-density dike system, in which two types of dike were considered important for farming models such as rice and many other crops, they are: (1) Semi-dikes, a short low dikes system, can receive floods to build up alluvium for fields; and (2) Solid dikes, a high dikes system which completely protect the cultivated crops and farmers from floods

The aim of study was to determine the positive and negative aspects of dike system in order to propose a reasonable and profitable agricultural production complex model, which considered the valuable crops, the season and the consumer market. It has also assessed, how productivity and cultivated effectivity depend on the operation of the dike, floods and the environmental quality inner area of dikes.



Main methods

Interview- survey method

+ Interviewing with a total of 400 questionnaires
+ Monitoring farming models: building the Handbook - Diary, with the following indicators: Seasonal calendar; farming techniques; use fertilizers, plant protection; public expenses, irrigation; income and profit; the operation of embankments….

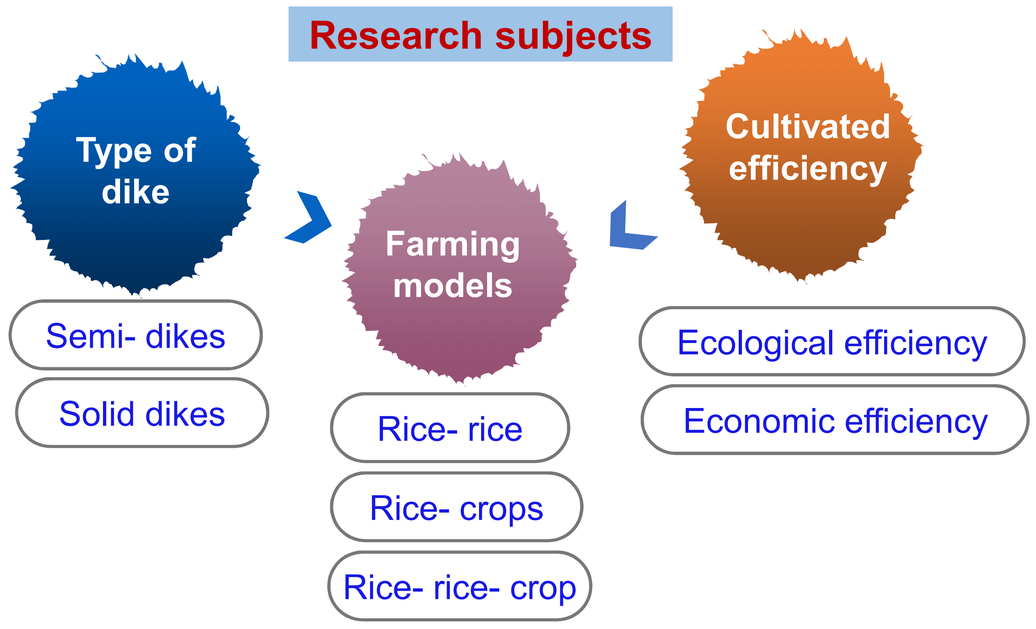
Assessing the ecological efficiency

Based on 4 factors: cropping schedule, type of soil, type of dike and farming pattern.
Adaptability to the soil environment of farming models
- N: non- adaptation
- S3: low adaptation
- S2: moderate adaptation
- S1: highly adaptation

Evaluating the economic efficiency

Based on the questionnaires and model monitoring datum. The economic efficiency of production models was evaluated by several parameters, include : Production value GO (Gross Output); Basic Investment (DC); Profit (Pr)

Research subjects



Result and discussion

Three types of rice farming models were evaluated in semi- dikes and solid dikes are: rice- rice; rice-crop; rice-rice-crop.
In which different kind of crops can be cultivated on the rice fields such as corn, cucumber, cabbage, watermelon, sesame, peanut, chilli, soybean, sweet potato.

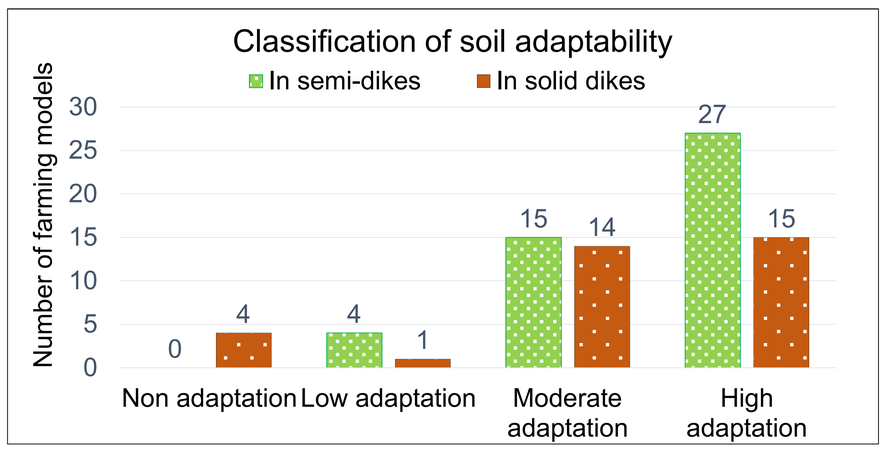
Cucumber crop

Cabbage crop

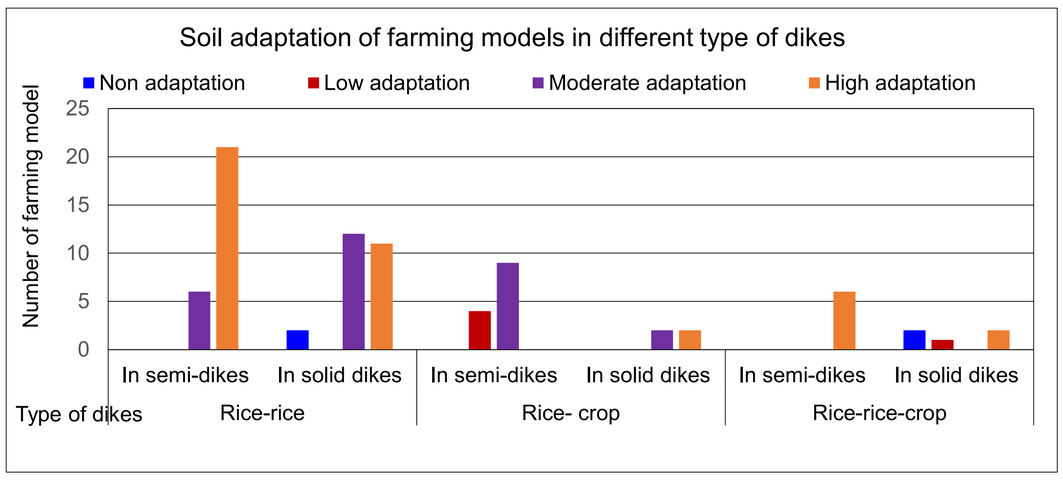
Sesame crop

- Rice-rice models had high adaptation with soil environment in both semi-dikes and solid dikes
- Rice-crop models are suitable cultivated in both types of dikes with moderate adaptation
- Rice-rice-crop models have advantages with soil environment if they are cultivated in semi-dikes, but in solid dikes will disadvantages because of the non-adaptation.

Farming models	In semi-dike		In solid dike	
	Number of models	Area (km^2)	Number of models	Area (km^2)
Rice-rice	27	98191	26	176653
Rice- crop	14	39392	4	54644
Rice-rice-crop	6	19438	5	53504
Total	**47**	**157021**	**35**	**284801**



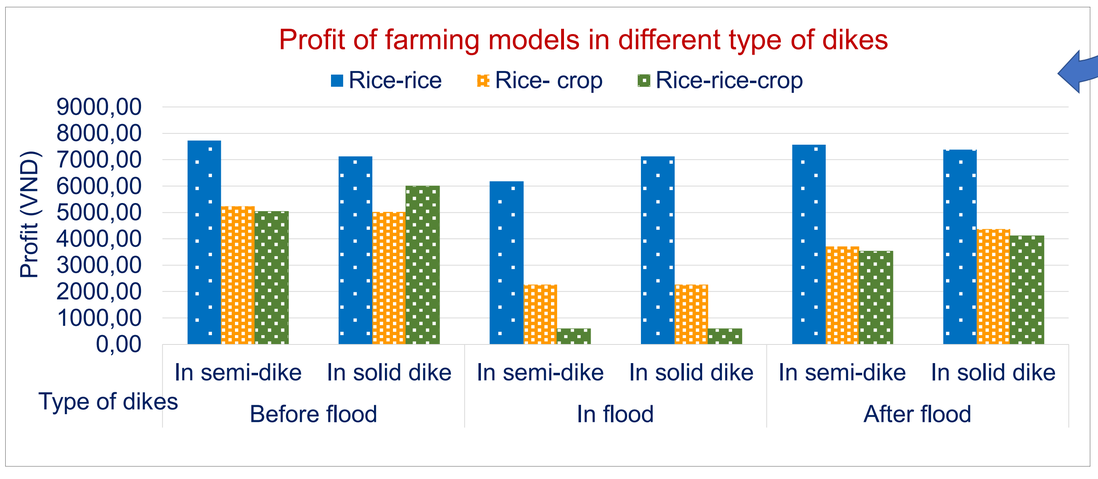
+ Non- adaptation class: occur in rice-rice and rice-rice-crop models in solid dikes.
+ Low adaptation class: in rice-crop models of semi- dikes and rice- rice-crop models in solid dikes
+ Moderate adaptation class: in rice-rice and rice-crop models in both type of dikes
+ High adaptation class: rice-rice and rice-rice-crop in semi dikes and 3 types of models in solid dikes

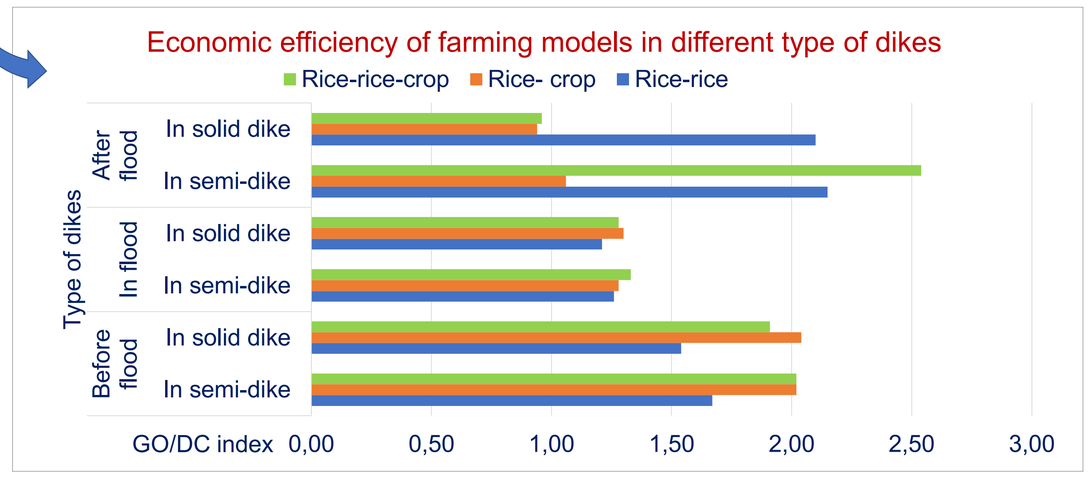


For rice-rice- crop models:

The value of Pr and index GO/DC showed that the efficiency of this models in solid dikes better than in semi-dikes

Sweet-potato crop





For rice-rice models:

The value of profit (Pr) and the index GO/DC showed that the efficiency of capital investment for the semi-dike area is better than in solid dike

For rice-crop models:

The value of economic indicators as Pr and GO/DC showed that the efficiency of this models in semi-dikes is more dominant, and the efficiency of capital is better

Type of farming models	Hongngu		Tanhong		Tamnong		Thanhbinh		Total
	Semi-dikes	Solid dikes	Semi-dikes	Solid dikes	Semi-dikes	Solid dikes	Semi-dikes	Solid dikes	
Rice-rice	5/6	1/6	4/4	0/4	2/2	0/2	7/8	1/8	20
Rice- crop					-	1/1			1
Rice-rice-crop	2/2	-	1/1	-					3
Total	8		5		3		8		24

Conclusion

- 24 farming models were evaluated with high eco-economic efficiency. In which, there are 20 rice-rice models, 3 rice-rice-crop models and 1 rice-crop model.
- 21/24 models are located in semi-dikes