# Assessment of exploitation and utilization of groundwater for domestic, agriculture and aquaculture in the coastal area of Tra Vinh province

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## INTRODUCTION

- Saline intrusion has been increasing (in terms of scale and duration), causing negative impacts upon water resources changes and leading to water shortage in the Tra Vinh's coastal areas.
- Groundwater has been overexploiting, leading to a significant decrease for domestic, agriculture and aquaculture use.
- The study focuses on the assessment of groundwater exploitation for domestic, agriculture and aquaculture and determines factors affecting to the acceptability of farmers for water-saving irrigation in the Tra Vinh's coastal areas.

## METHODOLOGY

The study uses a system dynamic (SD) model to simulate water use for domestic, agriculture and aquaculture, and Binary Logistic statistic to determine factors affecting to the acceptability of farmers for saving water in agriculture in the study area.

Step 1: The system dynamic (SD) approach is developed in a dynamic model (STELLA) basis on water balance (input and output) between water use and water supply.

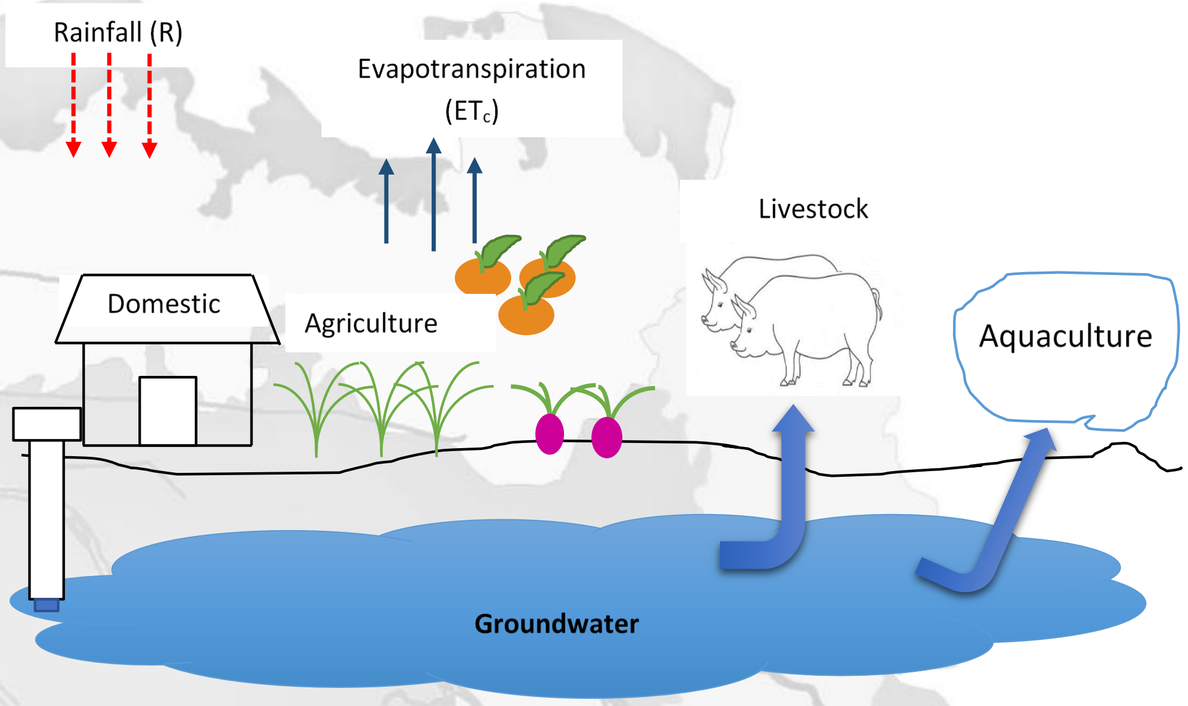
$$\sum W_{input} = \sum W_{output}$$

$$\sum W_{input} = \sum W_s + \sum W_r + \sum W_{Gr} + \sum W_{in}$$

$$\sum W_{output} = \sum W_{irri} + \sum W_D + \sum W_{lv} + \sum W_{Aq} + \sum W_{out}$$

***Where:***

***$\sum W_s$ = Water surface; $\sum W_r$ = Rainfall $\sum W_{Gr}$ = Ground water; $\sum W_{in}$ = Other input sources; $\sum W_{irri}$ = Agriculture; $\sum W_D$ = Domestic; $\sum W_{lv}$ = livestock; $\sum W_{Aq}$ = Aquaculture; $\sum W_{out}$ = Other output sources***




Step 2: The Binary logistic statistic was used to determine the factors affecting the acceptability of farmers for saving water in the cultivation process.

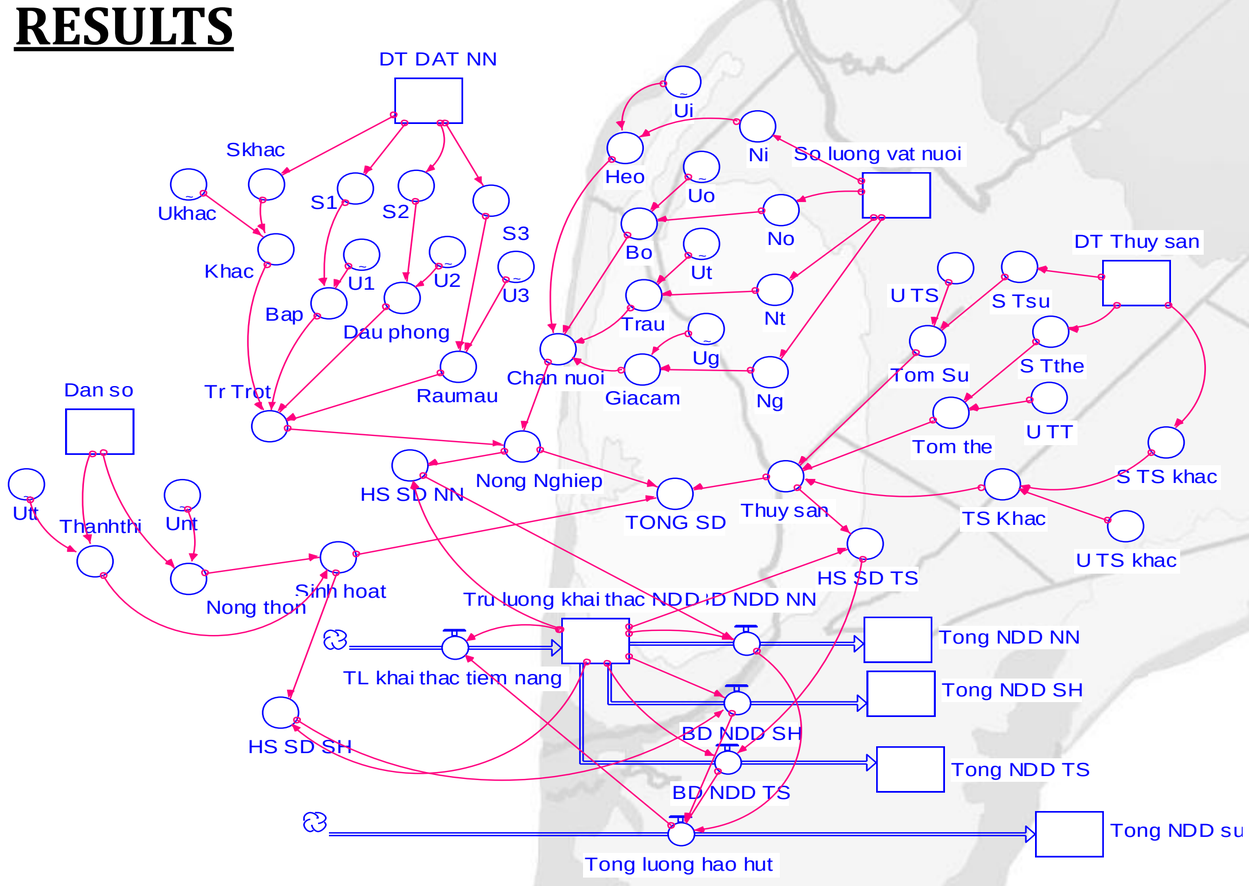
$$Ln\left[\frac{P(Y=1)}{P(Y=0)}\right] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + .. + \beta_8 X_8$$

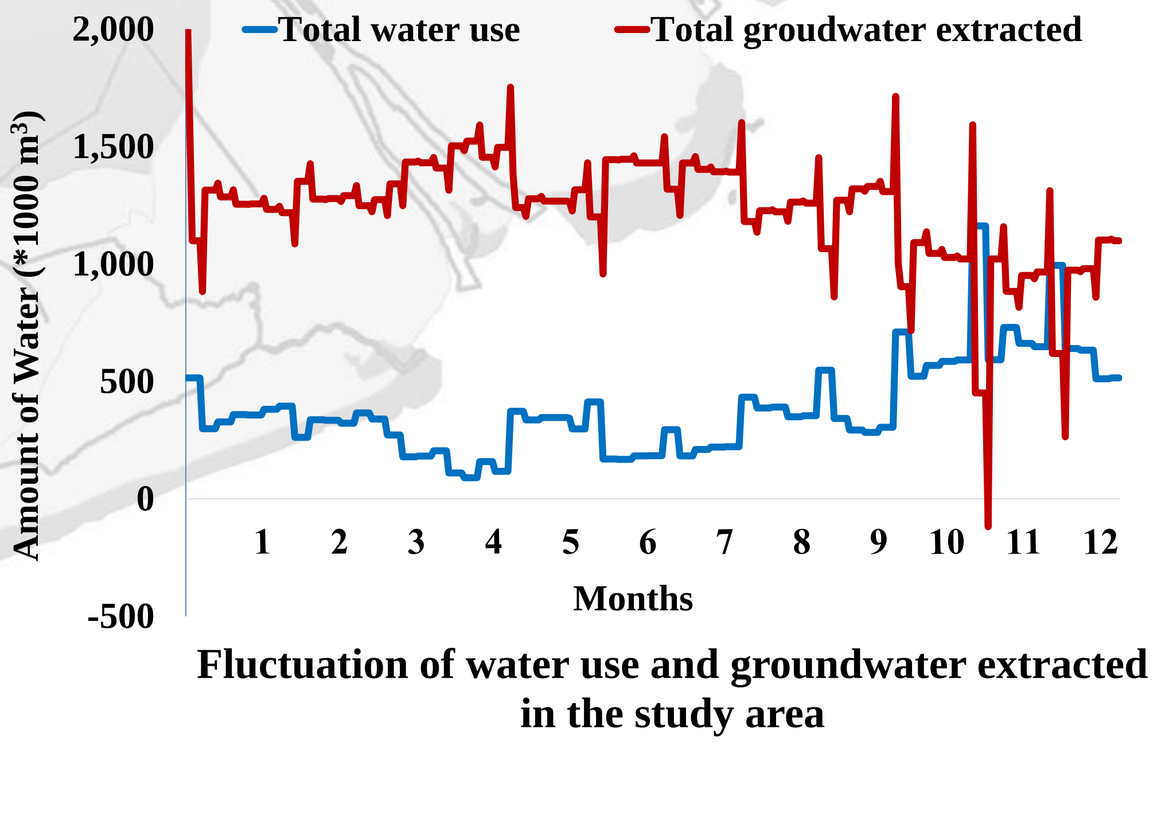
**Where:**

**P (Y = 1) = $P_o$: Probability farmers accept.**

**P (Y = 0) = 1- $P_o$: Probability farmers unaccepted**

## RESULTS




**Fluctuation of water use and groundwater extracted in the study area**

### Binary logistic model

***Y = 0.67 – 1.1*Age – 1.9*Labor – 1.1*Area – 1.4*Water-shortage + 1.9*Awareness***

## CONCLUSION

- Groundwater has extracted with the rate exceeding amount of aquifer for domestic, agriculture and aquaculture
- Water is used inefficiently and limited on water-saving awareness of farmers in the study area
- In order to apply effectively the new irrigation techniques to farmers, there are a necessary to consider on factors including: (1) the age of the household head; (2) family labor; (3) cultivated area; (4) status of irrigation water supply (lack or sufficient); and (5) awareness of the importance of irrigation to the quality of crops.