Chapter 6
Climate Change and Profit Loss:
A Case History of Salinity Intrusion in Rice Production

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ABSTRACT

The chapter aims to evaluate the profit loss of rice farmers due to salinity intrusion by collecting the information of rice production in three regions with the same natural environment conditions, social characteristics (e.g., the same social and farming culture, ethnicity, type of soil), and only differed with respect to the level of salinity in Soc Trang province, one of the most salinity-affected areas in the Vietnamese Mekong Delta. The study estimated the profit loss in rice production due to saltwater intrusion by the difference in rice profit between the non-salinity and salinity regions and showed this loss was about VND 9.3-15.1 million per ha-1 a year.

INTRODUCTION

Salinity intrusion is a natural phenomenon occurring in the land, estuaries and groundwater adjacent to the sea. Salinity intrusion occurs when there is a difference in the flow of energy as well as specific weight between fresh and salt water. Salinity intrusion is caused by many factors such as river flow levels, topography,

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geomorphology, the slope of river flow, the intensity of the sea tide, the wind speed and direction, water temperature and so on.

Salinity lands in the Vietnamese Mekong Delta are relatively large compared to the whole country due to the crisscrossing systems of river and canals resulting in saltwater easily penetrating further inland. Salinity intrusion lasts longer than normal and penetrates inland about 50 km if the raining season comes late, and $1‰$ salinity covers almost all the coastal estuaries. Most likely in the peak month, salinity could reach 1.0-1.5‰ (DWRM, 2016a; 2016b). This problem greatly affects agricultural production, especially rice crop in winter-spring season. In the time of water shortages in the dry season and at the end of the rainy season, farmers use brackish water to irrigate their rice fields, especially in the rice flowering stage, which leads to loss their rice yield and profit.

Scientific evidence shows that the rice losses of salinity intrusion is not so small in terms of reducing the productivity and profit. Although there are many studies on analyzing the effects of salinity intrusion in rice production, very few studies have evaluated specific statistics about the decline of rice profit caused by salinity. In this study, we analyze the effect of salinity intrusion to rice production and identify how rice farmers deal with and adapt the problems of salinity. The effects of salinity intrusion to rice farmers are defined as the total economic losses of rice production in terms of reduced quantity, reduced quality and an increase in input costs, which are estimated by comparing the profits between selected areas (a salinity and non-salinity area). The differences in profits between these areas are considered reflecting the economic damage, caused by salinity, to rice production. The results of study could provide useful information to local authorities, for example the department of Natural Resources and Environment, to issue appropriate policies to help or support farmers who are affected by salinity. The results of the study are also necessary data used as the value of benefit transferring into other similar future projects in Vietnam.

This chapter is constructed as follows. The next section describes the concept to estimate economic loss caused by salinity intrusion and data collection. The results and some discussion related to the effect of salinity intrusion to rice farmers and their adaptation of salinity problems are reported in the focus of the chapter. The final section presents some main conclusions and policy implication.

EVALUATION CONCEPT AND EMPIRICAL MODEL

The total economic loss of rice production includes three factors. First, a reduction in crop quantity assumes that salinity decreases rice yield. Second, a reduction in rice quality, which is measured as price, assumes that the lower price of rice in a particular region could reflect reduced rice quality due to salinity. Third, an increase in input