CHAPTER I
INTRODUCTION

1.1 Background

Climate change due to the greenhouse effect have been growing nowadays as human activities have been increasing which has a great impact and damages to the coastal area in many aspects i.e., an increase of the sea temperature, a reduction of the seawater pH, and an increase of a sea level (Wong *et al*., 2014). This research focuses on the impacts due to sea level rise, which mainly causes by the extended volume of the seawater because of an increase of the sea temperature as well as the thaw of the snow and the polar ice. IPCC (2013) studied the situation of a sea level in the past century and found that the global sea level has been increasing continuously; the mean sea level was increased of which the rate of a sea level rise averagely 3.2 mm/year in 1993-2010. Generally, the rates of a sea level rise are varied in each area. For Thailand, Office of Natural Resources and Environmental Policy and Planning (2009) reported that the Upper Gulf of Thailand inclined to have a sea level rise approximately 3.61-22.45 mm/year. In addition, Department of Marine and Coastal Resources (2012) simulated the changes of future sea level of the Upper Gulf of Thailand by setting the rate of a sea level rise averagely 5 mm/year and the value of land subsidence averagely 14 mm/year; it was shown that in the next 20-50 years, the sea level rise will be accumulated about 38-53 cm.

The sea level rise probably affects the coastal natural resources, especially the area of which the ecosystem is quite sensitive to the sea level rise for example Bang Khun Sai sub-district in Ban Laem district of Phetchaburi province. Bang Khun Sai consists of diverse condition of lands that can be divided into the following areas: 1) the upland area where it is suitable for agriculture including aquaculture, and 2) the lowland area where the coastal area consists of the coastal wetlands ecosystem i.e., the mangrove forest and the mudflat areas. Additionally, salt farming is found in the latter coastal area approaching toward the land. Furthermore, the distinctive point of Bang

Khun Sai sub-district is its mudflat area as being the largest source of natural cockles in Thailand and potentially the last natural breeding place for cockles in the country. The locals have knowledge and local wisdom for pedal board clam on mud bank. As a result, this area is considered as the gold mine and the important food resource for the locals. Due to this area is extremely important place for the locals, the Phetchaburi Province Authority has officially announced the proclamation to prohibit the cockle fishery in this area except for harvesting cockles by hand in order to reduce the problem of dragging cockles by fishing boats as well as to maintain a natural balance of the Don Hoi Kraeng area. Beside the threatened danger from the fishing boats, Bang Khun Sai and the Don Hoi Kraeng may face with the threatened danger because of the sea level rise for example flooding in the coastal lowland, invading of saltwater, and losing the ecosystem of the coastal wetlands; these problems also affect the ecosystem of the upland and the lowland as well as the dwelling areas of the locals ("The Proclamation of Phetchaburi Province-Prohibition of the cockle fishery" (September 18, 2008); Tosakul and Boonmathya, 2008; Bang Khun Sai Subdistrict Administrative Organization, 2011 a).

As a result, it is highly recommended that there should be some preparation for dealing efficiently with any possible impacts and making the investment worthiness. Thus, we chose the choice experiment technique to study the willingness to pay (WTP) of the Bang Khun Sai locals for decreasing the impacts due to sea level rise. Based on the choice experiment technique, it was indicated that the locals of Bang Khun Sai were aware and valued on how to decrease the impacts because of the sea level rise in many aspects i.e., the loss of the income from various jobs such as pedal board clams, aquaculture, salt farming, and agriculture, the frequency and the duration of flooding, and the loss of the coastal wetlands such as the loss of the mangrove forest and the mudflat areas. Thus, this research result can be used as the management guideline and plan to cope with a sea level rise situation effectively.

1.2 Objectives of research

(1) To study the willingness to pay of people in the Bang Khun Sai sub-district in order to decrease the impacts from a sea level rise in the following aspects: losing income from any jobs available in the upland and lowland area, flooding problems, and losing the mangrove forests and the mudflat areas.

(2) To collect the guidelines for coping with a sea level rise situation in the Bang Khun Sai sub-district.

1.3 Scope of research

Scope of research area

The research area covered Bang Khun Sai sub-district in Ban Laem district of Phetchaburi province for both the upland and the lowland areas.

Scope of research content

The study the willingness to pay for reducing either the impacts or the loss due to a sea level rise was carried out by one-on-one interview as well as collected the ways to properly manage a sea level rise situation in Bang Khun Sai by using the in-depth interviews.

Scope of research population

The population scope of this study was 380 locals in Bang Khun Sai sub-district whose ages were 18-75 years old. In addition, 9 participants of the in-depth interviews were included in this research since they could provide useful information about the ways to cope with a sea level rise problem.

Scope of research period

This research covered the period from May 2013-May 2015.

1.4 Conceptual framework

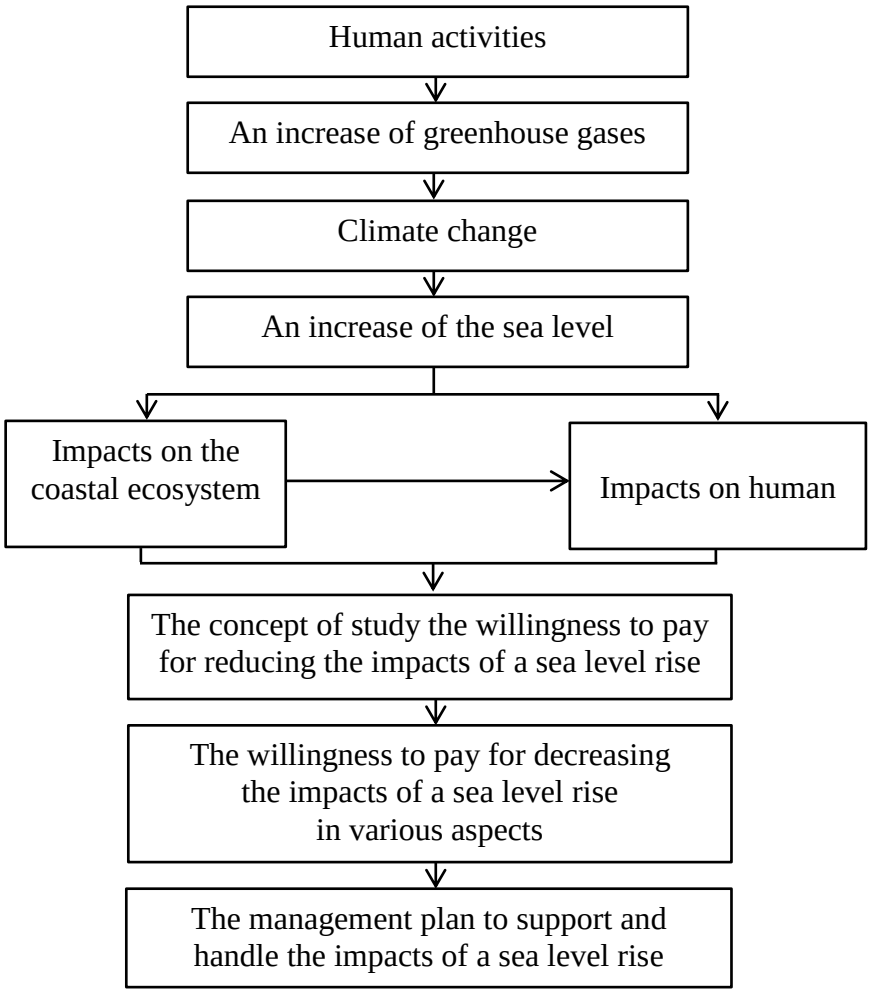

Figure 1.1 Conceptual framework

1.5 Expected results

(1) To perceive the economic loss due to the impacts of a sea level rise in Bang Khun Sai sub-district. Accordingly, the environmental management authorities such as National Committee on Climate Change, Office of Natural Resources and Environmental Policy and Planning, including the local authorities i.e., Phetchaburi Provincial Administrative Organization, Bang Khun Sai Subdistrict Administrative Organization, can utilize this result as the management and planning guidelines to

handle the future impacts of the increased a sea level for the community and the coastal ecosystem.

(2) To provide information about the impacts of a sea level rise for the coastal community and the coastal ecosystem i.e., the ecosystem of the mangrove forest and the mudflat areas. Other researchers as well as related authorities such as Department of Marine and Coastal Resources, Office of Natural Resources and Environmental Policy and Planning can employ this beneficial information for the assessment of the impacts in the other areas by means of the benefit transfer method.

1.6 Definition of term

Sea level rise (SLR) is defined as the mean sea level is increased. An increase of a sea level rise in each local area may be different from that of the global sea level. In addition, damages that may occur in each local area depend on how the locals and the related authorities cope with the problem.

Willingness to pay (WTP) is defined as an amount of money that a person is willing to pay or donate to obtain either satisfied goods or satisfied services. In this research, the WTP is defined as the amount of money that the locals of Bang Khun Sai sub-district were willing to pay or donate to an operational fund for dealing the impacts of sea level rise in Bang Khun Sai. The valuation of the WTP in this research was carried out by considering from choose different choices made by individual.

Attribute describes the characteristics of either each product or each service. In this research, the product/the service was the reduction of the impacts of sea level rise in Bang Khun Sai i.e., (1) a decrease of the loss of income from pedal board clams, (2) a reduction of the loss of income from aquaculture, (3) a decrease of the loss of income from salt farming, (4) a diminution of the loss of income from agriculture, (5) a reduction of the frequency and the duration of flooding, (6) a decrease of the loss of the mangrove forests and the mudflat areas. The final attribute in this research is defined as the money attribute to be used in the assessment of the willingness to pay i.e., (7) the amount of money donated to the operational fund.

Level is defined as the difference in terms of the intensity of measure or the result that occurs without any operation or after following the operational plan/the measure. In this research, the assigned attribute for decreasing the impacts of a sea level rise was divided into 3 levels: (1) no action level, which non-operation were taken for reducing a sea level rise in the future, (2) good level, which some actions were well taken to reduce the loss due to a sea level rise, and (3) excellent level, which some operations were executed excellently to decrease the loss because of a sea level rise in the future. For the money attribute, there were 5 levels: 0 Baht level, 50 Baht level, 100 Baht level, 300 Baht level, and 1,000 Baht level.

Choice set is defined as a combination of at least two choices. The respondents must choose their choice from each choice set. In this research, there were three choice sets: (1) no action, (2) Plan A, and (3) Plan B.