

INSTITUTE FOR SOCIAL AND ENVIRONMENTAL TRANSITION-INTERNATIONAL
CLIMATE RESILIENCE CASE STUDY

Can Tho, Vietnam

REAL-TIME INFORMATION ON SALINITY FOR AGRICULTURE AND HUMAN HEALTH IN CAN THO

2013–2016 | Implementing Partner: Can Tho Climate Change Coordination Office (CCCCO Can Tho)



THE CONTEXT

Can Tho city is located in the centre of the Mekong Delta, with a population of over 1.2 million people. Most of the city's land area of over 1400 km² is comprised of agricultural land, although about two-thirds of the population lives in the densely populated urban areas. Only about 40% of all households have access to the city's treated water distribution system, leaving nearly 60% of households—mostly in peri-urban and rural areas—to rely on other sources of water for drinking, cooking and other activities. According to a survey of 100 peri-urban households of Can Tho city in June 2013, households without access to piped water supply typically use multiple sources: river water, groundwater and bottled water. Poor communities in the peri-urban and rural areas of Can Tho are often dependent upon river water for both irrigating their crops, and also for domestic use. But water quality is a serious concern.

One of the factors affecting water quality is saline intrusion in the dry season (January – June), as seawater mixes with the river water and penetrates farther upstream during low flow conditions. Saline intrusion is a problem in many parts of the Mekong Delta, but had historically never been observed as far inland as Can Tho, which is 65 km from the open ocean. Salinity changes hourly with complex tidal flows in the many inter-linked canals and waterways of the delta. This makes it very difficult to predict when salinity levels will be dangerous in any given area.

In general, local communities in Can Tho were aware that salinity intrusion could have negative effects, but as it had yet not been an issue in Can Tho, they possessed little knowledge for how to modify their actions to deal with salinity.

For more information about our project and publications, please visit: <http://i-s-e-t.org/projects/can-tho-saline.html>

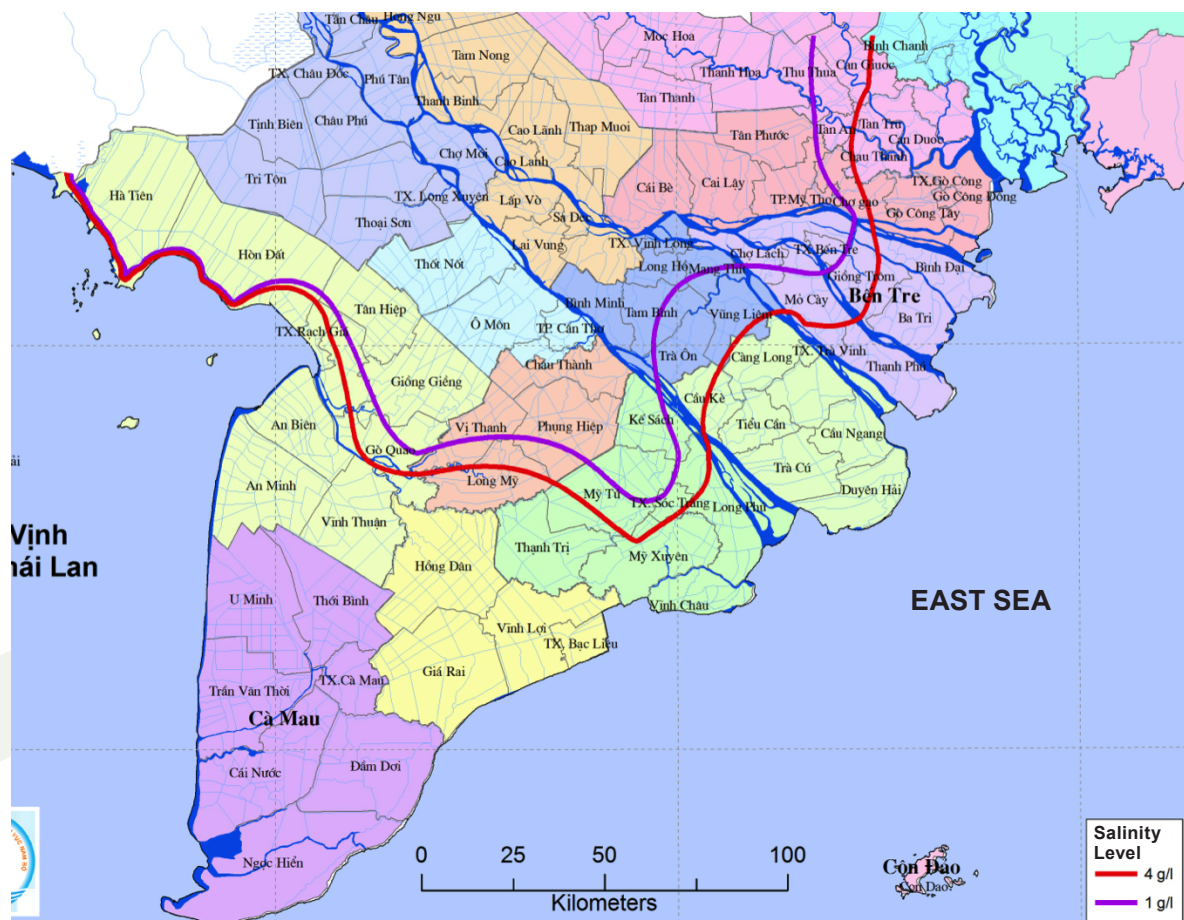
The problem

Saline intrusion has become a bigger problem throughout the Mekong Delta in the past ten years as a result of sea level rise, land subsidence and changing Mekong river flow in the dry season. In May 2010, salinity in the mainstream of the Hau River was measured at a level of one part per thousand (1‰) only 12 km from Can Tho city centre (Figure 1). This level is twice the allowable threshold for human health in Vietnamese water quality standards (QCVN 01/2009/BYT). This is a particular concern because a main water intake

for the city's water treatment plant and distribution system is located downstream of the city on the Hau River and exposed to these increasing salinity levels.

In recent years, there has been increasing public concern about salinity throughout the Mekong Delta, even in Can Tho, because of the losses this imposes on farmers and the increasing difficulty of water management in the dry season. Salinity thresholds appeared to move upstream each year, approaching Can Tho. But without accurate information about hourly salinity levels, it would be difficult to determine

FIGURE 1
SALINITY INTRUSION IN 2010 IN THE MEKONG DELTA



how best to respond. Salinity changes rapidly with tidal conditions, so water users may inadvertently extract water from a canal at a time when it is more saline than expected. However, if they have good information on approaching salinity levels, they can store freshwater or take other management measures to prevent crop losses or health impacts.

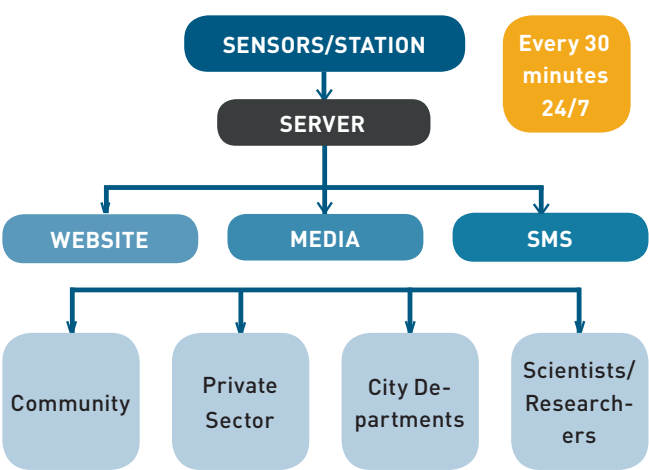
Finding Solutions

Recognizing that salinity intrusion, driven by sea level rise and climate change was a growing hazard, in 2012 the city of Can Tho committed to implement a project, with funding from the Rockefeller Foundation and technical support from the Institute for Social and Environmental Transition-International (ISET-International), to establish a salinity monitoring system capable of providing real-time salinity measurement data to the public. In 2013, eight salinity monitoring stations were installed around the periphery of Can Tho on major rivers or canals. Each station was mounted on a bridge or existing infrastructure in the middle of the channel, protected from external disturbance. Each is equipped with a wireless telemetry data transmission system

which sends measurement data to a central server every 30 minutes (Figure 2). Data from the central server is then automatically linked to an online database system to create a real-time salinity map which is accessible through a public website (Figure 3).

But creating and displaying the data are only part of the response. Water users in Can Tho are not accustomed to salinity hazards, so the project also devised mechanisms for publishing SMS alerts to key officials, individual subscribers, and the media. Using information compiled from technical experts, surveys and focus groups, the project has identified levels at which salinity could become hazardous in different areas of the city and identified alert threshold levels which trigger the SMS messages and are shown on the website. There are 4 levels of threshold warning delivered to different categories of subscribers: 0.48‰ for water supply companies; 1‰ for city departments including public health units; 2‰ and 3+‰ for individual farmers and household water users. The project also helped identify potential response strategies to minimize the impact of salinity and to promote those strategies with water users.

FIGURE 2
MODEL OF SALINITY MONITORING SYSTEM

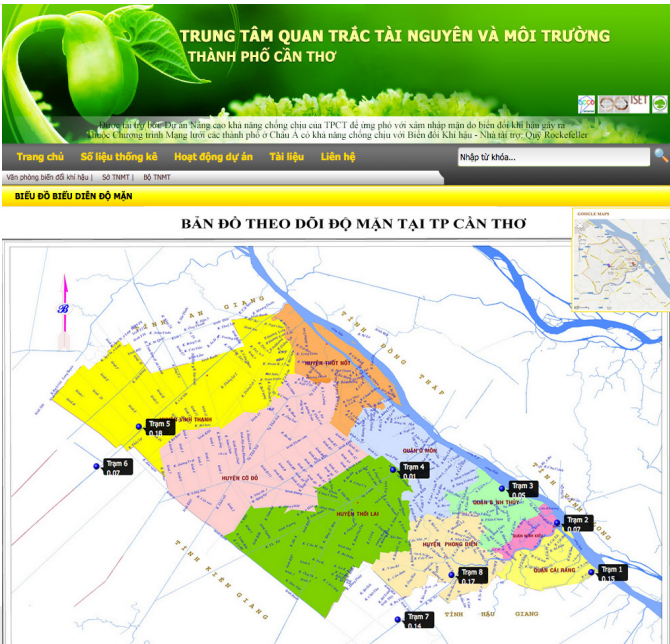


Outcomes: Trends of salinity intrusion and Can Tho response

From 2014, when the system became operational, until 2016, the recorded salinity levels remained low in and around Can Tho, and there was no need to implement the SMS warning system. But in early 2016, the Mekong Delta was severely affected by drought and salinity intrusion. From March 6 to March 10, 2016, monitoring station number 1 in Cai Rang district detected salinity levels of nearly 2‰ every day (See Figure 4) and delivered SMS alerts to subscribers.

On March 10, 2016, Can Tho city People’s Committee visited the affected area together with local city staff.

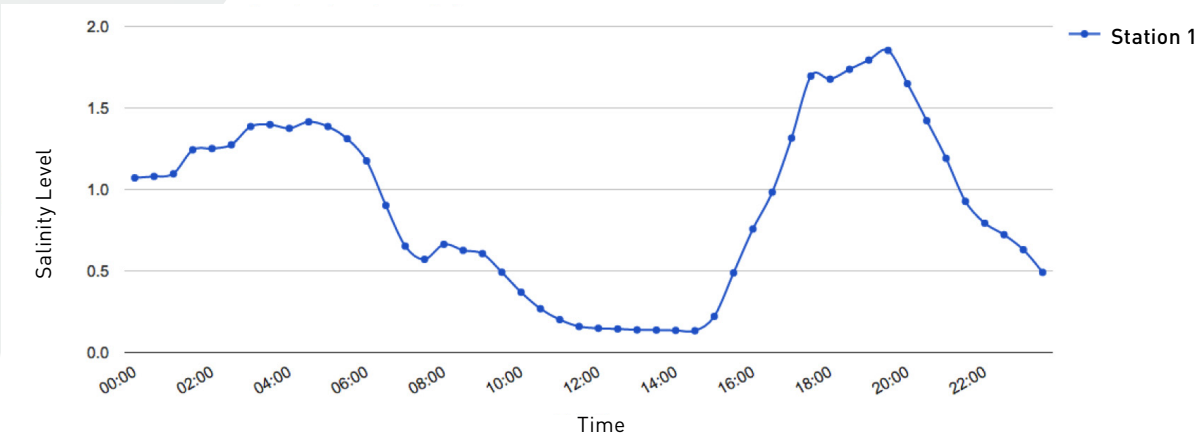
FIGURE 3
THE INTERFACE OF THE SALINITY MONITORING WEBSITE*



* nhiemmanct.vn

The monitoring data showing salinity levels in the river and nearby drainage canals that served agricultural areas convinced them to build a new water control structure in Tan Phu ward to prevent further saline intrusion along irrigation channels. The Department of Agriculture and Rural Development (DARD) has also been instructed to monitor the salinity levels continuously through the dry season and develop proactive strategies to respond to saline intrusion and encourage conservation of fresh water. In addition, the city’s Department of Construction has been directed to investigate the feasibility of relocating water intakes for the city’s treatment and distribution system farther upstream to reduce the risk of increased salinity in the city’s water supply system.

FIGURE 4
SALINITY LEVEL IN THE CAI RIVER ON MARCH, 6TH 2016



Summary of Resilience Measures by Type

INFRASTRUCTURE	ECOSYSTEMS	CAPACITY	INSTITUTIONS
Water management structures to control saline intrusion		Increased community awareness of salinity response measures	Real-time online public information on salinity hazard
Real-time salinity monitoring network		Training and media awareness for salinity information	New SMS warning and response provisions for salinity hazard

LESSONS FOR POLICY AND PRACTICE

Saline intrusion is likely to worsen with climate change, and will affect larger areas of the Mekong Delta in dry season. Local governments are responsible for responding to this challenge, through both physical infrastructure and planning measures. These include building hydraulic control structures to prevent saline intrusion and protect fresh water sources, building dykes and water management drains, or land use zoning for production, separating fresh water production zone (rice and other subsidiary crops, fruit, fresh water fish farming) from saline and brackish water production zone (fish and shrimp farming), and shifting crop production schedules. But without good information on salinity in the waterways, local government and water users will not know when investment in control measures is worthwhile, and what specific management measures are best implemented. Because the situation is changing rapidly, lack of information creates uncertainty and apprehension, sometimes without merit. For example, after the installation of Can Tho's salinity monitoring system in 2014, local government staff were relieved to see that salinity levels were

consistently low, so there was no need for an immediate response. But they were also able to respond quickly when salinity did increase.

By providing salinity warning data broadly to government officials, public subscribers and the media, those affected can actively close ditch gates, build seasonal dams to prevent saline intrusion and refrain from using water in highly saline periods.

In rural areas, there may soon be a need for more saline-resistant crops, and for new land management measures to ensure continued productivity. The increasing salinity levels also provide an argument for the city to safeguard its water system intakes and speed up the extension of its water distribution network, to ensure a higher rate of access to treated potable water. Salinity levels continue to be unpredictable, and the monitoring system is valuable in understanding the exposure to this new hazard in order to support planning and decision making by public and private actors in Can Tho city.

Local partners

- Department of Natural Resources and Environment

Contact Information

ISSET in Vietnam

Country Coordinator:

Ngo Le Mai
lemai@i-s-e-t.org

Address:

18 1/42, 1 Au Co, Tay Ho,
Hanoi

Tel: 04.371.867.02

Fax: 04.371.867.21

Website: i-s-e-t.org

CCCC Can Tho

Director:

Ky Quang Vinh
kqvinh@ctu.edu.vn

Address:

80 Phan Dinh Phung, Can Tho

Tel: 07103 819223

Fax: 07103 819223

Website:

biendoikhihau.cantho.gov.vn

Funded by the Rockefeller Foundation

under The Asian Cities Climate Change Resilience Network (ACCCRN)



The
ROCKEFELLER
FOUNDATION



Implemented by the Institute for Social and Environmental Transition-International
and the Climate Change Coordination Office of Can Tho City (CCCC Can Tho)



ISSET



Printed on 100% Recycled Paper