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## Residents' Perceptions of Water-Related Problems in the Mailiao Area, Taiwan

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### Abstract

This study surveyed the residents in Mailiao, a town located on the central-western coast of Taiwan, about their perceptions of environmental issues associated with water. A six-item measurement was developed. The residents were certain of sixteen identified environmental problems. Acid rain, subsidence and over-pumping of underground water were the three most serious problems in the area. The residents believed that these problems will worsen in the next ten years. They also believed that technology can solve the problems. The residents agreed to alter their lifestyles in order to alleviate the environmental problems.

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### 1. Introduction

Global warming has caused environmental problems around the world, many of them having to do with water: for example, icebergs are melting, the sea level is rising, and droughts, flooding, and snowstorms are more and more severe. Water appears on earth in a variety of forms (ice, steam, snow, liquid, etc.) and exists in different parts of the planet (ponds, streams, rivers, ocean, etc.). Different forms of water are constantly moving around the earth, and one of the most important areas that affects human life is where fresh water and salty water meet.

Coastal ecosystems are the most valuable natural systems in the world. They provide coastal protection, erosion control, food, carbon sequestration, and places for tourism and recreation, yet human

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beings continue to heavily develop the land along the coastlines, carelessly threatening the most precious ecosystems that they depend on for survival. The extreme climate effect is worsening the situation, and the coastlines of Taiwan have not been spared.

The land of the central-western coastal area of Taiwan was formed from the deposition of sediment as rivers flowed from the central mountains into the Taiwan Strait. Mailiao, a town located in this region, used to be an agricultural area, but has been suffering from many environmental problems, such as subsidence, erosion of the coastline, flooding, and ocean pollution. Residents here usually engage in livelihoods such as vegetable farming, livestock husbandry, fishing, or fish cultivation, all of which depend heavily on water. With the erection of the Formosa Plastics Corporation's (FPC) sixth naphtha cracker complex on reclaimed land near the coast, the environment has become seriously damaged. Water has become scarce and underground water has been over-pumped for agricultural and industrial use, resulting in low-levels of underground water and inundation by seawater. Industrialization has complicated these environmental problems. For example, air pollution and water pollution have increased, which in turn have caused acid rain and the destruction of ocean ecology. Fish catches have also decreased. It is important to examine local vulnerability to mitigate any environmental disaster whether it is an earthquake (Ma & Ohno, 2013), typhoon or water-related problems.

Past studies of environmental problems in coastal areas tended to focus on hydraulic engineering. Not many papers have investigated the perception of the general public toward the specific problems associated with water in the coastal area. Of the few studies that did, most tended to focus on the attitudes and behavior of students toward the general environmental problems of the local area (e.g., Wu Ya-wen, 2006). The purpose of this study, therefore, is to try to understand people's perceptions, attitudes, and opinions of the local water issues and includes the following specific objectives:

- To identify local environmental problems related to water in the Mailiao area.
- To investigate residents' perceptions of the existence of these identified problems in the Mailiao area.
- To investigate residents' perceptions of the seriousness of these environmental problems.
- To investigate residents' perceptions of the seriousness of the consequences these environmental problems incur.
- To investigate residents' opinions about whether the problems can be solved using scientific methods or technology.
- To investigate residents' opinions about whether the situation can be improved within the next 10 years.
- To investigate residents' willingness to change their lifestyle to alleviate the environmental problems.

## 2. Method

To identify local environmental problems related to water, we first observed the local environment, recording visible evidence of problems with pictures. We then searched texts, newspapers, and the internet to identify the problems that were not readily apparent. Finally, we examined scholarly works relating to local environmental problems.

Through direct observation and a literature review, sixteen local environmental problems were identified. These problems included poor drainage (retrieved from <http://gisapsrv01.cpami.gov.tw/cpis/cprpts/yunlin/depart/facility/ch2-2.htm>); flooding (retrieved from <http://e-info.org.tw/node/25832>); inundation by sea water (retrieved from <http://e-info.org.tw/node/67742>); erosion of the coastline (retrieved from <http://e-info.org.tw/node/2923>); movement of sandbanks (retrieved from <http://e-info.org.tw/node/23127>); river and water pollution (visual observation; retrieved from [www.appledaily.com.tw/realtimenews/article/life/20120627/129459](http://www.appledaily.com.tw/realtimenews/article/life/20120627/129459)); ocean pollution (retrieved from

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