Research report

Comparison of water quality and plant diversity in natural canals in Yan Ta Khao and irrigation canals in Na Po

Research Team

Ms. Atiya Torarit

Ms. Amonnat Kaewsuwan

Advisor

Ms. Khwanjai Kanchanasrimek

Ms. Sutheera Thacheen

Wichianmat School

Mueang District, Trang Province

Trang-Krabi Secondary Education Area Office

Research Title: Comparison of water quality and plant diversity in natural canals in Yan Ta Khao and irrigation canals in Na Po, Trang Province, Thailand.

Research Team: Ms. Atiya Torarit

Ms. Amonnat Kaewsuwan

Grade: 5 secondary school students

Advisors : Teacher Khwanjai Kanchanasrimek and Teacher Sutheera Thacheen

School: Wichianmat School, Trang Province

Abstract

This study aimed to compare water quality and plant diversity in natural canals at Yan Ta Khao and irrigation canals at Na Po, Trang Province, Thailand. The instruments used included water transparency measurement using a Transparency Tube in centimeters (cm) , comparison of dissolved oxygen levels using a Dissolved Oxygen (DO) kit, and comparison of water temperatures using a thermometer and a pH paper device to measure pH. The results of the study found that:

The results of the study of water from both sources at the natural canal in Yan Ta Khao Sub-district, Yan Ta Khao District, Trang Province, Thailand and the irrigation canal at Ban Na Po, Khuan Pring Sub-district, Mueang District, Trang Province, Thailand were slightly different, namely, the transparency of water at the natural canal and the irrigation canal had an average of 73 cm and the measurement of oxygen content in the water from both sources had an average of 7.2 mg/L and the temperature measurement in the water from both sources were different, the natural canal had an average of 28.3 °C and the irrigation canal 28.7 °C and the acid-base measurement of the water from both sources had different averages, the natural canal had an average of 6 and the irrigation canal had an average of 7 and the aquatic plants in the natural canal were as follows: stevia and the irrigation canal were as follows: algae

Keywords: Water quality, water pollution, surface water quality, groundwater quality, water pH , water turbidity

Introduction

Background and significance of the problem

People nowadays have different behaviors in using water resources in their daily lives, which causes the water to be dirty or rotten. Therefore, they want to know the amount, pH value of water in each area, how much it differs and what kind of aquatic plants there are in each area. Therefore, a project was created to compare the water quality and diversity of plants in natural canals in Yan Ta Khao and irrigation canals in Na Po. The Yan Ta Khao canal is located in Yan Ta Khao Subdistrict, Yan Ta Khao District, Trang Province, Thailand. It is a flowing water with aquatic plants and aquatic animals. Villagers also use the water in that area for their daily lives, including fishing and consumption. The irrigation canal in Na Po is located in Khuan Pring Subdistrict, Mueang District, Trang Province, Thailand. It is used to irrigate and drain water, to help agricultural crops grow, maintain the landscape, and to rehabilitate soil in arid areas during insufficient rainfall.

Research Question

1. Water quality, pH value of water, oxygen value of water, temperature value and transparency value of water in natural canals and irrigation canals are different.

2. The types of aquatic plants in the natural canal at Yan Ta Khao Subdistrict, Yan Ta Khao District, Trang Province, Thailand and the irrigation canal at Ban Na Po, Khuan Pring Subdistrict, Mueang District, Trang Province, Thailand are different.

Research materials and methods

Related variables

Hypothesis 1 : The water quality characteristics of natural canals and irrigation canals, water pH , water oxygen, water temperature and water transparency are different.

Independent variables : natural canals, irrigation canals

Dependent variable: Water quality

Controlled variables : Measurement method, Measurement time

Hypothesis 2 : The aquatic plant species in the natural canal at Yan Ta Khao Subdistrict, Yan Ta Khao District, Trang Province, Thailand and the irrigation canal at Ban Na Po, Khuan Pring Subdistrict, Mueang District, Trang Province, Thailand are different.

Independent variables **:** natural canals, irrigation canals

Dependent variable: Aquatic plant type

Control variables **:** Characteristics of water source, data collection time

Materials and equipment

1. Transparency Tube

2. Dissolved Oxygen (ppm)

3. Thermometer (Temperature)

pH paper measures pH values

Set study points

Natural Study Canal at Yan Ta Khao Subdistrict, Yan Ta Khao District, Trang Province, Thailand 7°22'24.5"N 99°40'40.3"E

Irrigation Canal Study at Ban Napo, Khuan Pring Subdistrict, Mueang District, Trang Province, Thailand 7°31'19.0"N 99°35'50.2"E

How to conduct research

Chapter 2

3. 1. Method of checking water transparency (Transparency) At the natural canal in Yan Ta Khao Subdistrict, Yan Ta Khao District, Trang Province, Thailand and the irrigation canal at Ban Na Po, Khuan Pring Subdistrict, Mueang District, Trang Province, Thailand

1. Measuring water transparency using a transparency tube (Transparency Tube)

3. 2. Measurement of dissolved oxygen in natural canals in Yan Ta Khao Subdistrict, Yan Ta Khao District, Trang Province, Thailand and irrigation canals in Ban Na Po, Khuan Pring Subdistrict, Mueang District, Trang Province, Thailand.

• Wash the sample bottle with sample water 3 times before collecting the sample.

• To collect water, immerse the sample bottle in water, fill it up, and close the lid underwater. If bubbles appear when the bottle is turned upside down, pour out the water and start collecting the sample again.

• Store the water immediately and test within 2 hours.

• Perform a total of 3 repetitions of the test, with the average value being within the range specified by the test kit.

3.3 Water temperature measurement (Temperature) At the natural canal in Yan Ta Khao Subdistrict, Yan Ta Khao District, Trang Province, Thailand and the irrigation canal at Ban Na Po, Khuan Pring Subdistrict, Mueang District, Trang Province, Thailand

• Immerse the thermometer in water about 10 centimeters deep for about 3-5 minutes.

• Read the thermometer at eye level with the thermometer bulb still in the water.

• Hold the thermometer for another 1 minute for the 2nd and 3rd measurements , changing the person reading the thermometer.

• Read temperature in degrees Celsius. Perform all measurements 3 repeats

3.4 Acidity-alkalinity of water (pH) At the natural canal in Yan Ta Khao Subdistrict, Yan Ta Khao District, Trang Province, Thailand and the irrigation canal at Ban Na Po, Khuan Pring Subdistrict, Mueang District, Trang Province, Thailand

• Fear of containers with 2 sample times

• Add a moderate amount of sample water.

• Dip the pH paper to measure the pH of the sample water (read the measurement method from the pH paper used).

• Compare the color of the pH test paper with the attached color strip.

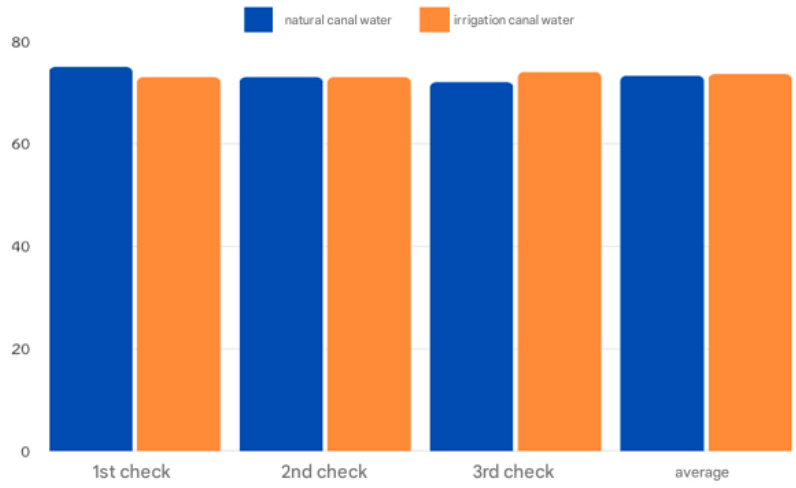
Chapter 3

3.5 Study the types and diversity of aquatic plants.

By using observations and comparisons of water from both natural canals at Tambon Yan Ta Khao, Amphoe Yan Ta Khao, Trang Province, Thailand and irrigation canals at Ban Na Po, Tambon Khuan Pring, Mueang District, Trang Province, Thailand.

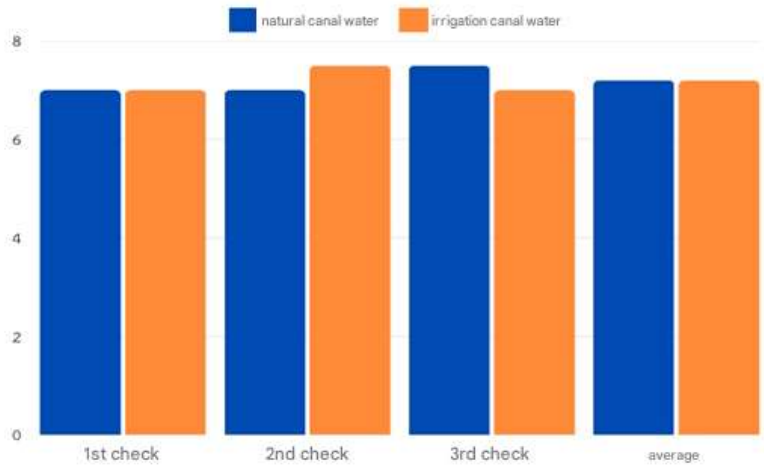
Research results

Figure 1. Bar chart showing Shows a comparison of the transparency of water in a natural canal in Yan Ta Khao Subdistrict, Yan Ta Khao District, Trang Province, Thailand and an irrigation canal in Ban Na Po, Khuan Pring Subdistrict, Mueang District, Trang Province, Thailand.



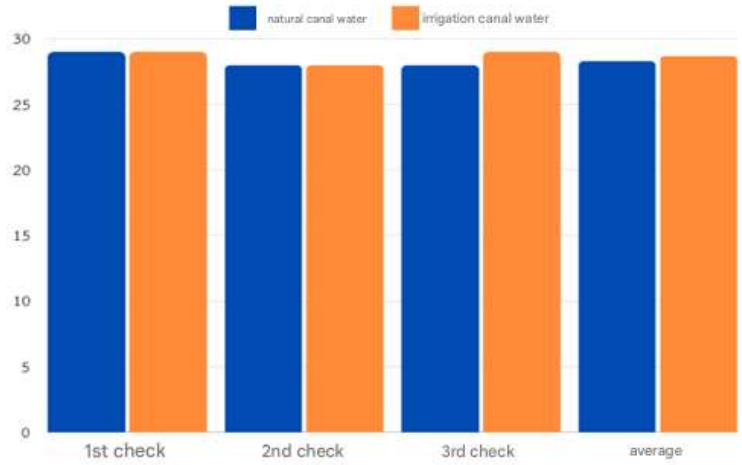
From the bar chart, it can be seen that the natural canal water in Yan Ta is clearer than the irrigation canal water.

Figure 2. Bar chart showing the comparison of the amount of oxygen dissolved in water from the natural canal in Tambon Yan Ta Khao, Amphoe Yan Ta Khao, Trang Province, Thailand and the irrigation canal at Ban Na Po, Tambon Khuan Pring, Mueang District, Trang Province, Thailand.



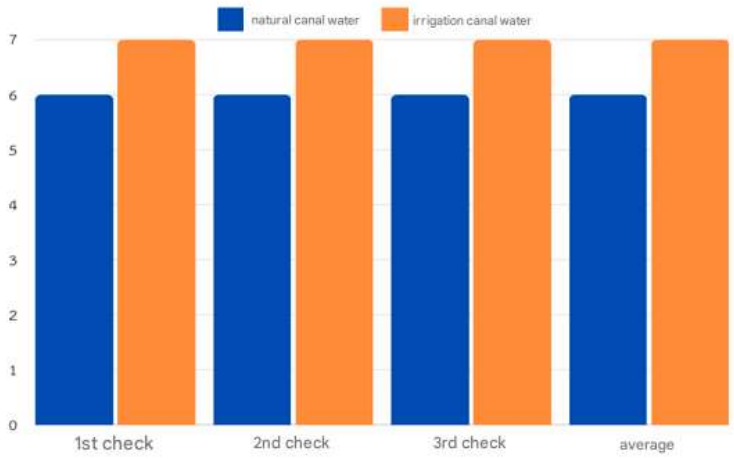
From the bar chart, it can be seen that both water and oxygen sources contain equal amounts of oxygen.

Figure 3. Bar chart showing comparison of water temperature measurements (Temperature) at the natural canal in Tambon Yan Ta Khao, Amphoe Yan Ta Khao, Trang Province, Thailand and the irrigation canal at Ban Na Po, Tambon Khuan Pring, Mueang District, Trang Province, Thailand.



From the bar chart, it can be seen that the water level of the irrigation canal is higher than that of the natural canal.

Figure 4. Bar chart showing the comparison of pH of water at natural canals in Yan Ta Khao Subdistrict, Yan Ta Khao District, Trang Province, Thailand and irrigation canals at Ban Na Po, Khuan Pring Subdistrict, Mueang District, Trang Province, Thailand.



From the bar chart, it can be seen that the water in the irrigation canal has a higher pH value than the water in the natural canal.

Table 5 shows aquatic plants found in natural canals in Yan Ta Khao Subdistrict, Yan Ta Khao District, Trang Province, Thailand.

at	Plant type	nature	photo
1	Stevia	Stevia is a dicotyledonous plant with single leaves arranged oppositely in pairs along the stem and branches. Above the leaf axils, short shoots on both sides emerge. Each leaf is lanceolate.	
2	Grass	Hair grass is an annual grass with stalks that grow upright or creeping along the ground.	

Table 6 shows aquatic plants found in the irrigation canal at Ban Na Po, Tambon Khuan Pring, Mueang District, Trang Province, Thailand.

at	Plant type	nature	photo
1	Moss grass	It is a small green single-celled plant, the same species as algae, that grows in groups and thrives in freshwater sources with abundant water, air, and sunlight.	
2	The Kapanghom tree	A perennial, climbing herbaceous plant. The stem and branches are rounded, light green, covered with fine, white or brown hairs. The leaves are solitary.	

Summary and discussion of research results

From a comparative study of water quality and plant diversity in natural canals in Yan Ta Khao and irrigation canals in Na Pho

The results can be discussed as follows:

1. The water from both natural canal at Yan Ta Khao Sub-district, Yan Ta Khao District, Trang Province, Thailand and irrigation canal at Ban Na Po, Khuan Pring Sub-district, Mueang District, Trang Province, Thailand are slightly different, namely, the transparency of water at natural canal and irrigation canal has an average of 73 cm and the measurement of oxygen content in water from both sources has an average of 7.2 mg/L and the temperature measurement in water from both sources is different, the natural canal has an average of 28.3 °C and the irrigation canal has an average of 28.7 °C and the acid-base measurement of water from both sources has an average difference, the natural canal has an average of 6 and the irrigation canal has an average of 7 and the aquatic plants in natural canal are as follows: Stevia and irrigation canal are as follows: Moss

Suggestions

1. Further study should be done on air quality and aquatic plant species.

Acknowledgements

This study was successfully completed because of the kind advice and assistance from Khru Khwanjai Kanchanasrimek and Khru Suthira Thachin, the environmental science subject advisors, for which the researcher feels deeply grateful and grateful. Therefore, the researcher would like to express her deepest gratitude. On this occasion, the researcher would like to thank the teachers and staff of Wichianmat School for giving various ideas and suggestions, which made this research more complete.

Finally, I would like to thank Teacher Khwanjai Kanchanasrimek and Teacher Suthira Thachin, and the places where the study was conducted at the Natural Study Canal in Yan Ta Khao Subdistrict, Yan Ta Khao District, Trang Province, Thailand, and the Irrigation Study Canal at Ban Na Po, Khuan Pring Subdistrict, Mueang District, Trang Province, Thailand, for providing complete information which made this study successful in a very short time. I would also like to thank many others who provided assistance, which cannot all be mentioned here.

Reference documents

1. GLOBAE THAILAND (Water Measurement Principles)

Source: https://globefamily.ipst.ac.th/

2. Rajamangala University of Technology Phra Nakhon 2013 by A Sukrasorn · 2018 — Thesis title: Study of the water quality of Khlong Prem Prachakon to lead to water management. Name and surname. Ms. Atcharaporn Sukrasorn. Ms. Nonthawon Sonchan. Mr. Phatthanthansorn Phiansawang.

3.https://cspc2.ocsb.go.th/%E0%B8%AB%E0%B8%8D%E0%B9%89%E0%B8%B2%E0%B8%82%E0%B8%99-brachiaria-mutica-forsk-stapf/

4. https://phar.ubu.ac.th/herb-DetailPhargarden/307

Appendix