

# The investigation on and the sustainable management of the jellyfish lake.



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# Abstract

**From September to May every year, it is the best viewing time for Cassiopeia jellyfish. My hometown is located in Linyuan District, the southernmost tip of Kaohsiung, Taiwan. The unique Ocean Wetland Park in Linyuan District not only has mangrove landscapes, diverse creatures, attractive beaches, and the only upside-down jellyfish on the island of Taiwan. Through media reports, many tourists come here for jellyfish. I wonder why Linyuan Wetland Park has the only jellyfish lake in Taiwan.**

**To find out the reasons, I went to Linyuan Wetland Park to test the relevant water quality near Jellyfish Lake. I wanted to know why Cassiopeia jellyfish only survive here. I also wanted to explore the long history about rich landscape and biological resources in the forest garden. How did the Ocean Wetland Park develop into its current state through management and operation?**

# *The Purpose of the Research*

**(1) Investigating the environment of upside-down jellyfish in Linyuan Wetland Park.**

**(2) Interview with private management units on the management and operation of Linyuan Wetland Park.**

**(3) Discuss the community creation and sustainable development direction of Linyuan Ocean Wetland Park.**

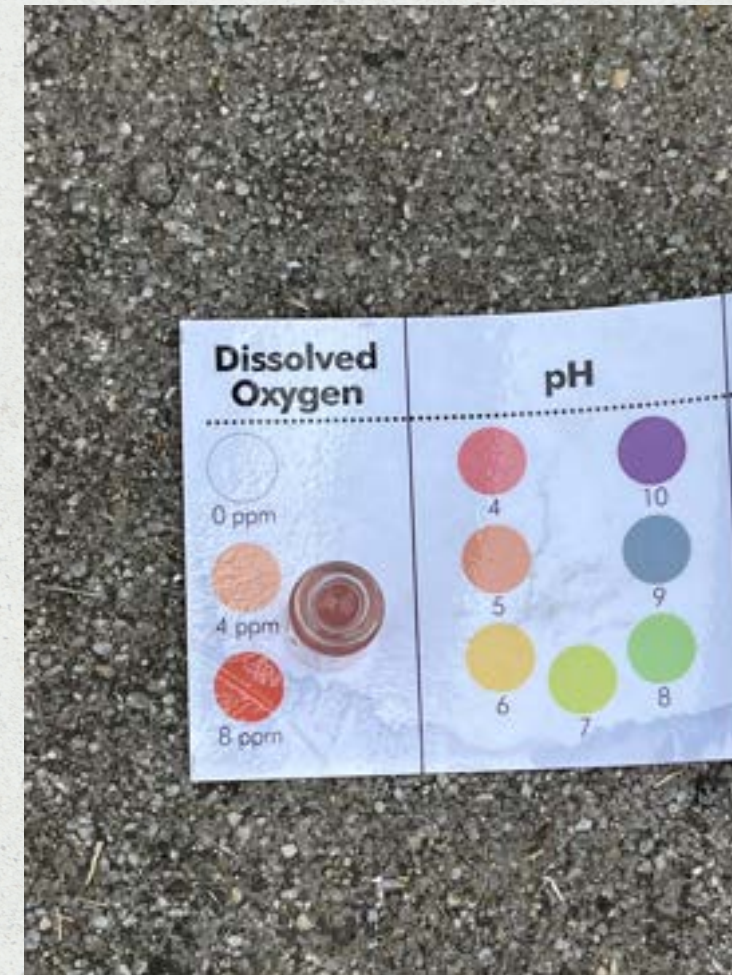
# Materials



**Turbidity  
comparison table**



**Air temperature  
&  
humidity meter**



**TesTabs-80 dissolved  
oxygen test ingots**



**water scoop**

# Materials



**pH detection pen**



**Eight in one test  
paper**



**TDS/EC test pen**



**Multifunctional  
water quality meter**

# Actual measurement



# photos of surrounding environment



# Draw a sampling point map

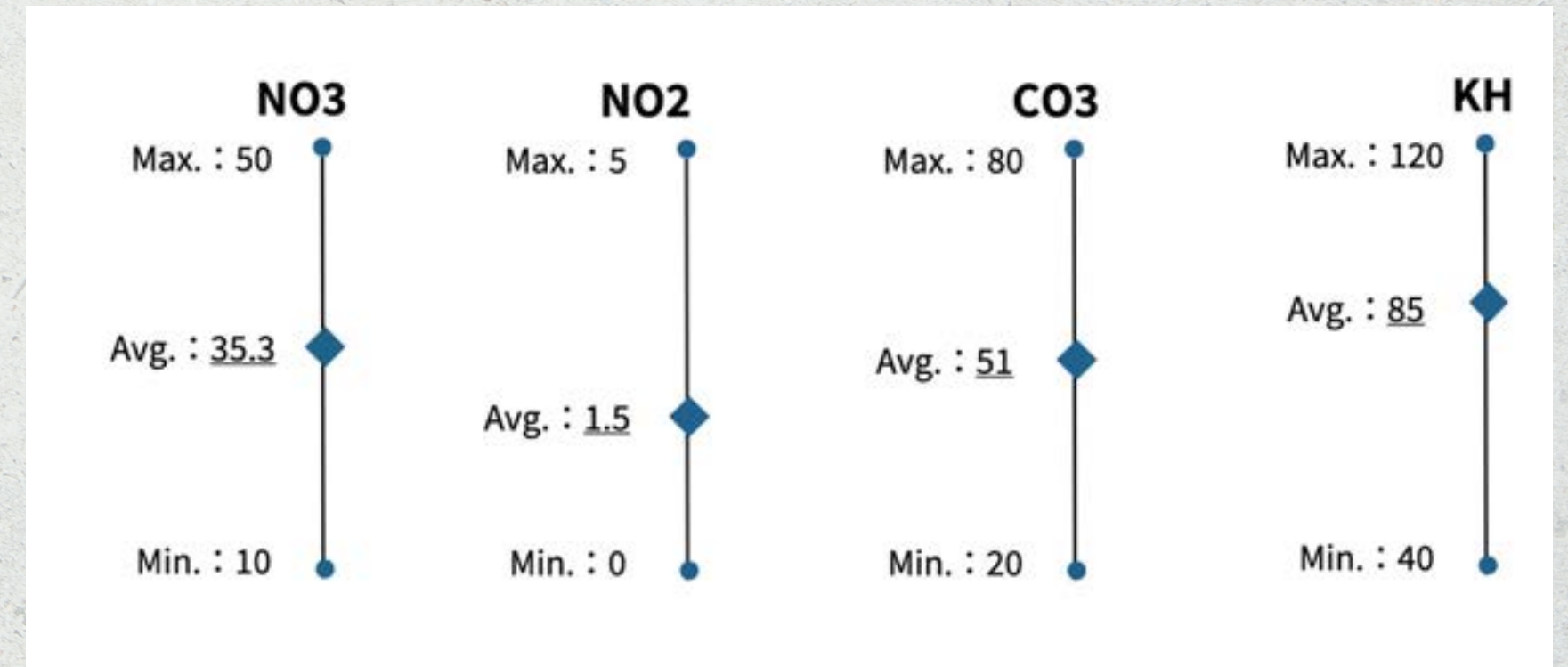
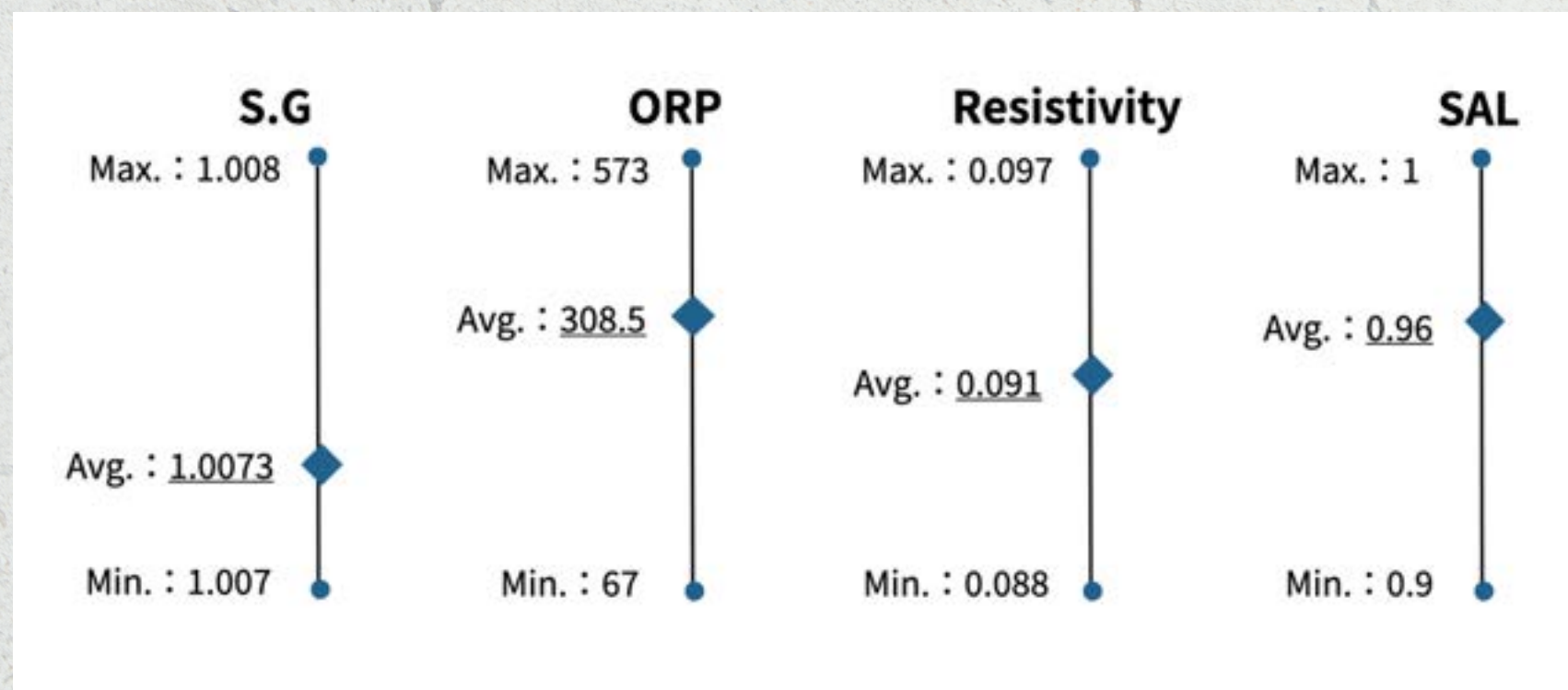
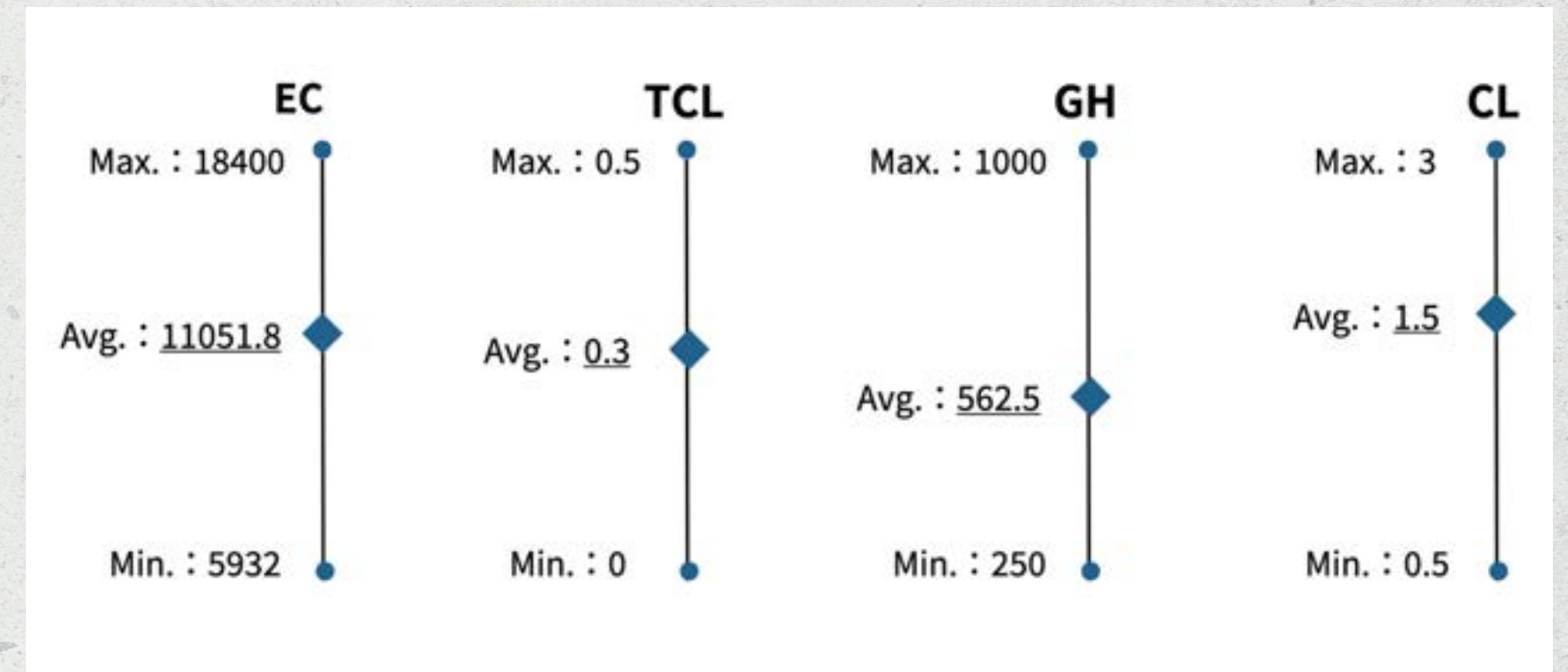
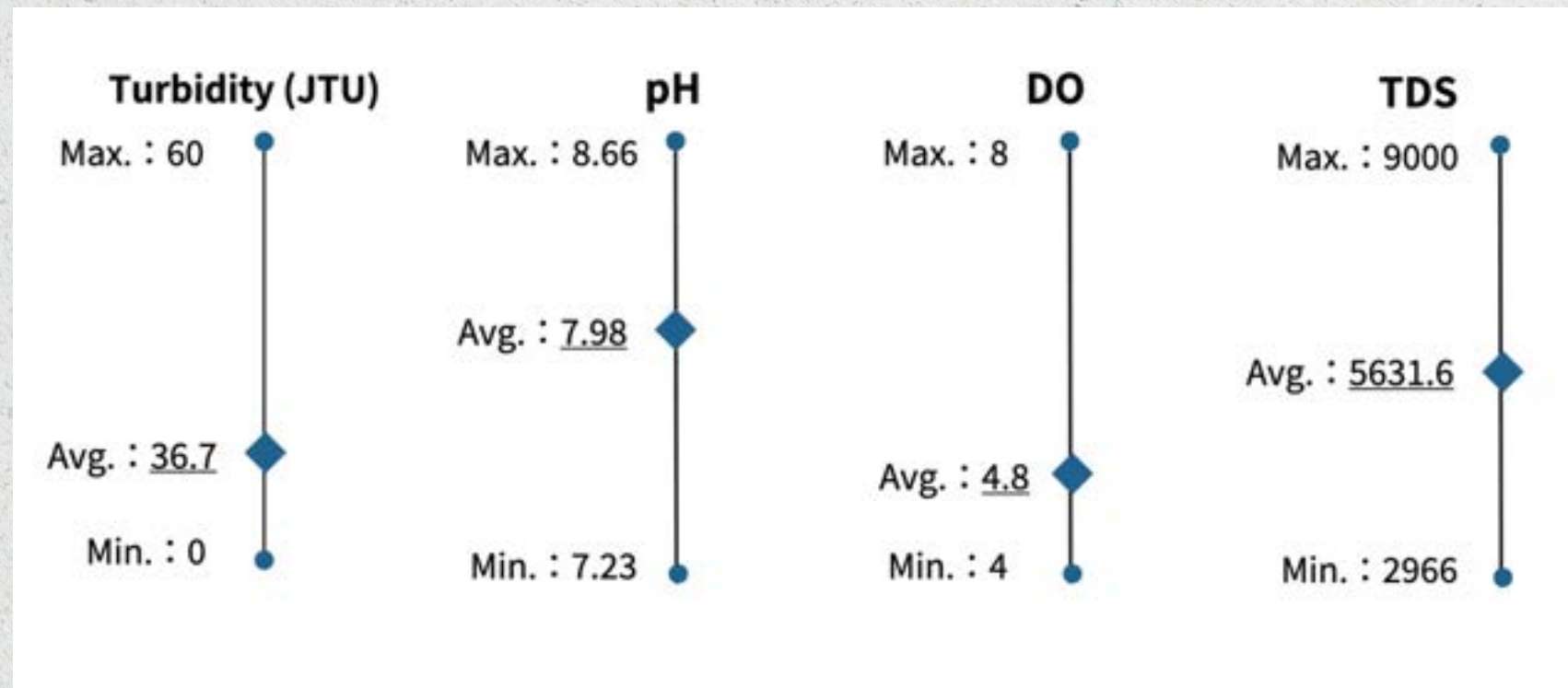
Points 1, 2, 3, 4, 5, and 6 are surrounded by the ecological pool (jellyfish lake). Point 1 is under the bridge and there are many small jellyfish. Points 2 to 6 have a large amount of big jellyfish. Since the number of jellyfish in each point is different, we chose six points to make a comparison. Points 7 and 8 are designed next to the ditch at the water inlet of the ecological pool. Because the ditch is adjacent to the factory, the water in the ditch contains industrial wastewater, but many small fish are also found in the ditch.





# box diagram

The average, maximum and minimum values of each data are drawn into a box diagram, and the basic living environment of jellyfish is analyzed.



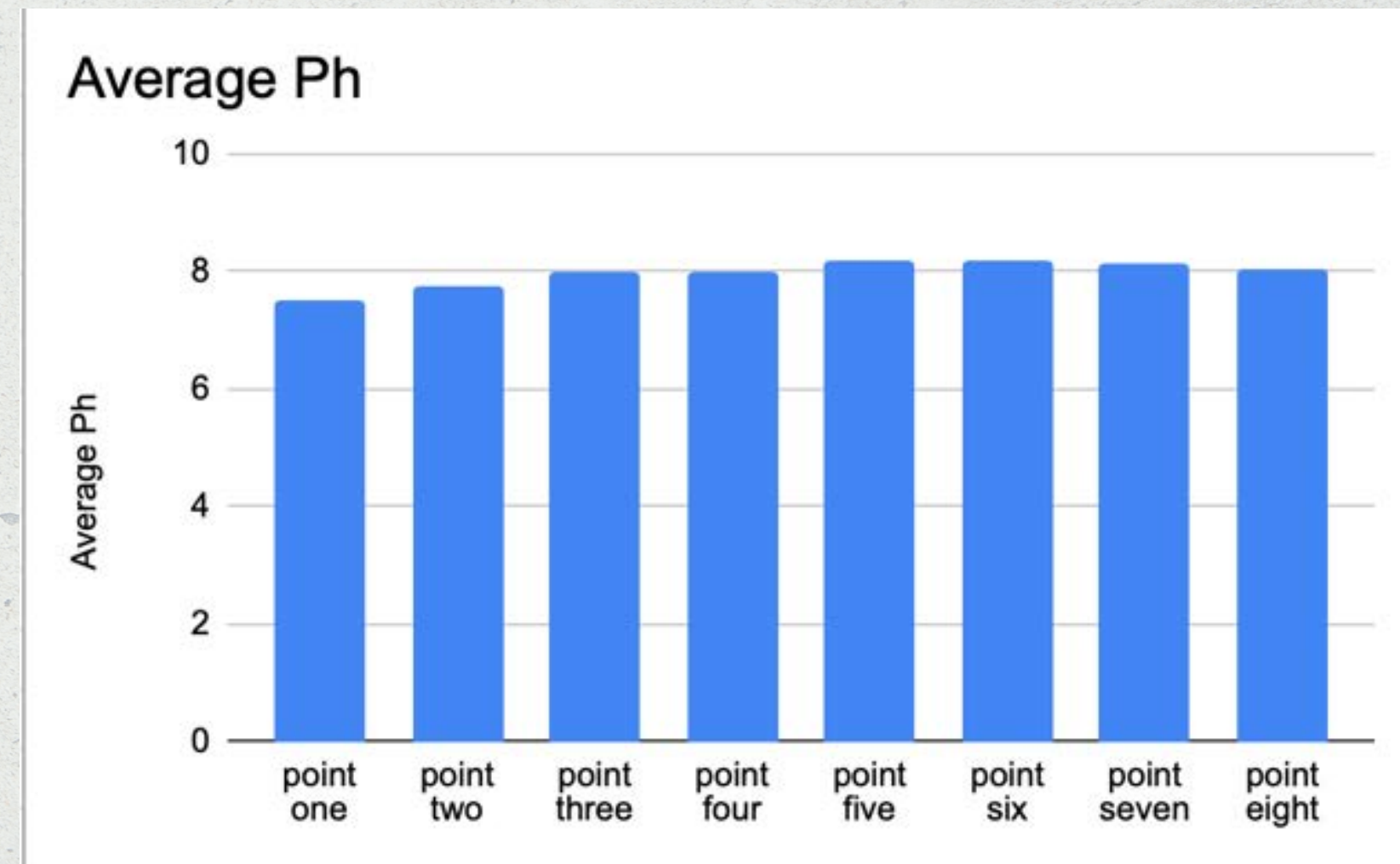
# *box diagram*

The figure shows that according to the pH value, we know the water quality is slightly alkaline. The average of dissolved oxygen content is 4.8 mg/L, the water is medium and light polluted. The maximum and minimum values of the total dissolved solid and electrical conductivity vary greatly. It can be inferred that's the pollutants or suspended solids are different at each point, but there are jellyfish existed in each point in common. The aggressively hard water and the average value of nitrate and nitrite all show that the water quality is not suitable for jellyfish survival. But, there are still tens of thousands of jellyfish existed in this area. It can be inferred that the fish don't need high water quality.

# Research results and analysis

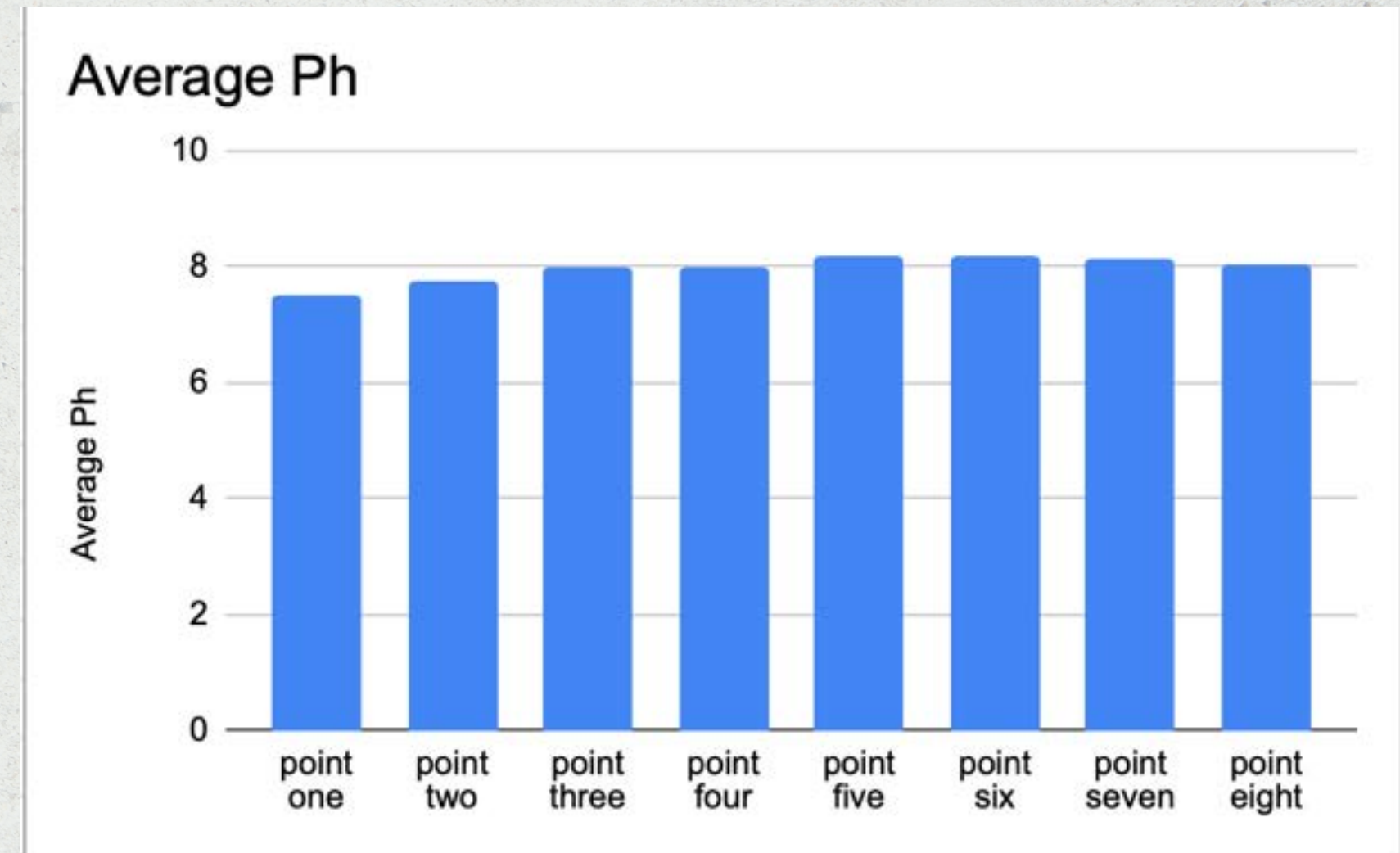
Study the average value of the pH value at each point for comparison

There are five time periods to go to Linyuan Ocean Wetland Park for sampling. The figure below shows the average pH value of each point in the five time periods (rounded to the second decimal point) to make a bar graph to compare.



# Research results and analysis

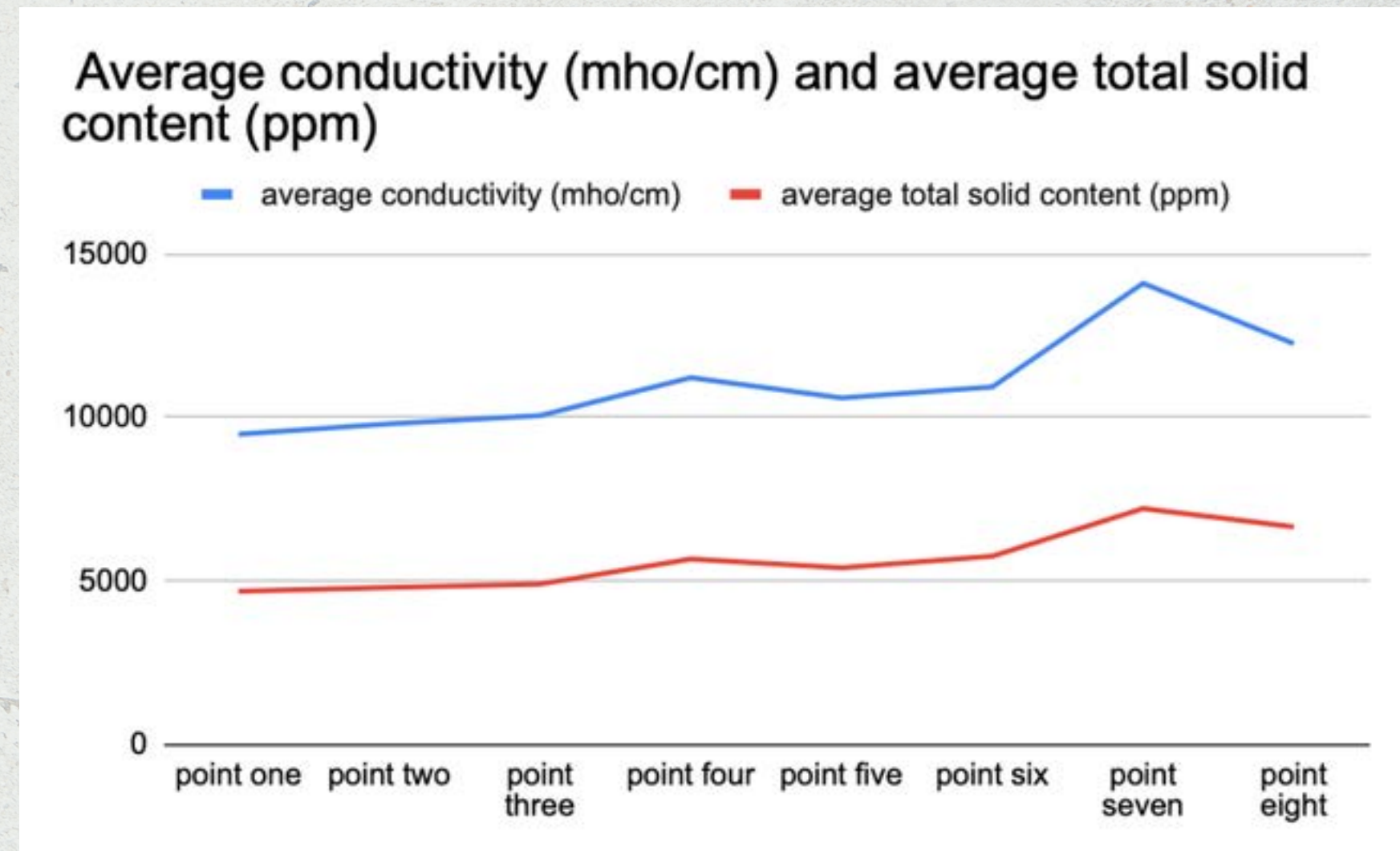
The average value of point 1 is 7.52, the average value of point 2 is 7.73, the average value of point 3 is 8.01, the average value of point 4 is 8.01, the average value of point 5 is 8.19, the average value of point 6 is 8.17, the average value of point 7 is 8.02, and the average value of point 8 is 8.06. It can be seen that the overall water quality is slightly alkaline. The point 5 has slightly more alkaline than other points.



# Research results and analysis

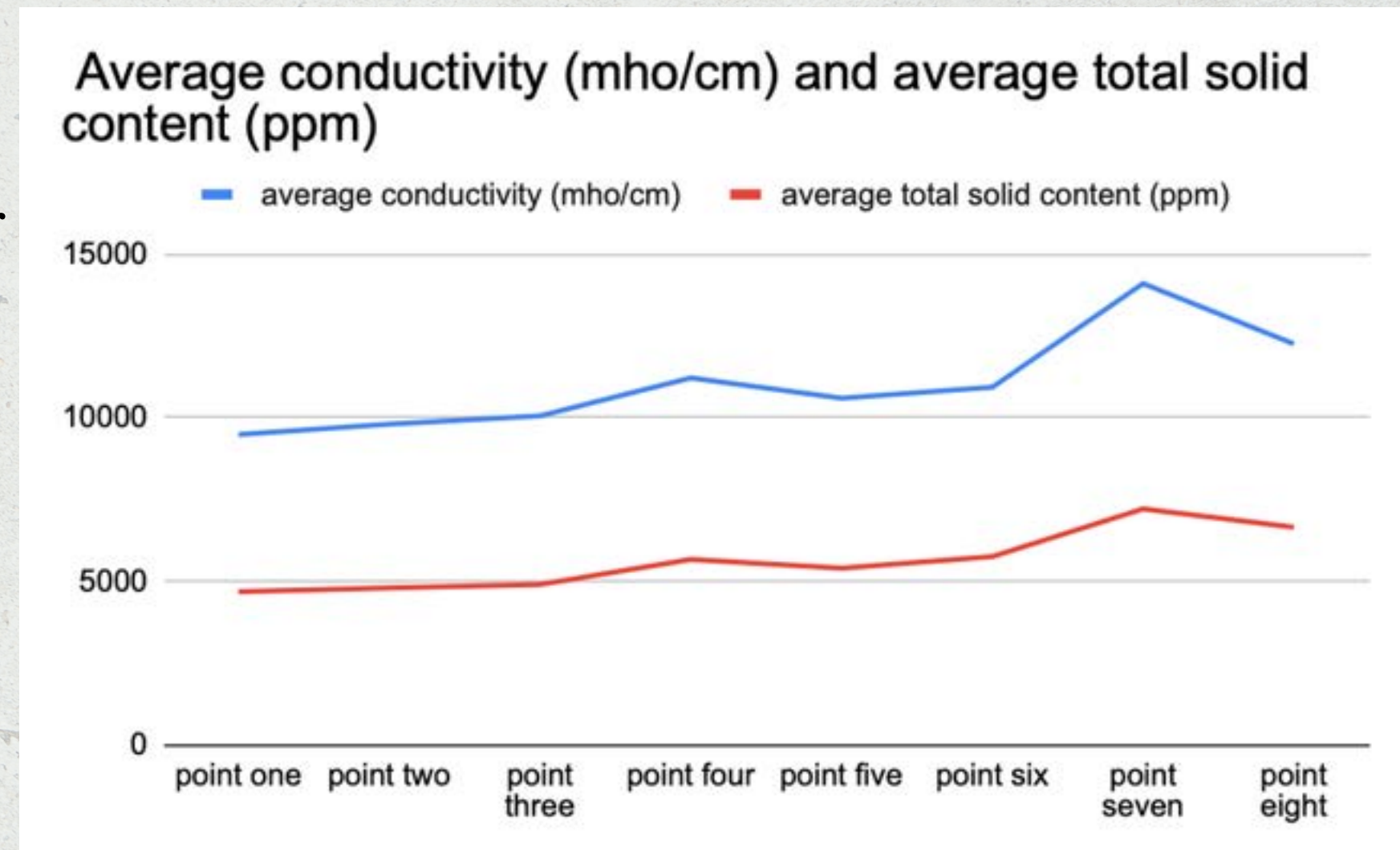
Study the electrical conductivity (EC) and total solids content (TDS) of each point

Using five time periods, calculate the average electrical conductivity and total solids content of each point (rounded to an integer), and use the combined bar graph for comparison.



# Research results and analysis

it can be deduced that the average electrical conductivity and the average total solid content in water have almost the same trend, and because there may be more solid suspended particles in the total solid content that will affect the electrolyte in the water. It can be speculated that the more electrolytes in the water, the more impurities in the water, too.



# SWOT Analysis of Linyuan Ocean Wetland Park

SWOT Analysis of Linyuan Ocean Wetland Park  
After understanding the general water quality status and the current situation of tourism operation and management of Linyuan Wetland Park, use SWOT Analysis to analyze the strength, weakness, opportunity, and threat of Linyuan Ocean Wetland Park in terms of community construction and sustainable development in the future.



# *Research Conclusions*

## **·Sightseeing in Linyuan Wetland Park:**

**It can indeed attract tourists from another area. But for the community, there is a pity that no way to improve the economic and tourism benefits.**

## **·About the Habitat of Jellyfish:**

**According to the current sampling points 1 to 6, to inferred that the water quality of Jellyfish Lake is moderately polluted. So, it can be judged that Cassiopeia jellyfish does not need great requirements for water quality.**



# Research Conclusions

## ·Formation of Jellyfish Lake:

Linyuan Wetland Park was originally only a mangrove area, and jellyfish appeared later, but the number of jellyfish was less than now. In order to solve the problem that the low water level and high-water temperature made it difficult for organisms to survive, non-governmental organizations provided suggestions for Maintenance Office. At last, the Maintenance Officers installed a pumping motor next to the retarding basin (the jellyfish lake now) to solve the problem. The pumping motor allows the water to circulate, and it causes the surging jellyfish numbers.

## ·Community Creation and Sustainable Development:

Local residents will carry out activities here or paint public walls nearby. The researcher believes that the establishment of Linyuan Wetland Park will help to gather the awareness of community residents, because most of the local residents are trained to become commentators. It can let everyone has the opportunity to participate in public affairs and form civil groups to pay attention to Linyuan Wetland Park.

# *Suggestions*

**The results of the analysis show that although the Linyuan Wetland Park can attract tourists from other places, the overall tourism and economic benefits are still not great. The researcher suggests that the Tourism Bureau and the Maintenance Office cooperate to promote relevant policies. In addition, the traffic in Linyuan Wetland Park is not so convenient. Tourists can only drive or take a bus to come here, but the existing bus schedule is limited. It is recommended to promote sightseeing bus during holidays and arrange travel plans for entire Linyuan District. It won't let tourists come to Linyuan Wetland Park but don't know where else to go nearby.**

# *Literature discussion*

**National Museum of Natural Sciences, March 9, 2023, from  
[http://digimuse.nmns.edu.tw/Demo\\_2011/NewModule.aspx?  
ObjectId=0b00000181eb8ecc&ParentID=0b00000181eb8ecc&Type=&Part=&Domain=az&Field=cn  
&Language=CHI](http://digimuse.nmns.edu.tw/Demo_2011/NewModule.aspx?ObjectId=0b00000181eb8ecc&ParentID=0b00000181eb8ecc&Type=&Part=&Domain=az&Field=cn&Language=CHI)**

**Chen Junqiang (2015). Research on ecological leisure resources of mangrove artificial wetland in forest park. National Pingtung University Ecological Leisure Master's degree program of education and teaching: master's thesis, taken from  
<http://ir.nptu.edu.tw/retrieve/22801/103NPTU1587030-001.pdf>**

THANK YOU