

# **Environmental Awareness: Do People Really Concern about the Setiu Wetlands in Terengganu, Malaysia?**

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## **Abstract**

Wetlands provide environmental and social values: habitats for many plants and animals, including threatened and endangered species; flood storage and storm-water regulation; groundwater recharge; water pollution filtration and sediment trapping; and soil protection from erosion. In the past two decades, managing and raising the general level of environmental awareness on all levels of society has become one of the main social goals that has reached a level of social and political consensus unseen ever before. Considering that only things that can be measured can actually be managed, the measuring of environmental awareness based on scientific criteria is becoming increasingly interesting to scientists working in different disciplines. The purpose of this research are, first, to identify the environmental awareness level toward Setiu Wetlands in Terengganu and second, to examine the relationship of wetland background and wetland issues towards environmental awareness among public people on Setiu Wetlands in Terengganu. Factor analysis were employ to elicit the main contributing factors and the result indicated a high level of awareness toward Setiu Wetland in the scope of knowledge wetland background, wetland issues and environmental attitude. Setiu Wetlands should have comprehensive policies to manage and conserve while the values of wetlands can give beneficial to the communities. How ever, the level of environmental awareness among public on Setiu Wetlands in terengganu should be measure to ensure either the policy maker, properly conserve and manage Setiu Wetlands in good manner.

**Keywords:** Setiu Wetlands, Environmental Awareness, Wetland Issues, Factor Analysis, New Ecological Paradigm (NEP).

## **Introduction**

Setiu Wetlands located in the Setiu district of Terengganu. It is also the largest coastal wetland complex on the east coast of Peninsular Malaysia, which contains a river comprising Setiu

River basin, Chalok River basin, Bari River basin, and Merang River basin, which converges and forms a continuous lagoon. This location makes *Setiu Wetlands* an area of major ecotourism potential in Setiu District. Setiu Wetlands itself is 26 kilometres long and 1.5 kilometres at its widest section. Setiu wetland has various ecosystems, a wide range of biodiversity and abundance of useful natural resources (Suratman, Suhaimi, Hussein, Latif, Mohd Talib & Weston, 2014). Setiu Wetlands is now a major area of focus for the development of research based on sustainable management of wetlands, biodiversity protection, and ecological function maintenance. Sultan Mizan Royal Foundation (YDSM), Terengganu Town and Country Planning Department (JPBD), Setiu District Council (MDS), Terengganu State Department of Agriculture, University Malaysia Terengganu (UMT) and University Putra Malaysia (UPM) are among agencies involved in the collaboration in the long term sustainable management of wetlands and thus contributing to the economic and social development of the local community.

Setiu Wetlands has nine ecosystems interdependent which consist of sandy islands, moats, mangroves, peat swamps, riparian forests, sandy seaside beds, and a lagoon full of sea and fresh water. The biodiversity continues to be a breeding ground for many mammals, reptiles, and marine life. A large swath of the melaleuca or "gelam" trees is found in the lowlands that make up the Setiu Wetlands, which are rare in this region. While, river basin also contains many types of coastal marsh and swamp forests such as *Avicennia* forest, *Bruguiera* forest, *Lumnitzera* forest, *Melaleuca* forest, *Nipa* palm forest, *Rhizophora* forest and mixed mangrove forest. The presence of seagrass beds also characterizes Setiu Wetlands. Setiu Wetland in Terengganu is one of the undervalued and potentially endangered wetlands of the area due to relatively unknown and lack of disclosed details. Setiu wetlands have brought together nine intertwined ecosystems as beautiful sites and unique habitats for the diversity of flora and fauna (Amin & Hasan, 2003). The importance of wetlands is greatly influenced by human activities, including environmental issues. In addition, the importance of environmental awareness among the public is also reflected. The threat to the conservation and management of wetlands is based on the level of public awareness. Furthermore, it is hoped that environmental awareness among the public will be seen as a factor in the success of future conservation and management Setiu Wetlands' efforts.



**Figure 1 : Setiu Wetlands**

*Source : terengganutourism.com*

### **Literature Review**

Many of today's environmental issues are primarily the consequences of individual actions, personal consumer preferences, and small and large industries operations. The fact remains, however, that the sustainability of the world's economy and people are interconnected to environmental well-being. The benefits of collaborative natural resource management, including enhancement of social justice, stakeholder conflict resolution, and implementation of ecosystem management, have been announced by the Terengganu State administration. Among the main issue, public awareness of environmental aspects is importantly to discuss.

The community or public should have proper information and understanding of the importance of the environment and wetlands. Over the decades, environmental issues become the universal debates, and Environment Assessment Impact (EIA) has been developing as a guide to physical development in the country. While the development of community-based stewardships has been identified as an important element in sustainable environmental management, the clear direction for departments and agencies is still under planning. An important research will raise questions, concerns, and perceptions of the environment; however, it attempted to operate on "environmental awareness" composite variables and then tested this empirically. However, this study proposed to find out the level of environment awareness among the public in the aspect conservation and management of one part of environment component, which is wetlands.

**The Relationship Between Wetlands And Environmental Awareness**

Psychologists have developed many models to understand the relationship between attitude (environmental awareness) and actions to explain what causes environmental awareness, what are intrinsic factors and what are the interrelationships between these factors (Elijah, 2017). Hence, Theory Planned Behavior (TPB) is using as a references in handling this study. The TPB originates from the theory of reasoned action (TRA) (Fishbein & Ajzen, 1975). The TRA aimed at predicting human behavior by implying that a person's behavior is influenced by behavioral motives, mainly affected by attitudes towards the act and subjective norms. The TRA has therefore two components: an attitude towards the perceived implications and subjective norms that depend on the confidence in the importance of referents and a motivation to behave in accordance with them. Several studies on consumer behavior and social psychology supported these correlations (e.g. Ryan, 1982; Sheppard, Hartwick & Warshaw, 1988). An extension of the TRA is the theory of planned behaviour (TPB), proposed by Ajzen (1991). The TPB added the concept of perceived behavioural control to the TRA as a third predictor of intention.

The TRA describes attitudes as behavioral assessments that are heavily influenced by behavioral convictions. Subjectives are defined as the "perceived social pressure to conduct or not to conduct the behavior" (Ajzen & Madden, 1986) and are influenced strongly by normative beliefs. The TRA considers that behavioral intent is the only determinant of the desired behaviour, that is to say that conduct is entirely volitional, i.e., under the control of the person (i.e., under the person's control; Ajzen & Madden, 1986). Meanwhile, The TPB (Ajzen, 1991) shares the two determinants of motivation of the TRA: attitude and subjective norm. A third determinant, perceived behavioral control, was introduced to the TPB to address the issue of volitional control, to help predict intention and actions when an individual has limited control (Ajzen & Madden, 1986). According to Ajzen and Madden (1986) perceived behavioral control as a —person's belief as to how easy or difficult the performance of the behavior is likely to be by measuring the tools and incentives available at the time of intention to conduct the actual behavior. In other words, when individuals feel the activity is less daunting and have more motivation and less challenges to meet, they are more likely to conduct behaviour. The perceived behavioral control proposed by Ajzen and Madden (1986) may influence behavior either indirectly by intention or directly as a measure of actual control.

**Wetlands**

Wetlands have often been viewed as unproductive areas and converted into agricultural or industrial uses, and have often been undervalued in their decisions on use and management. Wetlands sustain enormous rich biodiversity, including endangered species and several native. These natural resources have been known to provide habitats for many organisms and have significant environmental effects, for instance towards the hydrological, biological and ecological functions of the ecosystem. (Ibrahim, Aziz, & Hanifah, 2012; Kasawani & Kamaruzaman, 2009). Worldwide, wetlands have undergone varying patterns of change over time. Whilst analysis of environmental indicators such as pollen, microfossils, diatomic frustules, chemicals, physics and the magnet properties of sediments and organic matter at different levels in sub-surface stratigraphy are able to understand the nature

**Definitions, Characters, Structure, and Class of Wetlands**

Wetlands literature covers a large number of terms included under the common "wetland" heading, including marsh, lake, slough, bog, fen, swale, sump, muskeg, moor, mire, heath, carr, pothole, and peatland. There is no consensus on a universally acceptable definition of a wetland, largely due to the wide range of natural and physical environments that fall within the scope of the term. Wetlands include, by definition: the continuing presence of water in soil or on the surface of the soil (at least seasonally); specialized hydraulic soils that differ from the surrounding uplands; and wetland ecosystems. Wetlands vary from permanent bodies of surface water such as lakes or streams, although the boundaries of one can overlap with the other. The boundary between the terrestrial and aquatic ecosystems is wetlands. Wetlands may be infiltration areas for recharging groundwater and the sources of rivers, streams, and freshwater.

Holzer (1973) provides an appropriate hydrogeological definition: Wetlands is a topographical entity in which the shallowest groundwater table is not to be connected to the regional groundwater system at or near the surface for part of the year. The substrate that underlies this depression consists of organic or elastic sediments that are naturally deposited. According to Reppert, (1979), wetlands is the areas that are inundated or saturated by surface or ground water at a sufficient frequency and duration to support, and that under normal circumstances support, a prevalence of vegetation typically adapted to life under saturated water conditions. While Adams and Zoltai, (1969) focus on the operational definition for wetland integrates hydrogeological, pedological, and botanical characteristics: —Wetlands are areas of predominantly organic or water worked soils that are permanently or periodically saturated. The water table persists for a time at or above the ground surface, but it may drop well below the surface for seasonal periods. Standing waters, usually not exceeding 2 metres in depth may be present seasonally or persist over long periods. Wetlands are periodically saturated or inundated by local seepage or ground water flow, or they may receive water from remote sources by stream inflows, surface runoff, or flooding. Usually characteristic kinds of wetland vegetation develop||.

Wetlands have two broad categories: tidal and non-tidal. Tidal wetlands are also known as coastal wetlands, marshes, swamps and mangrove forests and are periodically flooded by ocean-powered tides. Non-tidal wetlands are called palustrine or freshwater wetlands, consisting of a complex assembly of inland wetland environments, even though they are saline in certain dry and semi-arid environments (Mitsch & Gosselink, 1986). Wetlands are the repository for the hydrological cycle's major water reservoirs: surface water, ground water, atmospheric water, and seawater in some areas. Standing water in wetlands is either the result of surface flooding or outcropping of the water table, which is the edge of the flooded region where the atmospheric pressure of the pore equals (Freeze and Cherry, 1979). Wetlands can exist where the surface is flooded for extended periods or where there is saturation because of ground water moves or stands close to the land surface. Through nature, wetlands can only thrive in the presence of water, while depending on the global hydrological cycle is their existence on continental land masses.



### **Environmental Awareness**

Environmental awareness can be broadly defined as human behavior's attitude to the environmental impacts. Beginning with the traditional concept of attitude, knowledge of the environment is a predisposition to respond in some way to environmental issues (Culiberg & Rojšek, 2008). It is certainly part of social awareness of one's systems of values and faiths.

A two-dimensional approach to understanding environmental awareness was suggested by Suzanne, Thompson, Barton, (1994). There are at least two reasons for concern about the natural environment among people. In particular, there are eco-centric people who value nature for their sake and hence believe it deserves special treatment because of its intrinsic value.

In comparison to them, anthropocentric individuals claim that in maintaining and improving the quality of human life, nature should be preserved for its importance. This is the main source of attitude knowledge about the environment. It is the main source of attitude interpretation of the environment. There are essentially two types of attitudes used to predict pro-environmental behaviour, namely attitudes toward nature itself and attitudes toward pro-environmental behaviour, i.e., other pro-environmental behaviors. When environmental consciousness (attitude) is accompanied by real pro-environmental behaviour, we may use the term environmental responsibility.

### **Measuring Environmental Awareness**

Studies on environmental awareness and factors of determination and correlation that influence it do not always generate consistent results. The question whether they (researchers) and their respondents understand the concept of environmental awareness equally is one of the major issues that the researchers face. Conflicting research findings and a large number of variables of impact have contributed to the notion that researchers do not always share the same idea of environmental awareness (Carlson, 2004).

Differentiate between (content-related) so-called substantive variations and theoretical variations between individual measuring instruments, i.e., measuring scales (Van Liere, Dunlap, 1981). The variations in content include gaps in the extent to which measures reflect various environmental concerns such as emissions, population issues, protection of biodiversity, and others. Whether the attitude towards various issues is expressed in the broader concept of environmental awareness is unclear. The conceptualist hypothesis, which consists of implicit or explicit assumptions about what constitutes the concept of environmental awareness of the respondents, is another source of variance. There may also be issues with different types of interpretations, particularly when concluding.

Most people don't see the environment very clearly and firmly. Environmental aspects need to be outlined as they form the basis for understanding of the environment. First, the view of the environment can be exploited as a general perception of the relationship between the environment, economic and industrial growth, and the impact of science and technology (Tuna, 2004). Secondly, environmental concerns were used as a second dimension to the environment in research, as values concerning the relationship between individuals and the environment and the perception of specific environmental issues by the respondents.

Values are constructs that relate to the final state or desired way that transcend certain situations, the selection of guides or assessments of behavior, people and events, and are

ordered by importance over other values to form a priority value system (Schwartz, 1994; Rokeach, 1973). While Schwartz (1994), values as trans-situational goals that are desired, which vary in importance, which act as guiding principles in the life of a person or social entity. Therefore, environmental values are attitudes or perceptions that act as guiding principles in one's life about environmental issues. People who work, live and have businesses in the community (—stakeholders)) have a common interest in protecting their shared environment and quality of life. The defining element of community-based ecosystem protection is that these people work together to develop plans and goals.

Environmental awareness can be broadly defined as the attitude towards the environmental consequences of human behavior. Starting with the common attitude definition environmental awareness is a predisposition to respond in a certain way to environmental concerns (Culiberg and Rojsek, 2008). One of the main social goals which has always reached unknown levels of social and political consensus, is managing and increasing the general level of environmental awareness on all levels of society. Considering that only the items that can be measured can actually be managed it is becoming increasingly important for researchers working in different fields to quantify environmental awareness based on scientific criteria.

### **Methodology**

For this study, the sampling technique that has been used is one of the non-probability techniques which is convenience sampling technique. The convenience sampling technique refers to the collection of information from members of the population who are conveniently available to provide it (Sekaran and Bougie, 2013). In convenience sampling technique, the members of the population who are conveniently available to provide information are selected. Furthermore, convenience sampling techniques provides the best way of getting information quickly and efficiently. The respondents of this study were made up of various people, including students, locals, visitors, academicians, professional and others in District of Setiu, Terengganu. The questionnaire used as the primary instrument to obtain data for this study. The data were analyzed descriptively based on frequency, percentage and mean to determine the level of awareness of respondents regarding the environmental attitude on Setiu Wetlands.

A survey test checklist was facilitated by the researchers on the respondent to determine the level of environmental awareness among the public on Setiu Wetlands, Terengganu. Instructions were carefully read and explained. They were asked to check the items containing the different situations in awareness by using Likert Scale. They chose from **Strongly Disagree, Disagree, Moderate, Agree, and Strongly Agree**. The Likert scale or Likert scale, named after its inventor, the American social scientist Rensis Likert, is a typically ordinary type of psychometric rating scale used to capture attitudes within a range of agreement-disagreement. Thus, the Likert scale is the sum of responses to several Likert options.

### **Research Instrument**

The instruments in this study were an approved survey questionnaire that measured environmental awareness level among public on Setiu Wetlands in Terengganu. These are adapted and modified from the various studies that seemingly related to the present one. The survey instrument used for data collection in this study was a set of questionnaires.

The questionnaire used was modified from several studies conducted by other researchers in the same area. The questions of the research are divided in 4 sections. In section A, the questions were about the demography of respondents such as age, gender, race and ethnicity, education level, job, and how many years lived in Terengganu. These questions were aimed at capturing a clear understanding of the sample involved in this study. Section B consisted of items in understanding wetlands background, which covered definition, function, values and the importance of wetlands. Section C, consisted of questions issues in conservation and management of wetlands. The last section in the questionnaire, Section D for environmental attitude using New Ecological Paradigm (NEP) scale according to Dunlap, *et. al.*, (2000).

### **Factor Analysis**

Factor analysis was used to determine whether the items are measuring the same construct. According to Coakes *et. al.*, (2010), factor analysis is also used to reduce large number of items in a construct that summarizes the essential items in the variables. To reduce a large number of items in a construct that summarizes the essential items in the variables, factor analysis was conducted. Besides, this method was also used to identify the underlying structures and dimensions that may be available among the independent, dependent and moderating variables. For the purpose of the study, Principal Component Factor Analysis with varimax rotation was utilized to identify the underlying structures or dimensions in the dependent and independent variables in this study.

In performing the factor analysis, some statistical values are required to be tested and analyzed in order to decide the suitability of the items as analyzed factor. In conducting the research at hand, several analyses were performed on the values of a Measure of Sampling Adequacy (MSA), the Kaiser – Mayer – Olkin (KMO) as well as Bartlett's test of Sphericity. All of these values are essential in conducting factor analysis. The MSA value for individual items was set to be above .50 and the KMO (overall items) values to be above 0.60 (Hair *et al.*, 2010). The Bartlett's test of Sphericity was observed to detect the presence of significant correlations among variables. It was appropriated to proceed with the factor analysis if the value of the test was large and significant ( $p < 0.05$ ) (Hair *et al.*, 2010). Anti-image correlation was conducted to identify the correlation and it must be greater than 0.50.

Factor analysis was conducted separately with regards to the independent variable which was wetland background and wetland issues. The dependent variable was environmental awareness. The criterion used to find out the number of factors to be extracted was the absolute magnitude of the eigenvalue of factors that was greater than one criterion (Hair *et. al.*, 2010). Table 4.10 below shows factor loading for the rotated factors of independent variable which is wetland background and wetland issues.

### **Results**

By using descriptive statistic, all means and standard deviation were computed for the dimensions of environmental awareness. Environmental awareness consists of 12 questions and using a Likert scale of 1 to 5 (strongly disagree to strongly agree). Furthermore, Best's Principle by Thaoprom (2004) was referred to in order to interpret the scores for environmental awareness. The minimum-maximum scores were divided by three ranges of the score which were low scores (1.00 – 2.33), average scores (2.34 – 3.67) and high scores



(3.68 – 5.00). Table 4.15 shows the Guidelines on the Interpretation of High Score Based on Best's Principle by Thaoprom (2004).

Table 1 : Level of Environmental Awareness

Variables	N	Mean	Std. Deviation	Level
Environmental Awareness	500	3.9040	.69951	High

#### *Level of Environmental Awareness*

Based on the result display in the Table 1 above, the level of the Environmental Awareness among the public people towards Setiu Wetland can be considered as high scores. The mean scores for environmental awareness was 3.9040. Other than that, for the terms of Standard Deviation, the environmental awareness among the respondents established the scores of 0.69951. The interpretation of scores for environmental awareness in the form of the average score that is based on Best Principles (Thaoprom, 2004) which indicates mean scores between 3.68 to 5.00 as possessed high satisfaction level. Therefore, it can be concluded that the environmental awareness among respondents were high on Setiu Wetland.

The Pearson Correlation Coefficient was applied to determine the relationship between the wetland background and wetland issues towards environmental awareness among public people on Setiu Wetland. Therefore, the finding from this analysis was used in order to determine whether the hypotheses of the study could be accepted or rejected. In addition, the researcher used correlation coefficient to determine whether the relationship was small, medium or large with negative or positive association. Cohen (1988) provides a guideline to explain the strength of the relationship of the variables in terms of the value of Pearson Correlation ( $r$ ) and the direction of the relationship for the variables used in the study to understand the relationship of wetland background and wetland issues towards environmental awareness among public people on Setiu Wetland. The guideline on the interpretation of correlation coefficient by Cohen's (1988) was distributed into three sections as stated in table 4.17 below. The result of the correlation is shown in the Table 2 below.

Table 2 : Summary of Wetland Background, Wetland Issues and Environmental Awareness

	1	2	3	4	5	6	7
Wetland Background	1						
Wetland Issues	.699**	1					
Environmental Awareness	.646**	.684**	1				

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Table 3 : Correlation Analysis between Wetlands Background and Environmental Awareness

		Wetland Background	Environmental Awareness
Wetland Background	Pearson Correlation	1	.646**
	Sig. (2-tailed)		.000
	N	500	500
Environmental Awareness	Pearson Correlation	.646**	1
	Sig. (2-tailed)	.000	
	N	500	500

As shown in Table 3, the correlation analysis between wetland background and environmental awareness indicates a positive relationship between the two. The finding marks that there is a relationship between wetland background and environmental awareness ( $r=.646$ ,  $p<.01$ ).

Table 4 : Correlation Analysis between Wetlands Issues and Environmental Awareness

		Wetland Issues	Environmental Awareness
Wetland Issues	Pearson Correlation	1	.684**
	Sig. (2-tailed)		.000
	N	500	500
Environmental Awareness	Pearson Correlation	.684**	1
	Sig. (2-tailed)	.000	
	N	500	500

As shown in Table 4 above, the correlation analysis between the wetland issues and environmental awareness indicates a positive relationship between the two. The finding marks that there is a relationship between wetland issues and environmental awareness ( $r=.684$ ,  $p<.01$ ).

### Conclusion

In order to find out the level of environmental awareness among public people towards Setiu wetlands, Terengganu, the method of Descriptive Statistic which comprised the mean and standard deviation scores was applied to answer the first research question that had been developed. The method was used for the dimensions of environmental awareness which are using NEP Scale by Dunlap, et.al., 2000. The scale of the scores must be interpreted by using the Best's Principal where the scores were divided into three range such as low, medium and high that was  $6-1/3=1.67$  (Thaoprom, 2004). Based on the findings, the environmental awareness level among public people towards Setiu wetlands, Terengganu could be considered in the high scores level because the mean score was more than the average score, which was 3.9040 (scores 3.68 – 5.00 is considered as high scores). Meanwhile, with regards to the standard deviation, environmental awareness indicated the scores of 0.699. Based on the result display, the level of the environmental awareness among the public people towards Setiu Wetland can be considered as having a high level of awareness towards Setiu Wetlands in the scope of knowledge wetland background, wetland issues and environmental attitude. For future research, it is highly recommend to add moderating effects to know the effect of this relationship when using moderating effects such as age, seniority and others since this study merely focused on direct relationship only between wetland background, wetland issues and environmental awareness

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