農業工程學報　第 60 卷第 4 期
中華民國 103 年 12 月出版

Journal of Taiwan Agricultural Engineering
Vol. 60, No. 4, December 2014

從遊客的觀點探討濕地環境保護
—以中都濕地為例

Wetland Environment Preservation from the Perspective of Visitors to Chong-Du Wetland

樹德科技大學
休閒與觀光管理系
副教授

楊 翰 宗*

Han-Chung Yang

摘　要

現今人們也已逐漸考慮把濕地當作生態旅遊的地方。然而，在地球的生物多樣性生態系統中，濕地是一個具有豐富生產力的地方。由於濕地是一個充滿飽和水分的地方，其範圍可說相當廣泛，亦相當適合於稀有、珍貴且瀕危的水鳥棲息和水生植物的生長。生態環境的永續發展強調，自然生態和開發利用之間的平衡，以維持生態系統的完整性與再生能力。因而，本研究以永續發展之理念為基礎，藉由探討濕地的發展潛力，同時瞭解遊客對於濕地公園的生態環境、生態旅遊與永續發展的認知。因此，研究中對於到訪濕地公園範圍內的遊客進行問卷調查，而問卷調查的方式採用便利抽樣法。期望本研究成果能瞭解遊客對於濕地生態環境的認知，以及濕地永續發展的認知和生態旅遊的認知，藉此可將該些結果提供有關單位做為促進濕地自然保護和永續發展理念的參考基礎。

關鍵詞：濕地，問卷，生態旅遊。

ABSTRACT

Currently, people are gradually considering wetlands as an ecotourism destination. A wetland is one of the productive places for biodiversity in ecosystem on the earth. Because wetlands are saturated with water, the scope of application is wide; it is a suitable habitat for rare and endangered aquatic birds and plants. The sustainable development of ecology emphasizes the balance between the use of the natural environment and development to maintain the integrity of the ecosystem and the ability to

*通訊作者，樹德科技大學休閒與觀光管理系副教授，82445 高雄市燕巢區橫山路 59 號，hcyang@stu.edu.tw

regenerate. In this study, we adopted the notion of sustainable development as the foundation of a discussion on wetland development potential, wetland environment, ecotourism, and sustainable development of a wetland park. Therefore, we administered a survey to tourists who visited a wetland park area. The questionnaire applied a convenience sampling method. The results can facilitate further understanding of tourist perspectives regarding wetlands as well as their knowledge regarding the sustainable development of wetlands and ecotourism. The results also indicate appropriate methods of promoting the conservation of wetlands and the concept of sustainable development.

Keywords: Wetland, Questionnaire, Ecotourism.

I. Introduction

Taiwan was formerly known as Formosa, the island of beauty, because it constitutes a series of beautiful mountains (Clarke, 2009; Lay *et al*., 2010). However, in recent years, the preservation of nature has been neglected in favor of economic development, such as building factories and roads. Environmental destruction and pollution has led to severe problems such as the gradual reduction of plant and animal species, decreases in forest and water resources, and landslides and subsidence phenomena, thus affecting sustainable development.

Wetlands are gradually reducing because of factors such as terrain change, land loss, river pollution, accumulation of waste in water lines, and gravel cleared for farming, landfills, and waste dumps (Cao and Fox, 2009; Vymazal and Kröpfelová, 2011; Zheng *et al*., 2012; Khusrul *et al*., 2013). In addition, the demand for land and economic development has rendered wetlands worthless. Hence, the development of projects continues to increase and the development methods use only the external values of the lands. This has led to several ecological and environmental problems. Wetlands in Taiwan feature rich biological resources, rare species of plants and animals, and winter migratory birds. Therefore, they offer a tourism and recreation resources, which is a vital condition for the development of ecotourism. Chiau (1999) observed that the protection and management of Taiwan's wetlands remains in the initial phase. A community building event in the 90's created social awareness of environmental preservation. In addition, ecotourism became a topic of discussion and wetlands were officially introduced to the Taiwanese tourist industry, including the Chong-Du wetlands. A wetland is closely related to the life of people (Xie *et al*., 2010; Horwitz and Finlayson, 2011). The people protect the wetland environment are already the necessary things. Therefore, understanding the public view of wetland maintenance has also become critical, and these opinions can be used as indicators for the management of wetlands.

Currently, wetland areas are decreasing, whereas pollution and siltation of wetlands is increasing. Therefore, sustainable development and protection of wetlands is crucial for the development of local economies. The protection of the wetlands requires more input, particularly advocacy and education on wetlands (Cachelin *et al*., 2009). Chong-Du wetland is located downstream of Love River in Kaohsiung City, Taiwan (Figure 1). Love River formerly fed into a redwood swamp and wood storage river linked plywood factories. Hence, this unique wetland park was preserved by the Kaohsiung City

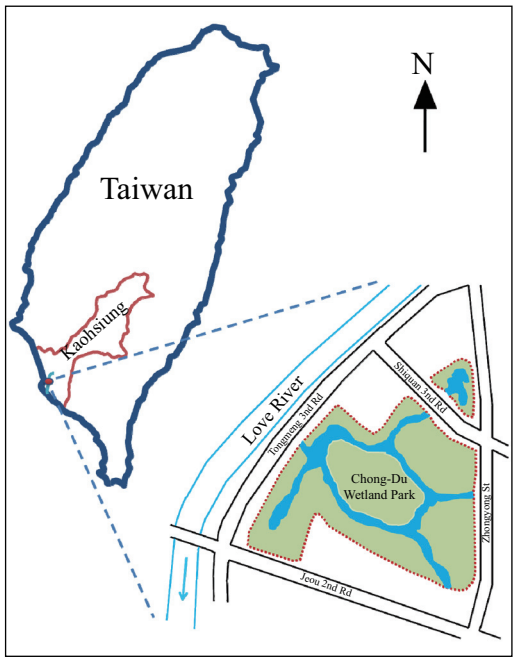


Figure 1. Chong-Du wetland sketch map.

government because of its nature environment as well as its industrial history. To preserve the environment, the park is equipped with low-light waterproof lamps and few man-made building and little use of concrete. No lighting equipment is used at the ecological island of Chong-Du wetland, making it ideal for watching sunsets. To protect the biological habitat and maintain biological diversity, the government executed a project for the restoration of a mangrove swamp and created a habitat for migratory birds, thereby transforming the wetland into an ecological classroom in an urban surrounding. Thus, this study's participants were visitors to Chong-Du Wetland Park. The objective was to understand the cognition of people for ecotourism and the sustainable development of wetlands. Questionnaires were administered in this study and the responses were analyzed using the SPSS software. The analysis of the responses assisted in elucidating visitors perceptions. The results of this study will be provided to other wetland parks as an ecological engineering reference and to improve the management of wetlands.

II. Literature Review

According to wetlands, sustainable development, ecotourism cognition, these related explanatory literature review carry out to provide the reference of the questionnaire designed.

2.1 Significance of Wetlands

In the global environment, wetlands play several roles and perform critical functions, such as flood control, flood regulation, water purification, shoreline protection, and the conservation of ecological, socioeconomic, and recreational value (Mitsch and Gosselink, 2007; Erwin, 2009; Davenport, 2010; Keddy, 2010; Wang *et al*., 2011). The value of wetlands can be combined with education, conservation, and sustainable use of resources as a basis for the development of ecotourism to promote economic development to continuously improve quality of life (Lu and Liu, 2010). If teachers from neighboring schools could use wetlands in outdoor teaching in addition to other effective teaching methods and materials, they could train students to develop a positive attitude toward the environment (Iozzi, 1989). The advantage of using wetlands as outdoor teaching sites is an increased environmental awareness for students, allowing them to develop positive environmental attitudes (Lisowski and Disinger, 1991). Baldwin (2001) indicated that any type of teaching method is proven to be more effective than wetlands ecology teaching.

2.2 Meaning of Sustainable Development

"Sustainable development" has now become a global concern for the public pursuit of ideals and goals including life, ecology, science and technology, education, and the economy. Attention is universally focused on sustainable development. The implementation of sustainable development

includes the three principles of fairness, sustainability, and commonality (Hsu *et al*., 2012). Three other factors, "environment," "economy," and "society," should also be considered, because these factors are interdependent and mutually affect each other (Kumah, 2006). The final state of sustainable development is sustaining and maintaining the three factors (Young, 1992). Braat (1991) proposed that the economic ecosystem infrastructure aimed toward maximum benefits should be ecologically sustainable. Fairness, sustainability, and commonality are required to pursue economic development and sustainable development, and attain social equity. In summary, because the aforementioned experts and scholars exhibit various backgrounds and were published at various times, perspectives on sustainable development vary; however, sustainable development is generally defined using the premise of "seeking a method to increase the benefits of contemporary people, but without reducing the benefits of future generations."

2.3 Meaning of Ecotourism

The concept of ecotourism originated from the awakening of humans to environmental ethics in the 1960s and 1970s. Certain U.S. national parks and protected areas were serious impact. People started rethinking the coexistence of wildlife and outdoor recreation. Hetzer (1965) was one of the first scholars to propose the term ecotourism (Dolnicar *et al*., 2013). He proposed four criteria for ecotourism: (a) minimizing the impact of the local culture and environment, (b) using local resources or cultures to produce the greatest economic benefit, (c) minimizing the effect of local tourist destinations on the ecosystem, and (d) achieving complete satisfaction of visitors. Kutay (1989) indicated that ecotourism is another tourism development mode (Weaver, 1999). In selected natural area, we need to guide the visitors to understand the local culture, planning a recreation place and providing recreation biological resources to achieve in-depth understanding and experience, and mark it with neighboring areas of socioeconomic links. Honey (2008) outlined an analytical framework comprising the following seven characteristics of ecotourism: (a) tourism of the natural environment, (b) minimization of the effect on the environmental, (c) cognition of the environment, (d) financial benefits and rights for local people, (e) conservation by fund, (f) respect for the local culture, and (g) support of human rights and democratic development. Based on these studies, the meaning of ecotourism can be expressed as a form of tourism in natural areas, emphasizing the concept of ecological conservation and sustainable development as the ultimate goal. Ecotourism has been internationally implemented for many years. In Taiwan, ecotourism was implemented in 2002, and the perception of ecotourism is generally vague. A clearer understanding of ecotourism would be helpful in achieving more effective implementation.

2.4 Meaning of Cognition

Reed (2007) stated cognition as a body receiving a stimulus through external means, and then forming perception and recognition based on the message in an inherently continuous process. Cognition is personal knowledge, personal understanding, personal awareness, and personal views, comprising perception, imagination, reasoning, and judgment (Weber, 1991; Marewski, 2010). In summary, cognition is an individual's senses, through which they receive messages or stimulation that are processed through reflection. Cognition is also based on various views in different levels, angles, and definitions.

III. Research Methods

According to the literature review in this study, cognition of wetlands, ecotourism, and sustainable development were defined as tourist knowledge and views of wetlands, ecotourism, and sustainable development. The research

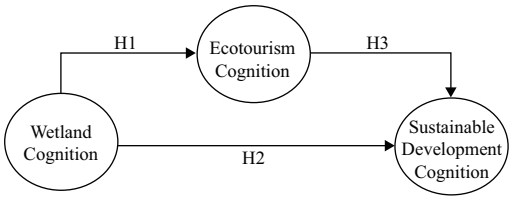


Figure 2. Research construction.

construction is presented in Figure 2. According to Figure 2, the research supposition is set up respectively as follows:

Hypothesis 1: Varying wetland cognition exerts a remarkable influence on ecotourism cognition.

Hypothesis 2: Varying wetland cognition exerts a remarkable influence on sustainable development cognition.

Hypothesis 3: Varying ecotourism cognition exerts a remarkable influence on sustainable development cognition.

The participants in this study were visitors to Chong-Du Wetland Park in Kaohsiung City. The research tool was a questionnaire and a 5-point Likert scale was used to analyse scores. In addition, a convenience sampling method was adopted for administering questionnaires. The first part of the questionnaire, regarding wetlands cognition, comprised the following 10 statements: (1) Maintenance of the wetland environment will contribute to ecological conservation; (2) The wetlands are a type of limited natural resource, if they are damaged, they will be difficult to repair; (3) The wetlands have many functions such as flood control, water storage, groundwater recharge, and water purification; (4) Damage to the wetlands will reduce the value of ecotourism; (5) Destruction to the wetlands will exert no effect on nature and the environment; (6) Establishing of wetland areas is helpful to wildlife survival; (7) Wetlands have abundant natural ecological resources that suit educational or leisure venues; (8) Wetlands are places where humans and wildlife coexist; (9) Wetlands provide a habitat and feeding environment for the survival of wildlife; and (10) We can allow wetlands to be converted for other purposes to support economic growth. The second part of the questionnaire, regarding ecotourism cognition, comprised the following 10 statements: (1) Ecotourism has an environmental education function; (2) Ecotourism areas must limit the number of tourists; (3) Ecotourism should have fewer tourist groups; (4) Ecotourism is a type of educational travel; (5) Ecotourism can help visitors to understand the local natural landscape; (6) We must hire local people as ecotourism guides; (7) Tourists can learn more about ecotourism and enhance the recreational experience by exposition; (8) In the narrator interpretation, the inappropriate behavior of visitors can be reduced; (9) Government and private conservation groups should play the role of a strict supervisor; and (10) Ecotourism should not involve disturbing the wildlife and destroying the environment. The third part of the questionnaire, regarding sustainable development cognition, comprised the following 10 statements: (1) A wetland park should use employ a narrator to provide interpretation services; (2) A wetland park should promote a natural experience; (3) A wetland park's development should maintain the natural landscape and ecological environment; (4) A wetland park should use a lot of hardware facilities to attract tourists; (5) A wetland park should provide visitors with recreational activities that have low environmental impact; (6) The profits earned by wetland parks should be used for conservation work; (7) If there is insufficient funding, protecting wetland wildlife is unnecessary; (8) If wetland resources are destroyed, restoring them is difficult, regardless of funds; (9) Natural areas should be engaged in static activities to reduce the interference of wildlife; and (10) Local governments should promote environmental protection methods such as waste water treatment, waste reduction, and recycling. Personal background information was requested in the final section.

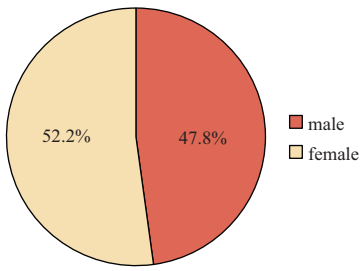
During the pretest, 30 questionnaires were administered, all of which were completed and returned and the number of invalid response was zero. After a reliability analysis, Cronbach's α was applied for the questions after the pretest. Depending on the data obtained, the α value of the wetland cognition ranged between 0.775 and 0.814 and the overall coefficient reached 0.809; the α value of ecotourism cognition ranged between 0.763 and 0.852 and the overall coefficient reached 0.813; and the α value of sustainable development cognition ranged between 0.639 and 0.781 and the overall coefficient reached 0.719. In this study, the questionnaire had a certain internal consistency and was reliable.

The final version of the questionnaire was administered to 400 people, and 400 questionnaires were returned; seven questionnaires were invalid, resulting in a total of 393 effective questionnaires and an effective returns-ratio of 98.25%. In this study, three methods were used to analyze the returned questionnaires. (a) Descriptive statistical analysis was used to understand the distribution of basic information. (b) An analysis of variance (ANOVA) was used to determine whether significant differences existed among "wetland cognition," "ecotourism cognition," and "sustainable development cognition." (c) Regression analysis was used to test the explanatory power of the entire structure, to determine whether the results were significant, and to analyze the effect of independent variables on the dependent variable.

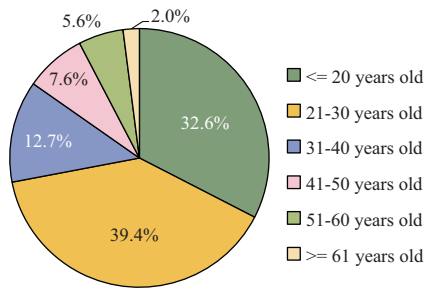
IV. Research Results and Analysis

Figure 3 shows the results of the descriptive statistics analysis of the participants' background data. Of the 393 questionnaires administered, 205 questionnaires were responded to by women (52.2%) and 188 were responded to by men (47.8%). The distribution of age was between 21 and 30 years, accounting for 39.4% of all the participants, followed by 20 years, accounting for 32.6% of all the participants. The participants primarily came from Kaohsiung City, which accounted for 79.9% of the participants. Participants' in tertiary education institutions accounted for 65.9% and 49.4% of all participants were students. Participants visiting the wetland park for the first time accounted for 52.2% of all the participants. Participants obtained information regarding the wetlands from friends and colleagues, which accounted for 35.4% of all participants. The participants visiting the wetland park with the goal of experiencing a natural landscape was the highest, accounting for 31.6% of the participants. Participants who answered "No" when asked whether they participated in nature conservation associations accounted for 96.2% of all the participants. Participants who answered "No" when asked whether they participated in sustainable development related studies accounted for 79.1% of the participants. Participants who answered "No" when asked whether they participated in ecotourism related studies accounted for 64.9% of the participants. Participants who answered "Yes" when asked whether they had heard of ecotourism accounted for 84.9% of the participants. Participants who answered "Yes" when asked whether they had heard of sustainable development accounted for 88.8% of the participants.

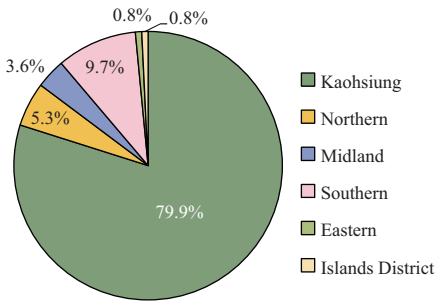
Table 1 indicates that participants with various educational degrees exhibited no significant differences for various variables. Currently, the schools and the government have begun promoting related subjects, and therefore participants with various degrees of education can understand related concepts and perception. Table 2 shows that participants of various ages exhibited had no significant differences for various variables. Currently, primary schools have begun teaching subjects related to sustainable development, the environment. The government is also actively promoting these topics, thus reducing the differences in the cognition of people of various ages.



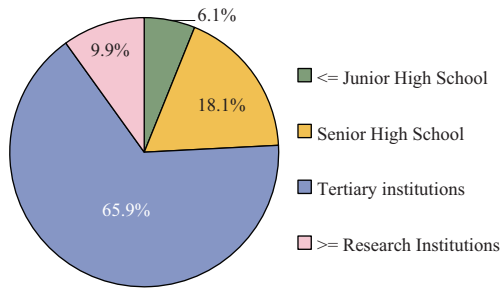
(a) Sex



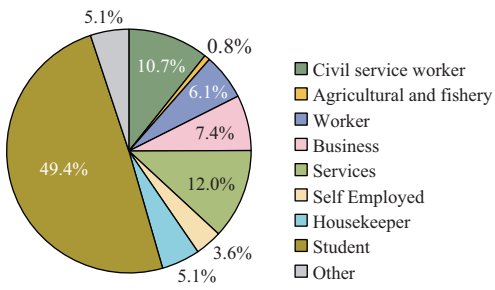
(b) Age



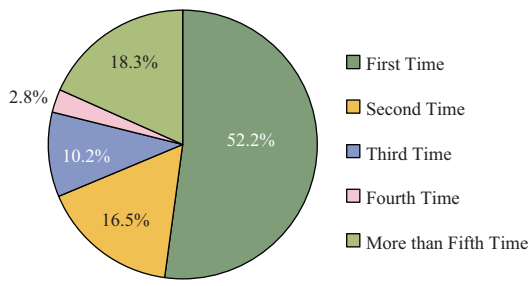
(c) Residence



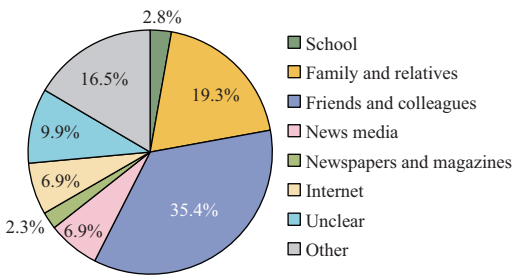
(d) Education level



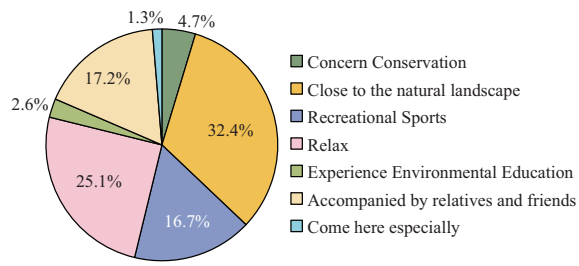
(e) Career



(f) How many times have you been here?

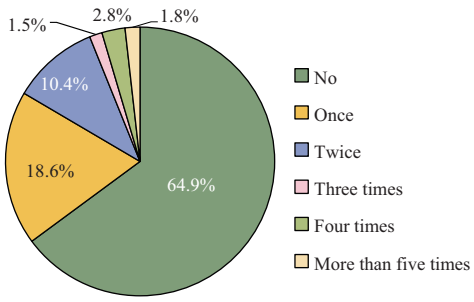


(g) Where are you known wetland informations from?

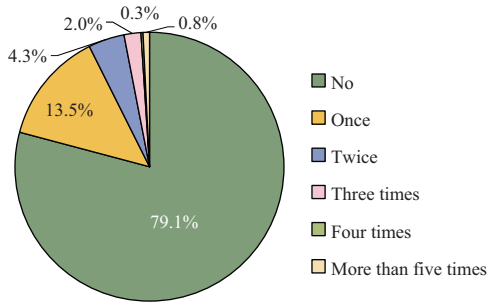


(h) What is your main goal arrival at here?

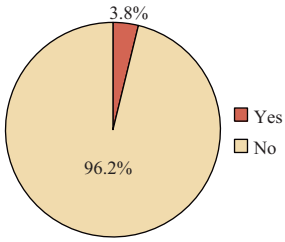
Figure 3. The descriptive statistics analysis of personal basic background material.



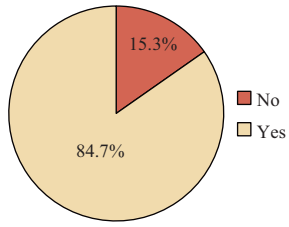
(i) Have you participated in ecotourism?



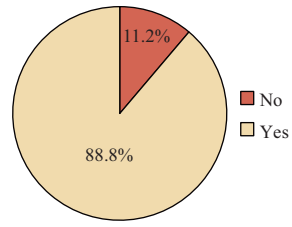
(j) Have you participated in sustainable development activities?



(k) Have you participated in nature conservation groups?



(l) Have you heard about the Ecotourism?



(m) Have you heard about the sustainable development?

Figure 3. (Continued)

Table 1. The relationship between education degree, wetland cognition, ecotourism cognition and sustainable development cognition.

		Sum of Squares	df	Mean Square	F	Sig
Wetland cognition	Between Groups	1.436	3	.479	2.430	.065
	Within Groups	76.647	389	.197		
	Total	78.083	392			
Ecotourism cognition	Between Groups	1.427	3	.476	2.067	.104
	Within Groups	89.536	389	.230		
	Total	90.963	392			
Sustainable development cognition	Between Groups	.323	3	.108	.605	.612
	Within Groups	69.172	389	.178		
	Total	69.495	392			

Table 2. The relationship between ages, wetland cognition, ecotourism cognition and sustainable development cognition.

		Sum of Squares	df	Mean Square	F	Sig
Wetland cognition	Between Groups	1.555	5	.311	1.573	.167
	Within Groups	766.528	387	.198		
	Total	78.083	392			
Ecotourism cognition	Between Groups	1.995	5	.399	1.735	.125
	Within Groups	88.969	387	.230		
	Total	90.963	392			
Sustainable development cognition	Between Groups	.914	5	.183	1.031	.399
	Within Groups	68.581	387	.177		
	Total	69.495	392			

Table 3. The relationship between the number of participated in ecotourism study activities and ecotourism cognition.

Ecotourism cognition	Sum of Squares	df	Mean Square	F	Sig
Between Groups	2.912	5	.582	2.559	.027
Within Groups	88.052	387	.228		
Total	90.963	392			

Table 4. The relationship between the number of participated in sustainable development study activities and sustainable development cognition.

Sustainable development cognition	Sum of Squares	df	Mean Square	F	Sig
Between Groups	.612	5	.122	.688	.633
Within Groups	68.883	387	.178		
Total	69.495	392			

Table 5. The relationship between different level of wetland cognition and ecotourism cognition.

Ecotourism cognition	Sum of Squares	df	Mean Square	F	Sig
Between Groups	38.072	18	2.115	14.956	.000
Within Groups	52.891	374	.141		
Total	90.963	392			

Table 6. The relationship between different level of wetland cognition and sustainable development cognition.

Sustainable development cognition	Sum of Squares	df	Mean Square	F	Sig
Between Groups	28.107	18	1.561	14.110	.000
Within Groups	41.388	374	.111		
Total	69.495	392			

Table 3 indicates that the participants who participated in ecotourism related activities differed significantly in ecotourism cognition. The Scheffe posthoc test results indicated that participants who had engaged in ecotourism related learning activities as many as five times scored higher on the cognitive level in comparison with those who had never engaged or had engaged up to four times in these activities. The participants involved in several ecotourism related activities perceived ecotourism differently. Table 4 lists that the participants who did not participate in sustainable development related learning activities, indicating that sustainable development cognition did not differ significantly. Hence, we can speculate that sustainable development might be too broad and esoteric an issue for people involved in learning activities to understand.

Table 5 presents the results of the participants' level of cognition regarding wetlands and ecotourism. As shown in the ANOVA summary chart in Table 5, the scores reached a significant level ($F = 14.956$, $p = < .05$). Therefore, the participants' wetland cognition and ecotourism cognition differed significantly. Table 6 indicates a significant influence on participants regarding wetlands cognition and sustainable development cognition. The ANOVA summary chart in Table 6 indicates that scores reached a significant level ($F = 14.956$, $p = < .05$).

Table 7 indicates that wetlands cognition

Table 7. The regression analysis of wetland cognition, ecotourism cognition and sustainable development cognition.

	β	R^2	Adj R^2	t	F	Sig
Wetland cognition to sustainable development cognition	0.611	0.374	0.372	15.268	233.116	0.000
Wetland cognition to ecotourism cognition	0.626	0.391	0.390	15.858	251.472	0.000
Ecotourism cognition to sustainable Development cognition	0.674	0.455	0.453	18.053	325.898	0.000

Table 8. Research Hypotheses validation.

Research hypotheses	Validation result
Hypothesis 1: Varying wetland cognition exerts a remarkable influence on ecotourism cognition.	set up
Hypothesis 2: Varying wetland cognition exerts a remarkable influence on sustainable development cognition.	set up
Hypothesis 3: Varying ecotourism cognition exerts a remarkable influence on sustainable development cognition.	Set up

exerted a significant influence on sustainable development cognition, standardized beta value of 0.611, $p < .001$, achieved significance, the R^2 (coefficient of determination) explained to 0.374. Conversely, when the participants' cognition regarding wetland environment was high, their sustainable development cognition increased, and vice versa. Conversely, when the wetland environment cognition was low, sustainable development cognition was also low. Table 7 indicates that wetland cognition and ecotourism cognition significantly influenced each other (β = 0.626, $p < .001$), indicating that the data reached a significant level. The R^2 explained variance of 0.391 indicated that when the participants' wetland cognition as high, ecotourism cognition was also high. Conversely, when the participants' wetland cognition was low, ecotourism cognition was also low. The analysis results in Table 7 reveal that ecotourism cognition affects sustainable development cognition. Table 7 indicates that ecotourism cognition and sustainable development cognition significantly influence each other (β = 0.674, $p < .001$). The R^2 explained variance of 0.455 indicates that when public ecotourism cognition is high, sustainable development cognition is also high. Conversely, when public ecotourism cognition is low, sustainable development cognition is also low. The results of the analysis were compiled in Table 8 to verify the research hypotheses.

V. Conclusion and Suggestion

This research was conducted in accordance with the theory of discussion and the empirical analysis of the results provides a critical reference for relevant studies on both the wetland park governance and related research.

People in higher education institutions, such as universities, colleges, and research institutes, exhibited higher wetlands cognition and sustainable development cognition. However, degree of education was not a substantive influence on the various forms of cognition. The results also explained that the participants were all concerned about the topics raised in this study and were aware of the basic concepts of sustainable development. People who visit wetland parks for the first time come in this field territory and most people have the same preference for being close to nature. The final analysis results revealed that people cognition of wetland ecotourism and sustainable development significantly influence each other. People cognition of ecotourism and sustainable development exert a significant influence, thus supporting the H1–H3.

Suggestions from related associations, such as nature conservation groups and the Wild Bird

Association of Taiwan, can reinforce ecotourism activities in the future and seminars on issues related to sustainable development could be helpful people in raising cognition. People might not be able to learn through traditional learning activities; therefore, the Wild Bird Association can use example stories to inform people about sustainable development. Wetland parks can employ interpretive guides and voluntary groups to educate people about wetlands. Ecotourism and guided tours can facilitate new experiences and enable people to obtain new cognition regarding wetlands, ecotourism, and sustainable development.

Acknowledgements

In this study, we are grateful to Benneth Shu and Cheng-Chih Chen assist in the research.

References

Baldwin, A. H. (2001). Got Mud? Field-based Learning in Wetland Ecology. *Journal of College Science Teaching*, 31(2), 94-100.

Braat, L. (1991). The predictive meaning of sustainability indicators. *In search of indicators of sustainable development* (pp. 57-70). Springer Netherlands.

Clarke, B. (2009). Among the headhunters: Janet McGovern and anthropology in Taiwan. *Studies in Travel Writing*, 13(3), 251-270.

Cachelin, A., Paisley, K., & Blanchard, A. (2009). Using the significant life experience framework to inform program evaluation: The nature conservancy's wings & water wetlands education program. *The Journal of Environmental Education*, 40(2), 2-14.

Cao, L., & Fox, A. D. (2009). Birds and people both depend on China's wetlands. Nature, 460(7252), 173-173.

Chiau, Wen-Yan. (1999). The Ecology Education of Taiwan Wetland Environment. *Environmental education quarterly*, 39: 23-32.

Davenport, M. A., Bridges, C. A., Mangun, J. C., Carver, A. D., Williard, K. W., & Jones, E. O. (2010). Building local community commitment to wetlands restoration: A case study of the Cache River Wetlands in Southern Illinois, USA. *Environmental management*, 45(4), 711-722.

Dolnicar, S., Yanamandram, V., & Juvan, E. (2013). Ecotourists: who are they and what should we really call them?. *International Handbook on Ecotourism*, 95.

Erwin, K. L. (2009). Wetlands and global climate change: the role of wetland restoration in a changing world. *Wetlands Ecology and Management*, 17(1), 71-84.

Hetzer, N. D. (1965). Environment, tourism, culture. Links(July): Reprint in Ecosphere (1970), 1(2), 1-3.

Honey, M. (2008). *Ecotourism and Sustainable Development: Who Owns Paradise?* 2nd ed. Washington, DC: Island press. 55.

Horwitz, P., & Finlayson, C. M. (2011). Wetlands as settings for human health: incorporating ecosystem services and health impact assessment into water resource management. *BioScience*, 61(9), 678-688.

Hsu, M. Y., Guan, S. S., & Tu, J. C. (2012). A Culture without Trash: The Strategy of Green Design Development in Museum Exhibitions. *Design for Innovative Value Towards a Sustainable Society*, 468-472.

Iozzi, L. A. (1989). What research says to the educator Part one: Environmental education and the affective domain. *The Journal of Environmental Education*, 20(3): 3-9.

Keddy, P. A. (2010). *Wetland ecology: principles and conservation*. Cambridge University Press.

Khusrul Amin, A. K. M., Haque, M. A., & Alamgir, M. (2013). Analysis of the Wetland Degradation around the Vicinity of Dhaka City in Bangladesh. *Asian Journal of Water, Environment and Pollution*, 10(2), 19-26.

Kumah, A. (2006). Sustainability and gold mining in the developing world. *Journal of Cleaner Production*, 14(3), 315-323.

Kutay, K., 1989, The new ethic in adventure travel, *Buzzworm: The Environmental Journal*, 1 (4): 31-36.

Lay, J. G., Chen, Y. W., & Yap, K. H. (2010). Geographic reality versus imagination in Taiwan's historical maps. *The Cartographic Journal*, 47(2), 180-189.

Lisowski, M., & Disinger, J. F. (1991). The effect of field-based instruction on student understandings of ecological concepts. *The Journal of Environmental Education*, 23(1), 19-23.

Logan, G. D., & Gordon, R. D. (2001). Executive control of visual attention in dual-task situations. *Psychological review*, 108(2), 393.

Lu, J. S., & Liu, Y. (2010). Evaluation on exploitation potential of ecotourism resources of wetlands in Yellow River Delta. *Wetland Science*, 8(4), 339-346.

Neisser, U. (1967), *Cognitive psychology*. New York: Appleton-Century-Crofts.

Marewski, J. N., Gaissmaier, W., & Gigerenzer, G. (2010). Good judgments do not require complex cognition. *Cognitive processing*, 11(2), 103-121.

Mitsch, W. J. and Gosselink, J. G. (2007) *Wetlands*. John Wiley & Sons, Inc., New York, USA.

Reed, S. K. (2007). *Cognition: Theory and applications*. CengageBrain. com.

Vymazal, J., & Kröpfelová, L. (2011). A three-stage experimental constructed wetland for treatment of domestic sewage: First 2 years of operation. *Ecological Engineering*, 37(1), 90-98.

Wang, Z., Song, K., Ma, W., Ren, C., Zhang, B., Liu, D., Chen, J. M., Song, C. (2011). Loss and fragmentation of marshes in the Sanjiang Plain, Northeast China, 1954-2005. *Wetlands*, 31(5), 945-954.

Weber, S. (1991). *Return to Freud: Jacques Lacan's dislocation of psychoanalysis*. p. 160. Cambridge: Cambridge University Press, UK.

Weaver, D. B. (1999). Magnitude of ecotourism in Costa Rica and Kenya. *Annals of Tourism Research*, 26(4), 792-816.

Xie, Z., Xu, X., & Yan, L. (2010). Analyzing qualitative and quantitative changes in coastal wetland associated to the effects of natural and anthropogenic factors in a part of Tianjin, China. *Estuarine, Coastal and Shelf Science*, 86(3), 379-386.

Young, M. D. 1992, *Sustainable Investment and Resource Use: Equity, Environmental Integrity and Economic Efficiency*.

Zheng, Y., Zhang, H., Niu, Z., & Gong, P. (2012). Protection efficacy of national wetland reserves in China. *Chinese Science Bulletin*, 57(10), 1116-1134.

Ziffer, K. (1989). *Ecotourism: The uneasy Alliance*. Working Paper No. 1, Conservation International, Washington, DC.

收稿日期：民國 103 年 1 月 17 日
修正日期：民國 103 年 4 月 15 日
接受日期：民國 103 年 4 月 26 日