

A Study on Riparian Forests of Idle Land to Build Design Using the IPA Strategy

Sang Hyun Choi¹ and Jong Choon Woo^{2,*}

¹Department of Forest Management, Graduate School, Kangwon National University, Chuncheon 24341, Republic of Korea

²Program of Forest Management Division of Forest Science, Kangwon National University, Chuncheon 24341, Republic of Korea

Abstract

In this study 'forest design in waterside unused land' of 'waterside area' in the specificity that multilateral, including landscape, recreation, social and environmental aspects in the space, taking into account by multiple factors :Raise 'practicality' than a functional management and police to hang out with, each element is usually way to improve the beauty. There is currently carried out waterside green area creation, which is artificial plantation and open spaces only emphasizing 'landscape' with lacking multi-function purpose, as a 'forest design in waterside unused land' strategy but it should be lowered by performance in this strategy. And the study suggested a strategy which prepared cultural and social infrastructure to be able to attract different fund and build local character as an alternative demand plan considered environmental character as a top priority.

Key Words: waterside idle land, forest design, riparian zone, IPA, META

Introduction

The four-river project is multipurpose, one of the government's policy but started in the aim to adapt to climate change. Certainly, it should have carried out the project considered as top issued topic, climate change, the focus of international response as an issue, and current national position. However many problems appeared since project has been a lot of progress. Most of the four river projects are worse than before environmentally due to artificial parts. Also, some of their change became quite an eyesore in the absence of continuous management. So the four-river project's main site the water's edge zone management of the importance has been gradually increasing. Accordingly, ecological soundness and rational management of aquatic areas for design needs to build a forest.

The target region of the study is waterside unused land near Lake Soyang. Han River is managed by the government support under Han River Water Management Law. However, from near Lake Soyang area is not the area supported by Han River Water Management Law, it is not supported by the government in reality. It is far from enough to manage waterside area via local governmental budget. For this reason, waterside area has become unused land, and it has brought environmental problems such as introducing pollution in waterside, muddy water and etc. used as illegal cultivation and desolation of land.

Therefore, this study tried to prepare the concept of 'Forest Design', which is a sensible management solution and a strategy in general waterside green area composition issuing for near Lake Soyang area of becoming unused land.

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Corresponding author: Jong Choon Woo

Program of Forest Management Division of Forest Science, Kangwon National University, Gangwondaehak-gil, Chuncheon 24341, Republic of Korea
Tel: 82-33-250-8335, Fax: 82-33-259-5617, E-mail: jcwoo@kangwon.ac.kr

Materials and Methods

Study site

Uiamho from the Paldang Dam catchment area, region concerning study is the water system management, it belonged Gapyungsamhe-ri, Baegyang-ri section, and Yeojubo waterside park which was belong to four-river side project. Accordingly, the waterside unused land through its field survey data and to the site tried to understand. As previously mentioned, it can be activated with four types which are Nature Ecological restoration type, Open Spaces type composition, Aquatic park type composition, Type composition of the Water-front in Urban Theme Park as a big category dividing. That is consistent with the type of four specific Samhoe-ri, Gapyeong area has been restored natural habitat type field survey, by Open Spaces type composition, Earth and of Ecological Restoration. There was (Baegyang-ri, section) the water system management areas.

Yurim park in Daejeon was the type of Aquatic park, and yeojubo waterside park as a type composition of the Water-front in Urban Theme Park. The study researched local characteristics of strengths and weakness of each type of investigation through four areas.

Forest design

'Design' in the dictionary sense meaning 'utilitarian design and graphics to equip them with a pretty sight to stay'. Also Han (1999) mentioned "Design is derived from Latin word 'Designare' etymologically and 'designare' is the regularized form of, make a design of departure in the same sense of our thinking in my head."

'Forest design' is therefore the fundamental concept of 'design' 'by a little bit of which there can have with the beauty and practicality of the forest from the perspective of 'forest management' would be to ensure that definitions. This study has 'Forest design' into the aquatic: the idle land of scenery and ethical, environmental, social, recreation and so categorized as factors of forest going to present a design strategy.

META analysis

A meta analysis is a statistical overview of the results from one or more systematic review and it produces a weighted average of the included study results and this ap-

proach has several advantages as Qualitative research methods (Thacker 1988). Basically, Quantitative analysis of previous research results different literature research methods could be said that a generic term.

Meta analysis has been limited to random clinical trials research was conducted but Over the past 40 years targeted research, Meta analysis is a growing trend is looking up (such as Stroup group 1997). Meta analysis targeted at a program of observational research by diversity in study design and engagement that are embedded over diversity in a variety of research design shortcoming, too, but at the same time, Quantitative and understanding could synthesize the results in that it provides tools that he can find an advantage (Egger et al. 1998).

Accordingly, to derive the forest for the design of factors of the waterside unused land made classification and data collection for that keyword. The ten copies of each study has been researched for these keywords which were aquatic green, aquatic park, environmental design and unused land. And it's the appearance of high frequency of factors from. After, the total factor of 21 extract through a meta-analysis.

IPA analysis

IPA (Importance Performance Analysis) measures client satisfaction with a product or service. It examines not only the performance of an item, but also the importance of that item as a determining factor in satisfaction to the respondent. The combined client ratings for those two components then provide an overall view of satisfaction with clear directives for management (Hammitt, Bixer, Francis 1996).

IPA divides qualitative factors into two measures. The first is importance measure and the other is performance measure of attributes. Likewise, if it is evaluate two important attributes and it is applied to matrix as a result, it will make it able to recognize where the management can invest prior to improve performance, where the management overinvested, or where can sustain the situation. In particular, IPA has limited resources maximizes the performance measure with combinations in the distribution of resources that can be very much to the way be use. Also IPA is an analysis method focused on considering the client performance measure of certain enterprise or product. The IPA consists of a pair of coordinate axis where the 'import-

tance' (y-axis) and the 'performance' (x-axis) of the different elements involved in the service are compared. Each of the quadrants combines the importance and the performance assigned by the customers/user given element of the service and possesses a different value in terms of management and the respective mean of self-stated raw importance and attribute performance data is the original point of this IPA matrix (Martilla and James 1977). This study used IPA regarding the relevant factors to waterside space forest design (Fig. 1).

Results and Discussion

Result of META analysis

Since 2000, 21 factors have been analyzed to build waterside forest design through aquatic green, Unused Environ-

mental Design, aquatic park (Table 1).

With the above mentioned factors, it divided into landscape, environmental, social, recreation, etc based on surveys by forest experts and managers of waterside area.

The result after analysis, the results had divided 4 factors of landscape, 4 social factors, 4 recreation factors, 4 environmental factors, and 5 standard repetition factors. 4 factors has been established after emitting standard repetition factors (Table 2).

Result of IPA

In landscape standard, 'keep up factor' are not derived and in future supposed to concentration factor was a natural planting. The importance was low in 'open space type' and 'artificial type of planting' but the performance was high so it evaluated as a 'possible overkill' which means it needs

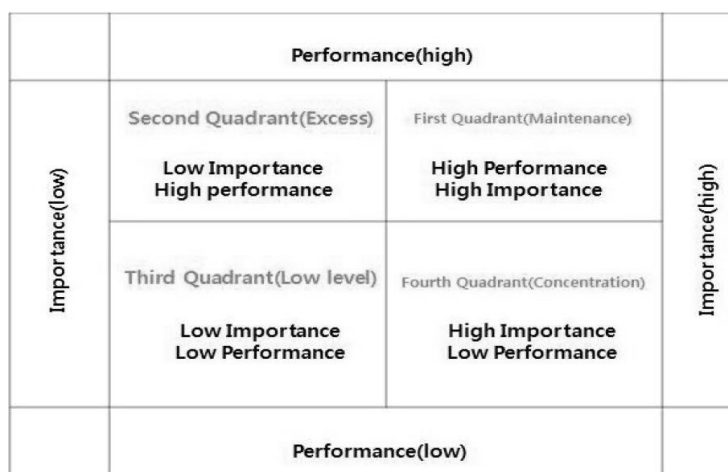


Fig. 1. IPA analysis model.

Table 1. 21 type of factors for forest design

Factor	Type	Factor	Type	Factor	Type
Climate	Repetition	Forest experience • education	Recreation	Making region tourist spot	Social
Leisure activity	Recreation	Arranging facilities	Repetition	Reflect regional feature	Sightseeing
Culture-festival	Recreation	Planting vegetation	Repetition	Topography	Repetition
Ecological restoration type of planting	Sightseeing	Block off pollutant	Environment	Attract other fund	Social
Ecological link	Environment	Open space	Sightseeing	Securing certified emission reductions (CERs)	Social
Aquatic park type of planting	Sightseeing	Creating jobs	Social	Soil	Repetition
Water purification	Environment	Natural bank	Environment	Convenient facilities	Recreation

Table 2. Type of factors for forest design

Classification	Main factor	Classification	Main factor
Sightseeing factor	Natural form of planting composition	Social factor	Regional tourist spot
	Artificial form of planting composition		Attract fund like company or etc
	Planting composition reflecting regional feature		Creating regional jobs
	Planting composition appropriate for the waterside open space		Secure certified emission reductions (CERs) composition
Environmental factor	Natural purification of aquatic green effect	Recreational factor	Forest experimental function
	Ecological link effect		Cultural function
	Natural bank function effect		Link with aquatic leisure activity
	Blocking pollutant effect		Reflecting national preference demanded facilities

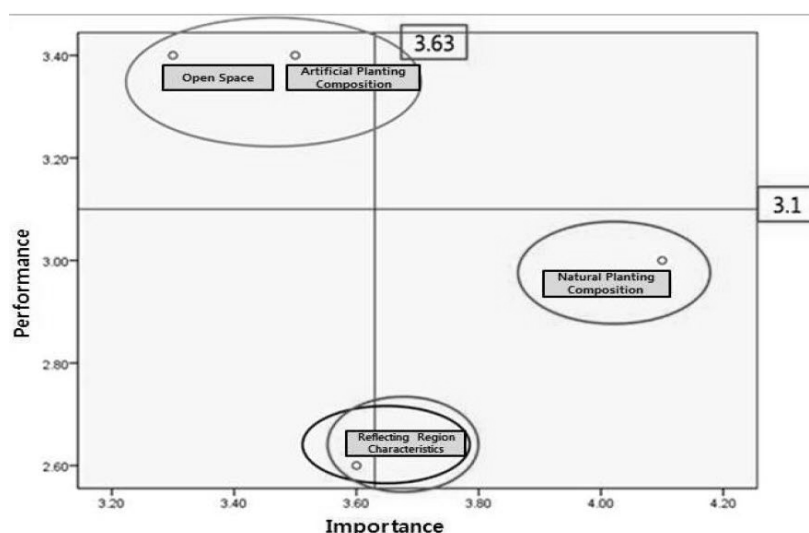


Fig. 2. Sightseeing standard result.

reevaluation. ‘Local character application’ was positioned the lowest priority area which means needed to be deleted. Here ‘local character application’ was 3.6 as a numeric result so a factor indicated by requires ‘immediate attention for improvement’ but it had been divided into remove factor because each factor’s importance and performance was very high in landscape standard (Fig. 2).

‘Natural cleansing effect of aquatic green’ and ‘Ecological effect links’ were resulted as ‘keep up’ factor in environmental factory analysis and ‘effect blocking pollution’ was resulted as ‘concentrate’ factor. There was no ‘overkill’ factor, the low priority was ‘functional natural bank effect’. The average performance was considerably low as 2.47 based on environmental standard, and average importance was high as 3.70. In relative analysis showed the ‘remove

factor’ and ‘keep up factor’ but in the case of absolute analysis, most the factors could be translated the factors need to be improved (Fig. 3).

‘Local tourist resort effect’ and ‘attract fund from enterprise or other area’ was indicated as a ‘keep up’ factor in social factor. There were no ‘concentrate’ and ‘overkill’ factors, and ‘creation local jobs’ and ‘secure carbon emission’ were resulted as the lowest priority factor. Here it showed ‘keep up factor’ in relative analysis that the importance of ‘bank fund from enterprise or other area’ was 3.47 at average, the performance was 2.57 at average but it will result as ‘immediate attention for improvement’. This was resulted from that the performance average was the lower than 3.0 in social factors as well (Fig. 4).

‘Keep up’ factor was not derived from recreation analysis.

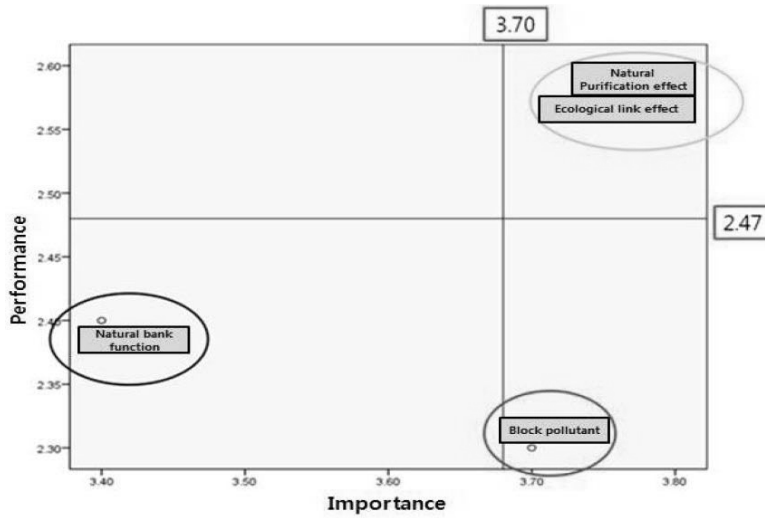


Fig. 3. Environmental standard result.

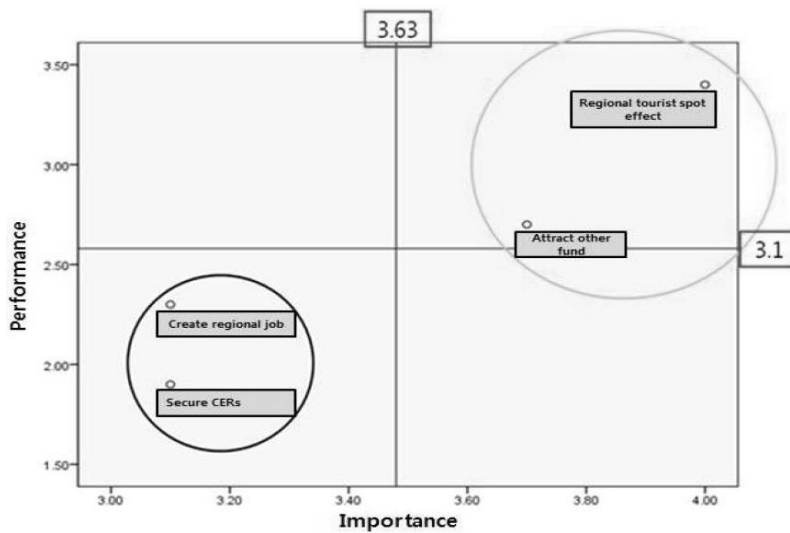


Fig. 4. Social standard result.

'Immediate attention for improvement' factor was 'forest experimental function' as a result. The factor needed to re-evaluate as a 'overkill' was 'cultural function' and water sports leisure activity links' as a result. 'Citizen's preferred facility application' was the factor of 'lowest priority area' needed to be removed (Fig. 5).

According to total analysis, 'local tourist resort effect', 'attract fund from enterprise or other area', 'forest experimental function', 'natural planting in the form of composition', and etc were resulted as 'keep up' factors. 'Natural purification effect function', 'local character application', 'ecological effect links', 'blocking pollution' were resulted as 'concentrate' factors. 'Waterside open space composition',

'cultural function', 'artificial planting composition', and 'water leisure activity links' were resulted as 'overkill' to re-evaluate. 'local job creation', 'natural water bank function', 'citizen's preferred facility application', and 'secure carbon emission' were the factors of 'lowest priority area' needed to be removed.

Total result and suggested strategy

The result after IPA analysis, the study can be suggested a strategy as follows. 'keep up' factors will keep up the current situation/activation, 'overkill' should lower the performance. When performance lowers, the factors' performance in improvement sector should bring higher.

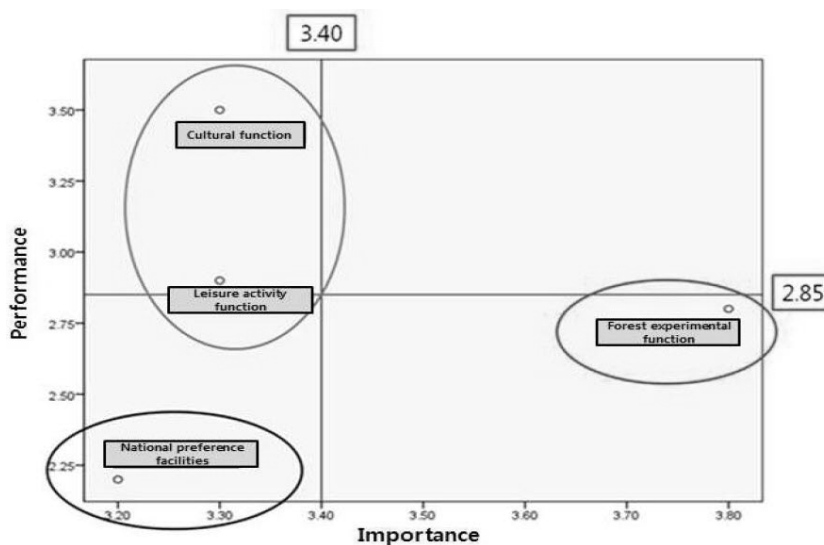


Fig. 5. Recreational standard result.

The result after current situation in South Korea, 'waterside open space composition', 'cultural function', 'artificial planting composition', 'links with water leisure activity', and etc, which are currently applied in most waterside, are 'overkill' factor so their performance should be lowered and reevaluated. In contrary, 'natural purification effect', 'local character application', 'ecological system links', 'blocking pollutions', and etc, which are environmental factors and landscape and social factors like 'local character application', were resulted as 'concentrate' needed improvement so the need to make higher performance compared to importance.

As these process, 'keep up' factors should keep up the current situation, the factors, such as 'open space composition', 'artificial planting composition', and etc, should lower the performance after reevaluating. The alternative solution could make a performance higher of 'landscape composition through local character application' in environmental factors, landscape and social factors. Also cultural and social opportunity condition such as 'attract fund from other area', which means private financial investment, a 'concentrate' factor should be extended.

Discussion

This study tried to build a general strategy rather than specific strategy because 'waterside unused land' range varies depending on properties and kinds. During the analysis

process, there was limitation to specify a specified strategy regarding riverside, lakeside, water system type, etc. Also it will be considered that the accurate result can be resulted if considering 'landscape change as time goes by' and specified factors according to each area's land condition and forest stand condition according to seasonal change and forest growth.

Conclusions

This is not simply classified by function but this study is try to build a strategy considering diverse aspects such as landscape, recreation, social environmental so it encouraged the function of the target area character, and this study is a strategy to raise the efficiency in managing management, which meant 'practicality'. This study has considered diversity aspects such as landscape, recreation, social, environmental, and etc so 'forest design in waterside unused land' of 'waterside area' in the specificity has been measured improving the way of beauty in landscape by harmonizing each elements and raising 'practicality' rather than single functional management.

This 'forest design for water side unused land' strategy has currently being done as waterside green area and open spaces type, which is composited only for 'landscape' and is standardized composition with lack of complex functions, so the performance for these should be lowered by reevaluating it. And as an alternative solution regarding this, envi-

ronmental characteristics can be considered as a most priority solution and the performance of 'local character application' as a demand alternative solution make it higher. Also the study has suggested a strategy of preparing a cultural and social infrastructure to attract fund from others.

However, as contemplation mentioned earlier, there was a limitation to consider specific factors such as each area's forest stand condition, land condition and distinguishing details at the target regions. So, there is a hope that further study can come up with more specified/concrete solutions beyond concepts and strategies established in this study, and this study can be used as basic research for a new paradigm, 'Forest Design', for forest management and control.

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References

- Choi YS, Kim JT. 2002. Parks' landscape lighting plan around waterfront for improving city beautification at night -Focused on Han Kang (river)'s park in Seoul. *J Elect* 16: 26-37.
- Chung JY, Youn YC, Cho DS. 2011. Governance types of corporate philanthropic forestry activities. *J Korean For Soc* 100: 722-732.
- Glass GV. 1976. Primary, secondary and meta-analysis of research. *Educational Researcher* 5: 3-8.
- Green BF, Hal JA. 1984. Quantitative methods for literature reviews. *Ann Rev Psyc* 35: 37-54.
- Jackson GB. 1980. Methods for integrative reviews. *Rev Educat-ional Res* 50: 438-460.
- Kim DI. 2012. Non-point source mitigation analysis by considering riparian area in Nakdong River. MS thesis. Kyungbuk National University, Deagu, Korea. (in Korean)
- Kim JJ. 2009. A study on the method of the riparian revegetation techniques for the riparian areas restoration: focused on the Han-River riparian areas. MS thesis. Dankuk University, Seoul, Korea. (in Korean)
- Kim MH. 2010. A research on the effects that CSR activities have on corporate image and job-seeking intention. MS thesis. Seokang University, Seoul, Korea. (in Korean)
- Kim NY. 2014. Waterfront development and cultural policy in Yokohama City, Japan. *JNPR* 38: 291-298.
- Kong KY. 2006. Evaluation of leisure activity using the IPA method. *J Tour* 20: 285-303.
- Kwak JY. 2012. Research on enterprises' participation in carbon offset project. MS thesis. Seoul National University, Seoul, Korea. (in Korean)
- Lee HK, Ku HG, Lim SW. 2010. The values and place-identity of waterfront park as leisure space in the city. *J For Sport* 23: 69-82.
- Lee YJ. 2013. (A) strategic plan of urban farming-garden expo for the vacant land in Janghang, Seochun-gun, Chungcheongnam-do. MS thesis. Seoul National University, Seoul, Korea. (in Korean)
- Park IK, Jun HW. 2013. A study on the influence to the attitude of residents by benefits of developing waterfront area for tourism in farming and mountain villages: centered in developing Buhang Dam, Gimcheon waterfront area for tourism. *J Northeast Tour* 9: 131-150.
- Thacker SB. 1988. Meta-analysis. A quantitative approach to research integration. *JAMA* 259: 1685-1689.
- Yoon SM, Kim YJ. 2010. Research on design of waterfront for the ecological urban space. *J Des* 23: 211-220.
- Yoon SW. 2007. Characteristics of turbidity flow and estimation of soil erosion using SWAT in Daecheong Dam watershed. MS thesis. Chungbuk University, Cheongju, Korea. (in Korean)