Prioritization of Value Chain Development Strategies of Bogor Botanical Garden in Indonesia using Analytical Hierarchy Process

Doni Yusri[1], Arief Daryanto[2], Purwadaria, H.K[3]

[1] PhD Student of Department of Human Geography, Georg-August-Universität Göttingen,Germany,
[2,3] Lecturer of Program of Management and Business, Bogor Agricultural University, Indonesia

E-mail : [1] doni.yusri@stud.uni-goettingen.de; [2]adaryant@mma.ipb.ac.id; [3]tpphp@indo.net.id

Abstract

Ecotourism value chain has significant impact on sustainability of Bogor Botanical Garden (BBG). The objectives of this study were to recommend development strategies for BBG ecotourism value chain, Data collected from observation, in depth interview, and literature was analyzed using descriptive analysis, value chain analysis and Analytical Hierarchy Process (AHP). Recommended strategies based on AHP were : 1) relying on the strengths of Bogor Botanical Garden as a focal point of the plus eco-edutourism programs, 2) improving quality of human resources at each value chain, 3) increasing investment for the development of value chain, and 4) marketing Bogor Botanical Garden various integrated packages with other tourism destination in Indonesia.

Keywords : Bogor Botanical Garden, Ecotourism, Value chain, Analytical Hierarchy Process (AHP)

1 Background

Tourism has been an important sector to contribute in the Indonesian economy. The average number of domestic tourists increases 1.60% and foreign tourists increase 5.10% during 2004-2010 (Ministry of Tourism and Creative Economy, Republic of Indonesia, 2011). The potential for tourism to be reliable by Indonesia is ecotourism. The potential tourism that can be developed for Indonesia is ecotourism or '*green tourism', 'soft tourism'*, '*responsible tourism',* or *'sustainable tourism'*.

Ecotourism is different from other forms of tourism because of this kind refers to the individual than mass tourism with similarly increased capacities to generate a range of environmental, economic, social and cultural impacts. World Tourism Organization (1998) stated that ecotourism and all nature-related forms of tourism account for approximately 20% of total international travel. The International Ecotourism Society (TIES) defines ecotourism as "*responsible travel to natural areas which conserves the environment and sustains the well-being of local people."* The Australian Office of National Tourism (1997) defined ecotourism as '*nature based tourism that involves interpretation of the natural and cultural environment and ecologically sustainable management of natural areas'.* Thereby, ecotourism related to sustainability concept.

Indonesia is known as a country with greatest biodiversity in the world. There are approximately 49 different types of ecosystems. Even though the area of Indonesia territory is only 1.32% of the total world area, it has 10% of plant species in the world, 12% of mammal, 16% of reptile and amphibian, 17% of bird, 25% of fish and 15% of insect species. Indonesia has approximately 120 potential ecotourism areas including national parks, forest parks, botanical garden, and marine tourism parks (Manurung, 2002).

One of most potency for ecotourism in Indonesia is Bogor Botanical Garden (BBG) that has area of 87 hectare. BBG is a botanical garden with the potential to be developed and has been long established by prof. C.G.C. Reindwart on May 18, 1817 under the name s'Lands Platentuin te Buitenzorg. The site was first used by Dutch for introducing tropical

plants from other parts of the world into region. The role of BBG is primarily to conserve, utilize and develop the potential of plants with activities, conservation, research, education, recreation and increased public appreciation of the botanical gardens.

Nevertheless, The BBG is facing many problems related to its sustainability such as lack of investment for maintaining the BBG, tourists quantity tend to decrease since five years ago, and lack of environmental awareness. Based on this, the strategy of development of eco-tourism value chain BBG must be preceded by a comprehensive study.

The scope of the value chain that will be examined are the actors who have a strong connection with KRB value chain ranging from travel tours and travel, transportation, hotels, restaurants, souvenir sellers, BBG, and stakeholders who have a strong relationship with BBG such as government agencies and institute of Indonesian science (LIPI). LIPI is the guards and the conservation of biological resources for BBG. In specially, member of BBG value chain that become actors in this study were who have formed a partnership or have made BBG for their destination for a business client and their existence could be identified as associated BBG. The emphasis of this study is on the package to make easily analysis of BBG value chain. Moreover, the purpose of research is to analyze the development strategy (up grading) ecotourism value chain in the context of sustainability of BBG. Analytical Hierarchy Process (AHP) approach was used to determine a structured priority of strategy of value chain development. The AHP was chosen in this study because it more easily be comprehended and subjectively evaluated into a hierarchy problem. The subjective assessments are converted into numerical values.

.

2 Research Methodology

This study was based on observation and in depth interview. The observation identified value chain actors of Bogor Botanical Garden, which were easy to develop actors adapted Model of Tourist Value Chain (Yilmaz dan Bititci, 2006) and Ecotourism Value Chain Model (Mitchell and Phuc, 2007). For in depth interview, it was design to gain deep information from expert experience who adjusted actors of BBG value chain that were determined.

Based on the adaptation model, this study has design six actors in tourist value chain of Bogor Botanical Garden. They were tour travel agent, transportation, hotel (acommodation), restaurant, souvenir shop and tourist destination (visit experience). Thus, the sampling actors of Bogor Botanical garden were PT Tirta Nusantara (actors tour travel agency and transportation), Hotel Salak The Heritage (actor hotel and accommodation), Restaurant and Café Dedaunan (actor restaurant), Garden Souvenir Shop (actor souvenir shop), Bogor Botanical Gardens (tourist destinations or visit experience).

Experts were interviewed how widely deeply they described the role every actor in value chain and the linkage of forward and backward relationship of the five actors of the value chain. Therefore, the result of the interview were formulated to AHP method. The study was conducted between April to July 2010, with 15 experts or decision makers who consist of owners, managers, and academician. They were asked because they had experience of Botanical Garden, in particular, it was to explain about value chain, tourism, ecotourism and other expert experience related to this study. The experts were also asked how they ranked every actor which the score was provided as similar as AHP has it. Microsoft Excel and Expert Choice 2000 version 10.5 was used to process data.

3 AHP for Assessing Ecotourism Value Chain of BBG

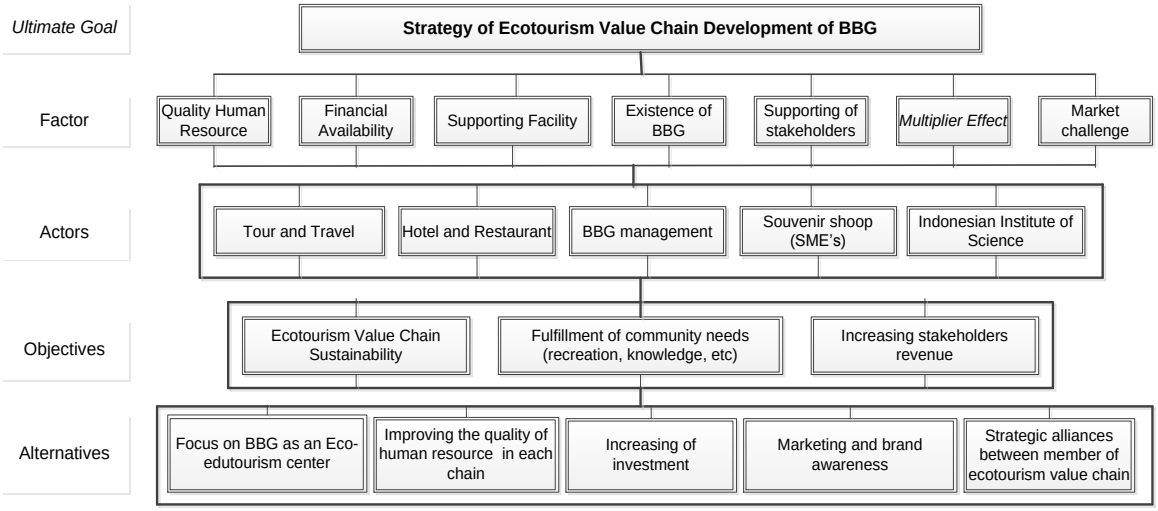
AHP is belong to Multiple Criteria Decision Making (MCDM) which was developed by Saaty (1980). The field of MCDM is classified into Multi-objective Decision Making (MODM) and Multi- Criteria Decision Making (Friguera et al., 2005: Bhusan and Rai, 2004). MODM approaches will be used if the decision space is continuous such as mathematical programming problems with multi-

objective. While, MCDM deals with discrete decision spaces where the alternatives are determined (Bhusan and Rai,2004; Hwang and Yoon, 1981).

The AHP produces weight values for each alternative based on the judged importance of one alternative over another with respect to a common criterion. It can be explained in the following steps:

1) Defining the problem into a structural hierarchy of goal, criteria, sub criteria, and alternatives. This step is the most important step as a basis for the process of AHP. In this study, we develop hierarchical structure as shown in Figure 1.

Figure 1. Hierarchical Structure of Strategy of Ecotourism Value Chain Development of BBG



2) Constructing a set of pairwise comparison of alternatives on a qualitative opinion to quantitative scale (Table 1). Each element in an upper level is used to compare the elements in the level directly below with respect to it. Data are collected from experts or decision-makers corresponding to the hierarchic structure.

Table 1. The fundamental scale of absolute numbers

Intensity of importance	Definition	Explanation
1	Equal importance	Two activities contribute equally to the objective
2	Weak or slight	
3	Moderate importance	Experience and judgment slightly favor one activity over the other
4	Moderate plus	
5	Strong importance	Experience and judgment strongly favor one activity over the other
6	Strong plus	
7	Very strong or demonstrated importance	An activity is favored very strongly over another; its dominance demonstrated in practice.
8	Very very strong	
9	Extreme importance	The evidence favoring one activity over another is of the highest possible order of affirmation

Saaty (2008)

3) The pairwise comparisons of various criteria created at step 2 are organized into a square matrix. The diagonal elements of the matrix are 1. The criterion in the *i*t row is better than criterion in the *j*th column if the value of element (*i*, *j*) is more than 1; otherwise the criterion in the *j*th column is better than that in the *i*th row. The (*j*, *i*) element of the matrix is the reciprocal of the (*i*, *j*) element.

For example, There are some element *n* on an operation system namely operation elements A_1, A_2, ..., A_n, and then the results of the pairwise comparisons of such operations elements will form a matrix comparison. Comparison of pairs starts from the highest hierarchical level where the criteria are used as the basis of creation comparison.

$$A_{NXN} = \begin{vmatrix} a_{11} & \cdots & a_{1n} \\ \vdots & \ddots & \vdots \\ a_{n1} & \cdots & a_{nxn} \end{vmatrix}$$

$A_{n \times n}$ matrix is a reciprocal matriks. It is assumed that there are n elements w_1, w_2, ..., w_n to be assessed in comparison. Value (judgment) pairwise comparisons between (wi, wj) can be presented as the matrix.

4) The principal eigenvalue and the relating normalized right eigenvector of the comparison matrix give the relative importance of the various criteria being compared. The elements of the normalized eigenvector are termed weights with respect to the criteria or sub-criteria and ratings with respect to the alternatives.

5) Calculating the consistency of the matrix of order *n* is evaluated.In fact, several irregularities of the relationship cause that the inconsistencies matrix because of it is in a person's preference. Matrix is theoretically known that a small error on the coefficient will cause a small deviation of the consistency. Eigen value which a deviation of consistency is called consistency index. Measurement consistency is expressed an index which is called 'consistency index' (CI), that calculated as:

$$CI = \frac{\lambda maks - n}{n - 1} \quad \text{.......} \quad 1)$$

λmaks = maximum eigenvalue of the judgment matrix
n = size of the matrix
If this consistency index fails to reach a required level then answers to comparisons may be re-examined of the judgment matrix. This CI can be compared with that of a random matrix, RI that called the consistency ration (CR). The comparison matrix of AHP model is acceptable if the value of CR less than 0.1.

$$CR = \frac{CI}{RI} \quad \text{.......} \quad 2)$$

6) The rating of each alternative is multiplied by the weights of the sub-criteria and aggregated to get local ratings with respect to each criterion. The local ratings are then multiplied by the weights of the criteria and aggregated to get.

4 Results and Discussion

Based on AHP Method, there were five criteria of hierarchy as the following and a variety of factor in each criteria level. (1) The criteria of factors for ultimate goal included human resource quality criteria, the existence of financial, availability of support facilities, the existence of the Bogor Botanical Garden, stakeholder support, and multiplier effect and market opportunities. (2) The criteria of actors for ultimate goal included tour travel and transportation, hotel, restaurant, souvenir shop, and BBG. (3) The purpose criteria of ultimate goal consisted of three objectives; sustainability of value chain, the needs of recreation for community, knowledge and other subject, the improving of stakeholder income. (4) the criteria of alternative strategies for ultimate goal consisted of five strategies ; increasing investment for the development of value chain, marketing Bogor Botanical Garden various integrated packages with other tourism destination in Indonesia, improving quality of human resources at each value chain, relying on the strengths of Bogor Botanical

Garden as a focal point of the plus eco-edutourism programs, and synergic activities to improve strengthen of value chain.

The results explained that the existence of BBG is the highest common factor of seven factors for the ultimate goal. The score of this factor is 0.291.This means that the strategy of developing a value chain should put Bogor Botanical Garden as an important factor especially when considering the age and trend interest of tourists for a tour of nature. Bogor Botanical Garden has thousands of rare plant species. Thus, Manager of Bogor Botanical Garden is the tallest actor to develop value chain strategies. The score is 0372. Therefore, the actor should emphasis BBG position besides the clean up as well as the conservation of eco-tourism destination. Sustainability of the value chain is the highest objective criteria with a score of 0585. Then the second is the needs of recreation for community with the score 0.214 and the third is the improving of stakeholder income by score 0.201. Based on AHP calculation of the obtained results that relying on the strenghts of Bogor Botanical Garden as a focal point of the plus eco-edutourism programs with a score of 0.245. This strategy is recommended to utilize the strengths of the Bogor Botanical Gardens primarily as a collection of diverse flora and Indonesia, strategic location and easy to reach, infrastructure, accommodation, and adequate transportation and easily accessible, and BBG which are well known in foreign countries to avoid the threat of such a a wide selection of alternative tourism, the emergence of alternative mass travel, travelers to Indonesia's security perceptions.

Based on the cooperation of members of the value chain analysis and improvement (upgrading) in the development of eco-tourism value chain of the Bogor Botanical Gardens actors and relevant stakeholders need to cooperate fully integrated. So the pattern of cooperation that has produced inequality between the chain be replaced on a pattern of mutually beneficial cooperation (synergism) and equally strong. Therefore, each of these actors in the chain ranging from stage to stage post-delivery orders, such as tours and travel, transport, accommodation, food and restaurants, souvenirs, entertainment and attractions began to do research, seminars, workshops or study for develop ecotourism value chain. The pattern should be formed for the chain BBG ecotourism, tour and travel that actors who are at the order stage offers tour packages BBG. When tourists have already booked the next link next transportation actor who provide services. Both actors tours and travel and transport actors both in the pre-delivery stage. Transfer occurs from the added value of the first actor to actor tours and travel transportation. Then the actor will transport travelers to transfer additional actors. Referring to the formulation and Yilmaz and Bititchi (2006) both actors are still in the stage of delivery. In this process happens again the second added value transfer from actor to actor transportation accommodations. Following value chain cycle when tourists are transferred to the next actor accommodation then tourists will enjoy attractions actor. Transfer occurs between the value-added third actor to actor accommodation attractions, both in the delivery phase. The next process a transfer of value from the value-added chain actor to actor attractions and restaurant meals. Then there is a transfer of value from actor to actor foods and restaurant entertainment and souvenir central actor. All processes are included in the delivery stage of the value chain guide. The next stage is the post delivery, where tourists who use the services of all these actors will give the impression in the form of an assessment of what he can along the value chain.

5 Conclusions

Based on the AHP, factor of presence of BBG is a major factor in the value chain (0.291), the actor who plays the manager of the BBG is 0.372. The most important aim of the strategy of development of eco-tourism value chain is sustainable value chain BBG (0.585) with the main strategy is to increase joint marketing Bogor Botanical Gardens as a place of eco-edutourism plus (0.324). The process of the development of value chains in this ecotourism destinations are BBG, then each member of the value chain can make internal

changes to open up cooperation with other value chain members. The process of formation of BBG value chain does not have to start from scratch, because the existing cooperation could be used as the basis for integrating the delivery of tourists to BBG stronger (backward and forward linkages).

The process of formation of BBG of value chain ecotourism could have followed the formation of the Rwandan tourism value chain. Formation process begins by conducting studies, research, seminars and workshops involving not only the value chain (in line) but involve other institutions such as the closely related type associations, local and central government agencies, schools tourism and financial institutions. KRB ecotourism value chain development will be compared as an organization which has a strategic plan for sustainability and competitiveness. The value chain must have a vision and a mission.

Programs that can be implemented with a combination of five strategies on the second point is the conclusion of the program package, the development of ecotourism and environmental sustainability diorama in one corner of BBG, eco-tourism promotion program, program promotion and organization of MICE (meetings, incentive, convention, exhibition), program promotion mix of activities.

REFERENCES

Barney, J.B. 1997. Gaining and Sustaining Competitive Advantage. Addison-Wesley Publishing Company Inc., USA.

Ballantyne, R. Packer, J. and Axelsen, M.2009. Trends in Tourism Research. Annals of Tourism Research Volume 36, Issue 1,pp 149 – 152

Bhushan, N and Rai, K. 2004. Strategic Decision Making : Appplying the Analytical Hierarchy Process. Springer, Berlin.

Clifton, J. and Benson, A. 2006. Planning for Sustainable Ecotourism: The Case for Reseacrch Ecotourism in Developing Country Destinations. Journal of Sustainable Tourism , Vol.4 No.3. pp. 238 - 254

Departemen Kebudayaan dan Pariwisata. www.budpar.go.id. Distribusi Bulanan Kunjungan Wisman dan Pengunjung Asing Melalui 15 Pintu Masuk dan Pintu Lainnya tahun 2007 dan 2008. Ditjen Imigrasi, BPS, Angkasa Pura I dan II. (diakses pada 12 Januar1, 2010).

Dinas Kebudayaan dan Pariwisata Kota Bogor. 2009. Data Pariwisata Kota Bogor Tahun 2009. Disbudpar, Bogor.

Fennel, D. 2008. Ecotourism. 3rd edition. Routledge taylor and Francis group, London

Figuera, J., S. Greco and M.Ehrgott (2005). Multiple Criteria Decision Analysis: State of The Art Surveys. Springer, New York.

Hall, C.M and Page, S.J.. 2002. The Geography of Tourism and Recreation: Environment, Place, and Space. 2nd edition. Routledge, London

Hill, J. and Gale, T. 2009. Ecotourism and Environmental Sustainability: principle and Practice. Ashgate Publishing Company., England, London.

Hwang, C.L. and Yoon, K. 1981. Multiple Attribute Decision Making : Methods and Applications: A State of the Arts Survey. Springer, Berlin

Lawrence, D.P. 1997. Integrating Sustainability and Environmental Impact Assesment. Environmental Management. 21 (4) 23-42.

LIPI-PKT KRB] Lembaga Ilmu Pengetahuan Indonesia – Pusat Konservasi Tumbuhan Kebun Raya Bogor. Laporan Tahunan Pusat Konservasi Tumbuhan Kebun Raya Bogor – LIPI : Tahun Anggaran 2008. LIPI-PKT KRB. Bogor.

Mitchell,J. and Phuc, L.C. 2007. Final Report on Participatory Tourism Value Chain Analysis in Da Nang. Management Consulting. Central Vietnam. Vietnam.

[Naturindo] Naturae Indonesiana. 2007. Kebun Botani di Era Indonesia Baru. Penerbit Naturindo. Bogor.

Porter, M.E. 1990. The Competitive Advantage of Nations. The Free Press, New York.

Saaty, L. 2008. Decision Making with the Analytic Hierarchy Process. *International Journal of Services Sciences, Vol. 1, No. 1, pp. 83 – 98.*

Sari, R. Editor. 2009. Renstra PKT KRB 2005-2009. PKT KRB. Bogor.

Subarna, A. Editor. 2006. Sekilas Kebun Raya Bogor. PKT KRB. Bogor.

Surisno. 2008. Laporan Tahunan Pusat Konservasi Tumbuhan Kebun Raya Bogor-LIPI : Tahun Anggaran 2007. LIPI-PKT KRB. Bogor.

Yilmaz, Y. and U.S Bititci. 2006. Performance Measurement in Tourism : a Value Chain Model. International Journal of Contemporary Hospitaliy Management. 18 (4) : 341 – 349.

_____ . 2006. Performance Measurement in The Value Chain : Manufacturing vs Tourism. International Journal of Productivity and Performance Management. 55 (5) : 371 – 389.

Yin, R.K. Case Study Research : Design and Methods. 2nd edition. Applied Social Research. SAGE Publications, California.