

***KABUYUTAN* SACRED SITES IN THE SUNDANESE LANDSCAPE OF INDONESIA:
A REEVALUATION FROM THE PERSPECTIVE OF SUSTAINABLE LANDSCAPE MANAGEMENT**

MOHAMMAD ZAINI DAHLAN

***KABUYUTAN* SACRED SITES IN THE SUNDANESE LANDSCAPE OF INDONESIA:
A REEVALUATION FROM THE PERSPECTIVE OF SUSTAINABLE LANDSCAPE MANAGEMENT**

インドネシアにおけるスンダ民族のランドスケープの自然聖地 *KABUYUTAN* :
持続的なランドスケープ管理の視点での再評価

MOHAMMAD ZAINI DAHLAN

**GRADUATE SCHOOL OF GLOBAL ENVIRONMENTAL STUDIES
KYOTO UNIVERSITY**

2017

ABSTRACT

The issue of sacred natural sites has been a concern for conservationists through various studies in the context of the evaluating the critical role of sacred places. Thirty-three *kabuyutan* as sacred natural sites in Indonesia that sanctified for generations by the Sundanese people were explored and identified their forms and functions. This study aims to understand the existence of *kabuyutan* in the Sundanese landscape as a basis for reevaluating its existence both from the standpoint of ecology and culture and to identify the potential of tourism through participant observation methods included field surveys, in-depth interviews, and focus group discussions (FGD) with key informants who have a relatively good knowledge. This study revealed that *kabuyutan* have a unique structure compare to surrounding landscape which particularly sacred due to the presence of ancestral graves or other associated natural element. Their existence was closely related to the water resources which mainly springs as an integral part of the hydrological system. Several *kabuyutan* functions as the boundary of water catchment area and delineate the watershed boundary. Results revealed that 249 of 332 plant species were reported to exist in *kabuyutan* and 96 of them have been verified based on vegetation survey. It is assumed that *kabuyutan* is potential to be hotspots of plant diversity as a preferable habitat for abundant plant species. In addition, the presence of all fifteen endangered plant species as well as 32.9% of native species such as a native and IUCN's threatened *tanglar* tree (*Aglaia elliptica* Blume, Bijdr), indicating the importance of *kabuyutan* towards biodiversity conservation. The presence of endemic and threatened species is important in designating a biodiversity hotspot that leads to making up conservation priorities. Also, findings that 130 of plant species could be identified for land and water conservation reinforced the potential of *kabuyutan* in the watershed management in addition to being a biodiversity hotspot. However, The lack of local people's awareness according to the critical role of *kabuyutan* causes the vulnerability of springs. Therefore, knowledge-sharing, especially by encouraging and strengthening the custodian's role as a presentative of both cultural and religious person is crucial to make up a positive perception of people that have a high impact on their awareness. Further, some preventive efforts should be applied to preserve the local plant species. Considering the influential role of religion in *kabuyutan*, there is a potential to set the appropriate rules by combining religious, customary, and governmental rules into an adaptive management strategy that would encourage people to utilize *kabuyutan* sufficiently. Furthermore, this study revealed that *kabuyutan* have a potential to be designated as a tourism destination by encouraging the readiness of the local people and strengthening a good partnership of government. Finally, this study emphasized that an application of landscape ecological method in understanding about phenomena of sacred natural sites in a cultural landscape shows a positive result and a potential to be further developed in the future study. The use of a hierarchical theory correspond to the traditional ecological knowledge of the Sundanese people indicates a high capability of this approach in providing sufficient information to understand the general characteristics of *kabuyutan* at a different scale and notifying a foundation for setting strategies and recommendations based on locality. Further, combination among religious laws (*sharia*), customary laws (*adat*), and governmental regulations should be elaborated and not to be contradicted.

ACKNOWLEDGEMENTS

First of all, I would like to express my grateful to the supervisory committee and the faculty members of Graduate School of Global Environmental Studies (GSGES). My thankful especially for my principal supervisor, Associate Prof. Dr. Katsue Fukamachi, whose expertise, understanding, generous guidance and support on both an academic and a personal level made it possible for me to work on a topic that was of great interested and challenged me. It was a pleasure working with her. The excellent advice and support of my second supervisor, Prof. Dr. Shozo Shibata, has been invaluable, for which I am extremely grateful. The last supervisor, Assistant Prof. Dr. Junichi Imanishi, for teaching me by constructive challenges and technical knowledge, I am highly indebted for his encouragement and patient. To all supervisors who put their trust in me and urged me to do better, I am most grateful.

I am highly indebted and thoroughly grateful to Associate Prof. Dr. Hirohide Kobayashi as a member of reviewer committee for his valuable suggestion and critical comment. To all member of the Lab. of Landscape Ecology and Planning and Lab. of Landscape Architecture, I am highly grateful for your help and support. I appreciate to Ms. Ayako Kamaga and other administrative officers in GSGES for their assistance during my study. All lecturers both in GSGES and CoHHO program, I am obliged for providing me insightful knowledge and experiences. I have engaged an internship program at School of Architecture, Planning and Policy Development, Bandung Institute of Technology, Indonesia and in a short research at Research Institute for Humanity and Nature, Japan as an intern. Thus, I am hugely indebted to all faculty members, especially Dr. Budi Faisal and Prof. Jumpei Kubota for their useful advice during my internship program.

My thankful would like to be expressed to local people in Ciomas and Kampung Budaya Sindang Barang for their countless help during field survey, particularly to the custodians who granted me a permission to conduct my research in their *kabuyutan* and accepted me to be part of their family. I would like to acknowledge the Indonesia Endowment Fund for Education (LPDP), Ministry of Finance, The Republic of Indonesia for their financial support both for my doctoral program and research grant.

Finally, I would like to express my gratitude to my wife Imbang Kartika for her kind personal support and great patience at all times, especially in taking care my little angels. Also, I am thoroughly grateful to my parents and siblings, who have been truly supporting me explore and pursue my interests. *Alhamdulillah* for having all of you. Last but not least, all thanks and praise due to Allah *Swt* for His blessing, so I bear on endeavor for years in Japan. Peace and blessings to Prophet Muhammad *Saw* for his excellent inspiration.

CONTENTS

ABSTRACT.....	I
ACKNOWLEDGEMENTS.....	II
CONTENTS	III
LIST OF FIGURES	VI
LIST OF TABLES	IX
LIST OF APPENDIXES	X
1 INTRODUCTION	1
1.1. BACKGROUND OF STUDY	1
1.1.1. Sacred natural sites as an element of traditional cultural landscape	1
1.1.2. <i>Kabuyutan</i> as a sacred natural site.....	4
1.1.2.1. Etymology of <i>kabuyutan</i>	4
1.1.2.2. Historical background of <i>kabuyutan</i>	4
1.1.2.3. <i>Kabuyutan</i> in the Sundanese historical heritage	7
1.1.2.4. Narrative of <i>kabuyutan</i> and associated concept.....	8
1.1.2.5. <i>Kabuyutan</i> within Sundanese landscape.....	13
1.1.3. Characteristic of Sundanese landscape	14
1.1.3.1. Historical aspect	14
1.1.3.2. Physical aspect	17
1.1.3.3. Socio-cultural aspect	20
1.2. PREVIOUS STUDY ON <i>KABUYUTAN</i>	23
1.3. JUSTIFICATION OF STUDY	25
1.4. OBJECTIVES AND SCOPE OF STUDY.....	27
1.5. STRUCTURE OF STUDY.....	29
2 SETTING OF STUDY	31
2.1. CONCEPTUAL BACKGROUND	31
2.1.1. Cultural landscape based on landscape ecological approach	31
2.1.2. Implementation of the hierarchical theory.....	33
2.1.3. Towards a sustainable landscape management.....	34
2.1.4. Legal aspects	36
2.1.4.1. Protected area	36
2.1.4.2. Natural resources.....	38
2.1.4.3. Cultural resources.....	39
2.1.4.4. Human resources	39
2.1.4.5. Watershed-based management	41
2.1.4.6. Tourism-based management.....	41
2.2. METHODOLOGICAL BACKGROUND.....	42

2.3. RESEARCH DESIGN	45
2.4. LOCAL CONTEXT	47
2.4.1. Physical characteristic	47
2.4.2. Demographical characteristic	50
2.4.3. Socio-cultural characteristic	52
3 ECOLOGICAL ASPECT OF <i>KABUYUTAN</i>.....	55
3.1. INTRODUCTION	55
3.2. METHODS	57
3.2.1. Study site	57
3.2.2. Data collection.....	57
3.2.3. Data Analysis	60
3.3. RESULTS.....	63
3.3.1. Informant characteristics	63
3.3.2. Conservational land classification	64
3.3.3. Structure and function of <i>kabuyutan</i>	68
3.3.4. Dynamic of <i>kabuyutan</i>	72
3.3.5. Ethnobotanical plant species	77
3.3.6. Plant species in <i>kabuyutan</i>	80
3.3.7. Conservational plant species	85
3.4. DISCUSSION	88
3.4.1. Source of knowledge	88
3.4.2. Importance of springs	88
3.4.3. Plant diversity hotspots.....	92
3.4.4. Important plant and land for conservational environment	93
3.4.5. Implications for conservation	96
3.5. CONCLUSION	97
4 CULTURAL ASPECT OF <i>KABUYUTAN</i>.....	99
4.1. INTRODUCTION	99
4.2. METHODS	101
4.2.1. Study site	101
4.2.2. Data analysis	102
4.3. RESULTS.....	103
4.3.1. Demographic characteristics.....	103
4.3.2. Cultural characteristic of <i>kabuyutan</i>	103
4.4. DISCUSSION	111
4.4.1. Current cultural characteristic of <i>kabuyutan</i>	111
4.4.2. Challenges for current management	113
4.4.3. Implication for sustainable management	115
4.5. CONCLUSION	118
5 TOURISM ASPECT OF <i>KABUYUTAN</i>.....	121
5.1. INTRODUCTION	121

5.2. METHODS	123
5.2.1. Study site	123
5.2.2. Data collection.....	123
5.2.3. Data analysis	125
5.3. RESULTS	125
5.3.1. Local people’s perception of KBSB	125
5.3.2. Ecological properties of KBSB	126
5.3.3. Cultural properties of KBSB	127
5.3.4. Potential of <i>kabuyutan</i>	129
5.3.5. Cultural tourism landscape planning	131
5.4. DISCUSSION	134
5.4.1. Planning a sustainable sacred place.....	134
5.4.2. Creative tourism in the Sundanese cultural landscape.....	136
5.5. CONCLUSION	137
6 GENERAL DISCUSSION	139
6.1. GENERAL CHARACTERISTIC OF <i>KABUYUTAN</i>	139
6.1.1. Reverence for ancestors (1 st category).....	141
6.1.2. Importance of history (2 nd category).....	143
6.1.3. Vulnerability of springs (3 rd category).....	145
6.2. ADAPTIVE MANAGEMENT OF <i>KABUYUTAN</i>	146
6.2.1. Empowering individual (micro-scale)	147
6.2.2. Connectivity through a history (meso-scale).....	148
6.2.3. Interdependence with agricultural landscape (macro-scale).....	149
6.3. FRAMEWORK FOR A SUSTAINABLE LANDSCAPE MANAGEMENT	150
6.3.1. Appropriate rules	151
6.3.2. Dissemination of knowledge	156
6.3.3. Sufficiency utilization	157
6.4. POTENTIAL OF <i>KABUYUTAN</i> AS TOURISTIC OBJECT AND ATTRACTION	159
7 GENERAL CONCLUSION	163
7.1. <i>KABUYUTAN</i> AND FUTURE MANAGEMENT.....	163
7.2. DIRECTIONS FOR FUTURE STUDY	165
SUMMARY	167
NOTES.....	169
REFERENCES.....	171
APPENDIXES.....	181

LIST OF FIGURES

Figure 1.1. Historical timeline of the existence of <i>kabuyutan</i> (Source: Hafidz, 2014).....	5
Figure 1.2. <i>Kabuyutan Karangkamulyan</i> is located in the tributary of Cimuntur and Citanduy River (a) and <i>Kabuyutan Cangkuang</i> where surrounded by a sacred lake (b) (Sources: https://goo.gl/xPSyyv (a) and documentation of author (a))	6
Figure 1.3. Diagram of the implementation of <i>tri tangtu Sunda</i> in zoning of the watershed-based landscape (Source: based on in-depth interview with a Sundanese environmental activist and also local people of Ciomas Village)	12
Figure 1.4. Configuration of <i>kabuyutan</i> in the Sundanese landscape (<i>tatar Sunda</i>) (Source: author).....	13
Figure 1.5. Historical map of the development of <i>tatar Sunda</i>	15
Figure 1.6. Mountainous ranges in <i>tatar Sunda</i>	18
Figure 1.7. Hydrological condition in <i>tatar Sunda</i>	19
Figure 1.8. Three large sacred trees of <i>Kabuyutan Baros</i> with diameter canopy around 69 m (a) has disappeared due to lack of understanding (b and c) (Source: doc. of KATCI).....	26
Figure 1.9. Structure of study	30
Figure 2.1. The administrative location of study sites.....	48
Figure 2.2. The physical background in determining the study sites.....	49
Figure 3.1. Study site in Ciomas Village and distribution of 33 <i>kabuyutan</i> within different type of land-use	58
Figure 3.2. Distribution of 21 sample plots in the KPG (6.6 ha) with the total plot size about 0.84 ha (12.7% of total area).....	59
Figure 3.3. Ecocultural boundary was deliniated by using 30-m DEM data to determine the watershed-based area of Cidarma River (<i>Pangauban Cidarma</i>).....	64
Figure 3.4. The arrangement of traditional Sundanese landscape (Source: author)	65
Figure 3.5. Spatial distribution map of the fifteen conservation lands within Ciomas Village (a-c), the Sundanese environmental conservation philosophy of <i>lemah-cai</i> (f), and the proposed environmental conservation strategy with different priority (g). Number in each land variable indicates the land classification in Table 3.2	67
Figure 3.6. Distribution of 33 <i>kabuyutan</i> within different type of land-use	69

Figure 3.7. The arrangement of five <i>kabuyutan</i> which bounded by a myth to ensure the continuity of hydrological system (a), the condition in <i>Kabuyutan Batudatar</i> (b), <i>cigondok</i> (c), <i>kitiwu</i> (d), <i>nusakutu</i> (e), and <i>kawis</i> (f) (Source: documentation of author)	72
Figure 3.8. The arrangement of <i>kabuyutan</i> to mark the boundary of Cidarma Watershed (Source: documentation of author)	73
Figure 3.9. Change in land-use during 14 years in Ciomas Village which led to loss of main elements and buffer zone of <i>kabuyutan</i> (see Appendix 4 for more details)	75
Figure 3.10. Landslide occur in surrounding <i>Kabuyutan Ranjeng</i> (a), <i>awilarangan</i> (b), <i>cikutuk</i> (c), and <i>gencoy</i> (d) that mainly caused by human activities (Source: documentation of KATCI).....	76
Figure 3.11. <i>Kabuyutan Panghulu Gusti</i> as a main venue of <i>nyepuh</i> tradition (a), location for tree plantation (b), planting tree species as a rite in tradition (c), tree species were planted during <i>nyepuh</i> in 2016 consist of <i>sirsak</i> (<i>Annona muricata</i> L. (d), <i>palahlar</i> (<i>Diprerocarpus retusus</i> BI. (e), and <i>matoa</i> (<i>Pometia pinnata</i> H.R. Forst&G. Forst.) (f) (Source: documentation of author (a, b, d, e, f) and KATCI (c)).....	84
Figure 3.12. The species-area curve of plant species within 33 <i>kabuyutan</i>	85
Figure 3.13. Conservational plant species found within <i>Kabuyutan Panghulu Gusti</i>	86
Figure 3.14. Perceived plant species for conservation area	87
Figure 3.15. The arrangement of <i>Kabuyutan Kimulud</i> together with several <i>kabuyutan</i> functions as a border for catchment area which also considered as a watershed boundary (a), the important role of <i>kimulud</i> as an anchor to divide and strengthen two different watersheds (b), and the actual condition of <i>kimulud</i> which composed by a single ancestral grave some plant species (c) (Source: documentation of author)	90
Figure 4.1. Sacred vegetation (a), sacred graves (b), <i>geger omas</i> sacred spring (c), as well as the customary rules set for managing the largest <i>Kabuyutan Panghulu Gusti</i> in Ciomas (Source: documentation of author)	101
Figure 4.2. The present condition of <i>kabuyutan</i> due to anthropogenic and natural disturbance such as in <i>Kabuyutan Baros</i> (a), <i>pasucian</i> (b), <i>cigondok</i> (c), <i>kimulud</i> (d), and <i>galogor</i> (d) (Source: documentation of author (b-f) and KATCI (a))	107
Figure 4.3. Conceptual framework of sustainability based on people's understanding (according to interview's results on Appendix 12)	115
Figure 5.1. Study site in <i>Kampung Budaya Sindang Barang</i> , Bogor Regency	124
Figure 5.2. Distribution of 57 <i>kabuyutan</i> within KBSB Village	127
Figure 5.3. Transference of the <i>ungkal biang</i> sacred stone from the river (a) to the current position in KBSB (b) (Source: documentation of author (b) and official KBSB (a))	128

Figure 5.4. Cultural heritage features in KBSB: <i>imah gede</i> as a main house for the custodian (a), traditional agriculture production tools such as <i>lisung</i> and <i>nyiru</i> (b), a traditional ritual of storing rice of <i>majikeung pare</i> (c), attraction of <i>rengkong</i> (d) and <i>angklung gubrag</i> (e), ritual <i>parebut seeng</i> by performing <i>pencak silat Cimande</i> during wedding ceremony (f) (Source: documentation of author (a-c) and official KBSB (d-f))	129
Figure 5.5. Cultural tourism landscape planning of KBSB based on the significance of distribution of 57 <i>kabuyutan</i> within KBSB (Source of base map: Dahlan (2009))	133
Figure 6.1. Three categories of <i>kabuyutan</i> based on ecocultural characteristic and its management priority. Number in parenthesis indicates the order of <i>kabuyutan</i> in Figure 3.6, Tabel 3.3, and Appendix 4 for details.	141
Figure 6.2. Framework of management strategies towards sustainable landscape	152
Figure 6.3. Distribution of rules for three main actors in the <i>pangauban</i> concept	158

LIST OF TABLES

Tabel 2.1. Framework of <i>study</i> based on the hierarchical theory	44
Tabel 2.2. Demographical characteristic of study sites	51
Tabel 3.1. Criteria for determining cultural significance of plant (Turner, 1988).....	62
Tabel 3.2. Traditional land classification for land and water conservation	66
Tabel 3.3. Structure of 33 <i>kabuyutan</i> in Ciomas Village.....	71
Tabel 3.4. General profile of landscape structure in Ciomas Village.....	73
Tabel 3.5. Land-use changes in Ciomas Village during 14 years.....	74
Tabel 3.6. Profile of <i>kabuyutan</i> structure	74
Tabel 3.7. List of protected plant species based on IUCN and Indonesia regulation	78
Tabel 3.8. Results of cultural significance analysis of plant species in Ciomas Village	79
Tabel 3.9. Calculation of cultural significance analysis of five particular plant species	80
Tabel 3.10. Endangered plant species exist in <i>kabuyutan</i>	81
Tabel 3.11. The composition and floristic dominance of tree species in <i>kabuyutan</i>	82
Tabel 3.12. Results of vegetation survey within 33 <i>kabuyutan</i>	83
Tabel 3.13. The general condition of plant species in Ciomas Village and <i>kabuyutan</i>	92
Tabel 3.14. Plant species diversity reported by some research in <i>tatar Sunda</i>	92
Tabel 4.1. Cultural aspects determine the characteristic of <i>kabuyutan</i>	104
Tabel 4.2. Managerial activities and regular schedule of <i>kabuyutan</i>	108
Tabel 4.3. Differences of some past and present management systems in <i>kabuyutan</i>	109
Tabel 5.1. The evaluation of potential 57 <i>kabuyutan</i> as tourism object and attraction.....	130

LIST OF APPENDIXES

Appendix 1. The nature of Sundanese concept through a philosophy of <i>tri tangtu Sunda</i>	181
Appendix 2. List of informants and their demographic characteristics (n=19)	184
Appendix 3a. Ethnobotanical survey sheet in English	185
Appendix 3b. Ethnobotanical survey sheet in local language (Sundanese).....	186
Appendix 3c. Tally sheet for identifying plant species within <i>kabuyutan</i>	187
Appendix 4. Characteristic of identified 33 <i>kabuyutan</i> within Ciomas Village	188
Appendix 5. List of 332 plant species were reported exist within Ciomas Village	195
Appendix 6a. List of 249 plant species were reported exist within <i>kabuyutan</i>	200
Appendix 6b. List of 96 plants species found within 33 <i>kabuyutan</i> in Ciomas Village	204
Appendix 6c. Distribution of 96 plant species were found within 33 <i>kabuyutan</i>	207
Appendix 6d. Number of individual 74 tree species were found within 33 <i>kabuyutan</i>	209
Appendix 7. List of 130 conservational plant species found within the KPG	211
Appendix 8. List of twenty-two open-ended questions	214
Appendix 9. List of informants and their demographic characteristics (n=67)	215
Appendix 10. Informants' responses about cultural aspect of <i>kabuyutan</i> in Ciomas Village.....	217
Appendix 11. List of forty-two open-ended questions	219
Appendix 12. List of informants and their demographic characteristics (n=17)	220
Appendix 13. Informants' responses related to <i>kabuyutan</i> in KBSB	221
Appendix 14. List of 57 <i>kabuyutan</i> were surveyed within KBSB.....	223

1 INTRODUCTION

1.1. Background of study

1.1.1. Sacred natural sites as an element of traditional cultural landscape

As a reflection of traditional landscape, the landscape in the Sundanese region shows a unique and distinctive character as a result of harmonious interaction between natural and cultural elements for a long period. The existence of traditional landscape that varies in characteristic is a fruit of the long-term adaptation process that has been through a period of slow development that shows the traditional character when compared to the surrounding landscape (Antrop, 1997). The interplay between humans and nature in a landscape can also be described as a reflection of the cultural landscape (Farina, 2001; UNESCO, 2011). Cultural landscape defined by UNESCO (2011) based on the World Cultural and Natural Heritage Convention in 1972 as a result of a combination of cultural and natural property, as well as the figure of human evolution with his/her dwelling within a specified period. Antrop (1997) stresses the small differences between the two concepts are based on the time of its formation that associated with the development history of the past for a traditional landscape (Antrop, 1997). However, the two concepts have similarities in the context of the existence of cultural and natural heritages that perceived as the particular identity of both two concepts (Agnoletti, 2014; Antrop, 1997; Farina, 2000), or may be named as a traditional cultural landscape (Antrop, 2006).

Considering several definitions of those two concepts, the presence of landscape elements with their associated values become imperative in defining a landscape. For example, a landscape consists of several main constituent elements such as the agricultural area, various agricultural activities, and cultures associated with farming can be classified as an agricultural landscape (Harrop, 2007) or a rural landscape if associated with the location (Agnoletti, 2014). Likewise, a place that perceived as a sacred place by

the local people due to the presence of sacred elements can be categorized as a sacred landscape or known as the sacred natural sites (Dudley et al., 2010; Rutte, 2011; Verschuuren et al., 2010). Together with the social, cultural, and spiritual values which they believed, people appreciate these places because of the respect for the grace of God and the ancestor's merit (Dudley et al., 2010).

Sacred natural sites defined as the area of land and water that have a special and significant spiritual value for the community (Verschuuren et al., 2010). These places vary in shape and size. Range from a single object such as a tree, a grave, spring, a lake, and a river or set of natural and cultural elements that is manifested in a forest, mountain to mountain range (Rutte, 2011) or may be exhibited in a settlement. The diversity of the integral elements of these places mainly affected by the level of human interference based on the underlying both spiritual and cultural values (Rutte, 2011) as well as social and ecological value perceived by the people. The bearing of human interference is the principal condition in identifying of a landscape (Antrop, 1997; Antrop, 2006; Farina, 2006), as well as to sacred natural sites. Thus, the sacred natural site is a reflection of the cultural landscape that is generated by creativity, work, and social initiative even to a low degree of influence.

The issue of sacred natural sites has been a concern for conservationists through various studies in the context of the evaluating the critical role of sacred places. In the last few years (Dudley et al., 2010), the biodiversity that exists within the sacred sites was assessed (Pungetti, 2013; Singh et al., 2014; Xu et al., 2006) and further Dudley et al. (2010) compared it with the surrounding area. Moreover, management aspect (Rutte, 2011) and the role of the community who lived in harmony together with these sacred landscapes (A. Ormsby & Edelman, 2010) were also studied. The results of several such studies can be concluded that the existence of sacred natural sites has shown a major role in preserving the environment both for biological resources and the physical environment as well as the people who live around it (Verschuuren, 2010; Robert Wild, 2010).

International organization such as the United Nations Educational, Scientific, and Cultural Organization (UNESCO), the Food and Agriculture Organization (FAO), and the International Union for Conservation of Nature (IUCN) have been paying attention in relation to the cultural heritage of a community or according to the function as a hotspot of biodiversity. Since the establishment of the UNESCO Man and Biosphere program in

1971, in order to improve the relationship between people and his environment as well as to preserve it through the utilization of natural resources in a sustainable manner (Schaaf & Rossler, 2010), the study of the important role of sacred natural sites continues to increase. Their importance as the guardian of biodiversity conservation become the main reason for such places to be preserved. Also, along with the preservation of biological resources, diverse cultural values that accompanied the use and management of sacred natural sites is maintained in harmony.

On the national scale, understanding the importance of these places has encouraged the National Committee of MAB-Indonesia under the coordination of Indonesian Institute of Sciences (LIPI) to take the initiative in exploring the role of natural sacred sites which perceived through its existence can preserve biological and cultural diversity. To initiate the program, a national workshop entitled “*Sacred Natural Sites: The Role of Culture in the Conservation of Biodiversity*” has been held in 2007. This workshop has presented 15 papers from various viewpoints in understanding the role of sacred natural sites in several representative cases in Indonesia. Furthermore, the representation of three presented topics associated with the Sundanese culture such as *Kasepuhan Gunung Halimun* (Adimihardja, 2009), *Mandala Baduy* (Iskandar, 2009), and *Kasepuhan Cibedug* (Yogaswara, 2009) show a significant opportunity to develop a related study in the Sundanese region. Principally, this study aims to consider the landscape conditions and its cultural properties which highly expected store critical information to achieve the nature conservation through preservation of Sundanese sacred natural sites, or known as *kabuyutan*.

According to scientific literature about the historical development of the Sundanese culture, *kabuyutan* known as sacred natural sites that sanctified for generations by the Sundanese people. Sundanese landscape as a living place for Sundanese people has been predicted to keep a variety of *kabuyutan*'s forms and functions as a source of information to understand the development of Sundanese culture. This condition has inspired Sundanese scholars to assess the existence of *kabuyutan* particularly from the standpoint of philology, archeology, and anthropology. They have been considering the *kabuyutan* in evaluating the past condition of the Sundanese people by identifying the historical artifacts or manuscripts related to *kabuyutan*. Based on these three major sources of information, *kabuyutan* were defined as a sacred place that functioned as a religious and

education activities, in particular for people who lived during the glory of the Sundanese Kingdom (until the end of 1600s).

The existence of *kabuyutan* exhibits a cultural reflection of the Sundanese people based on their spiritual needs that actualized in a space named *kabuyutan*. Through understanding *kabuyutan* as an element of the Sundanese landscape (*tatar Sunda*) as well as the culture of the Sundanese people (*urang Sunda*), the relevant information related to the physical structure and function of *kabuyutan* can be obtained as a basis for formulating a sustainable landscape management. Sustainability in the context of a wise-use of *kabuyutan* both their structure and function to ensure the future generation's use.

1.1.2. *Kabuyutan* as a sacred natural site

1.1.2.1. Etymology of *kabuyutan*

Understanding the term of *kabuyutan* is important before further consideration of its critical role in both ecological and cultural point of view. Recent studies on *kabuyutan* are mostly handled by the philologist and archeologist who took the information from the remaining of the historical aspect of *kabuyutan* both in writing (script and inscriptions) and physical heritage in a historic site. The term of *kabuyutan* based on etymology derived from Sundanese language by the word of *buyut*. This word is used to anything else in the same of sacredly forbidden by some hereditary or traditionary injunction (Wessing, 2006). *Buyut* is also a term of relationship to a descendant in the forth-generation, as the Great Grandfather or Great Grandchild. As for the *kabuyutan* are the places of worship of the ancestors (Kartakusuma, 2006; Rigg, 1862).

Besides, the prefix (*ka-*) and suffix (*-an*) in the word *kabuyutan* mean something (an object or place) associated with the object that is explained. Thus, either objects or places related to the ancestors can be classified as *kabuyutan*. Moreover, the term of *kabuyutan* can be assumed from the Arabic that derived from word *buyut* (بيوت) which is the plural form of the word *bait* (بيت) which means significant places (Hans, 1976; Steingass, 1882).

1.1.2.2. Historical background of *kabuyutan*

The Sundanese historian has considered the existence of *kabuyutan* as a religious place for *urang Sunda* since the pre-history period (Hafidz, 2014). Figure 1.1 shows the

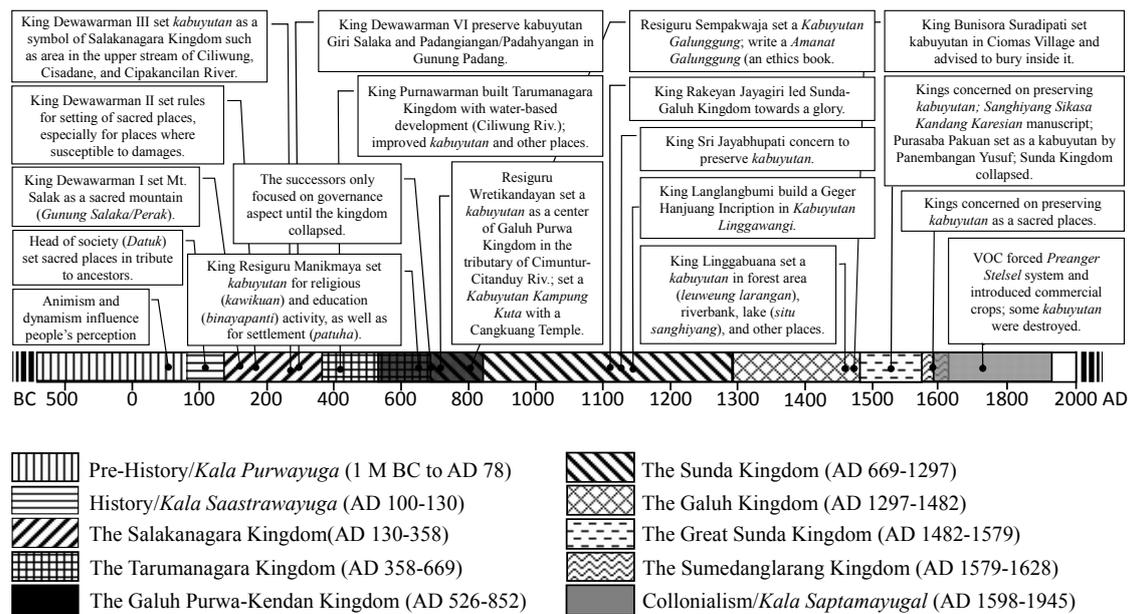


Figure 1.1. Historical timeline of the existence of *kabuyutan* (Source: Hafidz, 2014)

historical development of *kabuyutan*. In the *kala purwayuga* (1 M BC to AD 78), *urang Sunda* through their particular belief in animism and dynamism has already had a spiritual relationship with nature and produce a harmonization in various forms of religious artifacts such as menhir, altar, or symbolic and monumental statues (Yondri, 2013). This condition continues to historical period (AD 100-130) which is confirmed by worshipping objects and ancestral spirits that usually led by a traditional leader (*Datuk*). Furthermore, the establishment of Salakanagara (AD 130-358) as the first Hindu kingdom in the western part of Java, the King Dewawarman I set Mt. Salak as the first and the main *kabuyutan* in his territory. This policy was continuously implemented by his successors such as designation of upstream Ciliwung River, Cisadane River, and Cipakancilan River as other *kabuyutan* for the Salakanagara Kingdom until the King Dewawarman VI set *Kabuyutan Giri Salaka* and *Kabuyutan Padahyangan* at Mt. Padang before the kingdom being collapse and replaced by the Tarumanagara Kingdom.

Although the government transferred to the Tarumanagara Kingdom (AD 358-669), the existence of *kabuyutan* is inherited and maintained as one of the policies in the King Purnawarman period. In his period, *kabuyutan* are functioned not only as a symbol of the kingdom but also as religious and education center and mainly influenced by Hinduism as the state religion (Munandar, 2013). After the collapse of Tarumanagara, as the first king of the Galuh Purwa Kingdom (AD 526-852), The King Resiguru Wretikandayan

continues to implement the policy in maintaining *kabuyutan*. Given the significant role *kabuyutan* for the kingdom, the area located in the tributary of Cimuntur River and Citanduy River has been arranged as the main *kabuyutan*. Similarly, the Cangkuang Lake where located in the riverside of Cimanuk River has been designated as *kabuyutan* with the Cangkuang Temple as the primary element (Figure 1.2). At the same time, The King Resiguru Sempakwaja who entrusted to lead the Galunggung region as a part of Galuh Kingdom has established his territory as *Kabuyutan Galunggung*. In this period, the importance *kabuyutan* became a primary concern of the Kings. The manuscript of *Amanat ti Galunggung* confirmed that the parable of a king who could not keep *kabuyutan* is worse than the weasel's skin in the trash (Danasasmita, 1987; Kartakusuma, 2006; Munandar, 2013).

The existence of *kabuyutan* as a symbol of the kingdom as well as the center of religious and education activities proceed to be maintained, especially in the glorious period of the Great Sunda Kingdom (AD 1482-1579). *Kabuyutan* on that time more influenced by the traditional belief of *Sunda Wiwitan* that embraced by *urang Sunda* in general. However, the influence of Hinduism and Buddhism still exist even though unnoticeable (Munandar, 2013). Finally, the policy in maintaining *kabuyutan* is ended by the time when the collapse of the last kingdom in *tatar Sunda* (The Sumedanglarang Kingdom in the year 1579 to 1628) and the power handed over to the colonial rule (1598-1945 AD). Since then, *kabuyutan* just be the remains of history that keep a high cultural value for *urang Sunda*.

However, through understanding the *kabuyutan* as a sacred place due to the presence of spirits either from sacred objects or ancestors who buried at the site, the

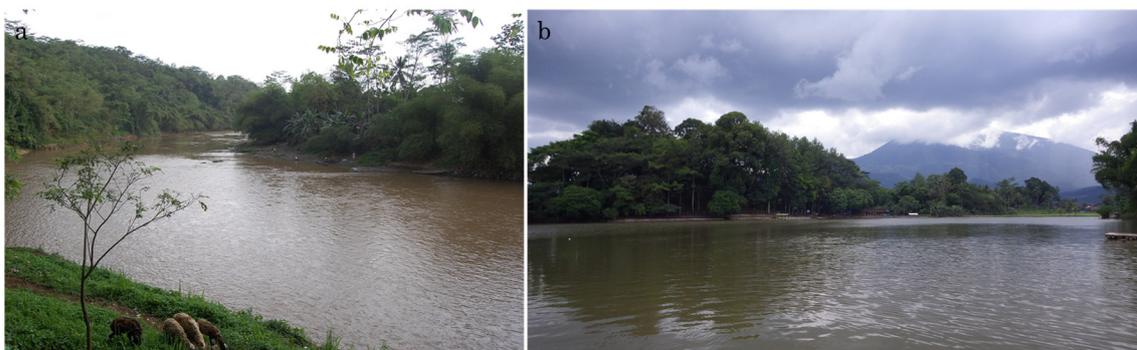


Figure 1.2. *Kabuyutan Karangkamulyan* is located in the tributary of Cimuntur and Citanduy Rivers (a) and *Kabuyutan Cangkuang* where surrounded by a sacred lake (b) (Sources: <https://goo.gl/xPSyvv> (a) and documentation of author (a)).

existence of *kabuyutan* is well maintained. Although not became a primary purpose in the management of area by the authorities in a particular time, *kabuyutan* were managed independently by local communities who live together with *kabuyutan*. The number of visits by pilgrims in particular proves their existence either to the past arranged *kabuyutan* or that determined recently (Fadillah, 2006).

1.1.2.3. *Kabuyutan* in the Sundanese historical heritage

The term of *kabuyutan* commonly known by archeologists who focus in the field of cultural heritage and local culture and by the philologist who reviewed the literature of the ancient language in the Sundanese old manuscript. *Kabuyutan* in Sundanese culture known since the days of ancient history by the evidence that found in the historical manuscripts (*naskah*) and inscriptions (*prasasti*). Several manuscripts such as *Naskah Amanat ti Galunggung* (Galunggung Commission), *Naskah Bujangga Manik* (Story of *Bujangga Manik*), and *Naskah Carita Parahiyangan* (Story of *Parahiyangan*) have presented the term of *kabuyutan*. As for the inscriptions, *kabuyutan* were found in *Prasasti Sanghyang Tapak*, *Prasasti Batutulis*, and *Prasasti Kabantenan*.

As an example, in the manuscript of *Amanat ti Galunggung* (Danasasmita, 1987), known also as the commission of Darmasiksa as a king of the Sunda Kingdom (1175-1297), *kabuyutan* is mandated to be preserved and protected from foreign interference. *Kabuyutan* considered as an important place for a religious and education center in the Sundanese Kingdom. Moreover, a parable of the king who was not able to keep *kabuyutan* like weasel's skin in the trash even more despicable. *Kabuyutan* has been described in the *Amanat ti Galunggung* as follows:

“..Luk, banyaga nu dék ngarebutna kabuyutan na Galunggung, asing iya nu monangkon kabuyutan na Galunggung, iya sakti tapa, iya jaya prang, iya höböl, nyéwana, iya bagya na drabya sakatiwatiwana, iya ta supagi katinggalan ramaresi, lamun miprangkona kabuyutan na Galunggung, a(n)tuk na, kabuyutan, awak urang na kabuyutan, nu lowih diparaspade, pahi dong na Galunggung, jaga bonangna kabuyutan ku Jawa, ku Baluk, ku Cina, ku Lampung, ku sakalian, muliyana kulit di jaryan, madan na rajaputra, antukna boning ku sakalaih..”

The term of *kabuyutan* also written in the inscriptions of *Kabantenan* that found by Raden Saleh in 1867, *kabuyutan* mentioned as follows:

“..//0// pun ini piteket Sri Baduga Maharaja Ratu haji di Pakwan Sri Sang Ratu Dewata nu dipitekatan (na)na lemah dewa sasana di su(n)da sembawa mulah aya nu nupahya, mulah aya nu nahoryaan te beh timur hanggatciraub ka sanhyan

salila, ti barat hangat ruseb. ka mu(n)jul ka bakekeng, cihonje. ka muhara cimuncang pun. ti kidul hanggat ka leuweung comon. mulah mo mihape ya. na. dewa sasana sanggar kami ratu. saparah jalan kagirangkeun. lemah larangan pigeusaneu para pun. ulah ek waya nu keudeu dibeunangng ing ngagurat na aing heman. di wiku pun ini piteket nu seba di Pajajaran. miteke tanna kabuyutan di sunda sembawa aya ma nu yuan mulah aya nu nyekapan. mulah nu munah-munah inya. nu ngaheuryanan lamun aya nu keudeu paambahna lurah sunda sembawa. ku aing ditah dipaehan. kena eta lurah kawikwan”.

In this inscription, the term of *kabuyutan* was described as a protected area and exempted from taxes. *Kabuyutan* located in the capital city of *Sunda Sembawa* and *Jayagiri* were sanctified due to its function as the center of religious activities that led by the monks (*wiku*). The monks who live in *kabuyutan* not only plays their role as a spiritual leader but also assists in taking care of the welfare of kingdom and its inhabitants. *Kabuyutan* in both places composes two regions, namely core zone (*lemah larangan*) and buffer zone (*sangga*) which have autonomy rules that cannot be entered by unauthorized people and killed as a punishment for noncompliance.

As a sacred place, *kabuyutan* were restricted to be visited and used by unauthorized people. Only certain people who can come into and utilize the resources in *kabuyutan*. Various restrictions and prohibitions were set in the concept of taboos (*pamali*) that perceived as the main customary law in maintaining the sanctity and sacredness of *kabuyutan*. The long-institutionalized rules have a positive impact not only in the historical and cultural aspects but also the ecological aspects.

1.1.2.4. Narrative of *kabuyutan* and associated concept

*Mangka miturut lajuning laku patanjala
Cukcruk ti hulu watonna, bari mapay munday ka muarana
Mangka nete dina rancage, mangka nincak dina kawiwahaan
Dinu mengkol ngilu mengkol, dinu nyurug ngilu nyurug
Bras ka muara awor jeung sagara deui*

(narrated by the elder)

Understanding *kabuyutan* as one of elements in the Sundanese landscape need more considering about the concept of the Sundanese traditional landscape management where *kabuyutan* have existed. Information about this concern is collected from the in-depth interview with a Sundanese environmental activist who has been conducting revitalization of the environmental management based on traditional ecological knowledge of the Sundanese people. Some information from the same source has been

well documented by Rahayu et al. (2016) who examine the environmental laws based on the local wisdom of Sundanese people. A limitation on spatial information of Sundanese landscape in the context of philosophy, theory, and its application, principally is caused by the traditional rules that prohibit in delivering related information before conducting a field survey (*saba*). Thus, the exploration and documentation of traditional ecological knowledge are very much determined by the active involvement of researchers.

In the concept of environmental management based on the local wisdom of Sundanese people as an expression of their traditional ecological knowledges, the three cardinal rules of *Sunda (tri tangtu Sunda)* is perceived as a principal constituent to control the interaction between human and nature, among human, and between human and God (Appendix 1). The ancestors perceived that human and nature have one dimension that can be clearly illustrated with the human body that has similar structure and function with nature, such as head/upstream (*sirah*), navel/midstream (*udel*), or foot/downstream (*dampal*). The fundamental relationship between human and nature produces experience (*pengalaman*). Furthermore, relation with experience generates knowledge (*ilmu*), and good deed (*amal*) as the final result of association with knowledge.

Tri tangu is also applied in selecting the actor of relation with the particular criteria and tasks, namely the elder (*karamaan*), the scientist (*karesian*), and the government (*karatuan*). Regarding the scale of implementation, *tri tangtu* also specified by categorizing into micro-scale (*kasaliraan*), meso-scale (*kabalareaan*), and macro-scale (*kabuanaan*). This prominent inspired by the traditional forecast (*uga*) related to natural resource management such as mentioned in the oral tradition of *Pantun Bogor*, "*Sunda kudu ngahampura, sabab Sunda kabagean memeres jaman*" (*Sunda must forgive because Sunda mandated to fix the era*). Furthermore, implementation of management is performed through three primary stages, namely foundation (*kabataraan*), development (*kadewaan*), and implementation (*karatuan*).

Kabataraan is an essential step that determines the sustainability of subsequent processes. This stage is addressed (1) to arrange the principal area of a landscape consisting of protection area (*leuweung larangan*), conservation area (*leuweung tutupan*), and production area (*leuweung baladahan*); (2) to determine the degree of damage consisting of no damage/reasonable (*sri*), low-impact (*lungguh*), moderate (*dunya*), heavy-risk (*lara*), and dangerous (*pati*); (3) to calculate the recovery period that consists

of beginning (*nista*), middle (*madya*), and ending (*utama*); and (4) to determine the carrying capacity per year. Arranging the critical area is a priority in initiating the process of management, in particular for the rehabilitation purpose. The ancestor of Sundanese people utilizes the structure and function of a river or '*patanjala*' as the most important instrument in arranging the landscape. *Patanjala* is considered due to its function that mentioned in the manuscript of *Amanat ti Galunggung* as a commission for guidance in life. The term of *patanjala* is described as follows,

“Ku na urang ala lwirna patanjala, pata ngarana cai, jala ngarana (a)pya, hanto ti burung/ng/eun tapa kita lamuna bitan apwa téya, ongkoh-ongkwah dipilalwaeun di maneh, gena(h) dina kageulisan, mudal kasimwatan, mullah kasiweuran ka nu miburung/ng/eun tapa, mullah kapidéngé ku na carek gwaréng, ongkwah-ongkoh di pitineung/ng/eun di manéh, iya ra(m)pés, iya geulis”.

which can be translated as,

“We emulate the ‘patanjala’; ‘pata’ means the water, ‘jala’ means the river. Would not waste our good deeds, if we follow the river. Focus on the flow to be passed, enjoy the meander, do not easily influenced, do not care about the things that would frustrate our good deeds; do not listen or pay attention to bad speech, and focus on our ideal desire. In a perfect and beautiful way.”

Through a survey of the river (*saba sunge*), Sundanese people are demanded to be able to value and understand the process of life embodied by the river which began its emergence from the springs, flowing towards the estuary, turning onward meander, falling down through waterfall, and arriving at the estuary to end at the ocean. The philosophy of water is a foundation for introducing *patanjala* as the concept of environmental management based on the watershed. The idea of *patanjala* is described through the following poem,

*Dina laku patanjala, mibanda tilu perkara
Tatahar jeung naratas, dipungkas ku neuteupkeun
Ari tatahar nyawalakeun laku urang
Laku keur pangauban, ta ya deui iwal keur babakti
Ari naratas mapay keur laku urang
Laratan pangauban nu di hilir, tengah, jeung di girang
Ari neuteupkeun nangtukeun laku urang
Tangtuna panguban keur larangan, tutupan, jeung baladahan
Tah kitu lajuning patanjala, mo dibasa keur mun can disaba
Tah kitu lajuning patanjala, tutungkusan karuhun urang*

Tah kitu lajuning patanjala, pa keun darma keur bangsa jeung nagara

Tah kitu lajuning patanjala, laku diri saestu keur babakti

which can be translated as,

“Patanjala consists of three main activities: preparation (tatahar), initial assessment (naratas), and determination (neuteupkeun). Tatahar is deliberation on activities to be undertaken to pangauban (landscape-based watershed) as a deed; naratas is a survey of pangauban in the downstream, midstream, and in the upstream; neuteupkeun is an arrangement of pangauban for protection (leuweung larangan), conservation (leuweung tutupan), and production (leuweung baladahan). That is the activities of patanjala, will not be told if it has not been surveyed, as an ancestral heritage that is intended for service in the nation, as well as the behavior to serve.”

The poem confirms the importance of zoning for implementation of the environmental management (rehabilitation and preservation) within the scope of a watershed-based landscape (*pangauban*). *Pangauban* as an ecological extent with the cultural values to strengthen its identity has been determined by the flow of water or river (*patanjala*) including a spatial unit from the upstream, midstream, and downstream. Water flows from the mountain region through the small river (*seke* and *solokan*), continue to the middle river (*susukan* and *wahangan*), then join to the big river (*walungan*) until it ends at the ocean. Furthermore, the basic concept of the establishment of protection, conservation, and production area is to maintain the continuity of the structure and function of the essential elements of nature, namely land and water (*lemah-cai*). Through this concept, each region that plays a major role in maintaining soil and water are perceived to be kept according to their origin (*wiwitan*) and certain function (*tangtu*) that have been set by the God.

The ancestor of Sundanese people perceived the implicit message conveyed by the Creator through every creation by utilizing wisely to ensure the future availability and utilization. The springs and its surrounding environment became a major focus of management, and they set this area as *leuweung larangan* that severely restricted in use. *Leuweung tutupan* have been set as the buffer zone in the upstream and downstream, in any riparian, as well as in *lemah mala* (dangerous land to human life and more regulated to be abandoned and grow naturally). As for *leuweung baladahan* were located outside the two previous areas have been arranged to fulfill the physical needs of human as a counterweight of spiritual needs. Based on the characteristics of places that make up these three principal areas, the ancestors perceived all part of their landscape as a mandate to

be guarded. Their perception, preference, and knowledge are expressed by sanctification that led to the establishment of sacred places named as *kabuyutan*.

Figure 1.3 shows a diagram of the implementation of *tri tangtu Sunda* in a whole watershed-based landscape (*pangauban*). By understanding the substance of *pangauban* which focused on water conservation as a vital element for living's life, a prior strategy concentrated on the protection of the upstream area (head/*sirah*, neck/*beuheung*, and chest/*dada*). Through their traditional ecological knowledge, the ancestors mandated to determine a zoning in this particular areas through the following steps:

1. Determine the main spring in the watershed (No. 5);
2. Calculate the distance between the ridge (A-A') that derived from the spring to the right ridge (No. 5 to A'), then from the spring to the left ridge (No. 5 to A);
3. Calculate the distance between the spring and the peak (No. 5 to B') using feet measurement that will be converted to metric system in the final calculation;

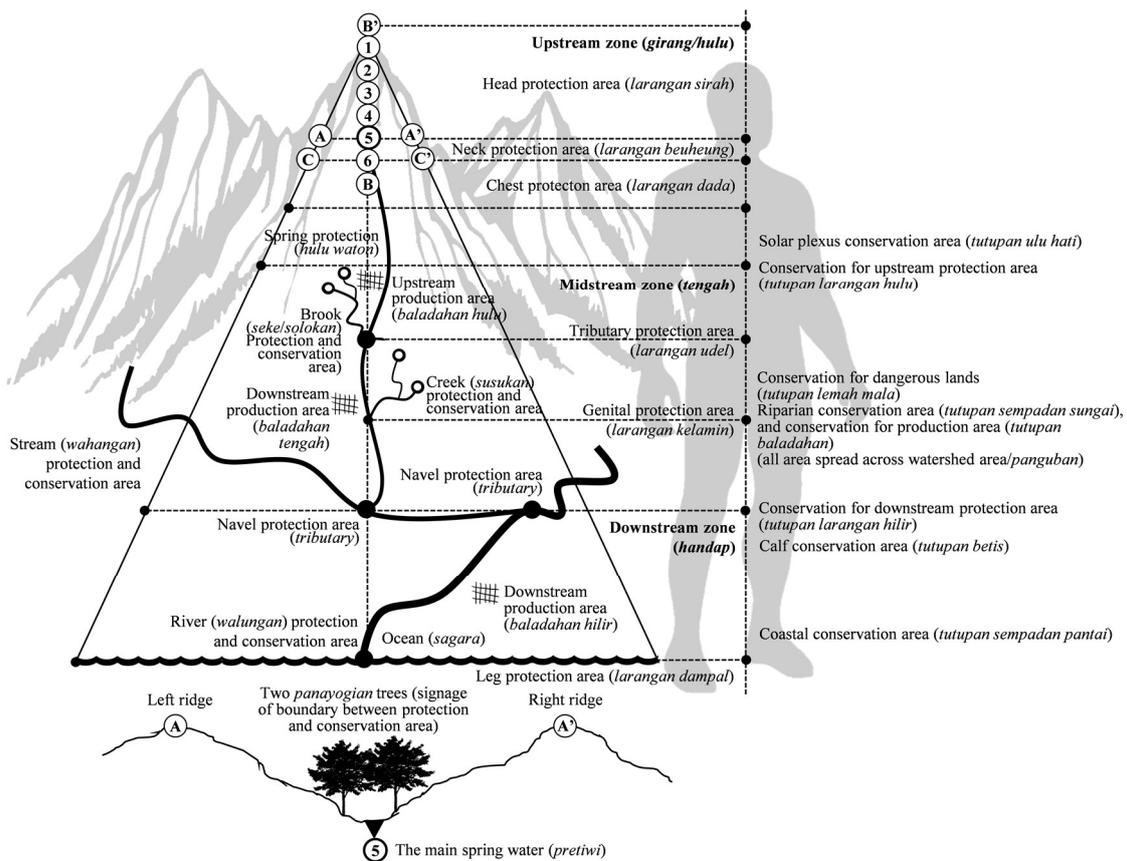


Figure 1.3. Diagram of the implementation of *tri tangtu Sunda* in zoning of the watershed-based landscape (Source: based on in-depth interview with a Sundanese environmental activist and also local people of Ciomas Village).

4. Determine the area of 1, 2, 3, 4, and six based on the calculation of distance (feet) between No. 5 and B’;
5. Calculate the distance between B and B' as length (feet);
6. Calculate the distance between C and C' as width (feet);
7. Calculate the area of head, neck, and chest prohibition zone.

1.1.2.5. *Kabuyutan* within Sundanese landscape

Based on the ecological perspective, *kabuyutan* can be interpreted as a space in which there are a variety of landscape elements with their respective functions are interrelated in one unified system. Physically, *kabuyutan* compose of natural elements such as trees, rocks, springs, rivers, soil, and artificial or cultural elements such as graves, inscriptions, statues, and altar. In the ecological framework, a *kabuyutan* represents a patch that linked to other patches by the river as a corridor (*patanjala*). Several interacting patches of *kabuyutan* can be characterized as a mosaic in the Sundanese landscape that formed based on hydrological system (Figure 1.4).

Kabuyutan connect the mountain (water source in the upstream) to the ocean (downstream) that sustained by basins as water retentions before further utilization. The ancestors understood this related water-based area as a *pangauban* with *kabuyutan* as one

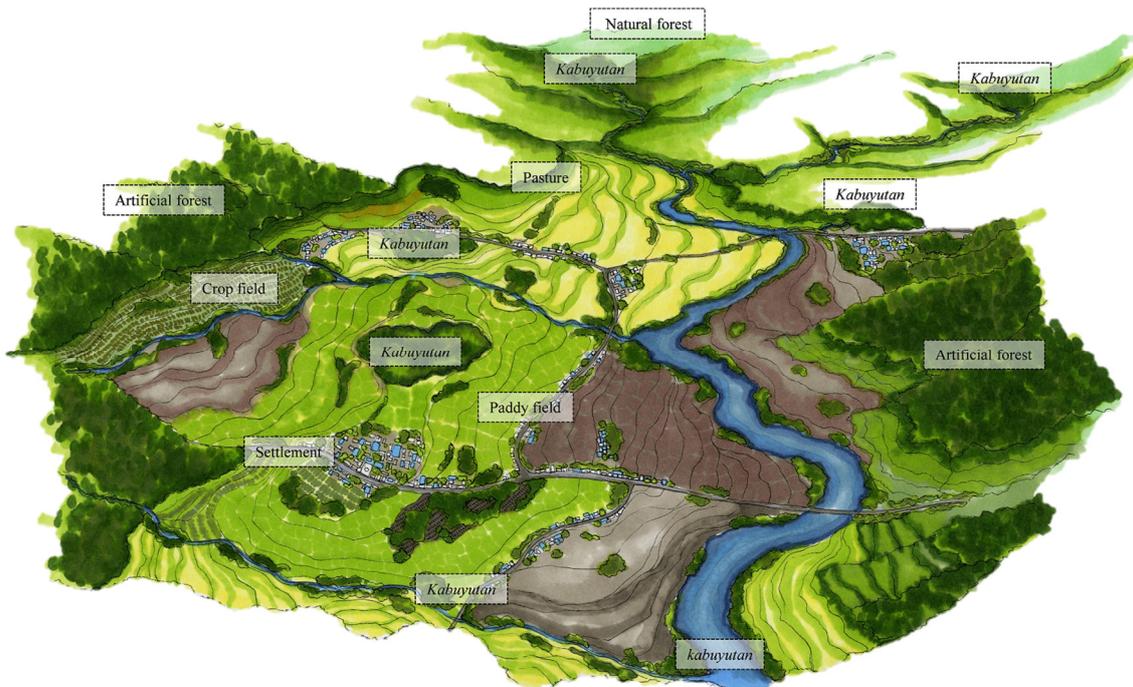


Figure 1.4. Configuration of *kabuyutan* in the Sundanese landscape (*tatar Sunda*) (Source: author).

of the elements where distribute along the river. The structure of Sundanese traditional landscape has been formed based on forest functions, namely protection, conservation, and production area and spatially adjusted to the flow of water or river (*patanjala*). Protection area, usually known as *kabuyutan*, are placed at any point of the spring. These areas have specific rules that prohibit unauthorized people from entering and utilizing the forest resources. The surrounding of protection area functions as conservation area where set by limited utilization to support the protection area. People are permitted to plant timber trees, fruit, and cash crops. This land-use type is known as the forest garden (*kebon-talun*) (Christanty, Abdoellah, Marten, & Iskandar, 1986; Soemarwoto, 1984). As for the production area is used for dwelling and agriculture in general. In this area, various types of land-use such as mix garden (*kebon campuran*), home garden (*pekarangan*), fish pond (*balong*), livestock sheds (*kandang*), and public facilities. The mixed garden is agriculture land that planted by diverse species of plants with random planting system. As for the home garden defined as a small-scale agriculture used for planting variety of plants for their daily needs, and usually combined with various types of livestock (Christanty et al., 1986).

1.1.3. Characteristic of Sundanese landscape

1.1.3.1. Historical aspect

Sundanese landscape (*tatar Sunda*) is a region where the Sundanese people (*urang Sunda*) are living and practicing their daily life activities. The term of *Sunda* in the context of the place has been mentioned in some Sundanese historical manuscripts and inscriptions as an evidence of the existence of Sundanese Kingdom (Kingdoms that ruled in the *tatar Sunda* from AD 130 until 1579). In the inscription of *Kabantenan* which found in 1867 is specified a name of a place called *Sundasembawa* as a sacred place in the region of the Sunda Kingdom (Ekadjati, 1995). An evidence in the historical manuscript least reported by Ekadjati (1995) contained in four manuscripts that were written in the late 15th century, namely *Carita Parahyangan* (Atja & Danasasmita, 1981b), *Siksakandang Karesian* (Atja & Danasasmita, 1981c), *Sewaka Darma* (Danasasmita, 1987), and *Bujangga Manik* (Noorduyn & Teeuw, 2006). According to the historical development, *tatar Sunda* has experienced several changes in its boundaries. Historically, the border of *tatar Sunda* can be found in a manuscript of *Bujangga Manik* that states, “*sadatang ka tungtung Sunda, meu(n)tasing di Cipamali, datang ka alas Jawa*” which means, “upon

arrival at the end of the (region) Sunda, (then) crossing in the (river) Cipamali to go to Java”.

In the first Sundanese Kingdom period in *tatar Sunda*, the power of Salakanagara Kingdom (AD 130-358) were demarcated in the western part of Java Island from the Sunda Strait to the edge of Citarum River as a boundary in the east. The area of *tatar Sunda* has been more expanded to the eastern part of Java Island to the brink of Cipamali River under the power of the Tarumanagara Kingdom with the Ciliwung River as a center of the kingdom. Then, the power was divided into two kingdoms due to the rapid development in the eastern region. First, the Sunda Kingdom that located in the western Citarum River until the Sunda Strait, and second, the Galuh Kingdom that located in the east Citarum River to the edge of Cipamali River. After the Tarumanagara Kingdom collapsed, two kingdoms clearly separated and independently declared as a kingdom. However, the two kingdoms reunited become the Great Sunda Kingdom in 1482 with the territory at a whole of the area in the first period of Tarumanagara (Figure 1.5).

The collapse of the Great Sunda Kingdom in the late 16th century (1579) has led to the division of the *tatar Sunda* into four major regions (Banten, Cirebon, Sumedanglarang, and Galuh). As a successor to its former glory, Sumedanglarang and Galuh region have

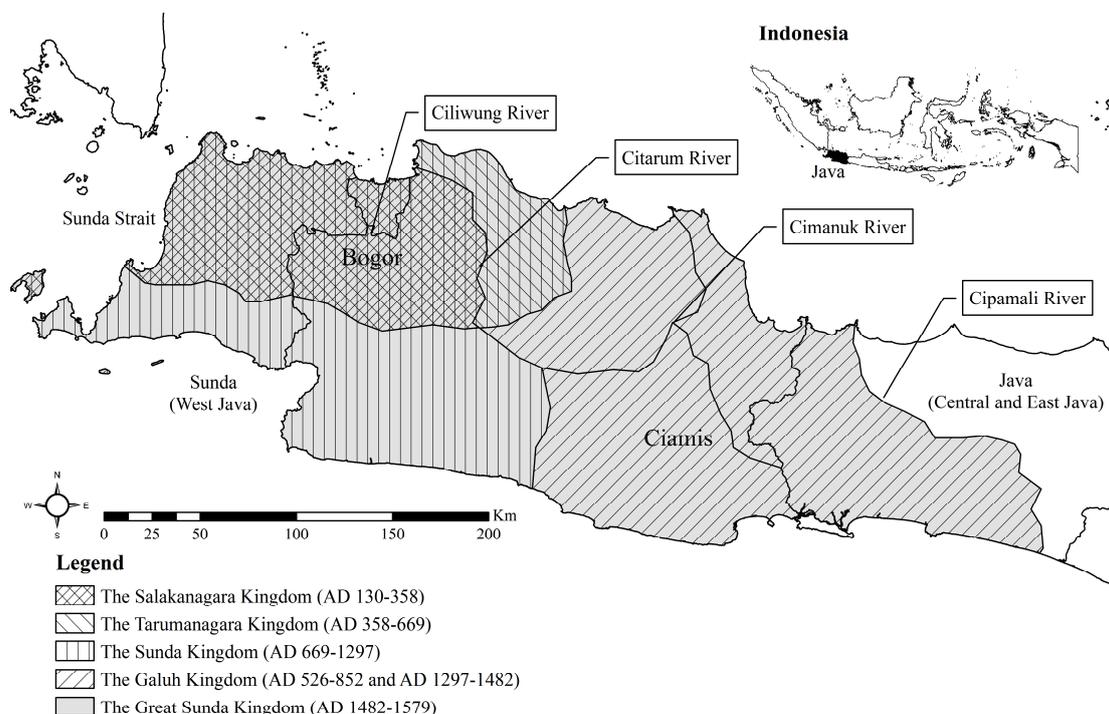


Figure 1.5. Historical map of development of *tatar Sunda*.

merged into the Sumedanglarang Kingdom (1579-1628). This condition also shows the change in *tatar Sunda* into more rural-centered development due to the location of the center of the kingdom in the inland and mountainous area (Ekadjati 1984). The condition led to *tatar Sunda* more known as *Sunda Parahiyangan* or *Priangan* (Lubis et al., 2003), while for Banten and Cirebon has evolved as an independent sultanate (Ekadjati, 1995).

Furthermore, the arrival of Europeans to Indonesia in 1598 has affected significant changes in the delimitation of *tatar Sunda*. Before *tatar Sunda* handed over its control to the VOC (*Vereenigde Oost Indische Compagnie* or the Dutch East India Company) as the dominant European power, *tatar Sunda* has been established as the administrative area with the same level as regency by the Sultan of Mataram in 1641. The power of Mataram Kingdom in *tatar Sunda* has ended by the Agreement of Semarang (*Verdrag van Semarang*) with the VOC (Lubis et al., 2003; Suriawidjaja, 2006). In the first agreement (1677) both parties were agreed to hand over the eastern part of *tatar Sunda*, then a whole of *tatar Sunda* was handed over to the VOC as a consideration for the settlement of problems in the Mataram Kingdom in Java according to the second agreement in 1705.

History proceeded with the control of *tatar Sunda* under the Dutch's power by dividing the Java Island into nine prefectures which one of them is the *Priangan* Prefecture that consists of Cianjur, Bandung, Sumedang, and Parakanmuncang. The division is based on the Dutch's policy of *Preangerstelsel* that considered advantageous. In 1811, *tatar Sunda* was controlled by British's power with Governor Raffles as a leader. *Tatar Sunda* was divided into 16 prefectures, and one of them is *Priangan* Residency that includes eight *afdeeling* (Cianjur, Sukabumi, Bandung, Cicalengka, Sumedang, Limbangan, Tasikmalaya, and Sukapura). Zoning on that period more influenced by the deployment of agricultural production centers, such as tea and coffee in particular. The western of *Priangan* more preferable for planting tea, while coffee plantation was suitable in the eastern region.

During the British's power, *tatar Sunda* was integrated as part of the West Java Province together with Banten, Batavia (Jakarta), and Cirebon based on the decisions Statute No. 235 and 378 in 1925 (Ekadjati, 1995). On that moment, the term of West Java began widely used as the name of the administrative area rather than as a living cultural identity in *tatar Sunda* itself (Ekadjati, 1995). Subsequent developments in the post-independence of the Republic of Indonesia since 1945, *tatar Sunda* initially compounds

a whole of the region within the administrative area of West Java Province except the Special Capital Region of Jakarta (DKI Jakarta) which set to be the capital city of Indonesia in 1964. Currently, *tatar Sunda* located in the three administrative regions, namely West Java, DKI Jakarta and Banten Province that has been established as an independent province in 2000. However, the Sundanese sense and influence is perceived remaining in the western part of Java.

1.1.3.2. Physical aspect

The current physical condition of *tatar Sunda* is the result of a natural development that has taken place over an extended period. This condition is determined by a variety of natural processes such as the rising and falling on the earth's crust (orogeny), volcanic activity, earthquakes, changes in the flow of rivers, and other natural processes (Garna, 1984; Yondri, 2013). The physical form of the landscape in *tatar Sunda* is a unity between the alluvial lowland areas in the north and the mountainous region in central and southern parts. Based on the geological structure and morphology, van Bemmelen (1949) divides *tatar Sunda* into four physiographic zones, namely Jakarta's zone, Bogor's zone, Bandung's zone, and the Southern mountainous zone with their typical characteristic. The condition of these zones has been formed by the removal progressively from west to east and causing the area in western Java becomes more hilly and mountainous (Djubiantono, 2006; Garna, 1984).

Jakarta's zone is a lowland and plain zone that ranging from west to east and formed by the deposition of alluvial soil due to the volcanic eruption in the southern regions such as Mt. Gede, Mt. Pangrango, and Mt. Salak. Bogor's zone and Southern mountainous zone are a hilly and mountainous area that located in the southern Jakarta's zone and stretching from west to east (Cipamali River). Bogor's zone is divided into two sub-zones, the first zone from the west with Mt. Karang (1,778 meters above sea level, and hereafter m asl) as the highest point to be bounded by Mt. Sanggabuana (1,291 m asl) and the eastern zone formed by a collection of Mt. Sunda such as Mt. Burangrang (2,064 m asl), Mt. Tangkuban Perahu (2,084 m asl), Mt. Bukit Tunggul (2,209 m asl), Mt. Manglayang (1,818 m asl), Mt. Tampomas (1,684 m asl), and Mt. Ciremai (3,078 m asl). Similarly, the Southern mountainous zone is composed of a cluster of mountains with a variety of elevation. The mountainous Pangalengan area with Mt. Kancana (2,182 m asl) is the highest point while other places distributed with an average elevation of 1000 m asl.

Bandung's zone is classified as plateau zone with a combination both low and high elevation of mountains range. This zone extends from the western region that starts from the highlands of Cianjur, Bandung, to the east in the highlands of Garut, Tasikmalaya, Citanduy valley and ends at Sagara Anakan Lake. The position of Bandung's zone that located between three other zones has formed the landscape by a combination of plains and mountains zone. This condition affects the Bandung's zone has a lot of mountains and valleys (Figure 1.6). The mountains were formed in the Bandung's zone such as Mt. Guntur (2,249 m asl), Mt. Galunggung (2,241 m asl), Mt. Talaga Bodas (2,201 m asl), Mt. Cakarabuana (1,721 m asl) and Mt. Sawal (1,733 m asl) have a major function to set up a central region of the mountainous landscape in *tatar Sunda* in addition to bound between the zones. The mountain ranges such as Mt. Salak (2,211 m asl), Mt. Halimun (1,925 m asl), Mt. Pangrango (3,019 m asl), and Mt. Gede (2,958 m asl) confine Bogor's zone from Bandung's zone. The Cluster of mountains in the south such as Mt. Patuha (2429), Mt. Malabar (2321), Mt. Wayang-Windu (2,182 m asl), Mt. Papandayan (2,622 m asl), and Mt. Cikuray (2,821 m asl) limits between two zones and southern mountainous zone.

The existence of the fourth zone has formed the characteristics of *tatar Sunda* with topography ranging from lowlands, highlands, up to the mountainous area. The characteristic of *tatar Sunda* as mountainous areas has affected the character of elements that compose the entire landscape such as soil, water, climate, vegetation, and animal.

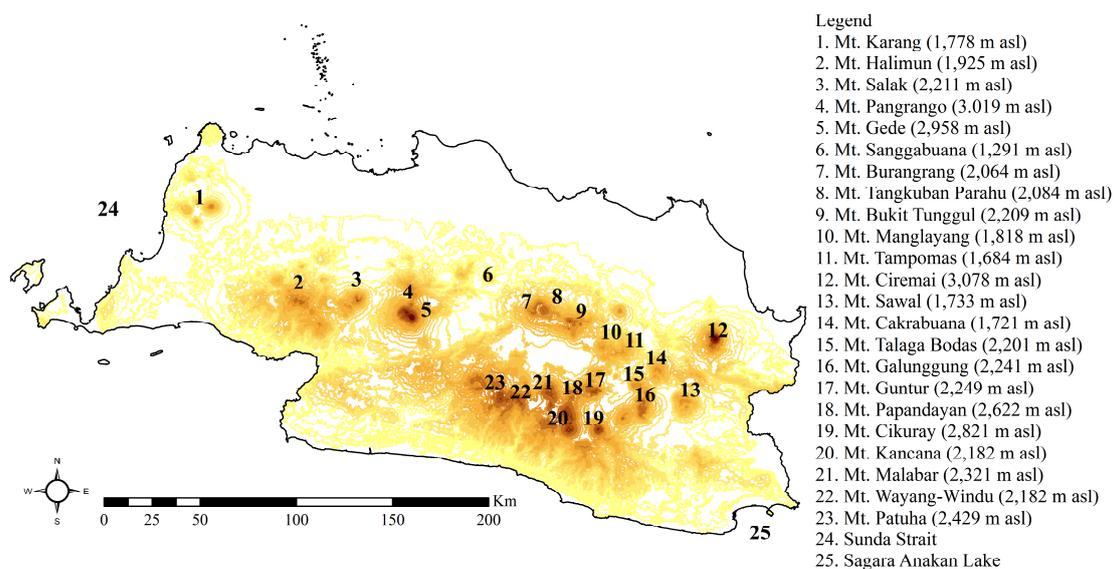


Figure 1.6. Mountainous ranges in *tatar Sunda*.

Land in *tatar Sunda* is dominated by the results of alluvial deposits and volcanic ash (Arsyad, 2010). The soil types that resulted from these activities such as latosol and regosol support *tatar Sunda* has a high fertility. Furthermore, the range of mountains in *tatar Sunda* has formed the characteristic of *tatar Sunda* as a region with abundant water resources. As the most important source for human beings and other creatures, water emerging from the springs in the mountains and then flows through the rivers then passing between mountain range. Small rivers flow water to the river with a greater capacity to gather and develop a whole river system (the river network). By considering the boundary of *tatar Sunda* based on historical and ecological aspects which bounded by the Cipamali River, at least 423 watersheds grouped into ten river systems. A total of 167 rivers flow into the North *tatar Sunda* (the Java Sea and the Sunda Strait) and the 256 rivers flow towards the south (the Indian Ocean). The abundance of rivers crossing the *tatar Sunda* offers abundant water resources (Figure 1.7).

The condition of *tatar Sunda* with abundant water resources and fertile soil strongly influenced by the weather that suitable for the mountainous area. Based on the climate data in the last decade (BPS, 2016) the average annual rainfall in *tatar Sunda* of 1930 mm with the number of rainy days of 176 days, and some regions have an annual level of rainfall above 3000 mm. *Tatar Sunda* has a higher level of rainfall than the eastern part of Java region. In addition, the average annual temperature in *tatar Sunda* of 23⁰ C with the lowest temperature of 17⁰ C and the highest stands at 29⁰ C. This condition also supports the weather conditions in *tatar Sunda* warmer all year round even in the rainy season and in the dry season.

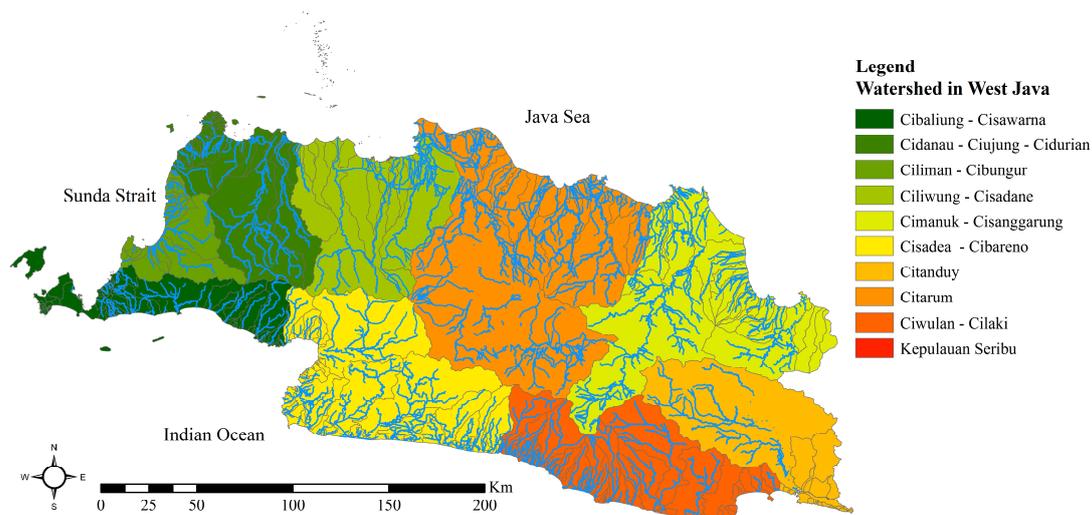


Figure 1.7. Hydrological condition in *tatar Sunda*.

The figure of topography and morphology of *tatar Sunda* can also be identified by understanding the content of the historical manuscript that describes the physical condition of *tatar Sunda*. The *Bujangga Manik* is one of the manuscripts that has been transcribed and translated into English by a Dutch scientist named J. Noorduynd and A. Teeuw (2006) in their book "Three Old Sundanese Poems". The manuscript tells the journey of a Hindu monk and also a Prince of the Sunda Kingdom who explores Java and Bali to meet the spiritual's needs as an ascetic. In general, about 450 places in Java are observed correspond to the natural formation at the site (topography) and more than 100 places in *tatar Sunda* with the prefix *Ci-* respectively. The evidence shows a closeness of Sundanese people in relationship with their environment that understood as a region with abundant water resources. People recognized their places and named by associating on aspects related water such as *Ci-bodas*, *Ci-beureum*, *Ci-tarum*, *Ci-liwung*, and *Ci-pamali*. (*Ci* = *cai* = water). Also, naming the area by using other natural physical characteristics such as ravines, mountains, hills, valleys, conceived as an integral part of their lives that used as the basis for the naming of their dwellings. Naming places like *Dayeuh Luhur* (a high place) showed evidence that the *tatar Sunda* having the physical characteristics that vary from flat, hilly to mountainous, as well as having valley areas. However, the dominance of the mountains creates *tatar Sunda* more known as *Sunda Parahiyanan*.

1.1.3.3. Socio-cultural aspect

Urang Sunda is the people who live and practice full daily activities in *tatar Sunda*. People are recognized as *urang Sunda* if their parent is from Sundanese ethnic or grow in a social environment with Sundanese culture and running the Sundanese norms and values (Ekadjati, 1995; Rosidi, 1984, 2000). Based on the historical development of *tatar Sunda*, there is a recognition of *urang Sunda* which constituted his residence as *urang gunung*. *Urang gunung* (mountain people) is simply defined as people who are living in mountainous areas (Rigg, 1862). Thus, Sundanese people who are living and practicing in almost all activities of life in the mountainous regions (*parahiyanan*) are deserved as the mountain people.

The archaeologists and philologists at least been able to describe who the Sundanese people and how culture is created as a result of their interaction with the environment. Understanding *Sunda* in the traditional context, the scholars always associate it with the Sundanese people who exist in Kanekes (*urang Kanekes*) (Ekadjati,

1995) and also known as *urang Baduy* (Garna, 2006). The living of *urang Kanekes* is different in many respects than the *urang Sunda* in general. Some differences are noticed regarding customs, social order, and religion or beliefs that held by *urang Kanekes* in relation with their environment. Customs that reflected in *urang Kanekes* is the result of understanding, practicing, and continuing the values for generations to gather into a set of values that are still accepted and implemented by the descendants. The number of customs exhibits *urang Kanekes* as a model of ancient or traditional Sundanese culture (Ekadjati, 1995). This shows the firmness of *urang Kanekes* in maintaining traditional values and their persistence in resisting the influence of foreign cultures.

Urang Kanekes inhabit and live in the remote inland areas of western *tatar Sunda* (located in Banten Province). *Kampung Kanekes* (hamlet) located in the northern region of Mt. Kendeng (1200 m asl) and close to two major rivers which flow across the hamlet (Ciujung River and Cidurian River). This hamlet surrounded by hills and among them is Mt. Howe which recognized as a very sacred place because of the presence of *Arca Domas* in Leuweung Ower (sacred forest of Ower). Many opinions of experts who explain the origin of *urang Kanekes*. However, *urang Kanekes* stated that their existence has existed since the first human being on earth (Adam) (Ekadjati, 1995). The recognition was followed by the particular roles and tasks of *urang Kanekes* in relation with *urang Sunda* in general (Ekadjati, 1995). *Urang Kanekes* said that they live in a region also known as a *mandala* or *kabuyutan* that believed as a center of religious activity (Garna, 2006; Munandar, 2013; Prawiro, 2013). Their presence in the sacred place and require them to *tapa di mandala* by following the sacred rules (*buyut*) as determined by their ancestor to keep the human relationship with God, between human, and human with nature. Some rules are handled, such as:

“Buyut nu dititipkeun ka puun adalah nagara satelung puluh telu, bangawan sawidak lima, pancer salawe negara, gunung teu meunang dilebur, lebak teu meunang dirusak, larangan teu meunang dirempak, buyut teu meunang dirobah, lojor teu meunang dipotong, pondok teu meunang disambung, nu lain kudu dilainkeun, nu ulah kudu diulahkeun, nu enya kudu dienyakeun.”

which can be translated as,

“Buyut (rules) entrusted to puun: thirty-three countries, sixty-five rivers, the center of the twenty-five countries, the mountain should not be crushed, the valley should not be undermined, the taboo should not be disrupted, rules should not be changed,

the length should not be cut, the short should not be jointed, the other must be excluded, the prohibition must be denied, the right must be justified. "

Urang Kanekes understand that their life is to do a *tapa di mandala* (strive in *mandala*) and *tapa di nagara* (strive in the country) for *urang Sunda* in general (Ekadjati, 1995; Garna, 2006). *Tapa* (imprisoned) in this case is perceived as practicing the best according to their respective duties. By the description in the manuscript of *Amanat ti Galunggung* that defines the meaning of *tapa* with a charity (Atja & Danasasmita, 1981a; Danasasmita, 1987),

"Carek na patikrama na urang lanang-wadwan, iya twah iya tapa. Iya twah na urang. Gwareng twah gwareng tapa, maja twah maja tapa, rampes twah rampes tapa; apana urang ku twahna mana beu(ng)har, ku twahna mana waya tapa."

which can be translated as,

"According to the teachings in patikrama (all customs), for men and women, charity is the same as tapa. That is the meaning of our charity. Poor charity, the worst tapa. Moderately charity, moderate of tapa. Perfect charity perfected tapa. Because our charity we can become rich because of charity we also we succeed in tapa."

Urang Kanekes are entrusted to perform six major tasks: (1) *Ngareksakeun Sasaka Pusaka Buana* (keeping a place of worship in *Sasaka Pusaka Buana*); (2) *Ngareksakeun Sasaka Domas* (maintaining a place of religion in *Sasaka Domas*); (3) *Ngasuh ratu ngajayak menak* (caring and respecting the government); (4) *Ngabaratapakeun nusa telu puluh telu, bangawan sawidak lima, pancer salawe nagara* (defending the 33 countries, 65 rivers, and the center 25 countries); (5) *Kalanjakan kapundayan* (hunting and fishing for annual ceremony of *kawalu*); and (6) *Ngukus ngawalu muja ngalaksa* (burning incense during worship, *kawalu* and *laksa* ceremony). Traditional beliefs of *urang Kanekes* who believe in the existence of *Batara Tunggal* (The Almighty) or *Batara Jagat* (The Lord of the world), or *Batara Seda Niskala* (The Supreme Invisibility), or *Nu Ngersakeun* (The Supreme Desiring) influenced in these tasks. The beliefs are trusted and continued to perform in each aspect of their lives and known as the *Sunda Wiwitan* or *Jatisunda* (Ekadjati, 1995; Garna, 2006; Indrawardana, 2014).

Urang Kanekes are mainly practicing traditional agriculture system by utilizing local resources around their hamlets, and they are prohibited from farming wet paddy. They are mandated to plant dry paddy (*huma*) which only grown and harvested once a year. Their agricultural production can only be relished by themselves and when

welcoming guests. There is a prohibition to sell their farm products. Besides, they are strictly permitted to hunt three animal species (squirrels, deer, and elk) and four fish species (*soro*, *paray*, *kancra*, and *udang*).

Reflecting on the experience of *urang Kanekes*, there are some considerable differences compared to *urang Sunda* outside *Kanekes* who known as *Dangka people*. Currently, the majority of *urang Sunda* have been practicing their lifestyle like a modern human live that has been treated by information and technology. Furthermore, they have embraced the teachings of Islam as their religion although the teaching of previous religions such as dynamism, animism, Hinduism, and Buddhism is assimilated and acculturated in practice (Kahmad, 2006; Najib, 2006). Before accepting Islam, the religious life of *urang Sunda* is strongly influenced by the belief in the supernatural or magical powers beyond the power of God such as from the ancestors and other spirits (Munandar, 2006). That is being a critical point that must be avoided in the Islamic teaching. However, there are some Sundanese communities outside *Kanekes* who are still embracing and practicing *Sunda Wiwitan* such as people in *Kasepuhan Ciptagelar* who residing in the Mt. Halimun-Salak region. Nevertheless, Prawiro (2013) reported that the current religion of *urang Kanekes* is *Slam Sunda Wiwitan* by adding the word ‘Slam’ to response the influence of Islamic teachings in *Kanekes*.

1.2.Previous study on *kabuyutan*

As noted earlier, the term of *kabuyutan* at least has been found in scientific studies since the mid-20th century. In the study of philology, *kabuyutan* was a part of the research findings rather than the primary object of study which mainly focused on the transcription and translation of historical and cultural relics (Ekadjati, 2006). Similarly, in the archeological studies that concern to identify the traditional Sundanese culture, *kabuyutan* still a part of the research findings (Munandar, 2013). Likewise, from the standpoint of anthropology, the term of *kabuyutan* is mentioned only as a part of the Sundanese culture that functioned as a religious place (Garna, 2006; Wessing, 1999). Subsequently, some archaeological and philological studies have been conducted to examine *kabuyutan* as the primary object of research from the end of the 20th century (Djubiantono, 2006; Inagurasi, 2006; Kartakusuma, 2006; Munandar, 2006, 2013; Saringendiyanti, 1993).

In these studies, particularly in the archaeological study, Saringendiyanti (1993) conducted a specific study by taking an ecological point of view in uncovering aspects of the existence of *kabuyutan*. Saringendiyanti (1993) concluded that the placement of *kabuyutan* greatly influenced by the physical environment of the site such as close to the water resources, located on fertile land, and placed in a higher place than the surrounding environment (hills or mountain). In subsequent studies, in addition to reviewing the physical aspects of the environment that have been described by Saringendiyanti (1993), Kartakusuma (2006) improved the objective by adding the religious function. Ecologically, Kartakusuma (2006) explained that the existence of *kabuyutan* in Kawali has a connection with the surrounding landscape (Cimuntur River) as well as presented a hypothesis that rivers connect among *kabuyutan*.

In the standpoint of anthropology, the studies about *kabuyutan* are more developed to describe the meaning of *kabuyutan*, particularly regarding the influence of Islamic Teaching on the classic heritages both tangible and intangible. The reason behind the sacredness of *kabuyutan*, the existence of supernatural power generated from both sacred object or a person who is buried in the *kabuyutan* become the main reasons (Fadillah, 2006; Najib, 2006). Fadillah (2006) mentioned the places commonly used as *kabuyutan* such as hills, public cemetery, sacred graves, and other natural places are deemed to have powers beyond human control. As for the cultural approach in the study of *kabuyutan* more focused on identifying the influence of religious teachings or people's believe in the past to the existence of *kabuyutan* (Munandar, 2006, 2013).

According to a literature review of several related studies about *kabuyutan*, there is a lack of study that examines a comprehensive aspect of *kabuyutan* both from ecological and cultural point of view. Based on the findings presented earlier by the scholars, the scientific proof is important whether the connection between *kabuyutan* and water resources has a strong relationship or vice versa. Also, with a description of the ecological characteristic in the placement of *kabuyutan* which closely related to its surrounding environment needs to be more examined and proofed by the empirical data. Further, cultural information of *kabuyutan* in the current condition need to be more explored to understand its function. Although, some basic functions of *kabuyutan* have been successfully examined based on their particular aspect, a comprehensive analysis is crucial to deal with the problem when the interaction of different functions arises.

Therefore, a landscape ecology-based study promises to provide comprehensive information regarding the existence of *kabuyutan* according to their physical form and function in the system of ecology and culture.

1.3. Justification of study

Indonesia as a country with diverse ethnicity, of course, provides a variety of values and cultures that is reflected in the structure of cultural landscape. Sundanese people as the second largest ethnic group in Indonesia has shown its existence by the presence of sacred natural sites that are scattered in almost all regions of *tatar Sunda*. However, the lack of knowledge according to the critical role of these places leads to destruction. Understanding about the role of sacred natural sites is perceived as a sacred place that merely serves as a place to respect their ancestors and to express their spiritual values. This matter is also a critical issue in the term of the spiritual development of *urang Sunda* that continues to evolve with the current religious teachings (Islam). The majority of *urang Sunda* challenges a different perception and paradigm with the minority who is still practicing the classic teachings to understand about *kabuyutan*. In reality, however, the majority of *urang Sunda* who has become a Muslim (the person who is embracing Islam), the classical teachings are assimilated and acculturated in some religious activities. The condition is also occurring in other Indonesia ethnicity such as Javanese (Sunyoto, 2011).

The existence of sacred natural sites and associated activities are mainly perceived has a close relationship with the presence of supernatural powers other than the power of God (*Allah Swt*) that currently believed by the majority of the Sundanese people. The fundamental difference between classic beliefs that believes the power of creatures as a helper and the belief in Islam that believes only God who has absolute power to help is considered become the main issue in a cultural context (Najib, 2006). More emphasized that participating creatures with God is regarded as a big sin for the Muslim. With the oneness concept of God (*tawhid*) in Islam, everything that tends to or definitely leads to associating partners with God will lead the culprit out from Islam (apostate). Consequently, there is a lack of understanding that leads to a disharmony among society as well as between society and the environment in appreciating and understanding the phenomena of *kabuyutan*. However, of course, another prevailing view owned by the people who are still practicing the whole or part of the classic teachings either recognized

as a true follower or they have become the Muslim need to be considered further. As a result, sustainability of *kabuyutan*'s structure and function in line with understanding among the people as a source of peace can be achieved.

This phenomenon was considered to be the cause of physical destruction that occurred in the sacred natural sites. For example, some *kabuyutan* in Ciomas have experienced crucial damage such as in *Kabuyutan Baros* which lost an essential element (three large trees) that believed by some people to have magical powers (Figure 1.8). The condition is interpreted differently by people who consider the existence of these trees could potentially lead to the sacredness beyond the religion rules that would fall into idolatry¹. Historically, Sundanese people have been experiencing in a spiritual development since the ancient believe of animism and dynamism to acculturate with the new teachings such as Hinduism, Buddhism, and recently with Islam which is embraced by majority of Sundanese people. Regardless of the pros and cons of the different understandings of religious standpoint, however, this condition has caused an ecological system becomes impaired. Local people said that the impact of the loss of trees which they regard as “*tutunggul kampung*” or the pillar or anchor of the hamlet have affected the condition of water resources become diminishing in their areas.

Considering the current issue in *kabuyutan*, the interplay between people and their landscape cannot be separated from religious teachings embraced by the people. The importance of religion was a concern of a British historian, Christopher Dawson who states that we cannot be able to understand a phenomenon in society before we understand their religion (Zoetmulder, 2007). *Urang Sunda* also known as the religious community certainly cannot be separated the relationship with religious teachings which they believed. This reciprocation is revealed in the presence of *kabuyutan* that threatened its survival due to the lack of mutual understanding in facing the ecological and cultural phenomenon in *kabuyutan*.

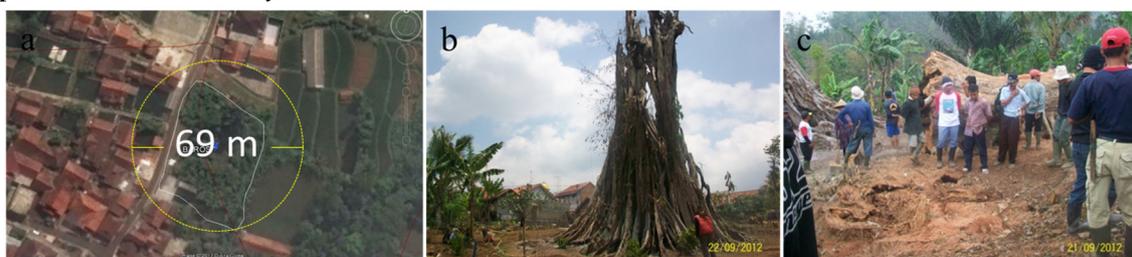


Figure 1.8. Three large sacred trees of *Kabuyutan Baros* with diameter canopy around 69 m (a) has disappeared due to lack of understanding (b and c) (Source: doc. of KATCI).

Concerning to the actual conditions, especially in *tatar Sunda* where the inhabitants who have diverse perceptions, preferences, and also the level of knowledge, the appropriate solution that can fill the lack of understanding is crucial. Through these efforts are expected to fill the gaps in knowledge that have an impact on mutual understanding to reduce or even avoid the destruction of the ecological and cultural function of sacred natural sites. Also, previous studies related to the existence of *kabuyutan* is limited to the archaeological and anthropological aspect. Most of the study particularly focused on certain aspects such as the presence of artifacts and interplay with the community regarding both culture and religion, and also the relationship to the physical environment. Previous studies have not been able to reconstruct the concept of *kabuyutan* and associated values in the context of landscape that affects the sustainability of both ecological and cultural system. A great deal of study has been conducted on the *kabuyutan* but few comprehensive studies have been carried out, mainly to discover the connectedness of *kabuyutan* with the surrounding environment and people.

Furthermore, a lack of information about *kabuyutan* in the present context needs to be fulfilled by conducting an explorative study to examine the physical extent and function of *kabuyutan* in a landscape from the ecological and cultural perspective. Ecologically, the existence of *kabuyutan* is assumed has a high ecological diversity such as various types of plants, animals and other environmental elements with their particular functions. In addition, the existence of *kabuyutan* has been perceived as a space for local people in demonstrating their spiritual values, social, as well as their culture.

1.4.Objectives and scope of study

Given the background of the study mentioned previously, research questions are addressed as follows: (1) how is the function of *kabuyutan* in the current Sundanese landscape? and (2) what is the alternative solution for the sustainability of *kabuyutan*? The basic understanding of the definition of *kabuyutan* is required to answer the research questions. Concerning the previous studies, the term of *kabuyutan* has been described by the philologists, archeologists, and anthropologists as a place that functioned as a center of religious activity as well as an education center following the settlement space of *wiku* in the ancient period. Their existence was characterized by the influence of the pre-history (megaliths), classic (Hinduism-Buddhism), as well as Islamic religious system. From an

ecological standpoint, *kabuyutan* defined as specific places that are designated as restricted areas for using the existing resources due to certain reasons. These places particularly composed by natural elements such as rivers, rocks, and trees. In the context of geomorphological, the placement of *kabuyutan* has been identified close to water resources and in the high position (hill or mountain). Culturally, *kabuyutan* has sanctified and consecrated by the community in the future due to its vital function both in the ecological and cultural system, and their remaining sacredness.

Although the definition of *kabuyutan* tends to portray a religious atmosphere in the pre-history and classical period (hereafter classic period) with a distinctive character, the existence of sacred places stipulated following the collapse of the Great Sunda Kingdom and the influence of Islam can also be categorized as *kabuyutan*. The sacredness of those locations that confirmed by the local communities is perceived as one of the essential conditions for *kabuyutan* status. Moreover, by considering the aspects of etymology (combination of prefix and suffix on *kabuyutan*), every object or place associated with the ancestors can also be classified as *kabuyutan*.

Based on those important points, the presence of *kabuyutan* is determined by physical conditions and their typical management systems. Physically, *kabuyutan* vary in shape and fundamental elements that are different from the surrounding environment. Also, their existence needs to be strengthened by the recognition of the community towards the sacred status. Therefore, the definition of *kabuyutan* used in this study is unique places sacred to the people who live in the vicinity because of the presence of supernatural powers both derived from inanimate objects (springs, rivers, rocks, trees, and graves) or something considered alive (ancestral spirits and other spirits).

This study was determined to understand the existence of *kabuyutan* in the Sundanese landscape as a basis for reevaluating its existence both from the standpoint of ecology and culture. As an explorative study towards an actual phenomenon case, this study emphasizes on three objectives: (1) to analyze the ecological conditions of *kabuyutan*, (2) to analyze the status of the culture associated with *kabuyutan*, and (3) to analyze the potential tourism as a solution for sustainable management of *kabuyutan*. The first and second objectives were set to answer the first question which is expected to reveal the current ecological and cultural characteristic of *kabuyutan*. As for the third objective was

set to deal with the second question to determine the appropriate solution for sustainability of *kabuyutan* through a tourism activity.

Regarding the broad ecological and cultural aspect related to *kabuyutan*, the study on ecological aspect was emphasized in the exploration of the physical condition and the ecological functions of *kabuyutan* to find the main ecological characteristics of *kabuyutan* which mainly focused on a landscape and plant species analysis. As for the study on the cultural aspect emphasized on exploring local people perception affecting the existence of *kabuyutan* to understand the role of society towards sustainability of *kabuyutan*. Besides, study of the tourism aspect is emphasized on finding alternative solutions for the sustainable management of *kabuyutan* by utilizing the existence of *kabuyutan* and associated ecological and cultural values as tourism objects and attractions.

Furhtermore, this study aims to understand the meaning of the sustainability of a landscape. Concerning a definition of sustainable development proposed by the World Commission on Environment and Development (Brundtland, 1987) as development that ensures the needs of the present generation without compromising the ability of future generations to fulfill their needs. This concept can also be associated in managing the sacred natural sites. Thus, the benefits could be utilized by many generations not only by the people who live around it but also for the people in general, to understand its existence as a cultural and natural heritage that is worthy of human beings (UNESCO, 1972, 2005).

1.5. Structure of study

This study is organized in seven chapters to answer the two research questions: (1) how is the function of *kabuyutan* in the current Sundanese landscape? and (2) what is the alternative solution for the sustainability of *kabuyutan*? Chapter one is focused on introducing the current issued related to the sacred natural sites and *kabuyutan* in particular, as well as the justification and objectives. Chapter two explains the conceptual and methodological background, research design, as well as the local setting. Chapter three and four are presented to provide the current condition of *kabuyutan* both from the ecological and cultural point of view. The potential of *kabuyutan* as a tourism destination for sustainable landscape management is explored in chapter five. A general discussion is presented in chapter six, and overall conclusion and recommendation are summarized in chapter seven (Figure 1.9).

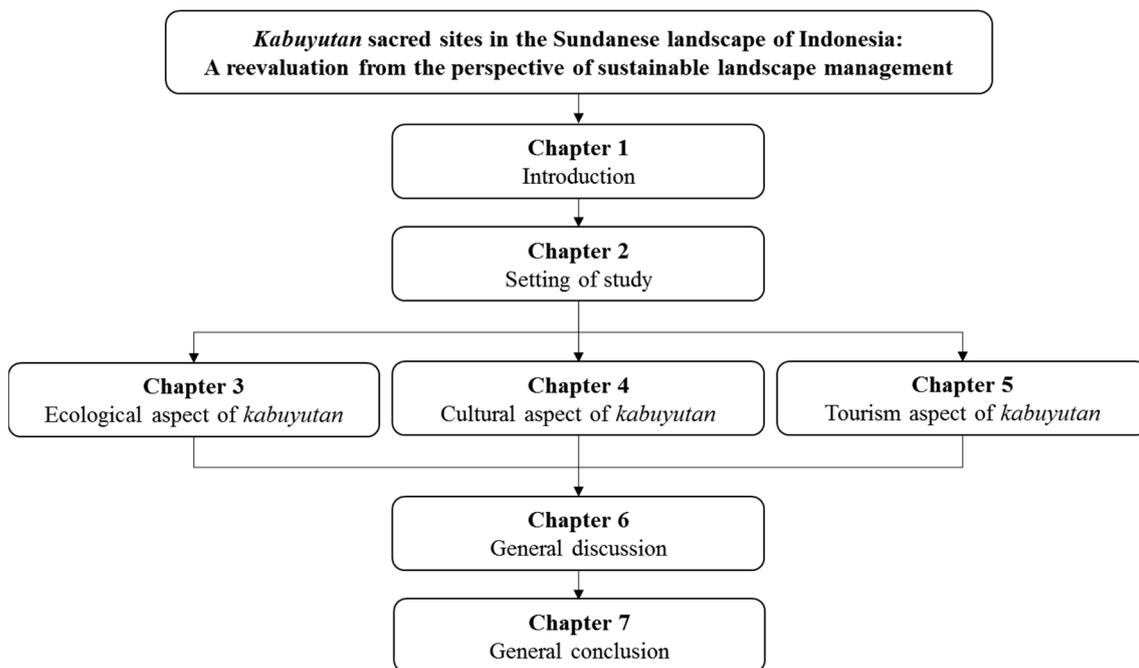


Figure 1.9. Structure of study.

2 SETTING OF STUDY

2.1. Conceptual background

2.1.1. Cultural landscape based on landscape ecological approach

This study relies on an understanding of *kabuyutan* as a cultural landscape element with landscape ecology standpoint. The definition of the landscape in this study refers to some expert opinion that in general has defined as a reflection space an ecosystem or more heterogeneous which is more focused on the spatial characteristics of these ecosystems (Farina, 2001; Forman & Godron, 1986). The formation of ecosystems is determined by the interaction of the main constituent elements, both natural and human aspect (Forman & Godron, 1986). The dominant influence of humans on the natural landscape shaped its character that reflects the expression of distinct identity of the people (Antrop, 1997, 2006) known as the cultural landscape (Farina, 2000, 2001; Nassauer, 1995).

Landscape ecological approach in this study is focused on understanding their intertwined relationship between landscape and culture. The landscape is categorized as a cultural landscape because of the influence of the culture so that their existence is not only shield the natural structure but also preserve the cultural values. Nassauer (1995) proposes a premise that culture shapes a landscape, and the landscape affects culture. Furthermore, Nassauer (1995) offers four basic principles for understanding the cultural aspects from landscape ecology standpoint: (1) the perception, cognition, and the value of human influence and are influenced by the landscape; (2) the cultural conventions that also affect the existence of the landscape; (3) the difference between the concept of culture and related scientific concepts in understanding the ecological functions of the landscape; and (4) the existence of cultural values remain in the landscape.

On the other hand, Farina (2000) attempts to understand the ecological characteristics of a cultural landscape that is summarized as follows; (1) the productivity of the cultural landscape merges with the features of the environment (ecotopes); (2) the natural process and culture are intertwined with one another; (3) disturbance caused by human activities affect the ability of recovery; (4) the diversity of a landscape mosaic can be maintained; and (5) processes in the landscape such as the flow of energy, nutrients, and organisms, connectivity, and the establishment of an independent character in every ecological matrix can also be maintained. Therefore, to understand the existence *kabuyutan* as a form of the cultural landscape can be studied with the landscape ecological approach.

Landscape ecology as a discipline that investigates the relationship between environmental components in a spatial space is evolving not only focused on consideration of the interaction between elements in the cultural landscape, but more focused on the influence of the culture itself (Farina, 2001; Nassauer, 1995; Naveh, 2000). Landscape ecology proposes an understanding about a landscape which is emphasized in the analysis of the structure, function, and change of the landscape. The structure can be understood as a relationship and spatial arrangement of a landscape element or a set of objects in the ecosystems that make up a composition and configuration (Dramstad et al., 1996; Forman & Godron, 1986). In the study of landscape ecology, the term patch is used to describe a non-linear structure in addition to the linear structure (corridor) and determined as the smallest component in the analysis. Henceforth, a collection of patches is defined as a matrix in a landscape that is characterized by diverse or even homogeneous, separated or connected, and the unity between the structural components that form a mosaic (Dramstad et al., 1996; Forman & Godron, 1986)

Forman and Godron (1986) define the function as an interaction of the constituent elements of the landscape. The interaction causes the flow of energy, materials, and species of the landscape structure, the movement of animals, plants, water, air, wind, and other materials (Dramstad et al., 1996). The change is a modification due to the reduction or improvement that occurred in the structure and function of the landscape (Forman & Godron, 1986). The changes in the landscape structure affect its function and vice versa. The conditions that affect each other is an important concern of ecological landscape studies that not only focus on one element, but it becomes more thorough and

comprehensive (Farina, 2001, 2006a, 2006b). For example, a change in an agricultural landscape with its traditional character there is an area composed by tree stands, then that component is removed, it will affect other landscape elements such as the loss of genetic resources, water, soil, air, and retaining pests. Furthermore, Farina (2001) asserts that in examining a landscape, it is important to pay attention to the essential elements in a landscape such as spring water or some particular places were important element of landscape were exits without ignoring the role of other parts as a whole.

Considering the characteristics of the landscape continues to evolve that are affected by natural systems as well as by culture (Farina, 2001, 2006a; Forman & Godron, 1986), the role of management is crucial, especially for landscape conceived ecologically and culturally significant. Management performed on each natural and cultural element while considering their relationship (Farina, 2001, 2006c) after conducting a survey towards elements and functions, as well as the changes in the landscape (Forman & Godron, 1986).

Referring to Forman and Godron (1986), based on the landscape ecological approach, management of *kabuyutan* as a sacred natural site or sacred landscape can be categorized as management of remnant natural landscapes in the matrix of cultural landscapes such as agriculture area, rural settlement, production forest, even in urban residential areas. Changes in this category are more influenced by human interference such as land-use changing that affect the isolation of the landscape structure due to the increasing of fragmentation that causes vulnerability of interior species. Forman and Godron (1986) suggest to the management of such landscape, with emphasis on two points. First, structuring the landscape to strengthen its character to support the sustainability of the species interior. Second, balancing function on the flow of energy, species, and material between landscape elements that were examined by the constituent elements surrounding landscape. More emphasized in this regard, management should minimize or reduce the flow of these functions. Furthermore, Farina (2001) stresses that the sustainability of ecological systems within a landscape structure could be guaranteed at the whole of landscape mosaic by considering the connectivity among landscape elements within a landscape.

2.1.2. Implementation of the hierarchical theory

Taking into account the concept of *kabuyutan* that emphasizes the unity and integrity of the function of ecological and cultural systems, watershed-based management is considered as the best approach and is very useful in the study of landscape ecology (Brandes et al., 2005; Farina, 2001, 2006; Karadağ, 2013). This approach is considered capable of connecting various units of analysis where the water flow is a function of the landscape structure. Watershed is an area composed by a river network including the catchment area (upstream) and the water basin area (downstream). In general, the area can be categorized as a landscape and watershed can also be interpreted as a boundary of a landscape (Forman & Godron, 1986).

In the context of watershed-based landscape management, Farina (2001) defines as the implementation of the hierarchical theory. This theory is focused on understanding the landscape based on the scale of priorities. In this case, management can be performed at the highest or lowest level of the watershed according to the characteristics of the landscape at each level. General speaking states that any change in the smallest systems would affect the higher levels of the system. Therefore, understanding emphasized on the scale of priority, so that the change in scale of assessment need to be supported by change in spatial and temporal aspect (Farina, 2001; Wu & David, 2002; Zhang et al., 2013).

Study of ecological systems through hierarchical theory approach tends to rapidly growing due to its ability to provide a better solution compared to other approaches (Wu & David, 2002). This theory is concerned with the reconstruction of the complex system into several subsystems analysis stage (Wu & David, 2002; Zhang et al., 2013). The complex systems have identified two main structures, the vertical structures that make up multiple levels of analysis that affected by the process, and the horizontal structure of the units of analysis. General speaking states that a non-symmetrical relationship appears between two levels. It shows that the level above will restrict the level below, while levels below will provide information on the upper level and not vice-versa. As for the structure analysis unit, the relations are symmetrical and reciprocal.

2.1.3. Towards a sustainable landscape management

Regarding the recommendation for achieving a sustainability of landscape as the final goal of this study, Antrop (2006) gives two key perspectives to the sustainability of landscape. The first perspective is focused on the preservation of the quality and value of

the landscape that is recommended for its achievements through conservation of traditional practices with associated functions as well as maintains the existence of traditional knowledge owned by the community. The second perspective is focused on the economic sustainability of local communities by combining the potential of natural and human resources for the utilization of the landscape in the future. Furthermore, both perspectives can be applied as a basis for determining achievement strategies either through intensification or extensification of the landscape, as well as regarding scale of activity and the time of implementation.

Furthermore, considering the existence of *kabuyutan* that closely related to water resources, the concept of sustainability is concentrated on the sustainable use and availability of water resources. The presence of water greatly affects sustainable development and considered as the main purpose due to its vital function to achieve the sustainability of the social, cultural, and spiritual aspect of the community (WWAP, 2015). Through efficient water resources management, sustainability of other resources both nature and culture can be achieved. In general, the concept of sustainability in this study refers to the concept of sustainable development by the Brundtland Commission in the document "*Our Common Future*" in 1987. This commission states that sustainability is a development that ensures the availability and utilization of natural resources following environmental services for the current generation while considering the expediency and its availability for future generations.

The concept of sustainability focuses on three important aspects, namely, economic, social-political and environmental. To achieve these targets, in 2000 the UN Millennium Declaration was declared to strengthen cooperation among countries in resolving global issues focused on reducing poverty in the world. Through eight goals set out in the Millennium Development Goals (MDGs) are scheduled for 2015, the sustainability aspects related to water resources focused on improving people's access to water resources and sanitation. Furthermore, in 2015, as a continuation of the MDGs set the Sustainable Development Goals (SDGs) to ensure water security for sustainable development with the main target, "*Securing Sustainable Water for All.*" In this case, water security is defined as the capacity of society to ensure access to adequate quantity and ease of obtaining high quality water resources for the sustainability of a healthy ecosystem within the watersheds, as well as to ensure efficient maintenance of life and

wealth against disasters caused by water such as flooding, landslides, loss of land, and drought. This target was set to be achieved in 2030 with the ultimate goal to achieve five objectives, namely: (1) forming a healthy society, (2) increasing prosperity, (3) ensure balance and fairness, (4) maintain the ecosystem, and (5) creating a strong society (WWAP, 2015)

In addition, by understanding a quote of Patrick Geddes, a Scottish pioneer city planners, sociologist, biologist, and geographer, who states "*Think global, act local*" (Stephen 2004), the achievement of sustainability in landscape management also adjusted toward the goals of environmental protection and management in the Act of the Republic of Indonesia No. 32 Year 2009^s. This Act states that a good and healthy environment is a fundamental right of every citizen of Indonesia and the acquisition is fully guaranteed by the state. Furthermore, the current condition showing a decline in quality and quantity of physical environment and function. It is necessary to safeguard and manage the utilization that assured for generations.

Therefore, the conservation and environmental management aimed: (1) to protect the territory of the Republic of Indonesia from pollution and/or damage to the environment; (2) to ensure the safety, health, and human life; (3) to ensure the continuity of life and the preservation of ecosystems; (4) to preserve the environmental functions; (5) to achieve harmony, harmony, and balance the environment; (6) to guarantee fairness of the present generation and future generations; (7) to ensure fulfillment and protection of the right to environment as part of human rights; (8) to control the use of natural resources wisely; (9) to realize sustainable development; and (10) to anticipate the global environmental issues. The integration of both concept is necessary to achieve the sustainability of the Sundanese traditional landscapes management and *kabuyutan* in particular.

2.1.4. Legal aspects

2.1.4.1. Protected area

The existence of *kabuyutan* by formal rules can be addressed from the standpoint of its existence and the presence of the essential element. Both of these viewpoints can support the importance of *kabuyutan* from ecological and cultural aspects. According to the Act of the Republic of Indonesia No. 26 Year 2007^a Concerning the Spatial Planning

and further elaborated in the Government Regulation No. 26 Year 2008^b Concerning the National Spatial Planning, *kabuyutan* can be categorized into a protected area with the main function in protecting the environmental sustainability that include natural resources, man-made resources, the value of history and culture of the nation in order to achieve the sustainable development. The existence of elements in the form of natural resources (water, soil, plants, and animals) and human-made resources (graves) which preserve a high historical and cultural value denotes the importance of *kabuyutan* to maintain its existence.

Kabuyutan spread over protected areas according to the form and function of the protected areas outlined in the Presidential Decree of the Republic of Indonesia No. 32 Year 1990^c Concerning the Management of Protected Areas, particularly in the area of protecting the areas underneath (protected forests and water catchment), local protection (springs, lakes, riparian, and the coastal), nature reserves (game reserves, wildlife reserves, national parks, forest parks, and natural tourism park), the cultural heritage and science areas, as well as disaster-prone areas. Management of protected areas is focused on the protection of land resources, water, climate, plants, animals, as well as historical and cultural values of the nation.

Technically these regulations set the standard rules for the management of protected areas such as the specification for water catchment areas should have a high rainfall and soil conditions that easily absorb water. As for the area around the springs set no less than the radius of 200 m, while for protecting the large-scale of river defined at least 100 m, 50 m for the medium river, and 10-15 m for small rivers around the settlement. This regulation is explained further in the Government Regulation No. 38 Year 2011^d Concerning the River. Also, each region is liable to natural disasters or caused by human interferences such as the area of volcanoes, earthquakes, floods, and landslides designated as protected areas. As for protecting the important cultural and science area is designated around the historical and cultural heritage as well as the certain geological sites. Furthermore, in the context of West Java Province (Regional Regulation No 2 Year 2006^e), protected areas are developed to encompass 45% of the total area by improving the function of protected areas within the forest area, recovering the degraded area, conveying function of reserve forest and limited production forest to protected forest, restricting the development of regional infrastructure in the protected areas, and

establishing forest area at least 30% of the watershed area. The plan is targeted to be achieved by 2018.

2.1.4.2. Natural resources

Given the importance of natural resources and ecosystems to human life and other living things, the appropriate management is essential. *Kabuyutan* that perceived allegedly in preserving a variety of protected species tends to be considered further. The existence of protected plant and animal species due to their extinction and rarity in their availability in nature is a fundamental consideration of the enactment of the Act No. 5 Year 1990^f Concerning the Conservation of Natural Resources and Ecosystems. These species are strictly prohibited to use it in any form, except for the purpose of research, science, and rescue the species. Community participation for sustainability management system is highly regarded through participatory programs from the government.

These biological resources and associated environment elements may exist in the state, customary, or community forest areas (the Act No. 41 Year 1999^g Concerning the Forestry). Regarding the customary forest, before the enactment of the Constitutional Court Decision No. 35 Year 2012, it was categorized as one of forest owned by the state. After issuing the current law, the right of customary forest is returned to the indigenous people. Through these rules, *kabuyutan* can also be categorized as the customary forest or the village forest according to the Ministerial Decree of the Minister of Forestry of the Republic of Indonesia No. 89 Year 2014^h Concerning the Forest Village.

In addition, the presence of water and soil is also beneficial for the human being as well as whole living things. Obtaining water for their minimum basic needs to meet the healthy, clean, and productive is the primary right that must be ensured by the state. However, the availability is facing inequalities towards the increasing of demands. Thus, the appropriate management is crucial. The Act No. 7 Year 2004ⁱ Concerning the Water Resources explains that the water resources management is implemented based on the watershed management to particularly conserve water surface and groundwater. The water resource management is necessary to ensure fairness in their utilization. In addition to that, these regulations guarantee the control of water resources by the indigenous peoples through their customary laws which do not contradict to the national policies and

regulations. In addition, the existence of community and their associated customary laws that recognized and confirmed by local regulations is another requirement to be fulfilled.

2.1.4.3. Cultural resources

The existence of *kabuyutan* not only preserve the natural resources that form a unique characteristic of the ecosystem but added by the historical and cultural values as a result of the long-term interaction of people. The evidence is manifested by the presence of historical and cultural heritages such as the archeological relics from the classic period (dolmen and altar), until the Islamic period (ancestral graves). These elements represent the treasure of culture as a manifestation of the national identity. Therefore, the Government of the Republic of Indonesia enacted the Act No. 11 Year 2010^j Concerning the Cultural Heritage to protect the existence of objects, buildings, structures, sites, and the area of cultural heritage. Further, the Government Regulation No. 78 Year 2007^k Concerning the Ratification of the Convention for the Safeguarding of the Intangible Cultural Heritage enhances the protection efforts regarding these significant cultural elements.

In the context of the protection of cultural heritage in the *tatar Sunda*, the Government of West Java Province sets some related regulations such as the Regional Regulation about the Preservation and Development of Language, Literature, and Literacy (No. 14 Year 2014^l), the Preservation of Art (No. 15 Year 2014^m), and the Management of Archaeological, Historical, Traditional Values and Museum (No. 16 Year 2014ⁿ). Through these regulations, *kabuyutan* as a part of the cultural heritage of Sundanese people can be guaranteed its continuity.

2.1.4.4. Human resources

Local people who are living around *kabuyutan* play an important role to ensure the sustainability of *kabuyutan*. This relation highly appreciated by the state as a potential strategy in developing a community-based management. The importance of local people's participation encourages the government to include this aspect into the relevant regulations. For example, in the regulation of cultural heritage, biological resources, water and soil resources, up to the management of protected areas, the active role of the local people is recognized and expected to support the achievement of the sustainable management.

In addition to the demands of participation based on physical resources, the existence of local residents as human resources is imperative. The presence of local people who live both in urban and rural areas, either directly or indirectly interact with *kabuyutan*, they are bound to participate in its management actively. In particular, the existence of local people who have a special relationship with *kabuyutan* needs to be more considered regarding participation. In this regards, the presence of local people who categorized as indigenous peoples in the formal regulations have been mentioned in the Constitution of the Republic of Indonesia Year 1945^o on the Article No. 18b which states that the state recognizes and respects indigenous peoples and their traditional rights as long as they alive and in accordance with the development of general society and the principles of the Republic of Indonesia. The relation to the management of natural resources, the role of indigenous peoples at least mentioned in the regulation concerning the water resources which is explicitly stated that the state guarantees the role of indigenous peoples in the management of water resources. However, attention needs to be paid to the establishment of local people as indigenous peoples.

For better understanding about the indigenous peoples, the Ministerial Decree of the Minister of Home Affairs of the Republic of Indonesia No. 52 Year 2014^p Concerning the Guidelines for the Recognition and Protection of Indigenous Peoples defines the indigenous peoples as an Indonesian citizen who have distinctive characteristics, gregarious harmoniously based customary law, have a strong relationship with the ancestral origin or similar dwelling, and with the land and the environment, as well as their values which determines the system of economic, politic, social, cultural, legal, and utilize a single region for generations. In carrying out the activity of life, indigenous peoples guided by customary law which is perceived as a set of norms and rules both written and unwritten, being obeyed and respected for generations, and to have legal consequences or sanctions to regulate human behavior.

In the spatial context, the living areas of indigenous peoples described as indigenous territory such as land, water, and its associated resources with the certain boundaries, owned, used and preserved for generations and continuing to meet the needs of the community acquired through inheritance from their elders or claiming of the ownership of customary lands or forests. Through this rule, at least there are five important things to establish local people as indigenous peoples, namely the history of indigenous people,

indigenous territories, customary law, customary properties, as well as related institution/governance system.

2.1.4.5. Watershed-based management

The Act of the Republic of Indonesia No. 37 Year 2014^q Concerning the Soil and Water Conservation states that the soil and water conservation, including protection, restoration, enhancement, and maintenance their functions implemented based on watersheds, ecosystems, and the unit of land through an integrated watershed management. Watershed-based management is one of the national spatial planning strategies which relies on the principal functions of the region, especially to support the function of protection and cultivation (The Act No. 26 Year 2007^a Concerning the Spatial Planning). Through watershed-based management in which all components of the natural and cultural resources are gathered into a single management system, is expected to provide mutual benefits for society and the environment in a sustainable manner.

According to the Government Regulation No. 37 Year 2012^r Concerning the Watershed Management, a watershed is defined as a unity of the whole river chain which collects, store, and drain the water to the area underneath. A set of watersheds in a water resources management area within the coverage area of less than or equal to 2000 square kilometers categorized as a river basin. Management of protected areas through a watershed approach is a significant concern of the Government of West Java Province by establishing the Regional Regulation No. 2 Year 2006^e Concerning the Management of Protected Areas. Management in these areas aims to prevent any damages relate the environmental function, while a safe and healthy environment is the basic right of citizens that guaranteed by the government through the Act No. 32 Year 2009^s Concerning the Protection and Environmental Management.

2.1.4.6. Tourism-based management

Natural conditions, flora, and fauna, ancient heritage, historical relics as well as arts and culture of the Indonesia is a potential resource for developing and increasing the tourism sector. Tourism activities in a particular region have an important role in improving the welfare of people in addition to preserving the natural and cultural they have. The Indonesian government enacted the Act No. 10 Year 2009^t Concerning the Tourism to ensure the sustainability of tourism activities and the preservation of its

resources. The regulation explains that the operation of tourism must be based on the principle of utility, joint ventures and kinship, fair and equitable, livelihood, and self-confidence. The goal can be achieved with the capability to boost economic and social development of cultural life; religious values, customs, as well as the values of living in society; the preservation of cultural and environmental quality; as well as the sustainability of tourism itself.

Utilization of tourism objects and attractions is considered into three categories based on the resources, namely natural tourism, cultural tourism, and special interest tourism. The existence of *kabuyutan* and associated natural, cultural, as well as human resources, has an excellent potential to serve as a tourism destination which includes all three tourism categories. To increase tourism activities in West Java Province, the provincial government issued the Regional Regulation No. 8 Year 2008^u Concerning the Implementation of Tourism supported by the Governor Regulation No. 88 Year 2015^v Concerning the *Someah Hade Ka Semah* in the Development and Tourism Development in West Java Province. The idiom in this regulation, “*Someah hade ka semah*,” is a reflection of politeness in manners among others to create a feeling of safety, comfortable, peaceful, and memorable environment. The regulation provides an excellent opportunity for the Sundanese people through *kabuyutan* to optimally contribute in assisting the development of world civilization through a tourism sector.

2.2.Methodological background

Understanding the complexity as a landscape attribute (Farina, 2001), the hierarchical theory (Forman & Godron, 1986) was considered as an appropriate approach to understanding the complexity of *kabuyutan* to provide a significant contribution towards a sustainable landscape management. As suggested by Forman and Godron (1986), a prior identification of the structure, function, and changes in the landscape was essential before establishing a management plan. In general, the existence of *kabuyutan* is analyzed through an ecological and cultural perspective based on the landscape ecology approach. According to the hierarchical theory (Forman & Godron, 1986; Wu & David, 2002; Zhang et al., 2013), this study was divided into three stages. First, study at the micro-scale which was conducted in the smallest component of the landscape (patch and corridor) by analyzing their structure, function, and changes as a basis to characterize the

kabuyutan. At the meso-scale, the study was emphasized on a matrix scale to analyze the characteristics of the *kabuyutan*'s matrix, such as the coverage area of *kabuyutan* within a landscape, connectivity between *kabuyutan*, dissemination of essential elements, as well as the evenness character of *kabuyutan*. Finally, the study was focused on the landscape mosaic-scale to analyze the spatial linkage of *kabuyutan* with other landscape elements.

The cultural aspects were considered as an explanatory part to support the findings from the ecological aspect. As an agent of the development of landscape, culture influences and being influenced by the landscape (Nassauer, 1995). The dynamic of landscape that is continually changing in space and time shows that strengthening the relationship between people who are living together with the landscape is important. Human continues to see, feel, and understand any changes affecting their lives to be adapted in the utilization of the landscape (Farina, 2001; Nassauer, 1995). By combining the two aspects and applying the hierarchical theory approach, this study was expected to provide a broader and deeper understanding of *kabuyutan* in a traditional Sundanese landscape. Table 2.1 shows the hierarchical framework of study that divided into three major scales.

Furthermore, issue related to the sacred natural sites have become a concern by scholars in various parts of the world in recent years. At least, many of these places have been recognized its existence and understood its importance to the environment and the people who are living in the vicinity. However, scholars realize that still many of these sacred landscapes need to be explored to reveal the phenomenon due to their associated important values. Indonesia with a variety of ethnics and cultures can be ascertained stored a variety of forms and functions of sacred natural sites scattered from the eastern of the Papua Island to the western of Sumatra Island, from the northern of Kalimantan Island (Borneo) to the southern of the Nusa Tenggara Island.

The existence of cultural diversity presents a great opportunity for Indonesia to actively and responsibly contribute in assessing, utilizing, and preserving the existence of sacred natural sites, particularly for the Sundanese people as the second largest ethnic group in Indonesia. Their wisdom which is reflected in the *kabuyutan* as an expression of social, cultural, and ecological values need to be studied more in depth so that the benefits can be appreciated not only by the Sundanese people but also for general people. The realm of broad studies about the sacred natural sites requires an intensive effort to provide

Table 2.1. Framework of study based on the hierarchical theory.

Scale	Unit analysis	
	Ecology	Culture
Macro-scale (mosaic): Local landscape bounded by watershed	The spatial connectedness between <i>kabuyutan</i> and other landscape elements (agriculture lands, rural settlements, hedgerows, ecotones, green belts, pedestrian track, ponds, pastures, and plantation area.)	Agricultural practices, crops calendar, patterns of agriculture, local plant species, traditional use and management, toponymy, narrative/oral traditions, history, values, religion, knowledge, perceptions, preferences, and attitudes
Meso-scale (matrix): Local ecosystem composed by some <i>kabuyutan</i> and bounded by the main characteristic of <i>kabuyutan</i>	Coverage area of <i>kabuyutan</i> in the whole landscape, connectivity between <i>kabuyutan</i> , dissemination of essential elements, and evenness character of <i>kabuyutan</i>	Local plant species, ethnobotany, local natural resources, traditional use and management, remains of history and culture (artifacts and manuscripts), toponymy, narrative/oral traditions, history, values, religion, knowledge, perceptions, preferences, and attitudes
Micro-scale (patch/corridor): Local ecosystem of a <i>kabuyutan</i>	Landscape structure (size, shape, configuration, composition), the functions, the changes, an important element of the landscape, ecological component forming <i>kabuyutan</i>	Managerial aspect of <i>kabuyutan</i> such as planting specified plant species and collecting branches from the dead trees in the annual <i>nyepuh</i> ceremony, as well as cleaning up before pilgrimage season; narrative/oral traditions, history, values, religion, knowledge, perceptions, preferences, and attitudes

a preliminary description of the further development of the study. Concerning the issue of *kabuyutan* which is considered has less basic information, an explorative-qualitative research method would be a good option.

Recently, this approach was dominantly carried out by the sociologists, anthropologists, economists, or even academics and medical practitioners (Andreasen et al., 2017; Burkhard et al., 2015; Karimpour & Ruhe, 2017; Włodarska et al., 2016). In general, the scholars attempt to analyze the phenomena that occur and to locate the cause

of the problems that arise, which serve as a reference for further research. This type of study is also conducted by researchers who do not have broad knowledge and experience related to object of study due to lack of publications (Manerikar & Manerikar, 2014). Researchers are encouraged to be creative in choosing relevant representative resources to set the basic strategies in determining the orientation of future research. Thus, by understanding the urgency of the topics as well as the function of this approach, the relevant information related to *kabuyutan* can be more explored.

2.3. Research design

Exploration of cultural aspects was focused on acquiring the text-based qualitative data by performing some of the qualitative data collection methods, namely participant observation, in-depth interview and focus group discussion (FGD) which three of these methods are interrelated and reinforce each other (Bernard, 2006; Mack et al., 2005). Participant observation emphasizes the direct involvement of researchers with the object being studied as an actor of the phenomena for in-depth feeling (being an insider rather than an outsider). Similarly, in-depth interview and FGD are focused on the exploration of topics related to the study. The difference between the two methods is shown in the allocation of space, time, and setting the conditions and more emphasis on the relative placement between researchers and informants. Researchers should consider themselves as a moderator who leads the discussion in the FGD, while as a companion during in-depth interviews (Bernard, 2006; Mack et al., 2005). Both methods can be performed in conjunction with the method of participant observation in rapid participatory rural appraisal research schemes (rPRA). Mueller et al., (2010) and (Hellier et al., (1999) suggest to apply the method of rPRA as a solution for limited time and cost in a research. Through a series of interviews that include direct field survey, this method is recognized succeeded in presenting the preliminary information on the ecological and cultural studies.

Considering *kabuyutan* as an interesting and distinctive phenomenon in landscape and taking into account its association with ecological and cultural aspects, the exploratory study was strengthened by the phenomenological study approach. This approach emphasizes the fundamental understanding of what is perceived by the actors of the phenomenon (Lester, 1999). In the case of sacred natural sites, some researchers used this approach in the study of tourism, especially to understand the underlying

perception of tourists such as Andriotis (2009) who examines the phenomenon in Mont Athos. Lester (1999) provides some characteristics of this study such as focused on the experience of the actors of the phenomenon, more describe rather than explain, and provide a bridge for further studies rather than to close with a conclusion. Regarding the significance of data that interdependence with some the informant, Hycner (1985) explains that phenomenological study allows even to investigate the experience of one unique and appropriate individual to understand the phenomenon in general. Also, the author suggests considering more about the objectivity and the comprehensive viewpoint.

As a landscape-based study, the oral and textual data need to be supported by data obtained from a series of field survey, accompanied by the spatial data obtained from thematic maps such as geology, climate, hydrology, soils, and land use map as a preliminary information in understanding the landscape. Surveys through rPRA research scheme (Mueller et al., 2010) were conducted by characterizing the landscape, identifying the history of the region and land use change, as well as mapping to construct a mental map. Data collection was focused on ecological and cultural aspects outlined by four major aspects: historical, accessibility, utilization and management aspect related to the traditional Sundanese landscape and *kabuyutan* in particular. Especially for ecological data related plant species are obtained using the combination of some ethnobotany methods such as freelisting, participant observation, and survey (Gomez-Beloz, 2002; Hoffman & Gallaher, 2007; Kremen et al., 1998; Pei et al., 2009; Singh et al., 2014; Turner, 1988).

Fundamentally, the data obtained by this study is qualitative that will be analyzed to find a set of keywords as a basis for determining the meaning of responses. The set of meaning is more considered to give a general answer to the aspects of the research (Bernard, 2006). In this study, the data are analyzed by a combination of grounded theory and content analysis approach to identify categories and concepts that are stored in the text, as well as connecting with theoretical concepts. Bernard (2006) explains that the formulation of the hypothesis of the text on grounded theory and hypothesis testing via text is a fundamental difference between the two approaches. The important thing of this process is how to find the themes of each set of data being analyzed.

Ryan and Bernard (2003) and Bernard (2006) recommend several methods such as Word List and Key Words in Context (KWIC) to find a theme that is essentially done

with the process of coding. In fact, Miles and Huberman (1994) simply state that coding as the core of the text-based analysis, "coding is analysis." This method was used to look more closely at the words that are used, identify all the unique word and calculate the frequency of use and further organized into a list of words. Identifying a unique word and frequency of use are the core of the analysis using KWIC method to deal with the determination of theme.

As for the data obtained from the field survey were analyzed qualitatively through spatial analysis method such as the interpretation of the landscape's characteristic based on the mental map to be adjusted and compared with the result of digital overlaying maps. Also, the data from vegetation survey are analyzed through ethnobotany method that focused on searching the essential functions of the plant both ecologically and culturally. Furthermore, the analysis results are interpreted and discussed to find the essence of research as an answer to the proposed research questions and to formulate recommendations for a sustainable landscape management. The methods are used in this study will be more elaborated in each chapter.

Accordingly, an explorative-qualitative study is conducted to explore the current condition of *kabuyutan* as sacred natural sites in the Sundanese traditional cultural landscape through three most important aspects, namely ecology, culture, and tourism. Through a hierarchical theory correspond to the traditional ecological knowledge of the Sundanese people is assumed to provide sufficient information to understand about *kabuyutan* at a different scale. The ecological and cultural aspect of *kabuyutan* is studied to determine the general characteristic of *kabuyutan*. As for the tourism, aspect is identified to understand the potential of *kabuyutan* as a tourism object and attraction. Further analysis is conducted to identify the challenges and opportunities of *kabuyutan* to support in achieving a sustainable landscape management. Through this study, some adaptive and participative strategies are proposed to deal with the locality (Figure 2.1).

2.4. Local context

2.4.1. Physical characteristic

As mentioned earlier, the aims of the study were to obtain a deeper understanding of the existence of *kabuyutan* from the viewpoint of ecology and culture, as well as to find alternative management efforts as a solution to ensure the sustainability of its

existence and utilization in the future. In this case, two fundamental aspects influence the way in selecting the study sites. First, the exploration of *kabuyutan* and its vital role both in the ecological and cultural aspects. Second, the exploration of the potential of *kabuyutan* as constituent elements of culture-based tourism landscape planning. The first goal was expected to be achieved through exploration of *kabuyutan* in the Sundanese landscape of Ciomas Village where located in Ciamis Regency, as for the exploration of Sindang Barang as a culture-based tourism village (KBSB) in Bogor Regency was expected to realize the second purpose. Both villages are located in the West Java Province, Indonesia (Figure 2.1).

The locational, ecological, socio-cultural, and historical aspects were considered as a background in the selection of these two sites. According to the locational aspect, both Ciomas and KBSB were part of the West Java Province which is the administrative region of the *tatar Sunda* where Sundanese people are living. Ciomas Village located in the administrative area of Panjalu Sub-district, Ciamis Regency, while KBSB located in Pasir Eurih Village, Tamansari Sub-district, Bogor Regency. Based on the geological aspect (Figure 2.2), these two sites existed within the plateau region with an elevation more than 300 m above sea level and can also be categorized as part of the *Sunda Parahyangan* that are closely related to the Sundanese culture. As a part of Mt. Sawal region, Ciomas represented the lowland and hilly as the end of the Bandung physiographic formation's zone in the eastern of *tatar Sunda*. As for KBSB accounted for a mountainous volcanic region with Mt. Halimun-Salak together with Mt. Gede-Pangrango as the highest points in the western of *tatar Sunda*. The hydrological aspect showed that Ciomas connected to the Cimuntur Watershed as part of the river basin of Citanduy which flows to the Indian

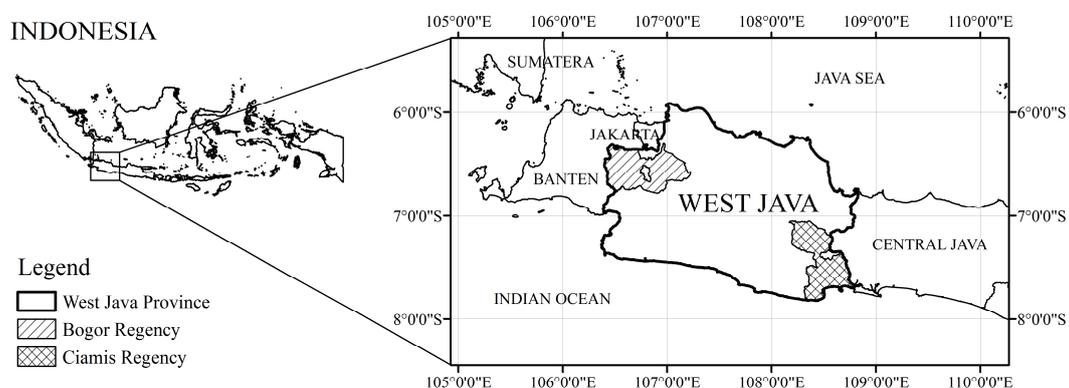


Figure 2.1. The administrative location of study sites.

Ocean, while KBSB located in the Ciliwung-Cisadane Watershed that flows to the Java Sea with Sindang Barang River as the smallest unit of the watershed.

The availability of abundant natural resources provided an ideal living space for Sundanese people. Their values were embodied in a distinctive cultural landscape as a mountainous landscape and influence the people's characteristic as people of mountain. Also, these sites were dominated by latosols that provide a fertile soil for the agricultural activity as the main occupation for local people. Nevertheless, it showed also the vulnerability of the region to disasters such as erosion, landslides, floods, and other land-based disasters. A high rainfall up to 3000 mm per year or an average per month of 154

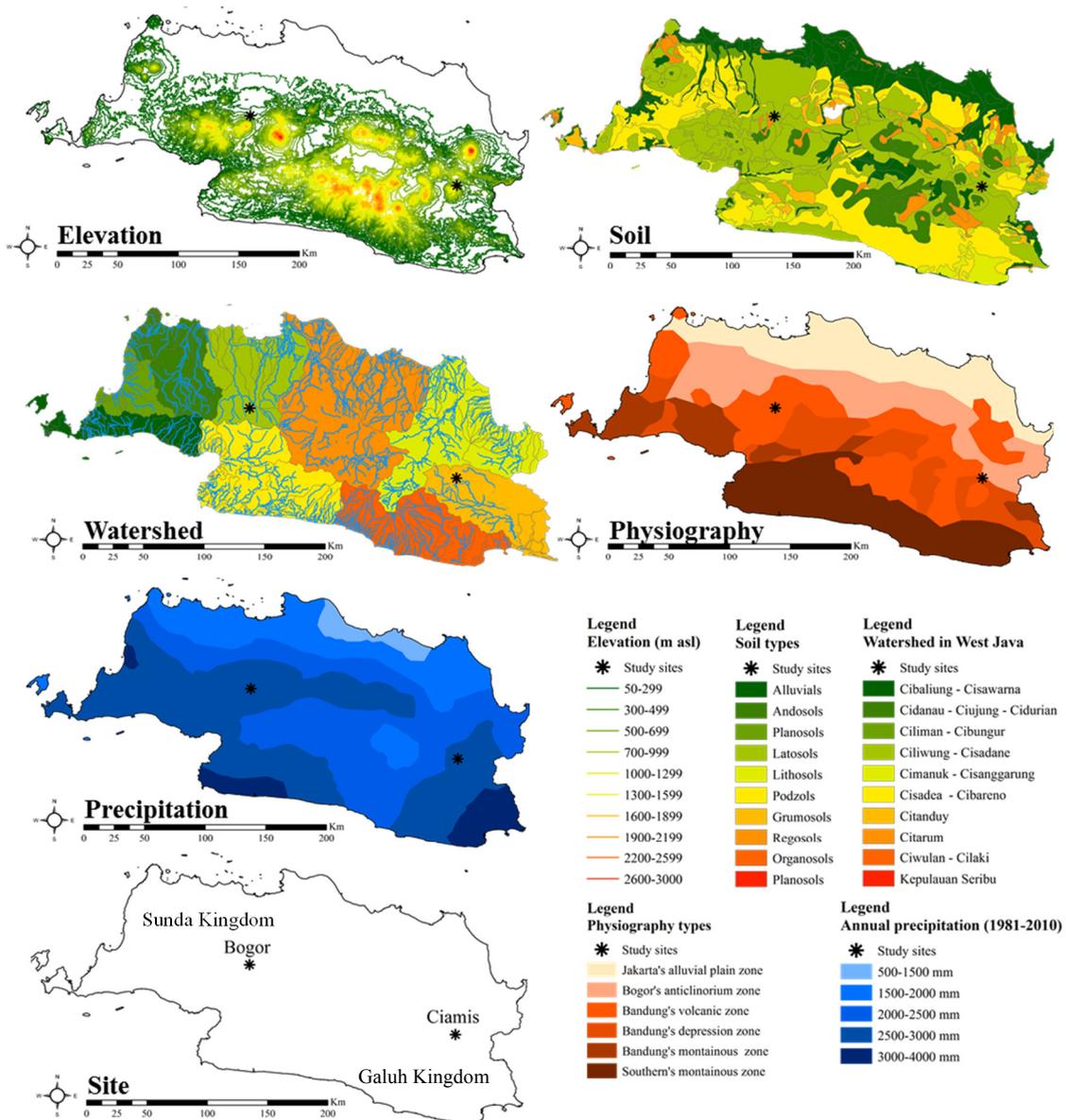


Figure 2.2. The physical background in determining the study sites.

mm (Ciomas) and 274 mm (KBSB) supported the main activity in agriculture, also strengthened the character of the Sundanese people as a people of water.

Historically, both sites were designated as the capital city during the period of the Sundanese Kingdom. Ciamis was the center of the Galuh Kingdom in the eastern of *tatar Sunda*, while Bogor as the center of the Sunda Kingdom in the western part. Similarly, when the two kingdoms united into the Great Sunda Kingdom (known also as the Padjajaran Kingdom), Ciamis and Bogor turns into a center of the kingdom depends on the King's preference. Therefore, it can be assumed that both sites preserve a variety of form and function of *kabuyutan* as a cultural heritage of the Sundanese people.

Furthermore, at the time of the domination of Galuh Kingdom, Panjalu Kingdom has become one of the small kingdoms that exist in the eastern of *tatar Sunda*, particularly in Ciamis. As part of the territory of Panjalu Kingdom, *Dayeuh Nagasari* in Ciomas was the center of the Panjalu Kingdom during the reign of King Prabu Rahyang Kancana until the monarchy ended and replaced with a system of regency (*kabupaten*) due to a change of power to the colonial government. Similarly, KSBS region had become a small kingdom under the reign of the Great Kingdom of Sunda when the central government placed in the area of Pakuan-Padjajaran Bogor. This place was functioned as a training center of the kingdom's knights and also one of the royal palace located in Tamansari.

Regarding the narrative of *kabuyutan* as well as its existence in the Sundanese landscape in consideration of the particular conditions of both Ciamis and Bogor Regency such as the various topography that ranges from hilly to mountainous region, the proximity to water resources, the comfortable living space and also prone to disasters, the presence of local people who characterizes as the mountain people with water-based culture, as well as the strong connectedness with the history of the Sundanese Kingdom, this can be assumed that both sites preserve the diverse forms and functions of *kabuyutan*. Therefore, these two sites were eligible to be selected as a case study of research related *kabuyutan*.

2.4.2. Demographical characteristic

Table 2.2 shows the demographical characteristic of Ciomas and KBSB Village people. As much as 0.5% of total population of Ciamis Regency lived in Ciomas Village, while 0.2% of total population of Bogor Regency settled in KBSB Village. The greater

number of resident in KBSB rather than Ciomas was caused by the nearest distance to the Indonesia's capital city of Jakarta. In addition to the function of Bogor as one of capital cities of the Sundanese Kingdom, during the colonial era (year 1800s), Bogor also was served as a residential area and was popular as *Buiterzorg* or the place without anxiety (Lubis et al., 2003). Since then, the number of population has been increasing and as one of satellite cities for Jakarta, Bogor served many commuters for living.

Regarding to the distribution people based on age, both villages were dominated by working age (20-75 years) and few elderly people (> 75 years) living on the villages. However, local informant reported that many of working generation are living outside of village and will return after more than five years. This condition caused more than a half of population working on non-agricultural activities for their main occupation such as private employees, entrepreneurs, or temporary laborers. Given this condition, however, the characteristics of Sundanese people were shown by people who living in both villages. Some of them were still practicing agricultural activities for supporting their life, especially related to traditional Sundanese agroecosystems such as forest garden, mixed

Table 2.2. Demographical characteristic of study sites

No.	Demographical aspect	Number of people (%)		
		Ciomas ²	KBSB ³	
1	Population	7590	13397	
2	Household	2197	3545	
3	Gender	Male	3812 (50.2)	6974 (52.1)
		Female	3778 (49.8)	6423 (47.9)
4	Age (years)	0-19	2690 (35.4)	4010 (29.9)
		20-39	2196 (28.9)	5672 (42.3)
		40-74	2467 (32.5)	3578 (26.7)
		> 75	237 (3.1)	137 (1.0)
5	Education	No School	1228 (16.2)	2589 (19.3)
		Elementary School	4299 (56.6)	5897 (44.0)
		Junior High School	1774 (23.4)	2181 (16.3)
		Senior High School	186 (2.5)	2314 (17.3)
		Academy	19 (0.3)	207 (1.5)
		University	84 (1.1)	209 (1.6)
6	Occupation	Agriculture	2962 (39.0)	242 (1.8)
		Non-agriculture	4547 (59.9)	13137 (98.1)

garden, and home garden (see Chapter 1). Their activities, especially for Ciomas people, were supported by the government program which determined their area as one of central areas for agricultural production.

Concerning the educational aspect, more than a half of population in both villages had a low grade of education. A limitation in term of funding become a challenge that lead to the lack of motivation to continue into a higher level of education. However, this condition does not mean that they had a low level of knowledge of their landscape. Furthermore, considering the majority of population as Sundanese and native people to both villages were potential in storing and preserving the important information related to *kabuyutan* and associated ecological and cultural elements. Among them, the custodian was a figure who highly appreciated and respected by local people due to his or her critical role in keeping the particular knowledge about *kabuyutan*. Culturally, the position of custodian was inherited according to the custody system.

2.4.3. Socio-cultural characteristic

People who living in Ciomas and KBSB Villages had a close relationship with the history of the Sundanese Kingdom, especially related to the existence of *kabuyutan* (see Chapter 1). The implementation of tradition in *kabuyutan* such as the annual *nyepuh* ceremony in Ciomas or *seren taun* ceremony in KBSB showed the existence of its influence on local people's life. These traditions were continuously held as an expression of their gratitude to the God and their respect to the ancestors. However, such activities were dominantly practiced by the particular people who had a fairly knowledge about the tradition.

Considering the important of tradition and associated physical and cultural elements, the custodians who had a privilege to continue the ancestor's mandate, have played their critical role in maintaining its existence. The custodian of *kabuyutan* in Ciomas for example, she encouraged local people who live in vicinity or even general people who respect to the Ciomas's ancestors, especially KH. Panghulu Gusti as the Islamic missionary as well as one of kings of the Sundanese Kingdom (the word 'KH' stands for '*Kyai Haji*' which means a title for the respected Muslim's leader) to always remember his endeavor by practicing a pilgrimage to his grave and implementing his mandates in daily life.

A historical record showed that the tradition has been carried out since his death in 1931 and become more popular when many pilgrims recommend his grave to be visited. The custodian reported that year by year the number of visitors are increasing. Moreover, since 2006 when the local government designated this *kabuyutan* as one of religious tourism destinations in the Panjalu District and the tradition as a tourism object and attraction, the large number of pilgrims visited the *kabuyutan* almost all year around. This condition has an impact on changing social and cultural condition of local people. In this regard, the custodian stated that local people should be able to adapt to the presence of outsiders with various cultural differences.

In dealing with this circumstance, some local environmental activists initiated to improve the potential of Ciomas Village by encouraging the younger people through a preservation of Sundanese landscape and Mt. Sawal region in particular. Under supervision of the custodian, they established *Komunitas Adat Ciomas* (KATCI) in 2009 and in 2013 has been registered as an indigenous community which is focused on revitalization of traditional Sundanese values to be adapted and implemented in the current condition. During the implementation of programs, they provided basic information in order to solve the current environmental problems. However, they were facing challenge to convey the message to the general people. Thus, the role of scientist as a bridge of communication is essential.

Besides, the increasing of visitor inspired some locals to support pilgrims by providing some accommodations such as meals, beverages, and gallons for taking sacred water from *kabuyutan*. This opportunity was supported by local government by providing a shopping area. Given this condition, Ciomas Village more gradually evolved into a tourist destination with the increasing of several supporting facilities such as parking lot, entrance gate, and several guest houses. Although it has an impact on increasing the economic income for some locals, the custodian stated that tourism activity in *kabuyutan* has caused the decrease or even loss of value and meaning of the pilgrimage itself. Therefore, the high potential of *kabuyutan* as tourism destination needs to be adjusted with the readiness of local people in welcoming the visitor and accepting the cultural differences.

Similarly, the custodian of *kabuyutan* in KBSB initiated to revitalize the existence of Sundanese historical and cultural heritages, especially related to the Great Sunda

Kingdom (also known as Padjajaran Kingdom). He established *Padepokan Giri Sundapura* in 2004 as an art studio for revitalizing the traditional music instruments, dances, and some traditions and ceremonies. Since 2006, the annual *seren taun* ceremony was successfully held once within a period of 30 years had been forgotten. This achievement attracted the attention of provincial and local governments to support particularly in a reconstruction effort of the traditional Sundanese village in Sindang Barang (finished in 2009). Since then, many local and foreign tourists have visited and enjoyed the various tourism objects and attractions. As a privately designated tourism place, however, the involvement and empowerment of local people was crucial to ensure the sustainability of tourism system. Lack of understanding related to the tourism aspect might be an obstacle in managing the landscape. Therefore, similar to the condition in Ciomas village, the readiness of local people in dealing with the tourism system was a challenge to be improved. In addition, different perception on appreciating *kabuyutan* between Muslim as a majority and few people who still practicing classical teaching tend to be other challenges towards a sustainable management of *kabuyutan*.

3 ECOLOGICAL ASPECT OF *KABUYUTAN*

3.1. Introduction

Thousands of sacred natural sites remain throughout the world, and many of them are little known, untouchable, or even ignored. These places have been considerably playing an important role to maintain and enhance the quality of the environment through their function as a safeguard of the existence of biocultural diversity (Dudley et al., 2010; Rutte, 2011; Zuhud, 2009) due to local people participation in maintaining their existence. The interaction between people and these places has proposed a set of knowledge to preserve its function for generations (Dudley et al., 2010; A. Ormsby & Edelman, 2010). Sacred trees, springs, graves, forest, hills, or mountains and associated cultural values are protected (Barrow, 2010; Bernbaum, 2010; Spoon, 2010; Xu et al., 2006). However, despite the importance of their existence, these places are particularly vulnerable to socio-economic changes such as unbalance demographic level, change in social and cultural paradigm, religious or spiritual development, and land-use change (Daye & Healey, 2015; Dudley et al., 2010; Xu et al., 2006). Therefore, some appropriate attempts in management are necessary to ensure its sustainability both physical existence and function. In such a context, exploration and identification of the physical structure, function, as well as changes in these sacred places (Forman & Godron, 1986) and the presence of specific knowledge of local people related to these places, are essential as a basis for developing an adaptive management strategy (Vodouhê et al., 2010).

In the last two decades, the topic of sacred natural sites has been widely discussed by scholars (Verschuuren et al., 2010). However, few case studies have been conducted in Indonesia (Dudley et al., 2010). Thus, a study of *kabuyutan* sacred natural sites which

is closely related to Sundanese people in West Java, Indonesia was conducted to expand the geographical range of studies and enrich the repertoire of knowledge. Historically, the term of *kabuyutan* was used to define the sacred place that is allocated for the center of religious and knowledge activities, settlement of priests, or conservation areas (Kartakusuma, 2006; Wessing, 1999, 2006). In few decades, this term was used by philologist and archeologist who concern on the Sundanese study. The evidence can be found in the ancient Sundanese manuscript such as *Amanat Galunggung* which explains their existence as a numinous place for respecting deities or ancestors (Danasasmita, 1987). *Kabuyutan* have been sacred by local people due to their believes that deities or spirits occupied these people and provided people certain powers such as the miraculous power to cure illness or to improve people's live with a blessing (Wessing, 1999, 2006).

As for physical features, *kabuyutan* can be simply distinguished from their surrounding landscape because a dense vegetation mainly covers it or marked by a particular sacred element that shaped their structure. The sacredness of *kabuyutan* has been understood over generations, and its existence has been protected by the customary laws that perceived as taboo (Wessing, 1999). It shows that essential information regarding environmental conservation is embedded in their existence. Sundanese people argued that control of accessibility and utilization be the necessary rules in managing *kabuyutan* for generations. As a consequence, few studies have been conducted by particular scholars who are Sundanese (Munandar, 2006, 2013), or who has a close relationship with the owner of *kabuyutan* due to a long-term research such as Wessing (1999). Moreover, most of the studies were conducted in the particular *kabuyutan* where have been designated as the cultural heritage of the national government (Inagurasi, 2006; Kartakusuma, 2006), whereas *kabutuyan* located in the common sites tend to be unexplored (Fadillah, 2006). This condition provides an opportunity to explore their characteristic as a basis for deeper understanding of their role in a landscape management.

Currently, similar to other sacred natural sites around the world, *kabuyutan* are facing challenges to maintain the balance along with social, cultural, and spatial dynamic. In dealing with this challenge, understanding ecological characteristic of *kabuyutan* is important to highlight its role in a whole Sundanese landscape (Wessing, 1999). Furthermore, local people have the potential role of providing valuable knowledge that may serve as a preventive effort to safeguard the environment. Concerning the vital role

of *kabuyutan* and its challenges towards sustainability, a qualitative-explorative study was conducted to highlight the existence of *kabuyutan*. The objectives of the study were set (1) to identify the current characteristic of *kabuyutan* based on ecological aspect, (2) to understand its implication for future management. The first objective was divided into two main focuses, consist of identifying the structure, function, and change in *kabuyutan*, and further identification was carried out on plant species as one of the main element in *kabuyutan*.

3.2.Methods

3.2.1. Study site

This study was conducted in *kabuyutan* in Ciomas Village, Panjalu District, Ciamis Regency, West Java Province (latitude 07^o07'00" to 07^o12'00" S, longitude 108^o15'00" to 108^o19'00" E) (Figure 3.1). Ciomas Village is located in the northern part of Ciamis Regency dominated by hilly area as part of Mt. Sawal which range between 512-1762 m above sea level (hereafter masl). The average annual temperature is about 25 °C, humidity 85%, and the average annual precipitation is about 2000 mm with the rainy season almost all year long except in June, July, and August. Dry land farming, paddy field, and forest dominate the land-use type to indicate the main local people's activity as farmers. About 33 *kabuyutan* were identified and distributed within the area with *Kabuyutan Panghulu Gusti* (KPG) as the largest *kabuyutan* due to its significance as the "heart of the village." Both natural and cultural elements such as sacred graves, springs, and several tree species were located within its compound.

3.2.2. Data collection

Participant observation methods included in-depth interviews, field surveys, and focus group discussions (FGD) were conducted. All methods were applied during February 2015 and continued to June 2016. In-depth interviews with four key informants who have a relatively good knowledge of the object study were selected by the snowball sampling method to highlight the existence of *kabuyutan* based on traditional ecological knowledge. Also, three FGDs with a total of 19 purposive respondents including the key informants (hereafter informants) were conducted to identify land types that were perceived as having to be conserved (Appendix 2). These methods posed the local perspective according to structure, function, as well as change which occurred in *kabuyutan* and surrounding landscape.

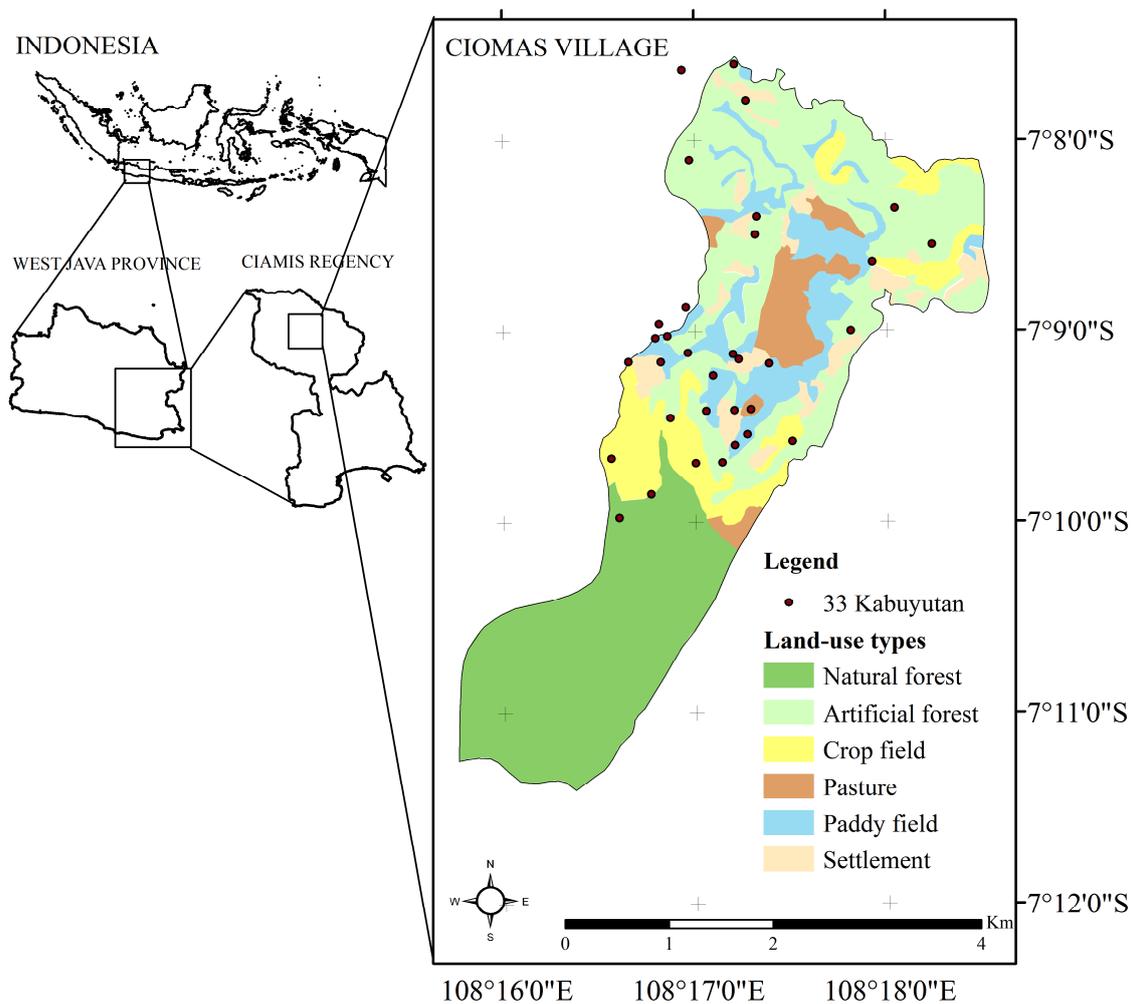


Figure 3.1. Study site in Ciomas Village and distribution of 33 *kabuyutan* within different type of land-use.

The ethnobotanical approach was used through several methods to identify plant species within *kabuyutan*. First, informants were asked to explain the plant species with their local names, habitat distribution, a variety of uses, used part of the plant, as well as their appearance, condition, and utilization through a free listing method. Then, participant observation was conducted with key informants for deeper understanding the existence and the function of plant species that mentioned earlier. Moreover, conservational plant species that could be used to manage a landscape were determined particularly. Information related to plant species was recorded and listed on the ethnobotanical survey sheets (Appendix 3a and 3b).

The results were used as a basic understanding to identify a characteristic of *kabuyutan* scientifically by conducting field surveys. Geographical location of each

kabuyutan were collected during a field survey using GPS Garmin eTrex® 30 as a source to generate spatial data of *kabuyutan* from thematic maps of year 2000 and 2014 (scale 1:25,000) and 30-meter Digital Elevation Model data which derived from the National Land Authority of Ciamis Regency and downloaded from the USGS's official website (<https://earthexplorer.usgs.gov/>) respectively. Five particular land variables were derived, namely slope, direction of slope (aspect), elevation, land-use, and approximate distance to river. These data were used to determine the structure of *kabuyutan*. Further, two different years of land-use maps were used to identify the change in *kabuyutan* and its surrounding landscape. To verify the land-use type, ground truth was conducted in some particular area that determined by purposive sampling method.

As a part of the ethnobotanical method, participant observation through a preliminary vegetation survey was conducted in the KPG as the largest *kabuyutan* which perceived stores many plant species including rare species to verify their existence in natural condition. This study assumed that the KPG represented the vegetation condition of *kabuyutan* in general. Furthermore, plots (20 x 20 m²) were laid randomly to identify plant species within 33 *kabuyutan* as well as to verify what have been reported by informants. Regarding to plot selection criteria, survey plots were principally set according to the customary rule which determines whether the area is permitted or not to be surveyed. Then, plots were sampled in the permitted area along contour or ridge as a direction of survey started from the top towards the lower area. Two or more plots were determined for larger *kabuyutan* by selected different side along the direction of transect. The number of plot varied depending on the extent of *kabuyutan* area (Figure 3.2).

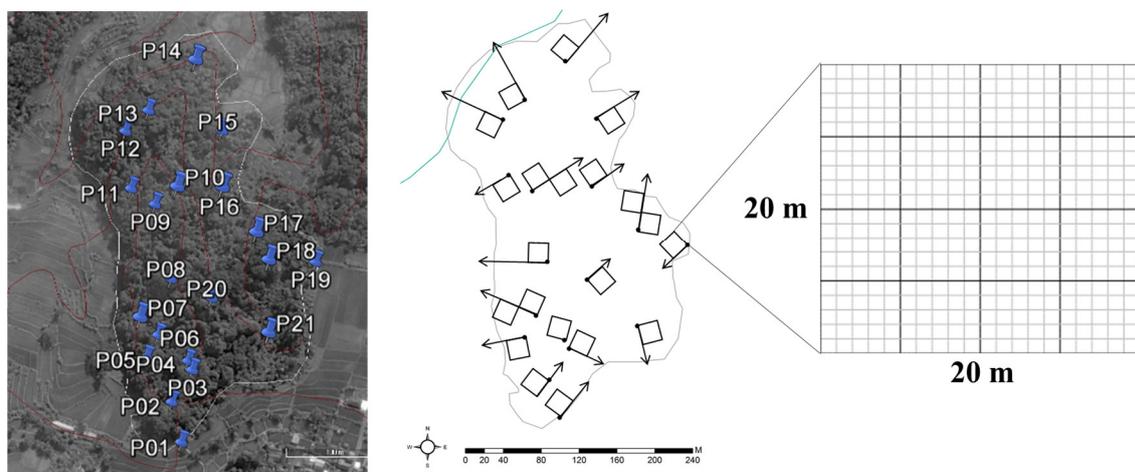


Figure 3.2. Distribution of 21 sample plots in the KPG (6.6 ha) with the total plot size about 0.84 ha (12.7 % of total area).

To avoid 'edge effects' distorting the data, peripheral areas, 3 m along the boundary or pedestrian track were excluded from the analysis except for *kabuyutan* which one or two plots per site. Tree species measuring ≥ 10 cm diameter at breast height (dbh), woody lianas, and other plant habitus with a height ≥ 1 m were enumerated. Tree height was measured using TruPulse® 360 laser range finder, while monocular Tasco (10x25) was used to identify plant species based on leaves or fruits. A measuring tape 20 m was used to identify and to measure dbh of all tree species with ≥ 10 cm dbh and ≥ 1 m height by considering the position of tree bole on the ground. Data were collected and listed on the vegetation survey sheets (Appendix 3c). Besides, some plant species were collected as a voucher specimen for further identification purposes as well as for collection of local people.

3.2.3. Data Analysis

A participatory GIS-based analysis method (Hessel et al., 2009) was conducted to identify the structure, function, and change of *kabuyutan*. This approach allowed local people to express their knowledge and related experiences as a basis information to reconstruct their traditional landscape. Further, the results were adjusted and compared with the result of digital overlaying maps to identify the characteristic of landscape and *kabuyutan* in particular. Analytical processes were conducted by (1) determining conservational land classification derived from participatory activity, (2) selecting significant land variables from this land classification to determine the characteristic of *kabuyutan*, (3) overlaying related variables to establish an environment conservation map, and (4) determining the change in land-use and associated drivers. Spatial data were analyzed using a GIS-based software, ArcGIS version 10.2.2 (ESRI, 2011). Also, patch analysis using the Fragstats 4.2 (McGarigal, Cushman, & Ene, 2012) was performed to provide spatial characteristic data of *kabuyutan*.

Plant species database that obtained from participatory activity was verified by using The Plant List database (The Plant List, 2013) to check nomenclatural information. Also, the IUCN Red List database and Indonesia protected plant database were used to verify whether the species was protected or common. The ecological significance of *kabuyutan* were analyzed based on the number of species exist within each *kabuyutan*, the presence of native or exotic species, as well as the rarity of species. Since the term of native species perceived by local people as species that have been existed in their location

for long period regardless of the understanding about the origin of those plant species, we used the scientific definition of native proposed by Tallamy (2009) as species that have been observed particular place or ecosystem and existed for generations due to natural process. Based on those databases, native species were ascribed to Indonesia and West Java region in particular. Besides, vegetation analysis was conducted to determine quantitative composition and floristic dominance with the following formula (Soerianegara & Indrawan, 1980):

$$\text{Abundance (A)} = \frac{\text{number of individuals}}{\text{total area (ha)}}$$

$$\text{Relative Abundance (RA)} = \frac{\text{Abundance of a species}}{\text{Total abundance of all species}} \times 100\%$$

$$\text{Frequency (F)} = \frac{\text{number of plots}}{\text{total plots}}$$

$$\text{Relative Frequency (RF)} = \frac{\text{Frequency of a species}}{\text{Total frequency of all species}} \times 100\%$$

$$\text{Dominance (D)} = \frac{\text{Total basal area of a species (ha)}}{\text{total area (ha)}}$$

$$\text{Relative Dominance (RD)} = \frac{\text{Dominance of a species}}{\text{Total dominance of all species}} \times 100\%$$

The Importance Value Index (IVI) as one of ecological significance indices was computed by adding the figure of relative abundance, relative frequency, and relative dominance, as it provides the relative contribution of species to the stand structure. Further, for determining score of vegetation diversity of tree species, species diversity indexes were used through the following formula (Ludwig & Reynolds, 1988):

$$\text{Index of Shannon – Wiener (H')} = - \sum_{i=1}^S \left(\frac{n_i}{N} \right) \ln \left(\frac{n_i}{N} \right)$$

$$\text{Index of Evenness (E)} = \frac{H'}{\ln(S)}$$

$$\text{Index of Dominance (D)} = 1 - \sum_{i=1}^S \left(\frac{n_i}{N} \right)^2$$

where S was number of species; n_i was total of individuals of i^{th} species; and N was total of individuals of all species. The highest score of three diversity indexes indicated a high diversity with rich number of species and their relative abundance and dominance respectively.

The cultural significance analysis of plant species was conducted by the quantitative assessment of important plant species in the ethnobotanical study. This analysis was necessary as a basis for considering the importance of particular plant species, their potential for both ecological conservation and social-economic purposes preservation (Turner, 1988). Also, this quantitative assessment is complementary to qualitative data that useful to deal with the environment issues, especially regarding plant species diversity (Hoffman & Gallaher, 2007). The Index of Cultural Significance (ICS) proposed by Turner (1988) was used to analyze the data. Turner (1988) proposed three necessary parameters in the cultural evaluation of plants which estimates of quality (q), intensity (i), and exclusivity value (e) of each plant of significance to the community (Table 3.1) with the following formula:

$$\text{Index of Cultural Significance (ICS)} = \sum_{i=1}^n (q \times i \times e)_{u_i}$$

where subscript u_i shows i-th use type, and ICS is the sum of scores of use types from u_1 to u_n , with n representing the last use described. This study assumed that plant species with high ICS value have a potential to enrich plant diversity due to their relation to the local culture which regularly manages those plants. Further, the native species with high ICS value were assumed to have importance both in cultural and ecological aspect to support conservation strategy in biodiversity.

Table 3.1. Criteria for determining cultural significance of plant (Turner, 1988).

Values	Description
Quality of use	
Primary foods:	
5 (u_1)	Food
5 (u_2)	Fruit
5 (u_3)	Vegetable
Other food-related uses:	
4 (u_4)	Spicy
4 (u_5)	Fodder
Primary materials:	
4 (u_6)	Construction
4 (u_7)	Industrial
4 (u_8)	Fuel
4 (u_9)	Fiber
Secondary materials:	

3 (u ₁₀)	Ornamental
3 (u ₁₁)	Medicines
2 (u ₁₂)	Ritual or spiritual uses, mythology
	Miscellaneous: conservation, org. fertilizer, org. pesticide
2 (u ₁₃)	Conservation
2 (u ₁₄)	Org. fertilizer
2 (u ₁₅)	Org. pesticide
1 (u ₁₆)	Recognition
Intensity of use	
5	Very high intensity; major attention focused on taxon on daily or seasonal basis; major effect on daily or yearly living patterns; plant populations often intentionally maintained through habitat modification; gathering and preparation and trading of plant product a primary cultural activity.
4	Moderately high use intensity; sought after or acknowledged frequently, often affecting daily and seasonal patterns of and attention to taxa a significant cultural activity.
3	Medium use intensity; sought after or acknowledged regularly, occasionally affecting daily and seasonal patterns of living; and attention to taxa a relatively frequent cultural activity.
2	Low use intensity; used or acknowledged casually; low impact on daily or seasonal living patterns; gathering and preparation and other attention to taxa a minor cultural activity (this value is used as the "norm" for uses whose intensity is not remarked upon or reported).
1	Minimal use intensity; used or acknowledged only rarely; negligible impact on daily or seasonal living patterns.
Preference of use	
2	Preferred, "choice" or superior component in a given cultural role.
1	One of several or many possible sources of average exclusivity or preference (this is the usual, or average, the value given for most uses, where preference or exclusivity is not reported or remarked upon).
0.5	Secondary source, of low exclusivity or preference in a given cultural role.

The particular plant species according to land and water conservation purposes were analyzed further. Then, the conservational plant species database was paired with the land classification data to propose an environmental conservation strategy by which the landscape would be managed by planting appropriate species in specific land types. Finally, results were discussed qualitatively to describe the phenomena.

3.3. Results

3.3.1. Informant characteristics

A total of 17 males (89.5%) and two females (10.5%), average age 51 years, were selected in the study (see Appendix 2). All informants were native and Muslim. 78.2%

had an education grade of elementary school or lower. The majority described themselves as farmers (68.4%), but they also participated in some local business activities such as carpentry or construction to fulfill their needs. The selected four key informants were a family of the custodian. Also, they have been mandated to manage the *kabuyutan* and associated religious activities such as pilgrimage. The key informants were selected due to their status as the leading custodian of *kabuyutan* in Ciomas Village and KPG in particular. Local people respected them as an authorized person to deliver knowledge about *kabuyutan*.

3.3.2. Conservational land classification

Through in-depth interview, key informants revealed the importance of zoning for implementing the environmental management within the scope of watershed (*pangauban*). As an ecological space with the cultural values as reinforcing its identity, *pangauban* has been determined by the flow of water or river (*patanjala*) including a spatial unit from the upstream, midstream, to downstream area. They confirmed the general concept of Sundanese landscape (see Chapter 1) and stressed that the Sundanese's ancestor have mandated the basic traditional concept in maintaining the continuity of structure and function of the essential elements of nature, namely land and water (*lemah-cai*). Figure 3.3 shows the different between administrative boundary (shown by red area) and ecocultural boundary that determined based on the traditional ecological knowledge of local people. They determined five particular places (*karantenan*, *kimulud*, *tembong*, *Jagakaya*, and *Hulu Lengkong*).

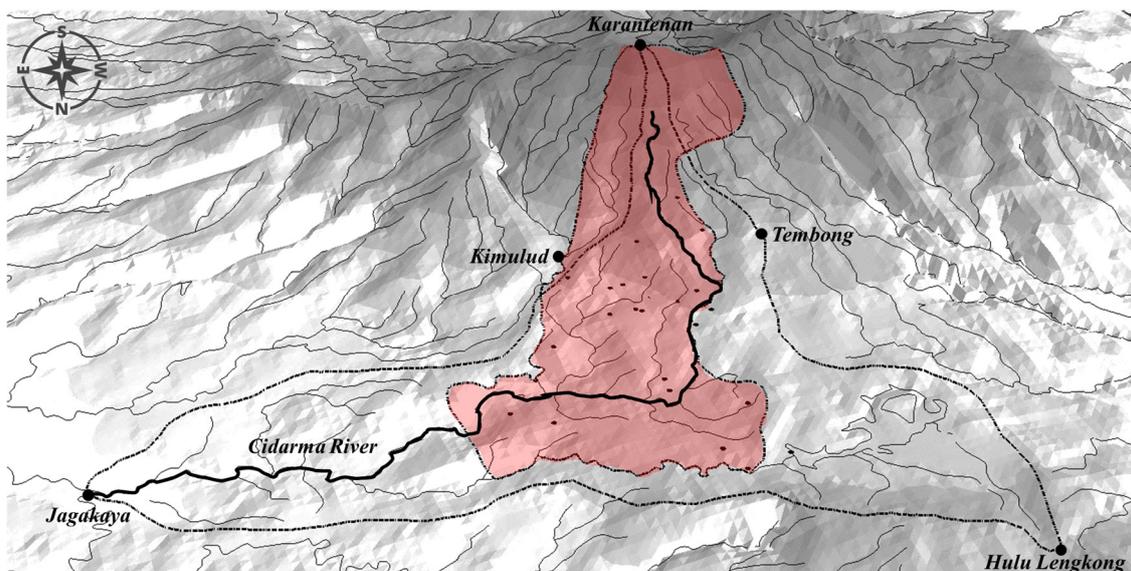


Figure 3.3. Ecocultural boundary was delineated by using 30-m DEM data to determine the watershed-based area of Cidarma River (*Pangauban Cidarma*).

jagakaya, and *hulu lengkong*) as benchmarks to delineate the watershed based area of Cidarma River.

This concept was implemented through determining landscape as protection area (*leuweung larangan*), conservation area (*leuweung tutupan*), and production area (*leuweung baladahan*) (Figure 3.4). Traditionally, a whole landscape perceived as a part of *leuweung larangan* and will converse into *leuweung baladahan* where human being needs a space for dwelling and agriculture production, while *leuweung tutupan* utilized for conserving the *leuweung larangan* from excessive use of *leuweung baladahan*. Springs and their surrounding environment became a major focus of management, and they set these areas based on traditional land classification as *leuweung larangan* that severely restricted in use. *Leuweung tutupan* have been set as the buffer zone in the upstream and downstream, in any riparian, as well as in *lemah mala* (dangerous land to human life). As for *leuweung baladahan* that located outside the two previous areas have been arranged for fulfilling the physical human needs as a counterweight of spiritual needs. Based on the characteristics of places that make up these three major areas, the ancestors perceived all part of their landscape as a mandate to be guarded. Sacralization of particular places due to its importance led to the establishment of sacred places, named as *kabuyutan*.

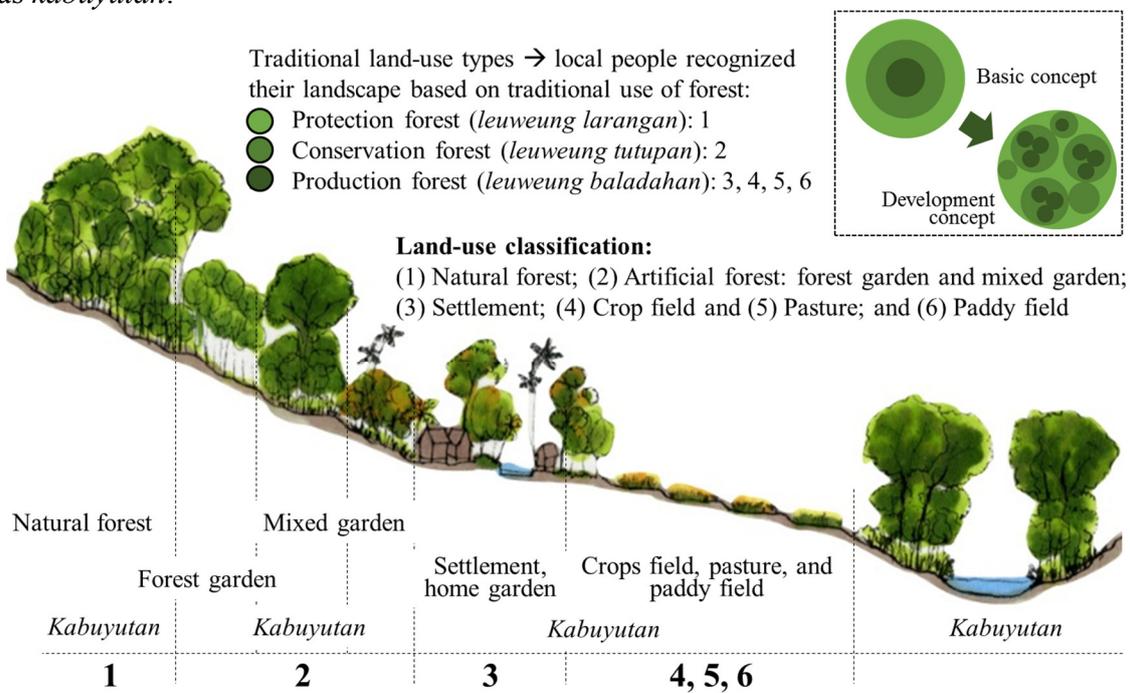


Figure 3.4. The arrangement of traditional Sundanese landscape (Source: Author).

This traditional land classification which determined by the function of forest (*leuwueng*), *kabuyutan* were perceived have distributed around a landscape. *Kabuyutan* in *leuweung larangan* mainly placed in the upstream and currently has designated as a national forest with a different function such as game reserve of Mt. Sawal and production forest managed by national forestry enterprise (PERHUTANI). As for *kabuyutan* in *leuweung tutupan* and *baladahan* spread over in particular type of land that potential being harmful to a human being (*lemah mala*) and more geared to be abandoned naturally for land and water conservation purposes. In addition, every spring was considered as *leuweung larangan* even though located outside this area. Through FGDs, informants were asked to determine which areas function as land and water conservation areas and 15 land types were perceived to hold that function (Table 3.2). These land types were perceived as representative of their particular land variables which determined by topographic map and several thematic maps (Figure 3.5).

Table 3.2. Traditional land classification for land and water conservation.

No.	Classification	Definition	Land variable
1	<i>Huma</i>	Dry field towards eastern	Aspect (east)
2	<i>Lamping</i>	Hillside towards western	Aspect (west)
3	<i>Lebak</i>	Southern/lower area	Aspect (south)
4	<i>Tepis wiring</i>	Settlement in flat area	Aspect (flat)
5	<i>Tonggoh</i>	Northern/upper area	Aspect (north)
6	<i>Geger</i>	Hilltop	Elevation (≥ 600 m asl)
7	<i>Tutugan gunung</i>	Foothill	Elevation (≥ 600 m asl)
8	(1) <i>Babakan</i> ; <i>landeuh</i> ; <i>lembur</i>	Settlement (differs in status)	Land-use (settlement)
9	<i>Makam</i>	Cemetery	Land-use (cemetery)
10	(1) <i>Kebon</i> ; (2) <i>reuma</i> ; (3) <i>leuweung</i> ; (4) <i>kubangan</i> ; (5) <i>sampalan</i> ; (6) <i>ruyuk</i>	(1,2) Secondary forest; (3) Primary forest; (4) Mallow; (5) Feeding area; (6) Woodland in settlement	Land-use (forest)
11	(1) <i>Babantar</i> ; <i>leuwi</i> ; (2) <i>kamalir</i> ; <i>susukan</i> ; <i>wahangan</i>	River differs in (1) depth and (2) size	River (≤ 100 m from river)
12	(1) <i>Bobojong</i> ; <i>jontor</i> ; <i>tanjung</i> ; <i>teluk</i> ; (2) <i>muhara</i> ; (3) <i>kerees</i> ; (4) <i>sabang</i>	(1) Foreland; (2) Tributary; Estuary; (3) Riverbank; Levee; (4) In between two rivers	River (≤ 100 m from river)
13	(1) <i>Kobakan</i> ; <i>situ</i> ; (2) <i>talaga</i> ; (3) <i>kolomeran</i>	(1) Basin; Lake; (2) Pond; (3) Drainage	River (≤ 100 m from river)
14	(1) <i>Gupitan</i> ; <i>jungkrang</i> ; (2) <i>lengkong</i> ; <i>somang</i>	Valley (differs in size)	Slope ($\geq 3\%$)
15	(1) <i>Bubulak</i> ; <i>tegalan</i> ; (2) <i>hunyur</i> ; <i>monggor</i> ; <i>pasir</i> ; (3) <i>pencut</i>	Hill (differs in size)	Slope ($\geq 3\%$)

Regarding aspect and elevation (Figure 3.5a and 3.5b), all direction and position higher than 600 m asl of a land were perceived as having to be conserved regardless of various land-use types. A key informant stressed that in addition to the harmonious relationship between Sundanese people and nature, the mountainous region which traditionally determined higher than 600 m asl was more perceived as sacred. Among the land-use types (Figure 3.5c), local people thought that forest, settlement, and cemetery areas had higher priority to be conserved than others due to their close relationship with people's philosophy of life. They were perceived as representing the circle of life with the forest as the place of birth, the settlement as the location of growth, and the cemetery as the place of death. Also, 'forest,' 'river,' and connected land-uses such as 'pond,' 'lake,' or 'basin' were also perceived as important landscape elements for continuing life. Thus, areas located close to the river (Figure 3.5d) were determined for conservation, particularly to prevent the severe impact of the flood disaster. Culturally, the distance was designated based on natural symbols such as particular plant species, stone, hill, or valley. However, practically, people perceived to refer to the Decree of the President of Republic of Indonesia No. 32 of 1990^c about protected areas management along the river.

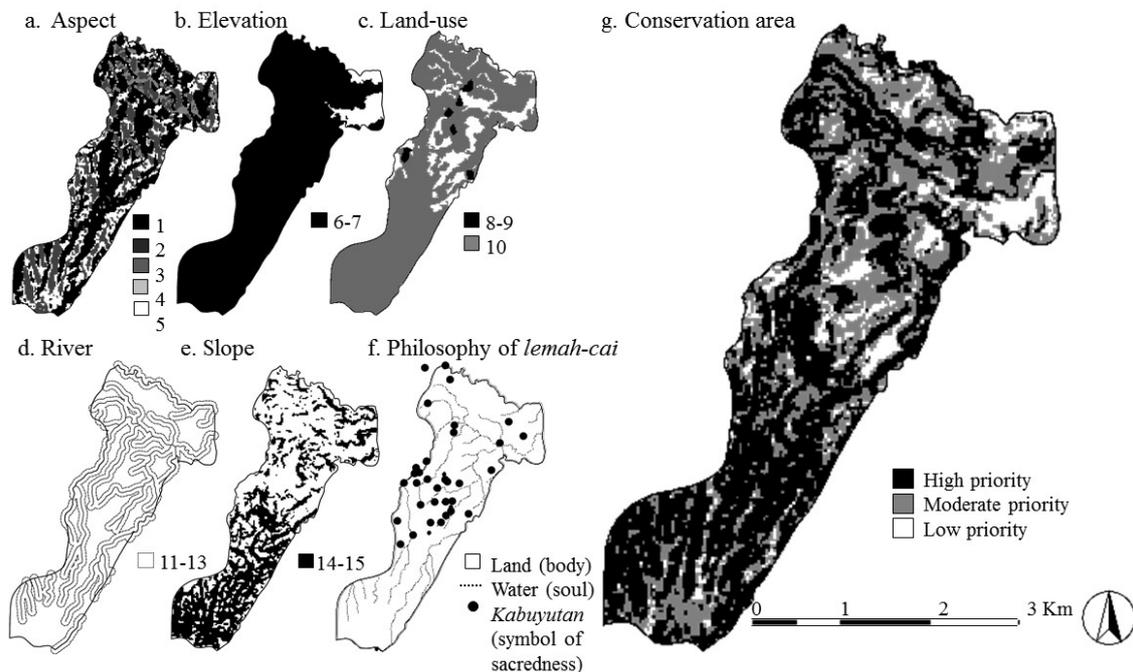


Figure 3.5. Spatial distribution map of the fifteen conservation lands within Ciomas Village (a-e), the Sundanese environmental conservation philosophy of *lemah-cai* (f), and the proposed environmental conservation strategy with different priority (g). Number in each land variable indicates the land classification in Table 3.2.

Among slopes, by considering the position of slope-related areas in the slope map (Figure 3.5e), most of them were found in the slope steeper than 3%. These areas were classified as conservation areas. People perceived that every type of slopes (gentle to steep) are risky and tend to be conserved due to a thorough understanding of all year long of the rainy season with high average rainfall. Their lands were potentially disastrous ranging from water erosion to mass movements such as soil creeps, landslips or landslides, and other challenges related to water. In summary, by taking the vital function of these areas into consideration, a participatory-based environmental conservation map was proposed which indicates some degree of priority ranking to guide management implementation (Figure 3.5g).

The map showed that areas with high priority management were dominant followed by the moderate and low priority areas respectively. The function of the high priority areas as protection area (*larangan*) were proposed to be revitalized by securing the important element such as spring and river chain, and can be empowered by the law enforcement of both customary and formal regulation. As for other areas, strengthening the basic function of conservation (*tutupan*) and production (*baladahan*) area through sufficient utilization would be appropriate in order to support the function of protection area in general. Further, supporting local people to implement their traditional ecological knowledge in the landscape management would be essential in dealing with locality.

3.3.3. Structure and function of *kabuyutan*

The findings revealed that informants have a relatively good understanding according to the condition of 33 *kabuyutan* and the surrounding landscape (Figure 3.6 and detail structure and figure of *kabuyutan* were shown in Appendix 4). According to the conservational land classification, about 33 *kabuyutan* were identified according to those particular five land variables as well as other associated variables (Table 3.3). Results showed that *kabuyutan* in Ciomas were located at an average elevation of 767 m asl as a part of the mountainous region. More than half of *kabuyutan* (57.6%) were placed on very gentle slope area (1-3%), and few were located on the moderately sloping area (5-15%). Among aspect, 24 *kabuyutan* (72.7%) were located in the area towards the eastern part, while south direction was absence due to the position of village on the side of Mt. Sawal that leads to the north. Also, people reported that *kabuyutan* located in areas toward the east were functionally set for protecting agriculture lands to use maximum energy from

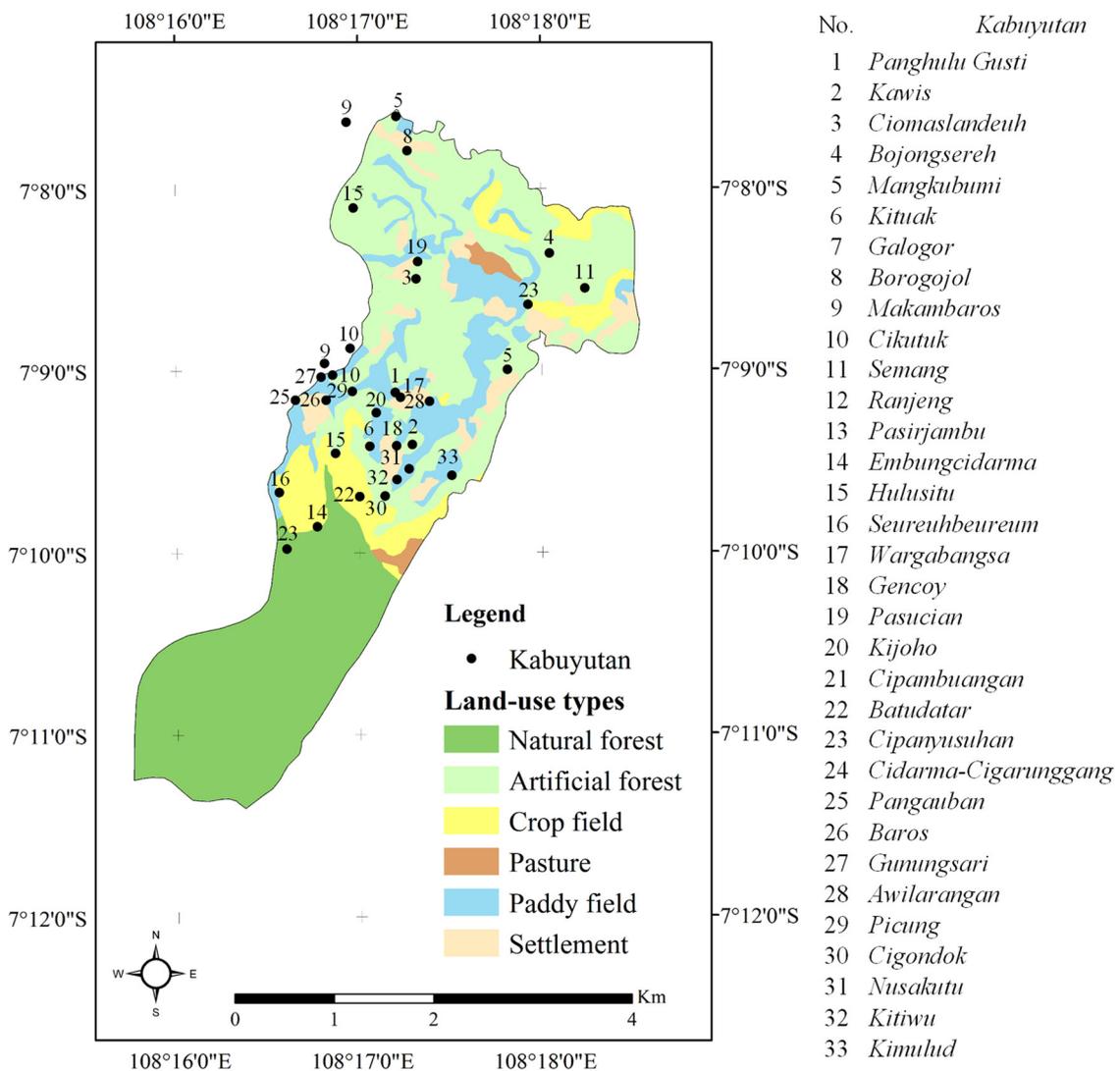


Figure 3.6. Distribution of 33 *kabuyutan* within different type of land-use.

sunlight, while the north and south direction were set to support the hydrological system due to the understanding of water cycle that flows from the north (forested areas) to the south (developed and cultivated areas).

Regarding land-use, the majority of *kabuyutan* were placed on the artificial forest (48.5%) with dominantly covered by dense vegetation and surrounded by paddy fields. These *kabuyutan* showed a fairly good condition which resembles the natural condition due to the regular management such as plantation of tree and other plant species. Conversely, *kabuyutan* located in cultivated area both paddy field and crop field showed the vulnerability to change. Informants stressed that the land-use changes were considered as a major driver in decreasing or even disappearing of *kabuyutan*, especially its

surrounding area (buffer zone). According to the approximate distance to river, results showed that *kabuyutan* were located around 88.9 m in average from the river and associated with water bodies such as springs, rivers, tributaries, or lakes. Also, the proximity distance to road indicated that most *kabuyutan* located more than 100 m from the road and few *kabuyutan* (12.2%) have no distance from the road. In addition to religious reason, *Kabuyutan Panghulu Gusti* showed the most frequent visitation of pilgrimage due to the proximity to main village's road. Currently, a dominance of small patch of *kabuyutan* (average of 0.9 ha) was distributed within Ciomas Village. However, people still perceived these *kabuyutan* as an anchor (*tutunggul kampung*) which confers resistance to the surrounding landscape.

As the main element in *kabuyutan*, springs have characterized about a nearly half of *kabuyutan* following by graves (33.3%) and plants (27.3%) respectively (Table 3.3 and Appendix 4). The existence of main elements within *kabuyutan* showed the importance of customary law (taboo) conveyed by the custodian in protecting them from the disturbance. Nonetheless, as a buried place of the ancestors, graves were more perceived as the main symbol of *kabuyutan* due to religious reasons while visitation as well as utilization of *kabuyutan*. The informant reported that majority of people visiting and utilizing *kabuyutan* for pilgrimage and obtain the blessing. Regarding the status of land where *kabuyutan* exist, results revealed that more than half of *kabuyutan* (63.6%) located on private land and few belong to land managed by the government. Findings also showed that most of the springs were found on the private land, while graves were found on government land.

Regarding those land variables and associated cultural values, informants reported that several *kabuyutan* were arranged to protect the vital area to ensure its sustainability. For example, five *kabuyutan* in Ciceuri (a hamlet in Ciomas Village) were gradually set to protect land and continuity of hydrological system (Figure 3.7). Sequentially, rainwater was harvested by *Kabuyutan Batudatar* in the upper area (symbolized by a stone), water occurs from springs in *cigondok* and *kitiwu* then were collected in *nusakutu* (symbolized by a stone). Further, *Kabuyutan Eyang Kawis* was set to continue this system for the area underneath. This arrangement was complemented by a myth which states, “*mun batu di batudatar paamprok jeung batu di nusakutu, Ciceuri bakal leungit (if the stone in batudatar meets with the stone in nusakutu, Ciceuri Hamlets will disappear).*”

Table 3.3. Structure of 33 *kabuyutan* in Ciomas Village.

No.	<i>Kabuyutan</i>	ELEV (m asl)	ASPC	SLPE	DTRV (m)	DTRD (m)	Area (ha)	LU	LS	Element
1	<i>Panghulu Gusti</i>	730	W	VGS	180.0	84.9	6.6	AF (PF)	G	Spr, Plt, Grv
2	<i>Kawis</i>	748	E	VGS	150.0	84.9	3.3	AF (PF)	G	Grv, Plt
3	<i>Ciomaslandeuh</i>	703	E	VGS	67.1	94.9	2.2	AF (S)	G	Grv, Plt
4	<i>Sereh</i>	680	E	VGS	174.9	67.1	2.1	AF (CF)	G	Grv, Plt
5	<i>Mangkubumi</i>	693	E	VGS	134.2	216.3	1.7	AF (S)	G	Grv, Plt
6	<i>Kituak</i>	784	N	GS	84.9	284.6	1.2	AF (PF)	P	Spr, Plt
7	<i>Galogor</i>	718	E	VGS	60.0	417.9	1.1	AF (PF)	P	Grv, Plt
8	<i>Borogojol</i>	665	E	NL	127.3	90.0	1.1	AF (CF)	P	Spr, Plt
9	<i>Makambaros</i>	794	E	VGS	90.0	60.0	1.0	AF (CF)	G	Grv, Plt
10	<i>Cikutuk</i>	760	N	VGS	30.0	60.0	1.0	AF (PF)	P	Spr, Plt
11	<i>Semang</i>	645	E	VGS	283.0	67.1	0.8	AF (CF)	P	Grv, Plt
12	<i>Ranjeng</i>	728	E	VGS	0.0	0.0	0.7	AF (PF)	G	Plt, Riv
13	<i>Pasirjambu</i>	731	E	VGS	42.4	180.0	0.7	AF (CF)	G	Grv, Plt
14	<i>Embungcidarma</i>	987	E	GS	0.0	150.0	0.7	CF (CF)	P	Spr, Plt
15	<i>Hulusitu</i>	861	W	GS	0.0	123.7	0.6	AF (CF)	P	Spr, Plt
16	<i>Seureuhbeureum</i>	929	W	GS	94.9	84.9	0.5	CF (PF)	G	Spr, Plt
17	<i>Wargabangsa</i>	748	W	NL	123.7	60.0	0.4	DS (DS)	G	Grv, Plt
18	<i>Gencoy</i>	755	W	VGS	247.4	60.0	0.3	AF (PF)	P	Spr, Plt
19	<i>Pasucian</i>	741	E	NL	161.6	42.4	0.3	CC (DS)	P	Plt
20	<i>Kijoho</i>	729	E	VGS	84.9	108.1	0.3	PF (PF)	P	Grv, Plt
21	<i>Cipambuangan</i>	736	E	NL	42.4	67.1	0.2	AF (PF)	P	Spr, Plt
22	<i>Batudatar</i>	928	E	MS	201.2	247.4	0.2	CF (CF)	P	Plt, Stn
23	<i>Cipanyusuhan</i>	1043	W	NL	60.0	390.0	0.2	NF (CF)	G	Spr, Plt
24	<i>Cidarma-Cigarunggang</i>	591	E	VGS	0.0	0.0	0.2	PF (S)	P	Plt, Riv
25	<i>Pangauban</i>	794	E	VGS	0.0	0.0	0.2	PF (S)	P	Plt, Riv
26	<i>Baros</i>	788	E	VGS	84.9	30.0	0.2	DS (DS)	G	Plt
27	<i>Gumungsari</i>	764	E	NL	0.0	30.0	0.1	PF (CF)	P	Spr, Plt
28	<i>Awilarangan</i>	712	E	NL	134.2	30.0	0.1	PF (CF)	P	Spr, Plt
29	<i>Picung</i>	756	E	VGS	0.0	60.0	0.1	PF (CF)	P	Spr, Plt
30	<i>Cigondok</i>	815	E	MS	30.0	84.9	0.0	PF (CF)	P	Spr, Plt
31	<i>Nusakutu</i>	734	W	VGS	42.4	120.0	0.0	PF (CF)	P	Plt, Stn
32	<i>Kitiwu</i>	762	E	VGS	42.4	42.4	0.0	PF (CF)	P	Spr, Plt
33	<i>Kimulud</i>	772	E	GS	161.6	0.0	0.0	PF (CF)	P	Grv, Plt

Abbreviation: Elevation (ELEV); Aspect (ASPC) with area towards northern (N), western (W), eastern (E), and southern (S); Slope (SLPE) with area nearly level of 0-1% (NL), very gentle slope of 1-3% (VGS), gently slope of 3-5% (GS), and moderately sloping of 5-15% (MS); Approximate distance to river (DTRV) and road (DTRD); Land-use (LU) with primary forest (PF), artificial forest (AF), crop field (CF), pasture (P), paddy field (PF), and settlement (S); Land status (LS) with land belongs to government (G) and private (P); and main element of *kabuyutan* such as grave (Grv), spring (Spr), plant (Plt), and stone (Stn).



Figure 3.7. The arrangement of five *kabuyutan* which bounded by a myth to unsure the continuity of hydrological system (a), the condition in *Kabuyutan Batudatar* (b), *cigondok* (c), *kitiwu* (d), *nusakutu* (e), and *kawis* (f) (**Source:** documentation of author)

In addition, informants also reported that *kabuyutan* is a part of *pangauban* (watershed-based landscape) that function to border the region by flowing of water. This can be shown by the arrangement of four *kabuyutan* namely *karantenan*, *tembong*, *jagakaya*, and *kimulud* with the first three *kabuyutan* were addition to previous 33 surveyed *kabuyutan*. To set the boundary of Cidarma River as the main river on this region, *karantenan* was set in the peak of Mt. Sawal as the main source of water in upperstream zone. Then, *tembong*, *jagakaya*, and *kimulud* were set to mark the boundary in the west, south, and east respectively (Figure 3.8). *Karantenan* was symbolized by a sacred spring named as *karantenan*, while others were symbolized by ancestral graves.

3.3.4. Dynamic of *kabuyutan*

Findings revealed that landscape in Ciomas Village has changed during 14 years (2000-2014). Increasing values of total edge together with decreasing value in the mean area indicated that landscape in 2014 had been fragmented into smaller patches.

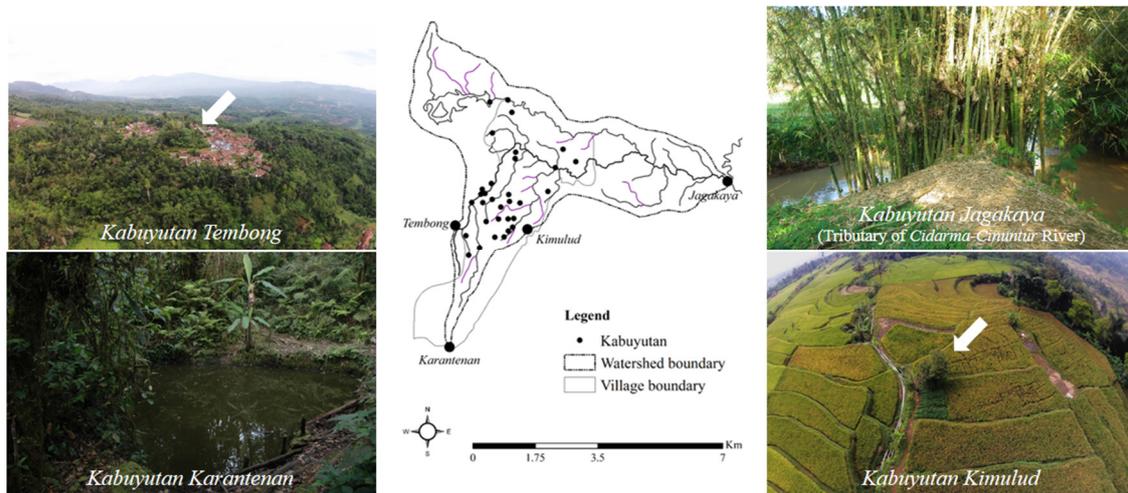


Figure 3.8. The arrangement of *kabuyutan* to mark the boundary of Cidarma Watershed (Source: documentation of author).

Fragmentation was also pointed out by the increasing of patch richness. The increasing value of Shannon's Diversity Index indicated that patch in 2014 more diverse compares with 14 years before. In addition, the value of Simpson's Diversity Index indicated that type of patch is considerably different both in 2000 and 2014, as for Shannon and Simpson's Evenness Index showed that patches are considerably distributed in a whole landscape (Table 3.4).

Concerning the changes in land use type, the number of patches (NumP) showed that settlement area is more fragmented in both two years. However, the highest level of fragmentation occurred in artificial forest area (five patches have formed) and paddy field (12 patches have formed). Based on the class area (CA) and percentage in a landscape (PLAND) natural forest and artificial forest area had a portion more than 30% of landscape and was considered as a matrix of the landscape. Dominant changes have

Table 3.4. General profile of landscape structure in Ciomas Village.

Aspects	Parameters	Years	
		2000	2014
Area	Total Area (ha)	1322	1322
	Mean Area (ha)	27	20
	Total Edge (ha)	7.1	7.4
Diversity	Patch Richness	49	59
	Shannon's Diversity Index	2.5	2.6
	Simpson's Diversity Index	0.8	0.8
	Shannon's Evenness Index	0.6	0.6
	Simpson's Evenness Index	0.9	0.9

occurred in artificial forest area (increasing about 50.5 ha in CA or 5.7 in the total edge (TE)) and in pasture area (decreasing about 53.3 ha in CA or 0.6 in TE). Increasing in the artificial forest from pasture area was mainly supported by the national tree plantation program (*One Million Tree for Indonesia*) which began from 2010. As for increasing in the settlement area was commonly occurred due to the increasing on demand for a residential area, whereas for increasing paddy field was mostly influenced by the increasing on demand for staple foods which mainly used for personal consumption (subsistence) rather than for sale (Table 3.5 and Figure 3.9).

Changes in *kabuyutan*'s scale occurred during 14 years which showed by increasing the total edge, patch richness, as well as the decreasing of the mean area, and some degree of diversity and evenness index. All changes led to the occurrence of fragmentation within *kabuyutan* (Table 3.6). The small scale of *kabuyutan* showed the disturbance mainly caused by the human intervention. Informants reported that many *kabuyutan* had lost their surrounding landscape and their main element due to the lack of landowners' knowledge about the importance of buffer zone (Figure 3.9). *Kabuyutan Panghulu Gusti* as an

Table 3.5. Land-use changes in Ciomas Village during 14 years.

Land-use	Parameters							
	NumP		CA (ha)		PLAND (%)		TE (ha)	
	2000	2014	2000	2014	2000	2014	2000	2014
Natural forest (NF)	1	1	428	428	32.4	32.4	0.3	0.3
Artificial forest (AF)	11	16	442	493	33.5	37.3	5.1	5.7
Crop field (CF)	7	8	145	122	11	9.3	1.9	1.8
Pasture (P)	5	3	69.8	16.5	5.3	1.2	1	0.4
Paddy field (PF)	6	18	149	171	11.3	13	3.5	4.3
Settlement (S)	19	20	87.2	89	6.6	6.7	2.4	2.4

Table 3.6. Profile of *kabuyutan*'s structure.

Aspects	Parameters	Years	
		2000	2014
Area	Mean Area (ha)	3.3	2.5
	Total Edge (ha)	0.2	0.3
Diversity	Patch Richness	7.3	9.2
	Shannon's Diversity Index	38.9	47.8
	Simpson's Diversity Index	1.4	1.6
	Shannon's Evenness Index	0.6	0.7
	Simpson's Evenness Index	0.7	0.7

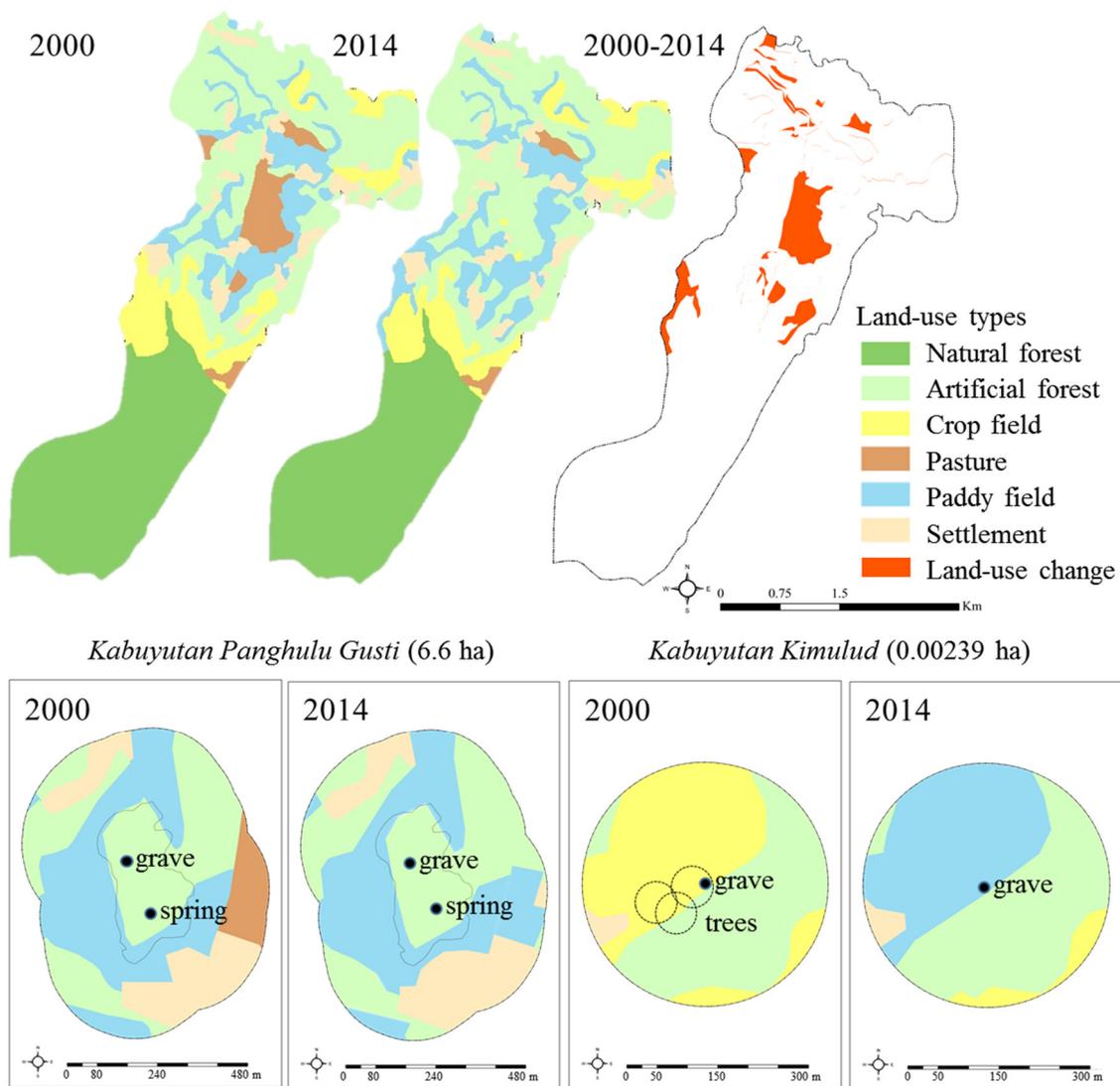


Figure 3.9. Change in land-use during 14 years in Ciomas Village which led to loss of main elements and buffer zone of *kabuyutan* (see Appendix 4 for details).

example, the land-use surrounding of *kabuyutan* has been conversing into paddy field and settlement area. As for *Kabuyutan Kimulud*, besides decreasing its buffer zone, this *kabuyutan* also experienced in disappearing sacred tress as its main element. People reported that most of changes were caused by the change in landowners' interest. Further, results revealed that most of the *kabuyutan* where springs exist more susceptible to change because mainly placed on private land.

In addition, an interesting finding revealed that land-use changes that have been occurring in the upstream area where coffee plantation has been progressively cultivated led to damages for the *kabuyutan* and people who live underneath, such as landslide in 2011 and droughts in 2012 (Figure 3.10). People reported that since colonial era, Ciamis



Figure 3.10. Landslides occur in surrounding *Kabuyutan Ranjeng* (a), *awilarangan* (b), *cikutuk* (c), and *gencoy* (d) that mainly caused by human activities (Source: documentation of KATCI).

Regency has been intensively developed as one of coffee plantation center in West Java Province. This report was also confirmed by Sundanese historian who states that *Preanger stelsel* system has been applied by Dutch government in West Java since 1677. During this period, Galuh Regency (the former name of Ciamis) was set to produce coffee sproducing by Ciamis people and being more popular when some people of Rajadesa Village return from Lampung Province (one of coffee production areas in Sumatera, Indonesia) after finishing a transmigration program.

Recently, Directorate General of Estate Crops of Ministry of Agriculture, Republic of Indonesia⁴ has published the tree crop estate statistics of Indonesia for year 2014-2016. This report stated that 1,532 ha have been cultivated for coffee plantation in Ciamis Regency (4.1% of total production area in West Java Province) with the total annual production of 646 ton or 807 kg/ha. Concerning the potential of area that suitable for coffee plantation, the provincial government supported the local farmers by providing seedling. Since 2014, thousands of seedlings have been distributed to the local people in Ciomas and other neighboring villages (including Rajadesa Village) where located in the Mt. Sawal area. Along with a rapid plantation program in Mt. Sawal, however, informants

reported that the sustainability of their landscape strongly depends on the existence of Mt. Sawal which perceived as the main of *kabuyutan*. Consequently, as an entrusted person in maintaining *kabuyutan*, the custodian endeavored to immediately deal with an appropriate solution before a wide-spreading of damages. Some strenuous attempts have been made such as an audience with the local government represented by the national forestry enterprise (PERHUTANI) and the natural resources conservation board (BKSDA) in 2012 and continues to date. The custodian demanded to take concrete steps in preventing the damages.

3.3.5. Ethnobotanical plant species

According to local people's knowledge, a total of 332 different species were reported in Ciomas Village which belongs to 101 families (Appendix 5). Most of the families (50.5%) have only one species, and Poaceae is a family that has the most species of 21 plant species (1.0%). Plant species were majority identified as tree species (43.4%) while epiphyte species were recorded as the fewest (0.3%) compare to others plant habitus. About three-quarter of plant species (71.7%) was identified as exotic species, while 94 plant species (28.3%) were recognized as native species. Five species were recognized as threatened species by IUCN (1.6%), while ten plant species were recognized as nationally protected species by Indonesia government due to their rarity in nature and difficulty in cultivation (Table 3.7).

Informants reported about 24 combinations were identified to indicate habitat distribution of plant species. About 77 plant species (23.2%) existed within *kabuyutan*, natural forest, and artificial forest area. A number of 11 plant species (3.3%) were identified as ubiquitous plant species that exist in all the habitat types (*kabuyutan*, natural forest, artificial forest, crop field, paddy field, and settlement area). Other findings showed that some unique plant species existed only in the natural forest (0.6%), artificial forest (1.5%), and settlement area (5.4%).

Regarding uses of the plant, informants reported that most of the plants were used for medicine (15.7%) and environmental conservation purposes (14.7%). A few number of plant species were used for fiber (0.2%) such as *Pinus merkusii* and four species (0.4%) such as *Oryza sativa* which majority of people use for feeding. Other uses were reported as for daily consumption such as fruits (9.3%), vegetables (8.3%), and spicy (4.1%); for

Table 3.7. The list of protected plant species based on IUCN and Indonesia regulation.

Scientific name	Indigenous name	Habitus	Origin	IUCN Status	National Status
<i>Tetrameles nudiflora</i> R. Br. (WCMC, 1998c)	<i>Binong</i>	Tree	Exotic	Least concern	
<i>Aglaia elliptica</i> Blume, Bijdr (Pannell, 1998)	<i>Tanglar</i>	Tree	Native	Least concern	
<i>Aleurites moluccana</i> (L.) Willd.	<i>Muncang</i>	Tree	Exotic		Protected
<i>Anacardium occidentale</i> L.	<i>Jambu mete</i>	Tree	Exotic		Protected
<i>Arenga pinnata</i> (Wurmb) Merr.	<i>Kawung</i>	Palm Tree	Native		Protected
<i>Cinamomum burmanii</i> (Ness & T. Ness) Blume	<i>Kayu manis</i>	Tree	Native		Protected
<i>Diospyros polyalthioides</i> Korth ex. Hiern	<i>Kiteja</i>	Tree	Native		Protected
<i>Durio zybenthinus</i> Murray	<i>Kadu</i>	Tree	Exotic		Protected
<i>Eucalyptus alba</i> Reinw. Ex. Blume	<i>Kayu putih</i>	Tree	Exotic		Protected
<i>Horsfieldia glabra</i> (Blume) Warb. (WCMC, 1998a)	<i>Kibeo</i>	Palm Tree	Exotic	Vulnerable	
<i>Manilkara kauki</i> (L.) Dubard	<i>Sawo kecil</i>	Tree	Native		Protected
<i>Mangifera indica</i> L. (WCMC, 1998b)	<i>Mangga, Buah</i>	Tree	Exotic	Data Deficient	
<i>Shorea macrophylla</i> (de Vr.) Ashton (MFRI, 2013)	<i>Maranti</i>	Tree	Exotic	Vulnerable	Protected
<i>Toona sureni</i> Merr.	<i>Suren</i>	Tree	Native		Protected

supporting household activities such as construction (9.4%), fuel (8.2%), industrial (2.2%), and ornamental (4.8%); as well as for supporting agriculture activities such as organic fertilizer (4.7%), organic pesticide (3.0%), and fodder (8.7%). A whole part of plant species (22.1%) was mainly used to fulfill local people's needs, especially for conservational purposes that require all part of the plant. Besides, people also used leaves (21.6%) for daily consumption such as for cooking or curing the ailments; branches (11.8%) for mainly used as firewood and charcoal; and stems (14.5%) for construction materials as well as for industrial purposes.

Based on analysis of data, Index of Cultural Significance (ICS) obtained for the 332-plant species useful for the Ciomas people ranged from 1 to 250 (Table 3.8). The highest value was for *tisuk* (*Hibiscus macrophyllus* Roxb. Ex. Hornem), while the lowest was dominated by the rare tree species such as *angsana* (*Pterocarpus indicus* Willd). Results from ICS's analysis were grouped into five categories to identify the species of particular cultural importance. Results revealed that only 8.1% of plant species were considered the

Table 3.8. Results of cultural significance analysis of plant species in Ciomas Village.

Value	Criteria	No. of species	Species
Very high significance	ICS \geq 100	27	<i>Tisuk</i> (<i>Hibiscus macrophyllus</i> Roxb. Ex. Hornem.) (E); <i>jati</i> (<i>Tectona grandis</i> L.f.) (N); <i>jati bodas</i> (<i>Gmelina arborea</i> Roxb.) (E); <i>afrika</i> (<i>Maesopsis eminii</i> Engl.) (E); <i>alba</i> (<i>Albizia falcataria</i> (L.) Fosberg) (E)
High significance	ICS 50-99	45	<i>Jagung</i> (<i>Zea mays</i> L.) (E); <i>padi</i> (<i>Oryza sativa</i> L.) (E); <i>nangka</i> (<i>Artocarpus heterophyllus</i> Merr.) (N)
Moderate significance	ICS 20-49	54	<i>Awi haur</i> (<i>Bambusa tuldoidea</i>) (E); <i>padi</i> (<i>Oryza</i> sp.) (E); <i>jengkol</i> (<i>Pithecelobium lobatum</i> Benth.) (N)
Low significance	ICS 5-19	88	<i>Cecenet</i> (<i>Physalis angulata</i> L.) (E); <i>dalima</i> (<i>Punica grandum</i> L.) (E); <i>awi hideung</i> (<i>Gigantochloa atroviolacea</i>) (N)
Very low significance	ICS 1-4	118	<i>Anggrek</i> (<i>Phalaenopsis javanica</i> Blumei.) (N); <i>angsana</i> (<i>Pterocarpus indicus</i> Willd.) (N); <i>antanan</i> (<i>Centella asiatica</i> (L.) Urban.) (N)

Abbreviation: Index of Cultural Significicant (ICS); species origin of native (N) and exotic (E).

very high significance and many species (35.5%) were identified very low significance (Table 3.8).

Results showed the detailed calculation for five particular species with the highest value of ICS (Table 3.9). This group was dominated by tree species which functions as timber for a specific use such as building material (u_6) or furniture (u_7). For example, *tisuk* (*Hibiscus macrophyllus* Roxb. Ex. Hornem) functions as fodder (u_5) has a very high intensity of use ($i=5$) which regularly used every day for feeding ($q=4$) and more preferred over other plant use options ($e=2$). Informants reported that after Indonesia government proclaiming the national program of *One Million Tree for Indonesia* in 2010, local government encouraged timber tree plantation such as *tisuk* (*Hibiscus macrophyllus* Roxb. Ex. Hornem), *alba* (*Albizia falcataria* (L.) Fosberg), *jati* (*Tectona grandis* L.f.), *jati bodas* (*Gmelina arborea* Roxb.), and *afrika* (*Maesopsis eminii* Engl.) to increase the prosperity in addition to environmental conservation purposes. To date, people have been planting those tree species in their forest garden, mixed garden, or even home garden as a deposit for future needs. Although the success of this program has been acknowledged, but the

Table 3.9. Calculation of cultural significance analysis of five particular plant species.

Scientific name	local name	Detailed calculation	ICS
<i>Hibiscus macrophyllus</i> Roxb. Ex. Hornem (E)	<i>Tisuk</i>	$(4 \times 5 \times 2)u_5 + (3 \times 5 \times 2)u_6 + (4 \times 5 \times 2)u_7 +$ $(4 \times 5 \times 2)u_8 + (2 \times 5 \times 2)u_{11} + (2 \times 5 \times 2)u_{12} +$ $(2 \times 5 \times 2)u_{13} + (4 \times 5 \times 2)u_{14}$	250
<i>Tectona grandis</i> L.f. (N)	<i>Jati</i>	$(4 \times 5 \times 2)u_5 + (3 \times 5 \times 2)u_6 + (4 \times 5 \times 2)u_7 +$ $(4 \times 5 \times 2)u_8 + (2 \times 5 \times 2)u_{11} + (4 \times 5 \times 2)u_{13}$	210
<i>Gmelina arborea</i> Roxb. (E)	<i>Jati bodas</i>	$(4 \times 5 \times 2)u_5 + (3 \times 5 \times 2)u_6 + (4 \times 5 \times 2)u_7 +$ $(4 \times 5 \times 2)u_8 + (2 \times 5 \times 2)u_{11} + (4 \times 5 \times 2)u_{13}$	210
<i>Maesopsis eminii</i> Engl. (E)	<i>Afrika</i>	$(4 \times 5 \times 2)u_5 + (3 \times 5 \times 2)u_6 + (4 \times 5 \times 2)u_7 +$ $(4 \times 5 \times 2)u_8 + (4 \times 5 \times 2)u_{13} + (4 \times 5 \times 2)u_{14}$	200
<i>Albizia falcataria</i> (L.) Fosberg (E)	<i>Alba</i>	$(4 \times 5 \times 2)u_5 + (3 \times 5 \times 2)u_6 + (4 \times 5 \times 2)u_7 +$ $(4 \times 5 \times 2)u_8 + (4 \times 5 \times 2)u_{13} + (4 \times 5 \times 2)u_{14}$	200

Note: subscript u_i shows the individual use of plant species for food (u_1), fruit (u_2), vegetable (u_3), spicy (u_4), fodder (u_5), construction (u_6), industrial (u_7), fuel (u_8), fiber (u_9), ornamental (u_{10}), medicine (u_{11}), spiritual (u_{12}), conservation (u_{13}), organic fertilizer (u_{14}), and organic pesticide (u_{15})

Abbreviation: Species origin of native (N) and exotic (E).

provision of tree seedling by considering the originality remains a challenge to optimize the program.

3.3.6. Plant species in *kabuyutan*

Based on vegetation survey, about 96 plant species belong to 47 families were found within 33 *kabuyutan* in Ciomas Village (Appendix 6). Most species were identified as tree (77.1%) following by herb (5.2%), bamboo (4.2%), liana (4.2%), palm tree (4.2%), pandanus (2.1%), shrub (2.1%), and fern (1.0%) respectively. About 58 species (60.4%) were exotic, and the majority of species were not designated as a protected plant species both by IUCN (97.9%) and national regulation (94.8%). In terms of utilization, most species were found in nature as a wild plant (65.6%), and none were regularly cultivated. A half of species indicated rarity while 28.1% of species were abundant. As for utilization, more than half of species (56.3%) were used in a little amount which considered as a sufficiency.

Results showed that some endangered plant species existed in *kabuyutan* and 5 of 7 endangered species were identified as native species for Sundanese landscape (Table 3.10). However, most of them were a rare species due to low level of dispersion within *kabuyutan*. For example, a native *tanglar* tree (*Aglaia elliptica* Blume, Bijdr) was perceived has a high cultural significance due to its existence for an extended period and well known as the main symbol of *Kabuyutan Panghulu Gusti*. The rarity has caused this

Table 3.10. Endangered plant species exist in *kabuyutan*.

No.	Scientific Name	Indigenous Name	Habitus	Plots	IUCN Status	National Status
1	<i>Aglaia elliptica</i> Blume, Bijdr (N)	<i>Tanglar</i>	Tree	1 (33)	Least concern	
2	<i>Arenga pinnata</i> (Wurmb) Merr. (N)	<i>Kawung</i>	Palm tree	14 (33)		Protected
3	<i>Cinamomum burmanii</i> (Ness & T. Ness) Blume (N)	<i>Kayu manis</i>	Tree	1 (33)		Protected
4	<i>Diospyros polyalthioides</i> Korth ex. Hiern (N)	<i>Kiteja</i>	Tree	5 (33)		Protected
5	<i>Durio zybenthinus</i> Murray (E)	<i>Kadu</i>	Tree	4 (33)		Protected
6	<i>Mangifera indica</i> L. (E)	<i>Mangga, Buah</i>	Tree	2 (33)	Data Deficient	
7	<i>Toona sureni</i> Merr. (N)	<i>Suren</i>	Tree	3 (33)		Protected

Abbreviation: species origin of native (N) and exotic (E); plots means number of *kabuyutan* and number in parenthesis indicates the total identified *kabuyutan*.

species to be sacred and restricted to its utilization. In contrast with *tanglar*, however, *kawung* (*Arenga pinnata* (Wurmb) Merr.) were found in a nearly half of *kabuyutan*. These species was also perceived as a culturally significant species for Sundanese people who has obtained its benefits for generations. Respondent reported that *kawung* is essential for environmental conservation due to its capability to catch and store water as well as to maintain the structure of the soil.

Nevertheless, they found some difficulties to cultivate this species because of the extinction of *careuh*, or the common palm civet (*Paradoxurus hermaphroditus*) which perceived has a mutual symbiosis with *kawung*. Informants said that the seeds would be easier to grow after the fermentation process through civet's digestion. They also mentioned that the decreasing number of *careuh* in line with the increasing of the coffee plantation to produce *kopi luwak* (civet coffee). Furthermore, IUCN listed palm civet as least concern species because its wide distribution, large population, uses a broad range of habitats, and is tolerant of extensive habitat degradation and change (Duckworth et al., 2016). This result also revealed the function of *kabuyutan* as preferred habitat of palm civet. This species used the connection among *kabuyutan* as their stepping stone to delineate the home range.

Table 3.11. The composition and floristic dominance of tree species in *kabuyutan*.

No.	Scientific Name	Local Name	RA	RF	RD	IVI	ICS
1	<i>Ficus calophylla</i> Blume (E)	<i>Kiara</i>	1.7	2.8	37.5	42.0	8.
2	<i>Lithocarpus elegans</i> (Blume) Hastus. Ex Soepadmo (N)	<i>Pasang</i>	18.4	11.6	9.4	39.4	13.0
3	<i>Ficus glabella</i> Blume (E)	<i>Bunut</i>	1.4	2.2	21.7	25.3	2.0
4	<i>Maesopsis eminii</i> Engl. (E)	<i>Afrika</i>	10.4	5.8	2.8	18.9	200.0
5	<i>Ailanthus triphysa</i> (E)	<i>Kalapa ciung</i>	5.8	7.7	3.3	16.8	8.0

Abbreviation: Species origin of native (N) and exotic (E); relative abundance in % (RA); relative frequency in % (RF); relative dominance in % (RD).

In addition to the endangered species, an interesting result was found that *kalapa ciung* (*Ailanthus triphysa*) and *pasang* (*Lithocarpus elegans* (Blume) Hastus. Ex Soepadmo) were distributed almost over the whole *kabuyutan* which counted fifteen plots and ten plots respectively. Table 3.11 showed that the relative frequency value of both species was higher than others. Besides, *pasang* was the top species which having large number of stands. The reason given was because of the ease of regeneration through the insect pollination and seed propagation. As for the widespread dispersion of *kalapa ciung* (*Ailanthus triphysa*), informants reported that similar with *kawung* (*Arenga pinnata* (Wurmb) Merr.), this species also perceived as both culturally and ecologically significant tree. This tree was perceived for marking the lands susceptible to a landslide as well as for identifying the sacredness of *kabuyutan*. Besides, genus of *Ficus* (fig trees) was identified has the high value of relative dominance due to its large size of canopy.

Concerning the importance of tree as a dominant species without compromising other plant habitus, at least 74 trees existed within *kabuyutan* (Table 3.12). The majority of tree species were found in *Kabuyutan Panghulu Gusti* as the largest *kabuyutan* in Ciomas Village and other *kabuyutan* located on government lands such as *Sereh* and *Mangkubumi*. Informants reported that annual tradition of *nyepuh* which requires tree plantation as a part of rituals has a potential to increase the number of species. Recently, three tree species, namely *sirsak* (*Annona muricata* L.), *palahlar* (*Dipterocarpus retusus* Bl.), and *matoa* (*Pometia pinnata* J.R. Forst&G. Forst.) were planted during *nyepuh* in 2016 (Figure 3.11). In addition, the afforestation program has been encouraged people to plant tree species regardless of their origin. As a consequent, native species was larger than exotic and five species with the highest ICS value were also found in *kabuyutan*.

Table 3.12. Results of vegetation survey within 33 *kabuyutan*.

No.	<i>Kabuyutan</i>	Area	LS	Plot	PA	SN (N, E)	TN	ITN	SWI	SI	EV
1	<i>Panghulu Gusti</i>	6.6	G	21	0.8	58 (25,33)	45	232	2.93	0.98	0.77
2	<i>Kawis</i>	3.3	G	7	0.3	9 (5,4)	7	14	1.48	0.99	0.76
3	<i>Ciomaslandeuh</i>	2.2	G	3	0.1	10 (6,4)	7	23	1.29	1.00	0.66
4	<i>Sereh</i>	2.1	G	6	0.2	23 (11,12)	17	40	2.52	0.97	0.84
5	<i>Mangkubumi</i>	1.7	G	2	0.1	15 (5,10)	10	21	1.97	0.89	0.86
6	<i>Kituak</i>	1.2	P	1	0.0	6 (3,3)	2	3	0.64	0.89	0.92
7	<i>Galogor</i>	1.1	P	2	0.1	7 (3,4)	6	15	1.41	0.72	0.79
8	<i>Borogojol</i>	1.1	P	3	0.1	10 (5,5)	8	16	1.76	0.97	0.84
9	<i>Makambaros</i>	1.0	G	4	0.2	18 (7,11)	16	24	2.59	1.00	0.91
10	<i>Cikutuk</i>	1.0	P	2	0.1	7 (2,5)	4	21	0.78	1.00	0.56
11	<i>Semang</i>	0.8	P	4	0.2	21 (8,13)	13	22	2.39	1.00	0.93
12	<i>Ranjeng</i>	0.7	G	2	0.1	10 (6,4)	7	19	1.66	0.93	0.85
13	<i>Pasirjambu</i>	0.7	G	3	0.1	18 (9,9)	13	27	2.41	0.99	0.94
14	<i>Embungcidarma</i>	0.7	P	2	0.1	3 (0,3)	3	40	1.02	0.92	0.92
15	<i>Hulusitu</i>	0.6	P	3	0.1	7 (2,5)	3	5	0.95	0.64	0.86
16	<i>Seureuhbeureum</i>	0.5	G	3	0.1	8 (2,5)	2	2	0.69	0.75	1.00
17	<i>Wargabangsa</i>	0.4	G	1	0.0	4 (2,2)	3	5	0.95	0.64	0.86
18	<i>Gencoy</i>	0.3	P	1	0.0	8 (4,4)	3	3	1.10	0.89	1.00
19	<i>Pasucian</i>	0.3	P	1	0.0	11 (2,9)	8	11	1.97	0.99	0.95
20	<i>Kijoho</i>	0.3	P	2	0.1	14 (5,9)	10	21	2.09	1.00	0.91
21	<i>Cipambuangan</i>	0.2	P	2	0.1	16 (5,11)	10	18	2.06	1.00	0.90
22	<i>Batudatar</i>	0.2	P	1	0.0	2 (1,1)	0	0	0.00	1.00	0.00
23	<i>Cipanyusuhan</i>	0.2	G	1	0.0	2 (0,2)	2	18	0.53	0.40	0.76
24	<i>Cidarma-Cigarunggang</i>	0.2	P	1	0.0	11 (4,7)	7	12	1.59	0.99	0.82
25	<i>Pangauban</i>	0.2	P	1	0.0	4 (1,3)	2	4	0.56	0.94	0.81
26	<i>Baros</i>	0.2	G	1	0.0	9 (0,9)	6	6	1.79	0.97	1.00
27	<i>Gunungsari</i>	0.1	P	1	0.0	5 (1,4)	3	3	1.10	0.89	1.00
28	<i>Awilarangan</i>	0.1	P	1	0.0	4 (2,2)	1	1	0.00	0.00	0.00
29	<i>Picung</i>	0.1	P	1	0.0	8 (1,7)	6	7	1.75	0.98	0.98
30	<i>Cigondok</i>	0.0	P	1	0.0	1 (0,1)	0	0	0.00	1.00	0.00
31	<i>Nusakutu</i>	0.0	P	1	0.0	2 (1,1)	1	1	0.00	0.00	0.00
32	<i>Kitiwu</i>	0.0	P	1	0.0	2 (1,1)	1	1	0.00	0.00	0.00
33	<i>Kimulud</i>	0.0	P	1	0.0	3 (0,3)	2	2	0.69	0.75	1.00

Abbreviation: Area in hectare; land status (LS) owned by government (G) and private (P); plot area (PA) in hectare; species number (SN) with number of native (N) and exotic species (E); tree species number (TN); individual tree number (ITN); Shannon-Wiener Index (SWI); Simpson's Index of Diversity (SI); Evenness Index (EV).



Figure 3.11. *Kabuyutan Panghulu Gusti* as a main venue of *nyepuh* tradition (a), location for tree plantation (b), planting tree species as a rite in tradition (c), tree species were planted during *nyepuh* in 2016 consist of sirsak (*Annona muricata* L.) (d), palahlar (*Dipterocarpus retusus* Bl.) (e), and matoa (*Pometia pinnata* J.R. Forst&G. Forst.) (f) (Source: documentation of author (a, b, d, e, f) and KATCI (c)).

As for other large *kabuyutan*, natural succession followed by the sacredness of such places led to maintain the number tree species. On the contrary, *Kabuyutan Cigodok* has lost its surrounding area which previously covered by trees. Other results found that *kabuyutan* located on private lands showed the less number of species due to the landowner's interest (Table 3.11). Some informants stated that people are usually utilizing their land based on their wish to fulfill their basic need which mainly to produce a staple food such as rice or other complementary crops. Thus, most of privately *kabuyutan* were surrounded by paddy or crop field area. Consequently, the area of *kabuyutan* was gradually fragmented and some of them existed only with their single elements such as graves, stones, plants, or spring. This study also revealed that the increasing of species number in line with the increasing of area (Figure 3.12) such as in the KPG where the area for planting is still widely available for supporting the sustainability of *nyepuh* ceremony (Figure 3.11b).

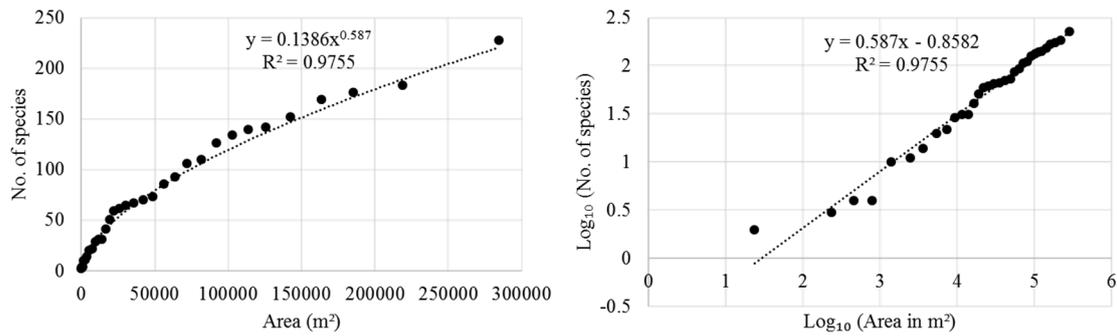


Figure 3.12. The species-area curve of plant species within 33 *kabuyutan*.

Also, the large number of species in one *kabuyutan* depended on the existence of sacred grave and other associated elements (spring) regardless of their land status. For example, *Kabuyutan Ciomaslandeuh*, *sereh*, *mangkubumi*, and *pasirjambu* where located in government land as well as some personal *kabuyutan* such as *pasucian*, *kijoho*, and *cipambuangan* had more than 10 plant species as well as the high value of diversity indices (Table 3.11). The sacredness of ancestral graves perceived as a main reason that controls the interaction between people and *kabuyutan*. Informants reported that local people respected the taboos in visitation and utilization of *kabuyutan* and tend to leaved it as natural as possible. Despite they used the resources, a strictly permission should be obtained from the custodian before entering and using *kabuyutan*.

3.3.7. Conservational plant species

One hundred and thirty plant species were found within *Kabuyutan Panghulu Gusti* (KPG) and recognized as being necessary for land and water conservation purposes (Figure 3.13 and Appendix 7). Our data showed that tree species were perceived as most essential for conservation purposes (69.2%) and more than half of the plants were exotic species (66.2%). The IUCN conservation status of the species *Tetrameles nudiflora* R. Br. was identified as ‘least concern,’ and that of *Shorea macrophylla* (de Vr.) Ashton as ‘vulnerable.’ The following species were identified as protected plant species by national regulation: *Diospyros discolor* Willd., *Durio zybenthinus* Murray, *Arenga pinnata* (Wurmb) Merr., *Diospyros polyalthioides*, *Toona sureni* Merr., and *Shorea macrophylla* (de Vr.) Ashton (MFRI, 2013). More than half of plants were identified as ‘wild species’ (82.3%), while 4.6% species were partially cultivated for specific uses such as construction material (*Albizia falcataria* (L.) Fosberg, *Magnolia blumei* Prantl., and *Hibiscus macrophyllus* Roxb. Ex. Hornem or for making spices or medicine (*Syzygium*

aromaticum (L.) Merr & L. M. Perry). More than half of plants were identified as ‘exotic’ as well as ‘rare species’ (66.2%) and were perceived as being located particularly in KPG.

As for the continued existence of the KPG sacred site and its plants, the informants stated that the role of its custodian was crucial in managing and keeping in existence plants and other biocultural resources. The local people highly respected the custodian. Their perception was that if they followed the custodian’s rules such as planting some tree species every year during the annual *nyepuh* ceremony, the *kabuyutan* would be sustained. However, they voiced concern that people’s understanding of the importance of the site may have diminished due to rapid socio-economic changes. During FGD sessions, informants were asked to determine appropriate environmental plant species that could be paired with particular areas, in particular with the aim to prevent land degradation such as soil erosion and landslides or to prevent water scarcity (Figure 3.14). Few plant species were recommended for east-facing areas (24.6%): among them, 34.4% were tree species, and 31.3% were shrubs. More than half of all plant species, among them dominantly tree species (56.9%) were suggested to be used for areas facing north. For areas facing east, west, and south, all identified plants species were perceived as appropriate. Tree species, however, were preferred (see Appendix 7).

As for elevation, a percentage of 93.1% of plant species was recommended to conserve areas located higher than 600 m asl, while 50% of them could be used for

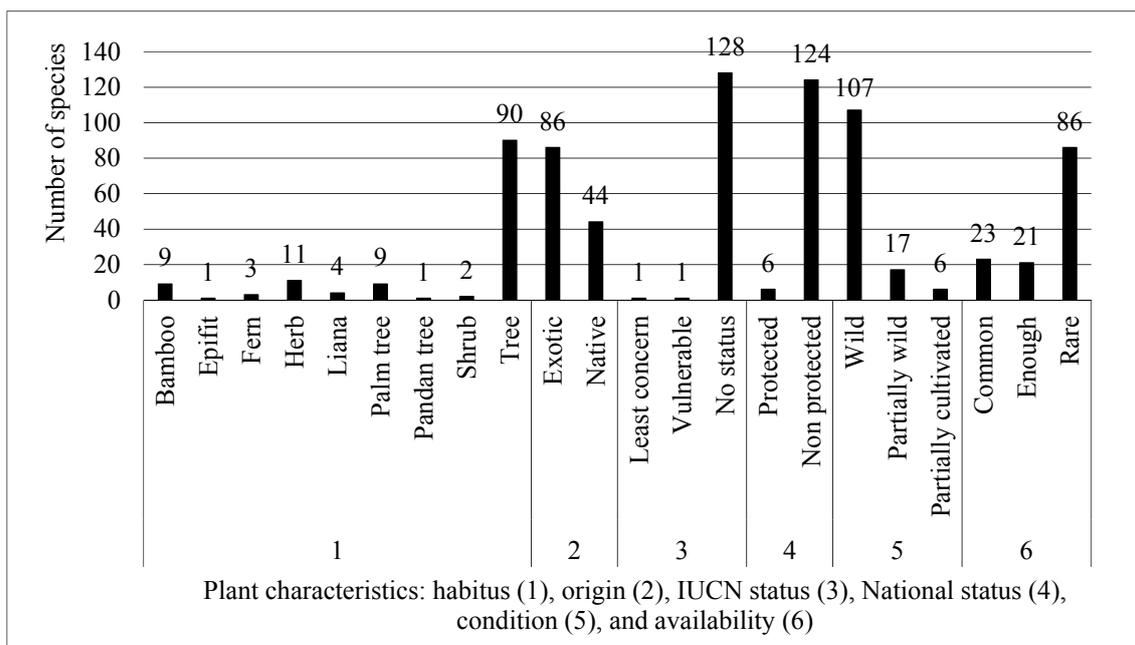
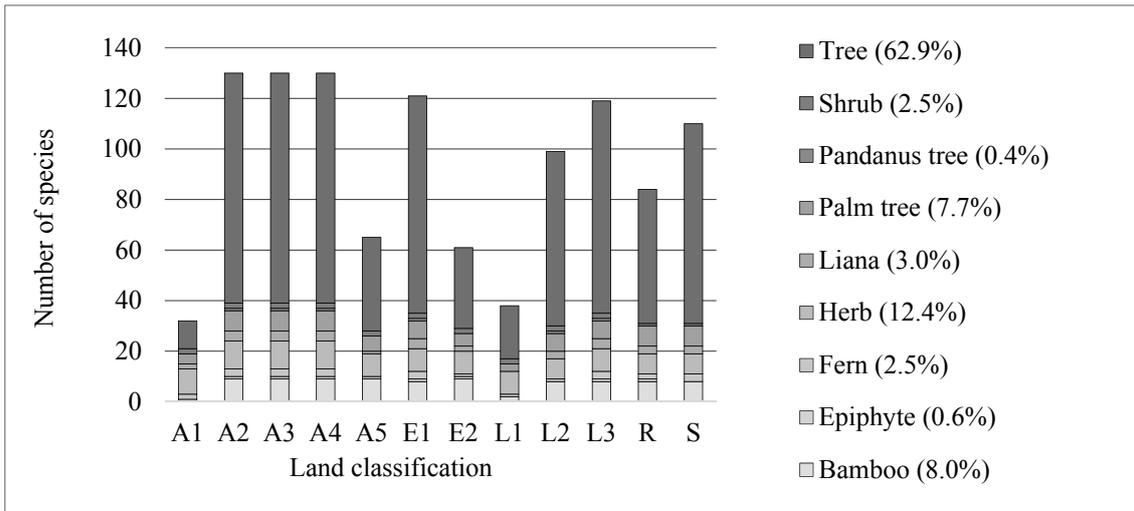


Figure 3.13. Conservational plant species found within *Kabuyutan Panghulu Gusti*.



conservation at lower altitudes. For both areas, planting tree species was highly

Abbreviation: Slope direction (aspect) towards east (A1), west (A2), south (A3), flat (A4), north (A5); Elevation ≥ 600 (E1) and < 600 m asl (E2); Land-use type of settlement (L1), cemetery (L2), forest (L3); River area within ≤ 100 m (R); Slope $\geq 3\%$ (S).

Figure 3.14. Perceived plant species for conservation area.

recommended. By considering the combination with the type of land-use, 29.2% few plant species were recommended to be used in the core settlement area for which trees (55.3%) and shrub species (23.7%) were mentioned as the priority. For cemetery and forest areas, more than three-quarters of all plant species, again dominated by tree species, were recommended. Areas along the river were perceived as a conservation area. Recommended were 64.6% of plant species, again dominated by tree species (63.1%). Similarly, in areas with a slope steeper than 3%, 84.6% of plant species were recommended. Among these, 71.8% were tree species.

According to local perception, six most preferred species were proposed for environmental conservation for all determined conservation areas. The species banana (*Musa spp.*) was perceived to be suitable in areas close to water bodies, especially around springs. The ti plant (*Cordyline fruitcosa* (L.) A. Chev.) and the broadleaf lady palm (*Rhapis excessa* (Thunb.) Henry) species were understood as signal plants that could mark the border of conservation areas. The white palle tree (*Ailanthus triphysa* (Dennst.) Alston) was used to mitigate landslide. The coconut (*Cocos nucifera* L.) and sugar palm (*Arenga pinnata* (Wurmb) Merr.) were perceived as having various benefits such as collecting and preserving groundwater and maintaining soil structure, especially in areas with steep slopes.

3.4. Discussion

3.4.1. Source of knowledge

The variety of structure and function, as well as the diversity of plant species in these sacred places (see Appendix 4), showed the importance of *kabuyutan*. Currently, *kabuyutan* are a protected area due to its sacredness, and customary laws play a fundamental role in its preservation. Findings showed that the informants had a good understanding of places function for land and water conservation purposes as a basis for determining *kabuyutan* and of plant species as one of their main elements. Further, the key informants played more important role in keeping up knowledge on conservational land and plant species because they had more opportunities to interact with natural resources in *kabuyutan* than other people. These results show the importance of strengthening interaction between the local people and *kabuyutan* so that knowledge on plants and conservation will be shared more widely among the local people.

Considerable knowledge of the function of various conservational land (see Table 3.2) and plant species (see Figure 3.13) influenced people's awareness and enhanced their wish to maintain the site. These results are consistent with other studies that show the important role of knowledge in increasing awareness that is considered as the first step for preparing a participatory management system (Vodouhê et al., 2010). In this regard, this study stresses that effective sharing of knowledge with other local people by all key informants and the custodian in particular, is instrumental in ensuring equality and continuity of knowledge.

3.4.2. Importance of springs

Local people's knowledge about their landscape and associated cultural values provide a fundamental information to understand the structure and function of *kabuyutan* as well as their changes. *Kabuyutan* have been determined based on traditional classification of fifteen lands (see Table 3.2) and perceived as a guardian of hydrological system (see Table 3.3). It has been confirmed by their close relationship with the water bodies in a landscape. Culturally, the function of water is embedded in the people's philosophy of life which expressed through the concept of *patanjala* (see Chapter 1). Informants explained that through this concept, the ancestors encourage their descendant to live and act like water. This idea influenced the characteristic of Sundanese people, and they were known as *urang cai* (water people) and a *urang gunung* (mountain people)

because they mainly inhabit in the mountainous area (Darsoprajitno, 2006; Ekadjati, 1995). People believed that by implementing this concept, the harmonious between human and nature would be realized. Thus, cultural and ecological-based approaches have been applied in dealing with its continuity. In addition to support previous studies (Ansari, Deodhar, Kumar, & Khatti, 2015), this result indicates a high dependency of people who live in the mountainous area of spring water for their sustenance and further will strengthen the cultural identity of people.

Springs as a part of a hydrological system that providing a source of water for a human being and other creations are facing a great challenge towards its sustainability. Water scarcity tends to be a reality in line with the disappearance of spring in nature. This study revealed that landscape surrounding the springs were gradually changed to other land-uses and led *kabuyutan* become small patches (see Figure 3.9 and Appendix 4). Other studies have reported this condition as a landscape fragmentation (Daye & Healey, 2015; Debusse et al., 2007; Echeverría et al., 2007; Ormsby & Bhagwat, 2010). However, results in Table 3.3 showed that most of the *kabuyutan* located around 88.9 m from the river and preserved the springs, indicating that the presence of *kabuyutan* is bounded with official regulation^{c,d} about its protection as a part of spring or river protected area which set around 200 m from spring and 100 m from river respectively.

Furthermore, *kabuyutan* provide protection for water catchment area. Culturally, the average elevation of 737 m asl for the majority of *kabuyutan*, indicating the sacredness of *kabuyutan* as a part of the mountainous region. Ecologically, however, several *kabuyutan* on the hilltop or ridge delineate the boundary of catchment area to identify the watershed. For example, *Kabuyutan Kimulud* was placed on the ridge as an eastern boundary of Cidarma Watershed (the main watershed in Ciomas Village) to ensure the utilization of land and water resources within the area in sufficiency (Figure 3.15). Other reason can be given by the existence of four *kabuyutan* that arranged to mark the boundary of Cidarma Watershed (see Figure 3.8). Arranging an area based on the hydrological system (watershed) is essential in dealing with efficient utilization of natural resources (Chang, 2012; Karadağ, 2013; Lalika et al., 2015) as well as the implementation of the ancestor's mandate.

The importance of *kabuyutan*, however, is not supported by the sufficient area due to the lack of knowledge of the landowner such as in *kimulud* that lost its sacred trees and

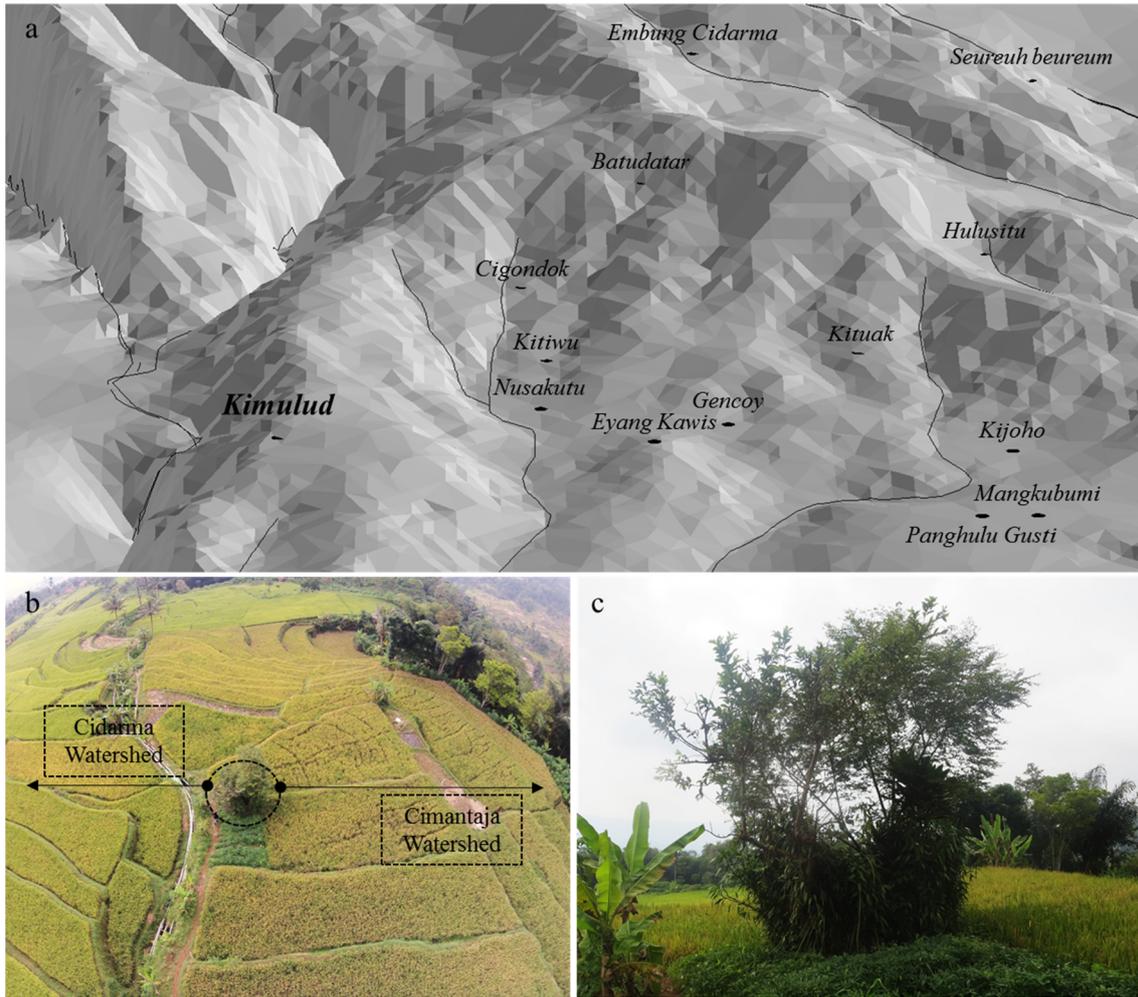


Figure 3.15. The arrangement of *Kabuyutan Kimulud* together with several *kabuyutan* functions as a border for water catchment area which considered also as a watershed boundary (a), the important role of *kimulud* as an anchor to divide and strengthen two different watersheds (b), and the actual condition of *kimulud* which composed by a single ancestral grave and some plant species (c) (Source: documentation of author).

buffer and only grave remains (Figure 3.15). According to the role of the mountainous region, designating them as a protected area^{c,e} by the official regulation would support the existence of *kabuyutan* through the conservational program for these particular areas. Several ongoing programs such as tree plantation would be potential to protect the *kabuyutan* by revitalizing the buffer zone as well as considering the origin of species.

Similar to previous study (Ansari et al., 2015; Joshi, 2006), finding also revealed that springs mostly occur in the very gentle slope area (see Table 3.3). This area potentially causes damages ranging from splash erosion to mass movements such as landslides and land erosion (Lalika et al., 2015). The instability of the land which is potentially disastrous has been well-understood by the ancestors, and they arranged

kabuyutan within this area to prevent and reduce the negative impact of slope-related disasters by an appropriate management such as planting particular tree species for land and water conservation (see Figure 3.14). In addition to the given natural aspect, springs located on the nearest distance to the road led *kabuyutan* to more accessible. The existence of the road for some *kabuyutan* perceived for ease of access and management, such as in *Kabuyutan Panghulu Gusti* which was frequently visited for pilgrimage. Nevertheless, the existence of roads may potentially cause an instability of *kabuyutan*. As a source of water, *kabuyutan* were potential to be claimed privately regardless the status of this natural element and the associated area in the state regulation. Therefore, prevention effort, especially revitalizing the function of the buffer zone is necessary to be encouraged (Cook et al., 2015; Echeverría et al., 2007).

Similarly, *kabuyutan* where springs exist and were dominantly surrounded by paddy fields, indicating the vulnerable status of them be destructed or even disappeared (see Table 3.3). Moreover, the major change in land-use during fourteen years was indicated by increasing of paddy fields (NumP increasing from 6 to 18 patches) (see Table 3.5). *Kabuyutan Cigondok* provides an example where landowner's interest as well as the lack of law enforcement in maintaining the existence of *kabuyutan*. The change in land-use into agricultural fields due to a lack of knowledge about the vital function of a buffer zone for *kabuyutan*. Further, the land ownership belongs to individuals reveals the weak implementation of rules regarding protected area around springs.

To date, however, the existence of spring and another main element of *kabuyutan* even though in the isolated and fragmented area, indicating the importance of customary laws in protecting the core zone of *kabuyutan* are respected by landowners regardless of the function of supported area. *Kabuyutan Cipambuangan*, for instance, the landowner respects the custodian's mandate by allowing a nearly half of land used for protecting a sacred spring. Therefore, the increasing level of knowledge as well as encouraging the effective rules which combine both official regulations and customary laws are necessary to prevent the conflict of interest between stakeholders. This proposition also reported by other researchers (Allendorf et al., 2012; Duckworth et al., 2016). However, this study more stresses to the strengthen the local customary or spiritual leaders (such as custodian) as long as they are more respected than official leader. The success of the tree plantation program in Ciomas cannot be separated from the role of custodian in its implementation.

3.4.3. Plant diversity hotspots

Results revealed that 249 of 332 plant species (75%) were reported to exist in *kabuyutan* according to local people's knowledge and 96 of 249 species (38.5%) have been verified based on vegetation survey (Table 3.13 and see Appendix 6). Also, the findings that high value of diversity indices for several *kabuyutan* (Table 3.12) were assumed that *kabuyutan* is potential to be a hotspot of plant diversity. This finding supports other studies that proposed a function of sacred natural sites as a preferable habitat for abundant plant species (Dudley et al., 2010; Hu et al., 2011; Khan et al., 2008; Santarém & Paiva, 2015). Furthermore, the number of species that existed in *kabuyutan* were comparable with other customary forests as well as national forests in the *tatar Sunda* (Table 3.14). In addition, regardless of survey's result, the presence of all fifteen endangered plant species as well as 32.9% of native species reported by informants, indicating the importance of *kabuyutan* towards biodiversity conservation (Table 3.13). The presence of endemic and threatened species is important in designating a biodiversity hotspot that leads to making up conservation priorities (Myers et al., 2000). This study shows a potential of *kabuyutan* to be designated as local biodiversity hotspot to support regional or further global conservation efforts.

Table 3.13. The general condition of plant species in Ciomas Village and *kabuyutan*.

Criteria	Number of species			
	Free listing		Survey	
	Ciomas	<i>Kabuyutan</i>		
Species	332	249	96	
Family	101	88	47	
Habitus	Tree	144	135	74
Origin	Exotic	238	167	58
	Native	94	82	38
Protected status	IUCN	5	5	2
	National	10	9	5

Table 3.14. Plant species diversity reported by some research in *tatar Sunda*.

No.	Name	Type of area	Habitus	No. of species	Authors
1	Baduy Village	Customary forest	All	237	Suansa (2011)
2	Dukuh Village	Customary forest	All	292	Hidayat (2009)
3	Naga Village	Customary forest	All	118	Dewi (2002)
4	Mt. Patuha	National forest	Tree	49	Mutaqien & Junaedi (2010)
5	Mt. Ceremai	National forest	Tree	43	Mulyasana (2008)

The existence of plant species highly depends on the cultural aspect that influences the management of *kabuyutan*. Although people reported that *kabuyutan* are basically abandoned and leaved to grow naturally, some regular management efforts are being practiced. The tradition which held in *kabuyutan* plays an important role to maintain the plant species. As an example, the annual *nyepuh* ceremony that held particularly by local people in *Kabuyutan Panghulu Gusti* requires some tree species to be planted and collects some branches from the dead trees as a part of rituals. The tradition has been successfully increasing the number of species, but without considering the origin of species. Consequently, the number of exotic species might be increasing in line with the implementation of tradition. However, a change of perception according to native species led to prevent the introduced species. As a result, two native tree species, *matoa* (*Pometia pinnata* J.R. Forst&G. Forst.) and *palahlar* (*Dipterocarpus retusus* BI.) have been planted during *nyepuh* in 2016. Moreover, *Dipterocarpus retusus* BI. is assessed as a vulnerable species by IUCN due to decreasing of the population within its habitat (Ashton, 1998).

Similar to other studies (Berkes et al., 2000; Reid et al., 2002; Vodouhê et al., 2010; Xu et al., 2006), this study stresses that dissemination of knowledge is essential to change people's perception that will influence their awareness to protect their valuable properties. Furthermore, this effort is also essential to increase the landowner's awareness (Honig et al., 2015) in managing *kabuyutan* regardless of the main element remaining on their land, especially according to the importance of trees in land and water conservation. Therefore, the availability of related information needs to be prepared in advance and encouraging their participation (Vodouhê et al., 2010) is important, especially to deal with the locality (Cook et al., 2015).

3.4.4. Important plant and land for conservational environment

The findings that most tree species (62.9%) were recognized as suitable for environmental conservation indicates a thorough understanding of the function of trees (see Figure 3.13). Trees as a part of *kabuyutan* were perceived as '*tutunggul*' which means a material that deeply entrenched into something to bind and to fasten parts together. It means that local people understood the influence of trees on the surrounding environment would keep the soil stable as well as will absorb and store water in the soil. Areas with a high number of tree stands showed low levels of disturbances such as water scarcity, soil erosion, and landslides (Lalika et al., 2015). Other types of plants such as epiphytes

(*Asplenium nidus* L.) and pandanus trees (*Pandanus furcatus* Roxburgh) were also mentioned by the local people. It suggests that every kind of plant plays a major role in conserving the environment. Exotic plant species dominated the existing plants in KPG. However, the local people did not specifically point them out due to a lack of knowledge about the origin of the plants. Local people understood native plants (33.8%) as those that existed in their environment, regardless of where the plants originated. Some studies state that the existence of native plants is one of the keys to environmental sustainability and that the use of native plants is recommended for maximum functionality of plants (Tallamy, 2009).

However, the 66.2% exotic plant species (see Figure 3.13) can still be recommended because they have already well adapted to the current environment and provide benefits. For instance, *Albizia falcataria* (L) Fosberg which is native to eastern part of Indonesia were widely distributed on large scale and smallholder plantation. This species was mainly planted for construction, furniture, fuelwood, as well as for reforestation and afforestation due to its characteristic as a fast-growing tree as well as a nitrogen-fixing species that contributes to improving soil fertility (Orwa et al., 2009). Also, other fast-growing trees such as *tisuk* (*Hibiscus macrophyllus* Roxb. Ex. Hornem), *jati bodas* (*Gmelina arborea* Roxb.), and *afrika* (*Maesopsis eminii* Engl.) combined with common timber tree such as *jati* (*Tectona grandis* L.f.) will accelerate the successful of forestation effort. Further, the ICS's result showed that people commonly use these trees for generating future income in addition to conservational purposes (see Table 3.9). The appropriate and strict rules must follow the implementation of this effort to select the well-adaptive exotic species such as avoiding the alien invasive species as well as to control its plantation.

A total of eight plant species have been recognized as protected species, consist of two species by IUCN (*Tetrameles nudiflora* R. Br. (WCMC, 1998) and *Shorea macrophylla* (de Vr.) Ashton (Ashton, 1998)), and six species by national regulation (*Diospyros discolor* Willd., *Durio zybenthinus* Murray, *Arenga pinnata* (Wurmb) Merr., *Diospyros polyalthioides*, *Toona sureni* Merr., and *Shorea macrophylla* (de Vr.) Ashton (MFRI, 2003)). This result indicated a vulnerability of other species due to a lack of rules. The existence of rules and an authorized institutional decision maker are necessary to manage utilization (IUCN, 2012). However, a long-term process is needed to evaluate a

species and to designate it as a protected species. The existence of an institution that can make immediate management decisions is important to prevent damage to a species. Similarly, in this study the role of the custodian is crucial, and it needs to be encouraged and strengthened. At the KPG, awareness of the rarity of some species led to the strict enforcement of certain customary rules, a successful strategy in keeping the KPG from being overexploited.

The condition of most plants growing naturally (82.3%) within the KPG indicated that there was a good chance for their sustainability (see Figure 3.13). It was mainly due to some customary rules that governed the use of certain plant species with specific goals in mind such as environmental conservation, or utilization in the ceremony. For example, local people perceived that the existence of sugar palm tree (*Arenga pinnata* (Wurmb) Merr.) is essential to secure the land and water resources. They also understood that the presence of palm civet is crucial to help the success of cultivation. Thus, on behalf of local people, the custodian demanded the related stakeholders to take concrete steps in managing the coffee plantation that leads to the decreasing of civet to be more sustainable. Therefore, strengthening the custodian's role and enforcing customary rules will be important to ensure the continued existence of wild plant species within the KPG. The important role of rules and the authority of the custodian was confirmed by the fact that most plant species designated as 'rare' were available within the precincts of the KPG (66.2%).

Fifteen conservation lands were identified based on the people's perception of human life in Sundanese philosophy that expressed by the word "*lemah-cai*" (land-water) (see Table 3.2 and Figure 3.5f). Through the paradigm of land as a body and water as a soul of nature, people believe that the human being has a close interrelationship with the natural system. This understanding emphasizes the primordial essence of life (*rawayan jati*) as shown in the phrase "*mulih ka jati, mulang ka asal*" (back to the origin of life) (Suryalaga, 2003), and has influenced their attitude toward nature. Thus, degrading the land and obstructing the flow of water are considered taboo. This is one of the reasons why areas to which or through which water flows and considered to be particularly vulnerable to land degradation or that tend to have water scarcity have traditionally been regarded as sacred places (*kabuyutan*). Further, the findings show that Sundanese people have managed their environment based on a broad concept of the water flow (watershed).

The comprehensive understanding of the environment at a large scale is consistent with (Brandes et al., 2005; Lalika et al., 2015), who explained that watershed-based management is the key to unite the ecological system, to regulate water allocation, to deal with water scarcity issues, and to achieve sustainability in the environment.

3.4.5. Implications for conservation

This study revealed that tree species were recognized and prioritized in managing the entire conservation area (see Figure 3.14). Lalika et al., (2015) suggests that the planting of trees provides high ecological benefits such as soil erosion control, water regulation, and biodiversity conservation that contribute to achieving environmental sustainability. Moreover, the use of various types of plant species with different strata will further improve the function of existent vegetation. Therefore, it is recommended to combine tree structures with bamboo, herbs, and other species to enrich their composition. For example, combination in planting some native species such as *awi gombong* (*Gigantochloa pseudoarundinaceae* (Steudel) Widjaja), *hoe* (*Calamus adspersus* Blume), *kawung* (*Arenga pinnata* (Wurmb) Merr.), *ki rinyuh* (*Eupatorium inulifolium* H.B. Kunth.), and *waru* (*Hibiscus decaspermus* Koord&Valeton) for land and water conservation purpose, especially in the susceptible area such as spring and riverbank.

In addition, six preferred plant species were proposed. The white palle tree (*Ailanthus triphysa* (Dennst.) Alston) was recommended for plantation in areas susceptible to landslides. This species is suitable for use in afforestation efforts because of its ease to adapt to a variety of soil conditions (Vidyasagaran et al., 2014). The species of banana (*Musa* spp.), coconut (*Cocos nucifera* L.), and sugar palm (*Arenga pinnata* (Wurmb) Merr.) were prioritized due to their ability to maintain soil stability and moisture. In fact, the presence of banana species can reduce the rate of erosion caused by water (Sepúlveda & Carrillo, 2015). Similarly, sugar palm species are known to maintain soil stability, and coconut species to maintain soil moisture (Orwa et al., 2009). The species ti plant (*Cordyline fruitcosa* (L.) A. Chev.) and broadleaf lady palm (*Rhapis excessa* (Thunb.) Henry) were selected to mark off the conservation areas. Both species were perceived as sacred plants that can provide spiritual benefits (Wessing, 1999). According to the conservation area map (Figure 3.5g), areas above 600 m asl with slopes ranging from gentle to very steep in nearly all directions, forested areas, and areas close to water

bodies have been designated as the high priority conservation area. As for another area will be appointed with various degrees of priority according to their characteristics.

3.5. Conclusion

This chapter concluded that local knowledge had provided significant information in defining the landscape as well as the changes and its reasons. About 33 *kabuyutan* were found and identified to have a unique structure compare to surrounding landscape which specifically covered by plant species and marked by springs, graves, or stones. *Kabuyutan* varied in characteristic depending on their physical features, and the proximity to the water bodies greatly influences each character. Springs have characterized about a nearly half of *kabuyutan* following by grave (33.3%) and plants (27.3%) respectively. Several *kabuyutan* functions as the boundary of water catchment area and delineate the watershed boundary to protect the stability of soil as well as the continuity of the hydrological system. *Kabuyutan*, where 15 of 33 spring in the village exists within its compound, are facing challenges for its sustenance due to the unpredicted change of landowner's interest and the weakness of law enforcement. Furthermore, the existence of *kabuyutan* and their particular elements need to be protected to ensure the sustainability of a whole landscape and particularly to strengthen the identity of Sundanese people as a *urang cai* and *urang gunung*.

The finding that a third four of plant species in Ciomas Village exist in *kabuyutan* reinforce the potential of *kabuyutan* to be a biodiversity hotspot. Considering the importance of native species as a foundation of natural ecosystem and protect biodiversity, however, some preventive efforts should be applied to eliminate the dominance of exotic species such as strengthened the selection of plant species when performing *nyepuh* tradition as well as when implementing afforestation in *kabuyutan*. Moreover, the result that 130 of plant species could be identified for land and water conservation indicated that *kabuyutan* play an important role in maintaining the existence of biocultural resources. Local people played a vital role in keeping existing knowledge related to the use of plants. Fifteen unique conservation areas were identified in which specific plant species with suitable functions will be planted. Using tree species combined with other types of plants will play a major role in optimally achieving the goals. This chapter recommended the plantation of six particular species based on their specific functions related to land and

water conservation, and their spiritual-culture properties. An environmental conservation map was proposed as a guideline for an appropriate management strategy.

Finally, the chapter suggested that dissemination of knowledge related to the importance of *kabuyutan* and its element is essential to increase local people's awareness. Encouraging and strengthening the custodian's role was crucial to ensure sustainable knowledge-sharing which will influence the perception of the local people—a first step toward the wise use of local natural resources. Further, this chapter suggested that there is a potential to combine customary laws and official regulations in the management strategy to ensure the sustainability of *kabuyutan*.

4 CULTURAL ASPECT OF *KABUYUTAN*

4.1. Introduction

Sacred natural sites are unique places that have been recognized to play a major role in maintaining nature and culture (Khan et al., 2008; Verschuuren, 2010; Verschuuren et al., 2010). Their importance has been recognized at the international level, particularly in the Sacred Natural Site Management Guidelines compiled by the International Union for Conservation of Nature (Wild & McLeod, 2008). These guidelines mention that local people are key stakeholders in a management system due to their in-depth understanding of a site. Recent studies about sacred natural sites showed that the role of local people in management is increasing (Allendorf et al., 2014; Dudley et al., 2010; Vodouhê et al., 2010). However, few case studies have been conducted in Indonesia.

To expand the geographical range of studies (Dudley et al., 2010) and enrich the repertoire of knowledge in the field of sacred natural sites, we conducted a study on *kabuyutan* sacred natural sites in Indonesia. *Kabuyutan* are unique sites that are considered sacred by the Sundanese people who live in the western part of Java Island. Similarly, like other sacred natural locations (Dudley et al., 2010; Khan et al., 2008; Verschuuren et al., 2010), *kabuyutan* have both physical and cultural features that are associated with local wisdom. They come in various forms and sizes and can consist of an individual element such as a tree, small spring, unique rock formation or ancestral grave, or comprise a whole landscape that is clearly distinct from the surrounding landscape (Kartakusuma, 2006; Wessing, 1999, 2006). They are mostly dominated by dense and high trees, and located on the top of hills or mountains, in valleys, in upstream areas (springs), in downstream areas, or in areas that are vulnerable to hazards such as

areas with river tributaries or riparian areas. Within *kabuyutan* sites, spring water, native plants, and animals tend to be preserved.

The Sundanese term *kabuyutan* is not widely familiar among the Sundanese people, but is mainly used by scholars who focus on Sundanese studies such as archaeologists and philologists. The term can be found either in some ancient manuscripts such as the *Amanat Galunggung* and the *Carita Parahyangan* or inscriptions such as the *Sanghyang Tapak*, the *Batutulis*, and the *Kabantenan*. Archaeologists defined *kabuyutan* as a sacred place for worship (Kartakusuma, 2006; Munandar, 2006, 2013; Wessing, 1999), while philologists defined it as a sacred place to store sacred manuscripts (Atja & Danasasmita, 1981a, 1981b, 1981c; Danasasmita, 1987). The word *kabuyutan* derives from the word *buyut*, which indicates something sacredly forbidden by some inherited or traditional injunction (Rigg, 1862). *Kabuyutan* is also a place for respecting the ancestors (Wessing, 1999, 2006).

Similarly to what was shown in previous studies, *kabuyutan* and other sacred natural sites are facing challenges to maintain a balanced ecological systems along with social, economic and cultural changes (Daye & Healey, 2015; Dudley et al., 2010; Spoon, 2010). The existence of an appropriate management system is critical to ensure *kabuyutan* sustainability. Although, the present management has been positively evaluated due to its long-standing existence of sacred natural sites around the world (Allendorf et al., 2014). As well as for *kabuyutan* (Wessing, 1999), research on cultural aspects that underlie any management effort is essential as a basis for constructing an adaptive sustainable strategy (Morimoto, 2004). The cultural dimension of this study is related to the existence of response of local people as a result of the long-term process of understanding about *kabuyutan* and shown in their perception (Allendorf et al., 2014; Jaafar et al., 2015; Vasilyeva, 2005). Through this perception, people's attitude to *kabuyutan* will be determined and further realized in the concrete action (Vasilyeva, 2005). Therefore, a better understanding of local people's perception of their sacred natural sites may help find ways to improve existent management into adaptive sustainable landscape management. Therefore, as an explorative-qualitative study, two objectives of this study were addressed: (1) to identify the cultural characteristics of *kabuyutan* and (2) to understand the implication of cultural characteristics for future management of *kabuyutan* and its surrounding landscape.

4.2.Methods

4.2.1. Study site

This study was conducted among local people associated with the 33 *kabuyutan* sacred sites in Ciomas Village, Panjalu District, Ciamis Regency, West Java Province (latitude 07^o07'00" to 07^o12'00" S, longitude 108^o15'00" to 108^o19'00" E) (see Figure 3.1). Ciomas Village is located at an elevation of 512-1762 m above sea level in the Sawal hills. The average daily temperature is about 25 °C, humidity 85%, and the average annual precipitation is about 2000 mm with rain almost all year long except in June, July, and August. Land use is dominated by forested areas, which are divided into primary forests in the upper part, and secondary forests or woodlands in and around the village. Besides, rainfed agriculture fields (crops and paddy) are found to support the activities of local people. *Kabuyutan* is distributed within Ciomas Village and placed by association with cultural background and in response to the natural environment. The sacred graves, sacred springs, and several sacred tree species are located within its compound. People were appreciated *kabuyutan* as a place for pilgrimage to visit the ancestral graves in addition to place for protecting environment (Figure 4.1).



Figure 4.1. Sacred vegetation (a), sacred graves (b), *geger omas* sacred springs (c), as well as the customary rules set for managing the largest *Kabuyutan Panghulu Gusti* in Ciomas Village (**Source:** documentation of author).

4.1.1. Data collection

An explorative-qualitative study was conducted to understand the cultural characteristics of *kabuyutan* in Ciomas Village. Cultural information was collected through in-depth interviews consisting of 22 open-ended questions related to history, accessibility, utilization, and management of *kabuyutan* in February 2015 (Appendix 8). This method is suitable for pilot studies that are carried out before a larger study is conducted, as well as for intensive case studies aiming to identify and describe a cultural phenomenon (Bernard, 2006; Mack et al., 2005). Sixty-three key informants among local people who lived close to *kabuyutan* within Ciomas Village both male and female were selected purposively. It was carried out by the custodian of the largest sacred site in the village, the *Kabuyutan Panghulu Gusti* (KPG). The custodian of this site is perceived as the most respected person in Ciomas Village. Her help was indispensable to ensure active participation of the informants.

Family members of the custodian were separately interviewed according to the phenomenological approach with the aim to obtain more details and accurate information about the actual state of the management of the *kabuyutan* and the surrounding landscapes. Information obtained from other interviewees was verified by the custodian to obtain a validity of the cultural information. The selected informants were interviewed in their home, while working in the fields, or while participating in the field survey. The local Sundanese language was used for better understanding. Most informants showed interest. The average individual interview lasted one hour. Informants were asked and encouraged to express their knowledge of the history, accessibility, utilization, and management of the 33 *kabuyutan* explored in the study. Then, the data was recorded and transcribed.

4.2.2. Data analysis

The results were described in full text and further analyzed with the grounded theory method. This approach draws on a simple observation to understand what people are talking about by looking closely at the words they use (Bernard, 2006; Ryan & Bernard, 2003). We identified and listed unique words in a text, counted the number of times they occurred, and then systematically searched the corpus of the text. Recurring themes were found after identifying and grouping similar meanings of words and phrases. The most frequent keywords were used as basic information and grouped into nine

cultural aspects consist of creation history (C1), accessibility (C2), important resources (C3), appropriate custodian (C4), disturbances (C5), maintenance schedule (C6), government's control (C7), community participation (C8), and personal control (C9) with the potential to highlight cultural characteristics of *kabuyutan* based on which a proposal for sustainable landscape management could be made.

4.3.Results

4.3.1.Demographic characteristics

A total of 34 males (54.0%) and 29 females (46.0%) were selected (Appendix 9). The average age was 44 years, and all informants were native and Muslim. More than half of informants (55.6%) had an education grade of elementary school or lower, and few had achieved a higher educational grade. While the majority described themselves as farmers (71.4%), their major income came from non-agricultural activities. They participated in some local business activities such as carpentry or construction. Although the basic needs for food could be covered by their agricultural activities (subsistence level), a few informants preferred work outside the village as employees or self-employed workers to fulfill other needs. They reported that they mainly used that income to build a house or buy other properties, especially land, as savings for their future needs.

4.3.2.Cultural characteristic of *kabuyutan*

According to the informants' responses (Appendix 10), there are about nine cultural aspects that can be consider to have formed the cultural characteristics of the *kabuyutan* (Table 4.1). First, the historical aspect of *kabuyutan* must be mentioned. It constitutes the most basic element to understand the development of *kabuyutan* (C1). Even though most informants did not understand the exact meaning of *kabuyutan*, 81.0% of them perceived the term *kabuyutan* as a sacred place and the holy grave (*makam karomah*); *makam karomah* was also the name among all *kabuyutan* names with which most informants were most familiar (88.9%). Many of the selected local interviewees (30.2%) had knowledge about the history of the first Islamic missionary who had come to their village, KH. Panghulu Gusti. The custodian also reported that KH. Panghulu Gusti has been known as 'Maharaja Bunisora Suradipati' as a King of Galuh (1357-1371). This missionary had asked to be buried in Ciomas while also calling for the preservation of the site and of associated values so that they could be passed on to future generations.

Table 4.1. Cultural aspects determine the characteristic of *kabuyutan*.

No.	<i>Kabuyutan</i>	Land-use	Land status	Elements	Cultural aspects								
					C1	C2	C3	C4	C5	C6	C7	C8	C9
1	<i>Panghulu Gusti</i>	AF (PF)	G	Grv, Spr, Plt	●	●	●	●	○	●	●	●	○
2	<i>Kawis</i>	AF (PF)	G	Grv, Plt	●	●	●	○	○	●	●	●	○
3	<i>Ciomas Landeuh</i>	AF (S)	G	Grv, Plt	●	●	●	○	○	●	●	●	○
4	<i>Sereh</i>	AF (CF)	G	Grv, Plt	●	●	●	○	○	●	●	●	○
5	<i>Mangkubumi</i>	AF (S)	G	Grv, Plt	●	●	●	○	○	●	●	●	○
6	<i>Kituak</i>	AF (PF)	P	Spr, Plt	○	●	●	○	○	○	●	○	●
7	<i>Galogor</i>	AF (PF)	P	Grv, Plt	●	●	●	○	○	●	●	○	●
8	<i>Borogojol</i>	AF (CF)	P	Spr, Plt	○	●	●	○	○	○	●	○	●
9	<i>Makambaros</i>	AF (CF)	G	Grv, Plt	●	●	●	○	○	●	●	●	○
10	<i>Cikutuk</i>	AF (PF)	P	Spr, Plt	○	●	●	○	●	○	●	○	●
11	<i>Semang</i>	AF (CF)	P	Grv, Plt	●	●	●	○	○	●	●	●	●
12	<i>Ranjeng</i>	AF (PF)	G	Plt, Riv	●	●	●	○	●	○	●	○	○
13	<i>Pasirjambu</i>	AF (CF)	G	Grv, Plt	●	●	●	○	○	●	●	●	○
14	<i>Embungcidarma</i>	CF (CF)	P	Spr, Plt	○	○	●	○	●	○	●	○	●
15	<i>Hulusitu</i>	AF (CF)	P	Spr, Plt	○	●	●	○	●	○	●	○	●
16	<i>Seureuhbeureum</i>	CF (PF)	G	Spr, Plt	○	●	●	○	○	○	●	●	○
17	<i>Wargabangsa</i>	DS (DS)	G	Grv, Plt	●	●	●	○	○	●	●	●	○
18	<i>Gencoy</i>	AF (PF)	P	Spr, Plt	○	●	●	○	○	○	●	○	●
19	<i>Pasucian</i>	CC (DS)	P	Plt	●	○	●	○	●	○	●	○	●
20	<i>Kijoho</i>	PF (PF)	P	Grv, Plt	●	●	●	○	○	●	●	○	●
21	<i>Cipambuangan</i>	AF (PF)	P	Spr, Plt	●	●	●	○	○	○	●	○	●
22	<i>Batudatar</i>	CF (CF)	P	Plt, Stn	●	○	●	○	○	○	●	○	●
23	<i>Cipanyusuhan</i>	NF (CF)	G	Spr, Plt	●	●	●	○	●	○	●	○	○
24	<i>Cidarma-Cigarunggang</i>	PF (S)	P	Plt, Riv	○	○	●	○	○	○	●	○	●
25	<i>Pangauban</i>	PF (S)	P	Plt, Riv	○	○	●	○	○	○	●	○	●
26	<i>Baros</i>	DS (DS)	G	Plt	●	●	●	○	●	○	●	●	○
27	<i>Gunungsari</i>	PF (CF)	P	Spr, Plt	○	●	●	○	●	○	●	○	●
28	<i>Awilarangan</i>	PF (CF)	P	Spr, Plt	○	●	●	○	●	○	●	○	●
29	<i>Picung</i>	PF (CF)	P	Spr, Plt	○	●	●	○	●	○	●	○	●
30	<i>Cigondok</i>	PF (CF)	P	Spr, Plt	○	●	●	○	●	○	●	○	●
31	<i>Nusakutu</i>	PF (CF)	P	Stn	●	○	○	○	○	○	●	○	●
32	<i>Kitiwu</i>	PF (CF)	P	Spr, Plt	○	○	●	○	●	○	●	○	●
33	<i>Kimulud</i>	PF (CF)	P	Grv, Plt	●	●	●	○	●	●	●	○	●

Abbreviation: Land-use: natural forest (NF), artificial forest (AF), crop field (CF), paddy field (PF), and settlement (S); land status: government (G) and private (P); main elements: grave (Grv), spring (Spr), plant (Plt), river (Riv), and stone (Stn); cultural aspects: the creation history (C1), the accessibility (C2), the important resources (C3), the appropriate custodian (C4), the disturbances (C5), the maintenance schedule (C6), the government's control (C7), the community participation (C8), and the personal control (C9); the black dot (●) shows the positive response indicated by the presence or existence of each aspect and conversely for the white dot (○).

Second, there is the aspect of accessibility. Accessibility enabled physical interaction between people and the various *kabuyutan*, and encouraged locals to have a particular intention or main reason to visit (C2). Although all of the *kabuyutan* in Ciomas were accessible, only 26 *kabuyutan* (78.8%) were visited with the particular objectives such as to obtain a blessing or to simply take advantage of certain natural resources such as sacred water (Table 4.1). Informants reported that they visited *kabuyutan* at least once a year (73.0%) to participate in the annual *nyepuh* ceremony held in the KPG, or to make a pilgrimage to other *kabuyutan*. They understood the rules to be followed before entering *kabuyutan* such as obtaining permission from the custodian and following instructions (68.3%). These rules were perceived as being a barrier to visiting *kabuyutan* with high frequency. Informants explained that the rules included being accompanied (9.5%) and purified (22.2%) by the custodian before visiting a *kabuyutan*. Most informants visited *kabuyutan* with the intention to perform a pilgrimage (*ziarah*) (63.5%) or to take part in a social gathering (*silaturahmi*) (11.1%) or to preserve traditions (25.4%) in line with customary laws. The custodian stressed that visitors should properly obey the rules as mandated by their ancestor, who was inspired by Islamic teachings. One such rule was to pray to God alone without associates in every prayer, and to avoid seeking the assistance of ancestral or other spirits.

The third aspect concerns *kabuyutan* elements that have beneficial values (C3). Informants perceived sacred graves, springs, and various plant species as the principal elements of *kabuyutan*. This study showed that only the *Kabuyutan Nusakutu* did not contain any of these three main elements but consisted of a small hill with a set of natural stone and resembled an island. Although, currently, the owner has planted *Albizia falcataria* (L.) Fosberg in this *kabuyutan*, the tree tends to be harvested in near future. This also the reason behind the name of ‘*nusakutu*’ where ‘*nusa*’ means island and ‘*kutu*’ means a small insect (louse). Furthermore, most informants (77.8%) mentioned that obtaining Allah’s blessing (*berkah*) was the primary benefit of *kabuyutan*. The informants perceived the water from the sacred spring (74.6%) is believed to be sacred and to have the power to cure or prevent disease, and to help find inner power, knowledge, prosperity, and blessings in life. Besides using it as drinking water, some farmers (14.3%) used it to water their agricultural fields. A few informants (11.1%) mentioned that some parts of plants from specific plant species were used in *mulung pangpung* (collecting fallen trunks

or branches) during the *nyepuh* ceremony. Regarding utilization of the site's natural resources, informants mentioned that excessive utilization was avoided thanks to the custodian's rules. Thus, water resources were used with sufficient amount (88.9%) as well as the limited amount (11.1%) for particular plant species.

The fourth cultural aspect concerns the presence of a custodian (*kuncen*) who is acknowledged as the proper person in charge of *kabuyutan* maintenance (C4). In this study, the KPG⁵ was the only sacred site that had a custodian while others were absence (Table 4.1). Informants stated that the inability of a child or other members of the custodian's family to continue the role of custodian due to a lack of knowledge and experience were the major cause of discontinuation of the custody system. Loss of trust by the local people was the main reason for a potential successor to continue the mandate. Asked about leadership, the custodian explained that *kabuyutan* have been managed for generations and led by custodians based on customary laws and a hereditary and centralized system. The custodian guarantees the continuity of the management system by making sure that people accept and follow the rules. The present system requires the role of the custodian to be inherited by a member of the custodian's family, usually the children. A new custodian displaying wisdom and discernment is appointed in a custodian's family meeting before a previous custodian dies or declares to be unable to continue leadership. A few informants said they would be concerned about the leadership of *kabuyutan* if an appropriate custodian did not lead it. However, they trusted the custodian's family regarding continuity of leadership. They believed that obeying the custodian was similar to respecting the ancestors.

The fifth aspect concerns changes in the dynamics of the *kabuyutan* landscape (C5). Informants reported that more than a third of all *kabuyutan* (39.4%) had experienced major changes, mainly due to human influence (Table 4.1). For example, *Kabuyutan Baros* had lost three sacred trees (*Magnolia macklottii* (Korth) Dandy., *Ficus glabella* Blume., and *Ficus benjamina* L.) due to misunderstanding about their spiritual and ecological function of such *kabuyutan*. Informants reported that the sacred trees which exist for many years with its wide and large canopy, are sometimes considered symbols of supernatural power that perceived could help the people to obtain merely for good luck. As for ecological function, they observed that its existence could secure the water resources from destruction. The custodian explained that the individuals who had cut the

trees thought the trees were potential to be offensive targets of idolatry, and that they had not been aware of the ecological impact they were causing. After this incident, people reported that water resources in the surrounding area started to dwindle. In another case, *Kabuyutan Pasucian* lost its historical identity due to a political interest that led to the displacement of the historical heritage *bumi alit*, a repository of sacred tools to Panjalu Village. Other *kabuyutan* such as *nusakutu*, *cigondok*, *awilarangan*, and *kimulud* had lost their buffer zone due to land use changes. Some natural disturbances such as fallen trees and landslides also occurred in *Kabuyutan Panghulu Gusti*, *mangkubumi*, and *galogor* (Figure 4.2).



Figure 4.2. The present condition of *kabuyutan* due to anthropogenic and natural disturbance such as in *Kabuyutan Baros* (a), *pasucian* (b), *nusakutu* (c), *cigondok* (d), *kimulud* (e), and *galogor* (f) (Source: documentation of author (b-f) and KATCI (a)).

Informants stressed that the existence of a custodian is essential to ensure the sustainability of *kabuyutan*. They said that obtaining permission from the custodian before they can visit (25.4%) and before they can use its resources (49.2%) is an essential and basic rule in *kabuyutan* management. They also mentioned many unwritten rules that have been handed down orally for generations and have continued to be observed in the form of taboos. They stated that taboos were a powerful system to preserve the *kabuyutan* (36.5%), since non-observance of taboos was thought to trigger a curse (30.2%). A potential offender of taboos was reprimanded, advised, and finally forgiven by the custodian (58.7%). They reported that thanks to these taboos (54.0%), problems rarely occurred in *kabuyutan* (90.5%).

The sixth aspect concerns the presence of maintenance schedule, which regulates the periodical and systematic management of *kabuyutan* (C6). *Kabuyutan* with sacred graves (36.4%) have a scheduled maintenance program at least once a year before or during *Ramadhan* (the month when Muslims observe a month of fasting) (Table 4.2). Informants explained that a representative of each hamlet in Ciomas participated in cleaning up the largest sacred site in the village (KPG) in preparation of the *nyepuh* ceremony at the second week of the month of *Syaban* (one month before *Ramadhan* on

Table 4.2. Managerial activities and regular schedule of *kabuyutan*.

Activities	Occasion	Location
Pilgrimage	Once a year during <i>nyepuh</i> ceremony at two weeks before the month of <i>Ramadhan</i> ; tentative visitation	Central <i>kabuyutan</i>
	Once a year in the end of <i>Ramadhan</i> or the early <i>Syawal</i> (one month before <i>Ramadhan</i> on Islamic calendar); tentative visitation	Local <i>kabuyutan</i> where ancestral grave exist
Cleaning	Once a year before welcoming annual pilgrimage; regular maintenance every Friday	Central and some local <i>kabuyutan</i> where ancestral graves exist
	Tentative schedule depends on owner's preference	Other local <i>kabuyutan</i>
Tree plantation	Once a year during <i>nyepuh</i> ceremony	Central and some local <i>kabuyutan</i>
Tree branches collection	Once a year during <i>nyepuh</i> ceremony for cooking three <i>tumpeng</i> (mountain-shape rice)	Central <i>kabuyutan</i>
Tree thinning and harvesting	Tentative schedule depends on owner's preference	Some local <i>kabuyutan</i>

Islamic calendar). At the time of *nyepuh* ceremony, people who loving in vicinity and from neighboring village came for gathering (*silaturahmi*), pilgriming the ancestral graves (*ziarah*), and planting some tree species within the KPG. Also, these maintenance activities were encouraged to be implemented at other local *kabuyutan* where sacred graves exist. People cleaned up local *kabuyutan* where ancestral graves exist to mark the beginning of the annual pilgrimage at the end of *Ramadhan* or in the early *Syawal* (one month after *Ramadhan*) as well as planted trees as a mandate to preserve environment. In addition, other local *kabuyutan* (*kawis* and *cipambuangan*) were thinned and harvested its resources which mainly planted tree based on the owner's needs such as for firewood and construction. As for other *kabuyutan* located in agricultural fields, forest garden, and mixed garden) were maintained tentatively depend on land owner's interest such as cleaning up or even nearly abandoned such as *gencoy*, *garogol*, *nusakutu*, and *cigondok*.

Regarding the history of management (Table 4.3), informants mentioned that performing the annual ceremonies such as the *nyepuh* worked as a long-term management system (46.0%). A few informants (25.4%) said that local people today forget to manage the surrounding landscape of *kabuyutan*. They stated that in the past, people had preserved both *kabuyutan* and the surrounding landscape. As a consequence, some *kabuyutan* had lost its buffer area and only particular elements still remain, mainly sacred grave, spring, and trees due to anthropogenic problems. They thought that managing the whole village meant realizing the Sundanese philosophical concept of educating each other (*silih asah*), giving each other (*silih asih*), and guiding each other (*silih asuh*). The concept which is not only applied to human beings, but also to all beings. Besides, role of the custodian is crucial as an appropriate role maker as well as a reminder for offenders.

Table 4.3. Differences of some past and present management systems in *kabuyutan*.

Aspects	Past	Present
Rules maker	Custodian and local people	Custodian
Strategies	Applying taboo, performing <i>nyepuh</i> , and managing surrounding landscape	Applying taboo and performing <i>nyepuh</i> ; designating as cultural heritage and protected area
Problems	Natural disasters (fallen trees, erosion)	Natural and anthropogenic (illegal hunting)
Punishments	Custodian's attention and feeling a curse	Custodian's attention and feeling a curse

The seventh aspect concerns the government's control as a legal guarantor of the management of *kabuyutan* (C7). The survival of *kabuyutan* in Ciomas can potentially be guaranteed thanks to formal rules. The main reason why a site is currently protected by governmental rules is the existence of significant elements and associated values at *kabuyutan* sites that are located within a landscape related to cultural heritage, natural resources, spatial planning, protected areas, forestry, or the river. Currently, only KPG is designated as a national cultural heritage⁵ by the local government thanks to its cultural and natural properties. Informants stated that the designation of *kabuyutan* as a cultural heritage (19.0%) by the local government was understood as helpful to protect them. Other *kabuyutan* in Ciomas also have the potential to be designated. One example is *Kabuyutan Nusakutu*: although the site has lost its main element, it still has a historical and cultural connection with other *kabuyutan*.

Finally, the last two aspects have to do with the presence or lack of community participation in the management of *kabuyutan* (C8), and with ownership of the land where *kabuyutan* are located (C9). Results revealed that in contrast to privately owned *kabuyutan*, *kabuyutan* on governmental land showed high community involvement. It was found that 21 *kabuyutan* (63.6%) located on private property, and that 12 of 15 springs were located within those *kabuyutan* (Table 4.1). The custodian said that the lack of local knowledge about land management rules needed to be addressed. For example, there was a rule that land located within 200 m² radius from a spring should not be used for other land uses except for conservational purposes. Another rule said *kabuyutan* in the vicinity of the river (within a distance of 100 m) were subject to riparian conservation.

According to the perception of sustainability (Appendix 12), by performing the tradition particularly annual *nyepuh* ceremony, informants perceived as one of the appropriate ways to achieve the sustainable management of *kabuyutan*. Accordance with the concept of sustainable management, informants (58.7%) perceived as a management that provides blessings over generations. The custodian stressed that a blessing is sufficient when scarce and harmless when abundant. Although a few informants (14.3%) did not understand the concept of sustainability, they understood that sustainability was a term related to long-term utilization (27.0%). When they were asked how sustainability could be achieved, nearly half of the informants (46.0%) stated that it could be accomplished through sufficiency utilization, "*use what is needed, not wanted.*" People

understood that excessive utilization is not allowed under the mandate given by KH. Panghulu Gusti. They also mentioned that an appropriate custodian would seek ways to achieve sustainability (22.2%) and would transfer knowledge and experiences (17.5%) related to *kabuyutan*. Those requirements for achieving sustainability were reflected in both traditions.

4.4. Discussion

4.4.1. Current cultural characteristic of *kabuyutan*

Sanctification, limitation, and restriction of access and use, and strict application of customary laws have been found to be effective in preserving the structure and function of the essential elements of *kabuyutan* and associated cultural values. Benefits of sacred graves, sacred springs, and plant species helped local people to understand the need for the sustainable use of specific and permitted resources. They acknowledged the value of the benefits, appreciated the fact that they had permission to access the site, and perceived the current management in a positive way. Similar results were relevant in other studies, which also concluded that the existence of benefits influenced perception (Allendorf et al., 2014; Nastran, 2015; Vodouhê et al., 2010; Zuhud, 2009).

Our results revealed the importance of water and plants and of a balanced ecological system for the survival of *kabuyutan* sites. However, in this study, the sustainable management of springs and plants which indicates by the existence of regular maintenance schedule strongly depended on the presence at the same site of cultural *kabuyutan* such as sacred graves (see Table 4.2 and Appendix 10). Natural *kabuyutan* without any connection to a cultural *kabuyutan* were reported to sometimes be neglected or not sustainably managed. Both types of *kabuyutan*, the cultural type and the natural type, gained in meaning and were more sustainably managed when they occurred together. On the other hand, *kabuyutan* whose origin (creation history) was lost or that did not have a custodian responsible for management and for the organization of community participation were highly susceptible to anthropogenic disturbance. This was perceived to happen in particular in the case of sacred natural sites located on personal property.

The special attention given by local people to sacred graves was closely related to divine blessings, which were perceived as primary benefits. On the other hand, benefits of natural elements were perceived as only secondary benefits that were related to more

significant, cultural *kabuyutan*. People reported that they experienced benefits at *kabuyutan* sites when they visited such sites as pilgrims. For example, they felt refreshed and experienced a sense of health, and they were filled with the hope that God would grant their prayers. The custodian explained⁶ that it was believed that prayers were fulfilled more fully and sooner if pilgrims were observant of the rules when they visited sacred graves to obtain blessings. Local people indicated in various ways that God's blessings (the religious or spiritual aspect) were the primary reason why they appreciated *kabuyutan*. They respected the memory of the deceased, especially the Islamic missionary who had come to their village in the past, and were highly appreciative of their enormous sacrifice for their village. The fact that religious activities in *kabuyutan* are still alive and that many pilgrims still visit such sites to respect their village ancestors shows that even today, the value of *kabuyutan* is not decreasing. The pilgrimage based on reverence for ancestors is an image of the cult of saints (Barrow, 2010; Collins-Kreiner & Kliot, 2000; Fadillah, 2006; Wild, 2010). Fadillah (2006) reported that ancestor worship had been occurring since the classical period, long before the Sundanese people adopted Islam. In the classical period, *kabuyutan* were places to worship local deities, sometimes together with ancestor (Munandar, 2006, 2013). Similar examples are found in Japan. One shrine, for example, was dedicated to placating reckless deities or *kami* (Senda, 1992).

After Islamic teachings had gradually entered the local culture, the original Sundanese cult of saints started to change. It was now strictly forbidden to worship other spirits than God. Since the introduction of Islam, the Islamic concept of monotheism (*tawhid*) has strongly influenced customary laws related to the management of *kabuyutan*. Under Islamic influence, the term *karomah* or *karamat*, a religious term that designates possession of powers, has become more widely used to indicate sacred sites instead of the term *kabuyutan*. Thus, people perceived sacred graves as *makam karomah*, while for sacred springs and plants perceived as *cai karomah* and *tangkal karomah* respectively. Both of terms are derived from Arabic *karāmat* (كرامات) and also *karāmāt* (كرامات) which means the ability to perform celestial wonders by Muslim saints or personages (Rigg, 1862). The wonders perceived as a gift from God given due to their strong faith and devotion in carrying out every command and prohibition. Consequently, the exemplary shown by such person and associated objects become the object of reverence when their absence (Al-Jauziyyah, 2005; Fadillah, 2006; Najib, 2006). Recently, the term *karamat*

more perceived has a negative connotation than *karomah*. Thus, person or other elements associated with *karomah* perceived more beneficial and showed more Islamic nuance. This is an indication of the strong impact of Islamic teachings. Even though some of the classical teachings are still practiced today, significant changes have occurred in the local perception and appreciation of *kabuyutan* under the influence of Islam (Fadillah, 2006).

The high local appreciation of *kabuyutan* where sacred graves are preserved stands in contrast to a certain local neglect of *kabuyutan* where springs and plants are conserved. This study revealed that anthropogenic disturbances occur more often in *kabuyutan* that do not contain sacred graves. It is therefore essential that local people learn to understand and appreciate other benefits and functions, such as those provided by springs and plant species. Further studies should be conducted, and more advantages of *kabuyutan* should be identified in order to improve people's knowledge of a variety of benefits.

4.4.2. Challenges for current management

The positive interaction between local people and local sacred sites or *kabuyutan* was enhanced by an understanding of the site's history, by the possibility to access the site and to use resources within the site, and by factors related to the management of the site. The current knowledge of the informants had clearly impacted their perception of *kabuyutan*. The findings revealed a lack of knowledge about past *kabuyutan* management among a few of the local people (see Appendix 10). These informants either had only limited knowledge, or they felt it was inappropriate to give away knowledge as elders. The management and rules in place during visits and pilgrimages, however, was perceived by locals as an appropriate strategy that helped to preserve *kabuyutan*.

Other ancient management techniques such as the management of the landscape surrounding a *kabuyutan* have mostly been forgotten today (see Table 4.3). Management of the landscape surrounding a *kabuyutan* should be highly recommended so that the surrounding land can again serve as a buffer zone. A previous study states that the existence of a protected area, particularly of small patches, is underpinned by the surrounding landscape (Daye and Healey 2015). *Kabuyutan* are mostly surrounded by agricultural fields, which are owned by people living in the vicinity. These lands will potentially be turned into settlements or other agricultural land uses to fulfill socio-economic needs. To protect the core of a sacred site from serious damage, the

management of the buffer zone needs to be regulated by formal rules^{c,d} which define the area within a radius of 200 m as a buffer zone for the springs and 100 m for *kabuyutan* close to the river.

The lack of knowledge found among many local people revealed the importance to connect the past with the present, and to hand down knowledge to future generations (see Appendix 10). Further, a more deeper appreciation of the *kabuyutan* with the ancestral graves rather than other elements, indicating that the knowledge about the importance of springs and local plant species needs to be increased to raise people's awareness. Especially local people living in mountainous areas should be aware of the value of springs and of the need to maintain the environment. The Ciomas people who inhabit part of the Mt. Sawal region have the responsibility to safeguard the springs in their area to ensure the continuity of the hydrological system in their landscape. Culturally, this will also strengthen their identity among Sundanese people since they are known as mountain people (*urang gunung*) and water people (*urang cai*) (Ekadjati, 1984, 1995; Koesoemadinata, 2006). A win-win solution for landowners is essential to ensure sustainability of *kabuyutan*, particularly when the sacred sites are located on private property. Law enforcement that encourages voluntary participation is a desirable measure to protect *kabuyutan*. When sacred sites are endangered, their designation as protected sites, or land consolidation to protect a wider area, may be appropriate measures.

Based on their knowledge, the local people had a good understanding of the sustainability of *kabuyutan* and of their management. They agreed that an appropriate management system was needed to ensure sustainable utilization now and in the future. The concept of sustainability was understood as a concept of blessings (*berkah*). The informants felt that the blessings had affected their life, and had made it more prosperous both in terms of socio-economic and spiritual-cultural values, especially in accepting their prayer. This can be explained by the fact that the local people are Muslims; their religion may be one of the causes of their positive perception and respect of nature. People interacted with the custodian with reverence and respected ancestors associated with the *kabuyutan* based on their deep religious understanding of how to obtain blessings. This correlation has been confirmed to be positively significant in the case of sacred areas (Allendorf et al., 2014; Barrow, 2010). However, the religious and spiritual aspects keep changing. Creating mutual understanding must remain a continuous effort. Furthermore,

finding that the only KPG with its specific custodian were exist, indicating the other *kabuyutan* told to be more destructed. Thus, encouraging the descendants or successors to have a willingness to continue the custody system is strongly suggested.

4.4.3. Implication for sustainable management

To achieve sustainability, which was perceived by the local people as a condition with plenty of blessings (see Appendix 10), we suggest considering three important strategies, which take into account the current understanding of the local people (Figure 4.3). First, the establishment of comprehensive rules by an appropriate custodian are necessary to ensure sustainable management. The custodian is perceived as the authorized person and as the guardian of the divine mandate of the ancestors (Wessing, 1999). Local people’s trust and their observance of the rules established by the custodian are necessary to ensure the sustainability of the leadership. Although the hereditary system restricts the people participation in the selection process, it was perceived as working well. Support of the present custodian will be a powerful way to establish suitable rules and to pass on the mandate to the next appropriate custodian.

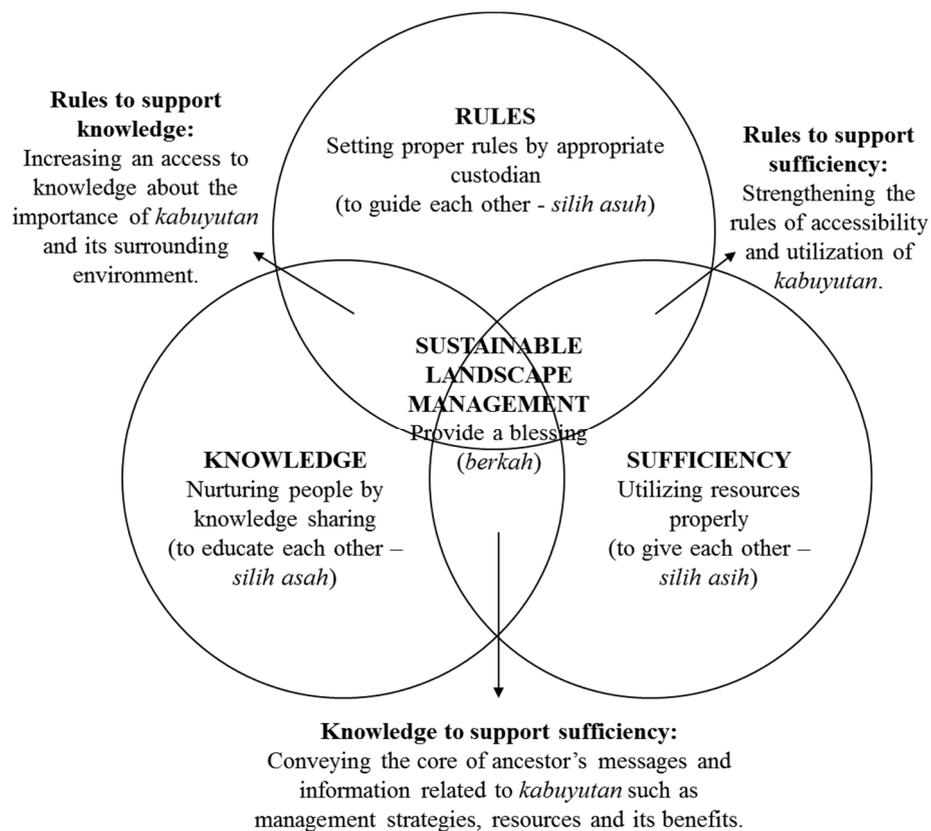


Figure 4.3. Conceptual framework of sustainability based on people’s understanding (according to interview’s results on Appendix 10).

Second, increasing local people's knowledge is important to support their participation in management. The dissemination of accurate knowledge requires a proper informant. The role of the custodian is important as long as local people feel that it is inappropriate for them to give away or pass on information. Knowledge is a major factor influencing people's positive perceptions of active participation (Vodouhê et al., 2010; Rasoolimanesh et al., 2017). The centralization of knowledge in the custodian's family and among a few elders and the absence of awareness among the young generation makes the system vulnerable. In such a situation, it is likely that knowledge is not passed on or is lost. It is important that the young generation knows the rules to maintain knowledge (Jaafar et al., 2015). Thus, this study suggests that passing down the essence of ancestral messages and information related to *kabuyutan* is important to prevent the loss of knowledge. Also, the existence of tradition which respected to local people such as *nyepuh* needs to be maintained as the proper occasion to hand down knowledge.

Third, limiting resource use to sufficiency use is an important measure to achieve sustainable management. Sufficient use is the core concept in the philosophy of sufficiency economy (NESDB, 2007). It encourages the consumer to be resourceful and to avoid excessive use (Abdul-Matin, 2010). In the context of a *kabuyutan*, the concept helps prevent degradation of the sacred site and its surroundings. Appropriate use of knowledge and effective implementation of rules also supports sufficiency use. A combination of these three strategies will not only support sustainability at Sundanese sacred natural sites, but will also lead to more sustainable management of the surrounding landscape. Moreover, the measures can be considered to be in harmony with the Sundanese philosophical concept of *silih asah, silih asih, silih asuh*, which serves as guidance for interactions between humans and other creatures (Sudaryat, 2014).

In addition to the implementation of those strategies, a critical attention needs to be paid regarding to the tourism program that affects the existence of *kabuyutan*. Similar to the previous studies (Andriotis, 2009), this study suggests that *kabuyutan* promote highly potential tourist destination due to the diversity of physical and cultural elements. However, the planning of tourism area set by the government needs to consider the readiness of local people who will be the key players rather than be the object of such program. The concerns of local people and the custodian, in particular, have been proven by the increasing number of damages occurring in some *kabuyutan*. It is precisely

contrary to the ancestral messages, yet these messages are always delivered at least during the annual tradition of *nyepuh* and *nyangku*. Some studies reported that the presence of tourist activity on sacred natural sites shows more adverse effect in changing the local value associated with these places in particular, such as much dependence on economic benefits rather than maintain the extent of those locations (Jalani, 2012), may purport an ontological separation between people and nature (Spoon, 2010), or may decrease the local's capacity to involve in tourism (A. Ormsby & Edelman, 2010).

The use of *kabuyutan* and associated culture as tourist objects and attractions is related to the provision of the conditional fund to support the existence of tradition due to the increasing needs of the implementation. Consequently, the tradition must be adapted to the requirement of the donors. Given these demands, the adaptive efforts should be prepared to anticipate the negative changes into the physical *kabuyutan* and associated values. In this sense, the government needs more thoughtful about the rules to be implemented in the potential tourist destination area. This potential requires the local people engagement to be more involved in every process of planning as well as the implementation due to their positive perception and sense of belonging towards sustainable management (Jaafar et al., 2015; Sirivongs & Tsuchiya, 2012).

Furthermore, the empowerment strategies by increasing the capacity and creativity of local people need to be more encouraged in an integrated manner. Recent studies stated that the integration of motivation, opportunity, and ability of local residents is highly able to support the successful of government's program and particularly in tourism sector (Hung et al., 2010; Jaafar et al., 2015; Jepson et al., 2014; Ormsby & Edelman, 2010; Rasoolimanesh et al., 2017). Thus, an adaptive tourism strategy will be achieved that match the abilities and needs of the local people. For example, simplicity without compromising the highest values in implementing *nyepuh* tradition needs to maintain its authenticity. Although by adding the interesting elements become more attractive for tourists, but contrary to the essential meaning of *nyepuh* as a religious tradition with the full meaning of sanctity and fervently. Through these efforts, the government has been able to provide a chance for local people not only to conserve their presence tradition, or to reconstruct their extinct tradition (Fischer et al., 2012; Jaafar et al., 2015; Rasoolimanesh et al., 2017; Saini, 2006), and also to transform their tradition and associated values and functions to deal with the present challenges by keeping its purity.

4.5. Conclusion

Understanding local knowledge is important to achieve sustainability in landscape management. This study provides valuable insights on how local people have contributed to keep alive cultural aspects of *kabuyutan* sacred natural sites, and identifies the strategies residents have developed for sustainable management. Findings showed that the more recent cultural characteristics of *kabuyutan* have mostly been the result of Islamic teachings. The interviewees in this study perceived God's blessings as the primary benefit of *kabuyutan*. They cited religious reasons and respect for the mandate of the ancestor who is remembered in the site as the main reasons why they obeyed the custodian's rules.

In addition, they stated that *kabuyutan* that are directly related to ancestors such as sacred graves are more carefully maintained than other *kabuyutan* with springs or plant species, and that the latter tended to be neglected. This circumstance shows the remarkable coexistence of two profoundly different between Islamic and classical teachings, especially related to the cult of ancestors who some of them were perceived similar to the saint such as KH. Panghulu Gusti. Recently, however, the Islamic teaching has been gradually acculturated and changed the orientation of classical teaching into the oneness concept (*tawhid*), whereas some parts have been practicing due to personal intention.

The results showed that rule makers, especially the custodian, have the authority to strengthen rules to promote sustainable management. On the other hand, they showed a relative lack of knowledge of the local people about the origin (creation story), meaning, benefits, and traditional management system of *kabuyutan*. It can be assumed that increasing local knowledge will also raise local understanding for sustainable management. Furthermore, it will also be necessary to carefully manage not only the *kabuyutan* sacred sites, but also the surrounding landscape. Only then, the essential elements of *kabuyutan* will be preserved; this insight already existed in the *kabuyutan* management of the past.

It can be said that the focus of the local people on ancestral graves and their relative lack of interest in other *kabuyutan* such as those with springs and plants makes the latter especially vulnerable to degradation or destruction. Along with environmental

degradation, the lack of planned preservation of these natural resources will reduce or even stamp out the cultural identity of the Sundanese people as *urang cai* (water people) and *urang gunung* (mountain people). To ensure more efficient future management, we suggest three strategies: effective rules, dissemination of knowledge, and encouragement of sufficient utilization. These strategies will be essential to create a resilient community that can deal with global changes and further to accept and implement the government's program such as tourism. Finally, this chapter also showed the usefulness of the explorative-qualitative method enhanced by the phenomenological approach as an initial step to carry out a broader study. In a further effort, the quantitative method should be applied to improve the study.

5 TOURISM ASPECT OF *KABUYUTAN*

5.1.Introduction

The demand for tourism opportunities increases along with increasing income and welfare. Change in paradigm, mindset, and knowledge raises the demand for tourism products that not only to fulfill recreational purposes but also to improve visitors' knowledge and experience of the local culture. Diversity in both natural and cultural landscapes tends to be developed as a source of local revenue through the development of the tourism sector (Alam & Paramati, 2016; Richards, 2009; Ursache, 2015). Bogor Regency, which is part of the *tatar Sunda* region, contains various places and attractions that can potentially become tourist destinations. To date, the development of the tourism sector in Bogor obviously focused on natural tourism. However, due to the decreasing the extent of carrying capacity, an alternative site is needed to support tourism activities which offer more creative and attractive experience.

Simonds (1983) defines 'landscape' as a form of nature with certain characteristics that can be enjoyed by all human senses, and in which characteristic elements blend harmoniously and naturally to strengthen the character of the whole. Based on the intensity of human intervention, landscapes are grouped into the natural landscape and cultural landscape. The cultural landscape is closely related to human activity, performance culture and values, aesthetic level, and historical events owned by the group (Farina, 2006c; Ishii et al., 2010; Tishler, 1998). Culture is the main agent in the formation of cultural landscapes whose preservation is highly meaningful since cultural landscapes are closely linked to the traditions of a society and are proof of the history of life (Nassauer, 1995; Terkenli, 2005).

Cultural tourism is one of three tourism activities mandated by the Law of the Republic of Indonesia No. 10 Year 2009 Concerning the Tourism^t to be developed. Cultural tourism provides access to essential values of a cultural or historical place and to livelihood features (customs) that prevail in society, in particular, those related to education or spiritual observation. Cultural attractions have a high attractiveness owing to the value of human creations of the past, art performances, and rituals and ceremonies with particular characteristics. Development of cultural tourism can provide tangible and intangible benefits that can improve the quality of people's lives. Given the two definitions above, a cultural tourism landscape can be defined as a landscape formed by the interaction of humans with the environment that reflects human intervention and management of natural resources and has the potential to be visited.

Gunn (1994) stated that two important factors motivate a person to travel, namely biophysical factors, touristic object, and attractions. These factors need to be optimally accommodated in an integrated manner to provide optimal visitor satisfaction and experience. As for biophysical factors, the carrying capacity is essential to manage natural and cultural resources (Chen, Nakama, & Zhang, 2017). Tourism destinations have valuable resources including natural amenities (hydrology, soil, landform, climate, and biodiversity) and resources created by humans (cultural and historic properties, and local lifestyle and customs). Tourism planning of a landscape, therefore, must meet the needs of human well-being while maintaining ecological systems and cultural integrity (Lozano-Oyola, Blancas, González, & Caballero, 2012; Santarém & Paiva, 2015; Soica, 2016).

Kampung Budaya Sindang Barang (KBSB) is an example of a cultural landscape within the Bogor Regency that could offer alternative solutions to promote tourism. Besides the various type of natural elements, this site promotes cultural as well as historical properties as its main touristic object and attraction. Culture-based tourism is an appropriate alternative solution, especially for areas that have high historical and cultural value. KBSB plays an essential role in conserving several ancient Sundanese rituals and ceremonies such as the *seren taun*, and in keeping alive the use of traditional music instruments such as the *angklung gubrag*, *rengkong*, and *uyeg*. To date, however, the potential of KBSB as a highly interesting cultural tourist destination has not been sufficiently explored, and tourist satisfaction has not been extensively determined. A

creative tourism planning is necessary to meet visitors' needs without compromising the sustainability of the site. Richards (2009) defined this new form of tourism as the tourism that has a potential to diversify and innovate the tourist experience. Furthermore, understanding the sacredness of this site, the sacred elements perceived as *kabuyutan* are potential to take into consideration. Therefore, the objective of this study was to identify essential characteristics of Sundanese landscape, particularly accordance with the possibility of *kabuyutan* in KBSB sacred site to support the development of tourism planning.

5.2.Methods

5.2.1.Study site

This study was conducted among local people associated with the sacred site of *Kampung Budaya Sindang Barang* (KBSB) in Pasir Eurih Village, Tamansari District, Bogor Regency, West Java Province (latitude 06⁰37'10" to 06⁰38'40" S, longitude 106⁰42'45" to 106⁰47'25" E). The study area is located at an elevation of 500-900 m above sea level in the foothills of Salak Mountain. The average daily temperature is about 26 °C, humidity 84%, and the average annual precipitation is about 4000 mm with rain almost all year long except in June, July, and August. In the total area of about 284 ha, land use is dominated by terraced paddy fields (151,7 ha) and woodlands (75,8 ha) that are mainly identified as mixed gardens (*kebon campuran*) or forest gardens (*kebon-talun*), and support the activities of the local people (Figure 5.1). KBSB was a private tourism place owned by the custodian family of Sindang Barang (see Chapter 2). Recently, this place has been designated as one of the culture-based tourism destinations in Bogor Regency. KBSB served a replica of traditional Sundanese village that show the period setting of the Great Sunda Kingdom (Padjajaran Kingdom) in Sindang Barang.

5.2.2.Data collection

Participant observation method (Mueller et al., 2010) was used to obtain ecological and cultural information. Landscape analysis (Gold, 1980; Gunn, 1994) was conducted to determine characteristics of the cultural landscape that would enable tourism planning that enhances landscape values and reduces its negative impact. In-depth interviews figuring 42 open-ended questions together with field surveys were undertaken to collect ecological and cultural information (Appendix 11). This method is suitable for pilot

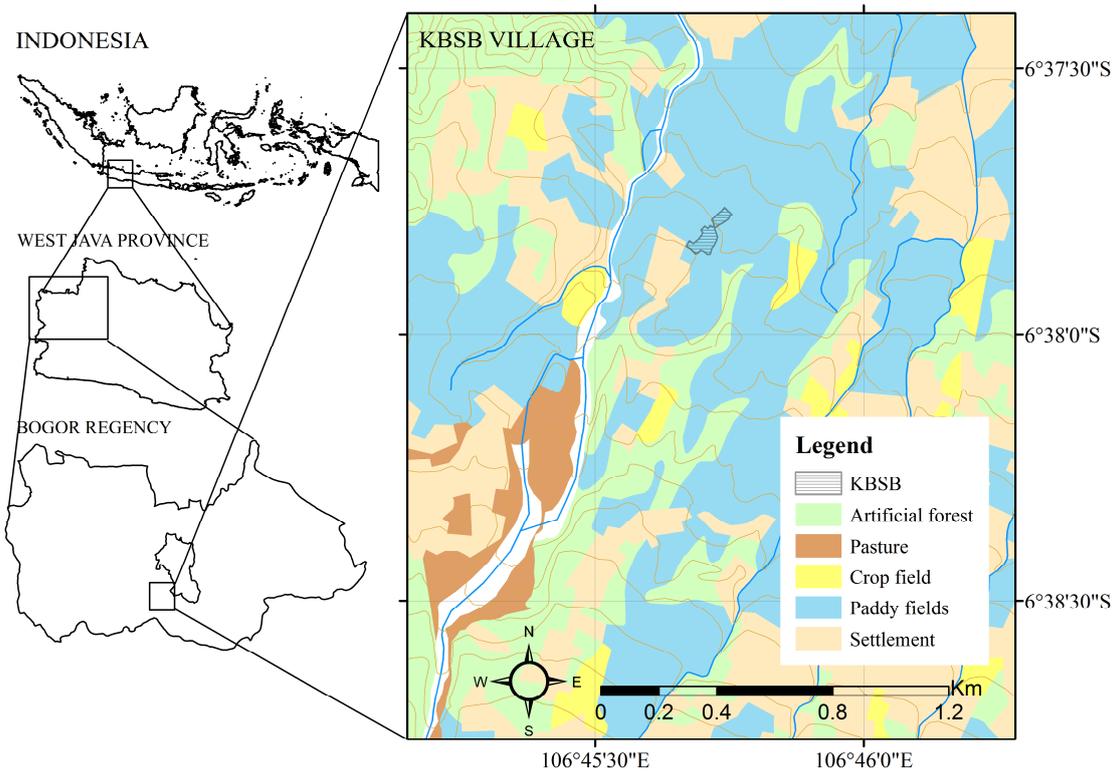


Figure 5.1. Study site in *Kampung Budaya Sindang Barang*, Bogor Regency.

studies that are done before running a larger study (Bernard, 2006). The snowball sampling method was used to select key informants in close vicinity of KBSB (Wright & Stein, 2005).

Considering the ownership of this place, the participation of owner was crucial to collect the basic and essential information about the development history, accessibility, utilization, as well as managerial aspect of *kabuyutan* within KBSB. Thus, we interviewed 17 key informants both male and female in June 2016. Interviews were conducted in the name of the custodian of the KBSB sacred site to ensure participation of respondents. The local language, Sundanese, was used for better understanding. Interviews were conducted in informants' homes or in the fields where informants were working. Also, respondents were asked to express their knowledge about the ecological and cultural character of *kabuyutan*, and to give information on any actual and potetial tourist activities taking place in KBSB. Oral data were recorded and transcribed. In addition, as a continuity of development program, a cultural tourism planning map of KBSB proposed by Dahlan (1999) was used as a benchmark for further development of KBSB based on the existence of 57 *kabuyutan* within KBSB.

5.2.3. Data analysis

The recorded and transcribed information were analyzed with the content analysis method which draws on a simple observation to understand what people think by determining frequent words they use to construct the corpus and find the theme (Bernard, 2006; Ryan & Bernard, 2003). The main themes were used as basic information to support the tourism planning process which described qualitatively. Spatial analysis was used to elaborate physical condition of KBSB in supporting the establishment of cultural tourism landscape planning (Fagerholm, Käyhkö, & Van Eetvelde, 2013).

Furthermore, 57 identified *kabuyutan* were analyzed their existence based on the tourism object and attraction analysis method proposed by MacKinnon et al., (1986) which focuses on six criteria (tourist attraction, market opportunity, location and accessibility, physical and social condition, tourism services, and facilities) with several particular aspects. This method focussed on analyzing the potential object and attraction by scoring each aspects into appropriate scores (ranges from 1 indicates low potential to 5 indicates high potential). Together with the key informants, all 57 *kabuyutan* were valued and the average score of each particular aspects was set as the basic information for suggesting the potetial of *kabuyutan* to be selected as tourism objects and attractions.

5.3. Results

5.3.1. Local people's perception of KBSB

Seventeen people were participated in the in-depth interview consist of 14 males (82.4%) and 3 females (17.6%) with the average age was 42 years (Appendix 12). All informants were native and Muslim and more than half of them had an education grade of senior high school (52.9%) and only the custodian graduated from the university. Majority of them (64.7%) participated in non-agricultural activities such as practicing entrepreneurship or working in private company. All informants were the family of Sindang Barang's custodian and currently were a part of management in the KBSB. Each member has an important role with particular task such as *sang rama* who lead the whole of custody system of KBSB (accompanied by his wife or *sang ambu*); *serat* as an administrative person; *jaba* and *pamatang* as a person in charge of agricultural and pastural activities respectively; and *pangawin*, *bareusan*, and *panglarap* in charge of security. The custody system run by heredity based on familial lineage.

Results in Appendix 13 showed that only the particular informant who have a closer relationship with *kabuyutan* and associated culture had a better knowledge than others. Thus, only the custodian understood the term and the creation story of *kabuyutan*. However, more than half of them perceived the other name of *kabuyutan* as the sacred grave, sacred forest, and sacred spring. They had a privilege to visit *kabuyutan* at least once a year in annual *seren taun* ceremony or during accompanying the tourists with a tentative occasion. A place for respecting ancestor as well as for attracting visitors were perceived as the main benefit of *kabuyutan* in KBSB. Water resources from the sacred spring was the only natural resources of *kabuyutan* which used sufficiently and fully permitted by the custodian as a requirement for fulfilling the spiritual need.

Besides, decreasing of even disappearing the meaning of *kabuyutan* were perceived as the challenge due to majority of them located in private land and lack of knowledge of local people on appreciating *kabuyutan*. However, informants reported that the existence of rule had an important role in maintaining the purity of *kabuyutan*. Regular maintenance along with regular visitation at least by the custodian family caused the *kabuyutan* more viable and accessible. Also, the existence of megalithic or historical heritages attracted the local government to survey, to identify, and to designate as national cultural heritages. Further, ensuring the long-term existence of *kabuyutan* was perceived as the sustainable management of *kabuyutan*.

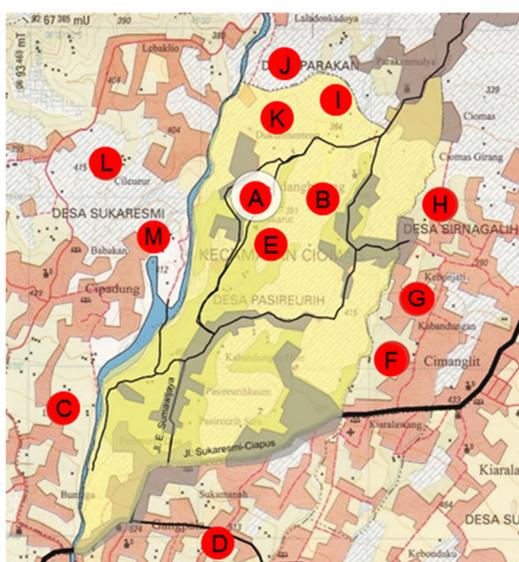
5.3.2. Ecological properties of KBSB

Findings showed that KBSB has unique ecological characteristics and abundant natural resources (Appendix 13). These resources interlinked to support the existence of *kabuyutan* by providing such as a plenty of water resources, a beautiful scenery, and cultural identity based on local biodiversity. For example, abundant amount of stones, as a consequence of the eruption of Salak Mountain in 1699. In fact, the area of KBSB is known as the '*kampung batu*' (village of stone). Local people have been using local resources to build an attractive human-made landscape that includes terraced paddy fields with piles of stones. Stones are also used to mark land ownership and to manage pedestrian tracks, and they serve as symbols at many sacred-historical sites. A hilly area with an average slope of more than 3% strengthened the characteristic of KBSB as a historic site associated with the history of the Padjajaran Kingdom: the slope represents a great altar which is perceived as a sacred place (*kabuyutan*).

The landscape of KBSB benefits from the two main rivers, Ciapus and Sindang Barang River, and its connected springs, which played an important role as water sources mainly used to meet household needs and to irrigate agricultural lands. Concerning the perception that water as a source of life, people highly concerned to protect this resource by securing the spring and the associated ecological and cultural elements. The landscape also featured several excellent vantage points from which the scenic beauty of the natural and cultural landscape can be viewed. The best views included those toward the KBSB, the terraced paddy fields, Bogor city, Ciapus River, Mt. Salak, and Mt. Gede-Pangrango. Local climate conditions contributed to the high attractiveness of the area: an average annual temperature of 26°C, a humidity of 84%, a sun intensity of 25°C, and precipitation of 4500 mm. Moreover, KBSB stored many plant and animal species such as the ti plant (*Cordyline fruitcosa* (L.) A. Chev.), sago palm (*Metroxylon rumphii* Rottb.), sugar palm (*Arenga pinnata* (Wurmb) Merr.), and Javan hawk-eagle (*Nisaetus bartelsi*).

5.3.3. Cultural properties of KBSB

Owing to the strong influence of the history of the Padjajaran Kingdom, KBSB stored many historical and cultural landscape elements that could potentially become tourist objects or attractions. At least 57 historical heritage related to the sacred site have been surveyed within KBSB (Figure 5.2 and Appendix 14). These include a long of 400 m sacred altar that leads to Mt Salak with symbolizing by a pyramid-shaped stone, the sacred springs of *jalatunda* and *sri bagenda*, which hold the functions of purification and



- A. Ungkal Biang
- B. Batu Ki Majusi, Batu Meja, Batu Tapak Cipamali, Batu Kursi Mbah Gabuk, batu Sindang Barang, Punden Sindang Barang 3, Punden Ki Majusi 2, Cineng, Cipamali, Cikubang, Cimeja, Cimalipah, Ciputri, Sumur Jalatunda, Makam Ki Majusi 1, Makam H. Ali, Makam Mbah Cemplang, makam Parangng Jaya, Makam Keluarga Pupuhu, Menhir Cieureun, Menhir Sindang Barang 3, Taman Sri Bagenda, Pohon Paku Jajar
- C. Batu Congklak
- D. Batu Temu Gelar Pasir Keramat
- E. Batu karut 1 and 2, Batu Kursi, Punden Pasir Keramat, Punden Batu Karut, Temu Gelang Batu Karut
- F. Punden Cilegok 1, Batu Kursi, Batu Lisung
- G. Batu Bolong, Menhir Kabandungan, Makam Mbah Dalem
- H. Batu Bangkong, Batu Cikalowing, Tugu Cikalowing
- I. Batu Dakn Leuweung Keramat 1, Batu Bergres Leuweung Keramat 1, Temu Gelang Sawah Lega, Batu Segi Tiga, Leuweung Keramat 3, Punden Surawisesa
- J. Batu Temu Gelang, Batu Kodok Budug, Punden Hunyur Cikareo
- K. Batu Congkak, Batu Bergores, Batu Kursi Dukuh Menteng, Punden Sindang Barang 1, Punden Cibangke, Punden Dukuh Menteng
- L. Batu Congklak
- M. Batu Tapak

Figure 5.2. Distribution of 57 kabuyutan within KBSB Village.



Figure 5.3. Transference of *ungkal biang* sacred stone from river (a) to the current position in KBSB (b) (Source: documentation of author (b) and official KBSB (a)).

of conveying spiritual power, and other sacred sites which mainly identified as sacred megalithic or historical stones. More than a half of them were found in the forested area including sacred forest. In the main center of KBSB (point ‘A’ in Figure 5.2), there is a specific shape stone named *ungkal biang* as a symbol of village (Figure 5.3).

KBSB provided the place to practice the rituals that contribute to the value and diversity of the cultural landscape include *rengkong* (the custom of shaking harvested rice to share happiness during the annual *seren taun* ceremony), *majikeun pare* (storing rice in a traditional warehouse or *leuit*), *parebut seeng* (an ancient ritual performed at wedding ceremonies), and *seren taun* (a harvest thanksgiving ritual). Other cultural elements include art performances such as playing the *angklung gubrag* (a traditional music instrument) and performing *pencak silat Cimande* (a traditional martial art) (Figure 5.4).

The spatial structure of KBSB also reflects the strong philosophy inherent in Sundanese culture (Rigg 1862; Wessing 1999). For example, the concept of *tri tangtu Sunda* (three cardinal rules of *Sunda*) has been well-implemented in the setting of spaces with some degree of scales (see Appendix 1). In general, the landscape of KBSB has been divided into three parts based on the function of each place according to the hydrological system, namely *luhur* (upstream), *tengah* (midstream), and *handap* (downstream). The landscape in the upstream area mainly functioned as a forested area for water conservation, while settlement and production areas such as agricultural lands were located in midstream and downstream areas.



Figure 5.4. Cultural heritage features in KBSB: imah gede as a main house for the custodian (a), traditional agriculture production tools such as *lisung* and *nyiru* (b), a traditional ritual of storing rice of *majikeun pare* (c), attraction of *rengkong* (d) and *angklung gubrag* (e), ritual *parebut seeng* by performing *pencak silat Cimande* during wedding ceremony (f) (Source: documentation of author (a-c) and official KBSB (d-f)).

Facilities in KBSB did not optimally meet the criteria of traditional Sundanese village customary laws. A traditional Sundanese village qualifies based on the availability of facilities such as *imah gede* (house of the custodian), *imah kokolot* (house of the custodian's family), *imah warga* (settlement), *alun-alun* (public space), *bale pangriungan* (community center), *saung leuit* (rice storage), *saung pareak saji* (ritual place), *saung parabot* (warehouse), *saung conat* (tower), *bale kambing* (special place in the middle of the pond), and other supporting facilities. Currently, KBSB has a total area of approximately 8,600 m², but it possesses only less than half of these traditional facilities. Other facilities must, therefore, be developed so that the place will have all the functions of a traditional Sundanese village. Also, development of local culture should be conducted to support the development of the area.

5.3.4. Potential of *kabuyutan*

Current studies revealed the potential of *kabuyutan* as a cultural and historical properties related to the KBSB to be adjusted into the on-going development program to obtain a sustainable management of *kabuyutan* (Table 5.1). The important finding can be shown on the highest value for authenticity and uniqueness of *kabuyutan* because every *kabuyutan* has their own special character such as stone, altar, grave, and spring.

Table 5.1. The evaluation of potential 57 *kabuyutan* as tourism object and attraction.

No.	Criteria	Aspects	Average score
A	Tourist attraction	1. Authenticity and uniqueness are maintained	5
		2. Accessibility that can be visit any time	4
		3. Beauty, comfort, and cleanness of the area is maintained	3
		4. Variety of object more than three types	3
		5. Site capability more than 15 people	3
B	Market opportunity	1. Proximity distance to the target visitor	3
		2. Ease of accessibility	3
		3. Proximity distance to the settlement area	3
		4. Positive image of the object	3
		5. Promotion and accommodation are well-managed	2
C	Location and Accessibility	1. Distance less than a radius of 1-3 km from the main road	4
		2. Accessible for vehicles (asphalt more than 3 m on width)	2
		3. Accessible for pedestrian (stone construction more than 1 m on width)	4
		4. Accessible to get point to point	2
		5. Public transportation to get the point	2
D	Physical and social condition	1. Carrying capacity is allowed	3
		2. low impact on biological resources	3
		3. Positive public perception	3
		4. Land ownership is clear	2
		5. Low population around the site (radius 20-100 m)	2
E	Tourism services	1. Good level of management	2
		2. Ease in obtaining valid information	2
		3. Friendly services	2
		4. Proficiency in communication and language	2
		5. Good mastery of the tourism material	2
F	Facilities	1. Facilities for children, parents, and special needs	2
		2. Supporting facilities with capacity more than 10 people (shelter, seating, etc.)	2
		3. Main facilities and infrastructures (roads, public transportation, lodging, etc.)	2
		4. Proximity to supporting facilities and infrastructures (restaurants, toilet, etc.)	2
		5. Proximity to certain infrastructures (internet café, hospital, etc.)	2

Note: The average score is counted by summing each score of *kabuyutan* in the particular aspect and dividing by total *kabuyutan*. The result shows the potential degree of *kabuyutan* in general depend on the particular aspect.

Moderate scores have been considered to value the *kabuyutan* based on the aspect of market opportunity which indicate the ease of accessibility for visitor as well as for local people in participating on management such as cleaning up the *kabuyutan* and surrounding area.

In term of physical and social condition, the presence of *kabuyutan* was considered environmentally friendly due to the consideration of placement based on ecological carrying capacity such as approximate distance to water bodies or located in the dangerous areas which show low level of disturbance, as well as due to the positive perception of local people in vicinity. However, the land ownership status was crucial while majority of *kabuyutan* located in the private land. Further, the condition of some *kabuyutan* where located in the center of settlement area tend to be destroyed due to the limitation of buffer area such as occur in the *taman sri bagenda* and *sumur jalatunda*.

Other findings revealed that a nearly low value shows in some aspects such as difficulties to get point to point due to some restriction (taboo) for example a restriction to visit particular *kabuyutan* on specific time (mainly for *kabuyutan* where ancestral graves exist which require assistance from the custodian). Also, in the tourism services there is a low level of knowledge about the tourism. Respondents stated that they find some problems to deal with foreign language as well with different culture of visitors. In addition, the availability of tourism facilities was unable to accommodate the visitors with variety of needs. However, in general, all *kabuyutan* in KBSB have a potential to be a tourism object and attraction with some consideration, especially related to the historical association with the history of Padjajaran Kingdom.

5.3.5. Cultural tourism landscape planning

The tourism planning process was conducted with the aim to increase the function and value of the site and to optimally use it as a cultural tourism area. A variety of tourist objects and attractions were optimally arranged to provide an interesting experience, new knowledge, and satisfaction for visitors. Particular attention was given to access and circulation, facilities, and greenery with the aim to enhance the attractiveness of the whole cultural tourism landscape (Figure 5.5). Space planning aimed to preserve the ecological and cultural value of KBSB while adapting the area to tourism needs by dividing it into three main zones: core, buffer, and development areas. Designation of these areas by the flow of water (watershed) focused on optimizing the function of sacred places.

The core zone was the main space with various objects, attractions, and tourist activities. Its main features were land and water sources that were considered sacred or related to sacredness of *kabuyutan* (Figure 5.5). This approach is consistent with the Sundanese concept of orientation by which a place is determined based on the existence

of land (*lemah*) and water (*cai*) (Purnama, 2007). Planning envisioned the development of this cultural and historical zone, in particular, the creation of activities and facilities that represent Sundanese culture, such as the use of traditional design in structures. Activities needed to be adjusted to the function of the zone. For example, activities with interpretation and visualization of cultural information were planned to achieve a better understanding of historical information by visitors and to improve the authenticity and uniqueness of *kabuyutan*. The historical core zone associated with the Padjajaran Kingdom such as a pyramid-shaped stone and its altar (see Appendix 14) needed to be developed and carefully maintained to prevent physical degradation or declining value of existing historical elements. Facilities were designed by the supervision of the custodian with the aim to preserve and improve the function of the area as a historical site. For example, biological or mechanical fencing at the boundaries of the site was planned.

The buffer zone was planned as a transitional space that connects the core and the development zone. It featured cultural and historical information such as agricultural activities and associated values which strengthening understanding of KBSB characteristics and aimed to raise the interest of travelers in visiting the tourist objects and attractions of the core zone. The buffer zone also served to indicate the landscape boundary marked by sacred places, in particular, historical sites, in line with the Sundanese concept of orientation (*kaca-kaca*), which uses sacred places as the border (Purnama, 2007). Finally, the development zone was envisioned to surround the core and buffer zones and to support the planned cultural tourism activities logistically. Tourism facilities in this zone served to accommodate visitors' needs, to provide a pleasant atmosphere that attracted attention, and to welcome tourists to places such as a restaurant, parking area, souvenir shop, or resting area.

Circulation and accessibility were planned in such a way that access was provided to all objects and attractions in the core, buffer, and development zones. To this end, circulation and accessibility were divided into a sequential (circuit) and exploration (dispersing) model, which allowed visitors to enjoy, observe, and visualize all objects and attractions in connection with each other. The planning of green areas aimed to optimize the ecological and cultural function of both local and introduced vegetation. Greenery zones were mostly directed at maintaining the stability of the ecosystem and improving the physical and moral welfare of the local people through the agricultural sector.

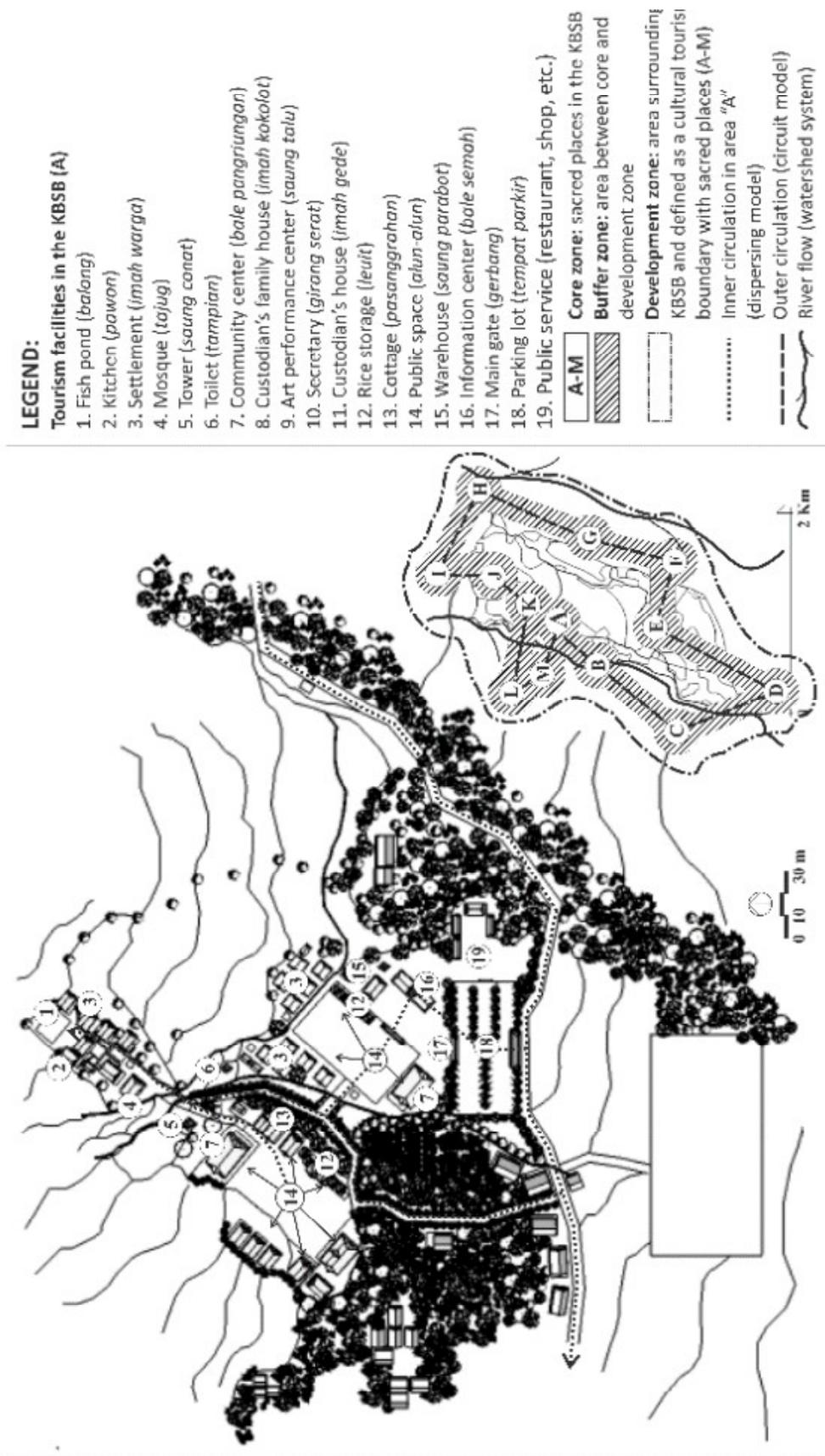


Figure 5.5. Cultural tourism landscape planning of KBSB based on the significance of distribution of 57 *kabuyutan* within KBSB (Source of base map: Dahlan (2009)).

5.4. Discussion

5.4.1. Planning a sustainable sacred place

Tourism planning in the Sundanese cultural landscape cannot occur without paying significant attention to the role of the local people who possess valuable ecological knowledge in managing and using their landscape in accordance with its functions. The existence of KBSB demonstrated the importance of the role of culture in creating an identity. Finding that the traditional ecological knowledge of the local people was reflected in the agriculture-based cultural landscape, indicating the result of human interaction with nature for generations. Biophysical elements are aptly integrated into several cultural properties, and can potentially become tourist objects and attractions. This type of cultural landscape is a manifestation of the Padjajaran Kingdom's grand wisdom in interacting with nature in the past. In fact, there is evidence that most of the kingdom's heritages were found in the form of agricultural activities rather than magnificent structure

Findings showed that the existence of sacred forests, sacred springs, and historical sites associated with spiritual activities such as altars, menhirs, and dolmens is evidence of the power of culture to create an identity (see Figure 5.2 and Appendix 14). In KBSB, the annual thanksgiving ceremony of *seren taun* is a sign of positive interaction between people and nature, and of respect for all creature due to a successful harvest. The existence of objects, attractions, and cultural activities can be perceived as an expression of the feeling of responsibility of the people toward their ancestors' mandate. The status of 'sacred' was conveyed by the individuals with the aim to mitigate the degradation of the landscape, in particular, that of the sacred place or *kabuyutan*. Further, the respect of local people in preserving the existence of *kabuyutan* expressed their grateful to the ancestors' endeavor during their life.

The decision to determine an object as 'sacred' resulted from people's spirituality: objects that had powers beyond human strength were given high value. Places with sacred objects had characteristics that differed from those in the surrounding environment. The area where KBSB is located belonged to the sacral palace in the past and various historical objects are scattered throughout the area. Distribution of these historical objects provided relevant information on managing a sacred landscape. In fact, results showed that the

sacred places were located in areas that were ecologically vulnerable to landslides, land erosion, flooding, loss of biodiversity, and other environmental damage (see Figure 5.2 and Appendix 14). For example, a placement of several *kabuyutan* in the surrounding of central KBSB (shown by point 'A' in Figure 5.5), indicating the deeper understanding of ancestors in protecting the watershed area and securing the spring area that perceived spiritually as a source of life. This finding is consistent with the function of sacred places in the Sundanese community as places of worship and the maintenance of environment (Wessing 1999).

Taking into account the role of sacred places, this study proposed a landscape planning strategy in which the location of the sacred places would mark the boundary of the cultural tourism landscape. Interestingly, the sacred places in KBSB were all located within the natural boundary characterized by the hydrological system (flow of water) (see Appendix 14). This spatial concept is locally known as *pangauban* in accordance with watershed-based regional planning, which is expected to provide maximum environmental benefits, especially regarding water use. The concept is consistent with a study by Brandes (2005) who states that watershed-based planning guarantees the continuity of ecological systems that can affect the sustainability of culture. This landscape planning strategy was also expected to increase the amount of exceptional knowledge and experiences for visitors.

Furthermore, this study revealed that the placement of *kabuyutan* considers the balancing between ecological and cultural benefits (see Table 5.1). Thus, this study emphasized that the utilization of *kabuyutan* in a tourism system is potential to link the ecological and cultural function of KBSB. Besides, results showed that difficulties to visit the *kabuyutan* caused a decrease in the utilization of their significance (see Table 5.1). Cultural restrictions that mitigate the *kabuyutan* from the excessive visitation and utilization, indicating the crucial of some improvement on the three main tourism zones to optimize the function of KBSB such as by providing information related to significance of *kabuyutan* along the buffer zone. Showing the agricultural elements and activities related to Sundanese agroecosystem such as shifting cultivation in the forest garden (*kebon-talun*) and mixed garden (*kebon campuran*), dry paddy (*huma*), or home garden (*pekarangan*) is potential to deal with the locality. Therefore, the potential of local resources would be highly appreciated.

5.4.2. Creative tourism in the Sundanese cultural landscape

Conventional tourism focused on the visitor as the subject and tourism resources as objects to be enjoyed without much interaction or communication. This type of tourism has led to saturation. On the other hand, the creative tourism is potential to be developed further. It provides wider opportunities for visitors and can develop visitors' potential knowledge and experience through active participation in local experiences (Richards, 2009; Richards & Raymond, 2000). The concept of creative tourism has increasingly gained attention during the last decade, as it meets the growing desire of visitors to be creative during their tourism activity. In creative tourism, both visitor and locals are encouraged to be interactive and share their knowledge. The goal for the visitor is to experience local culture as a local, which will at the same time enhance local people's awareness in preserving the heritage. Visitors, will improve local people's awareness and encourage them to maintain their heritage (Jelincić, 2012).

Our findings showed that the Sundanese cultural landscape with its significance sacred places has the potential to play a role in developing places that can provide creative tourism (see Figure 5.2 and Table 5.1). The traditional ecological knowledge of the local people is an important information reservoir that can serve as a basis for making the place into a destination for creative tourism. As an agriculture-based cultural landscape, KBSB provides wide opportunities for visitors to participate in local daily life actively. Visitors can explore diverse agroecological environments such as forest gardens, mixed gardens, home gardens, and paddy fields, and they can participate in rice seedling planting, tree or bamboo cutting, and other local participatory activities. Visitors are also allowed to take part in some processes of local rituals. While the observing rules set by the local custodian of the sacred site, they may participate in taking holy water, logging sacred trees, or visiting sacred places, which will satisfy their desire to get a better understanding of the sacredness of KBSB.

However, results showed that people are experiencing some difficulties while interacting with visitor (see Table 5.1). Thus, considering the role of local people, improvement of strategy should be considered by actively participation of the local people as well as collaboration with the local government. It can thus be expected that as a result of creative tourism, sustainability of the cultural landscape in KBSB will be enhanced thanks to the higher awareness of local people and the need to ensure visitor satisfaction.

5.5. Conclusion

Three main tourism zones, core, buffer, and development zone, were planned with the aim to optimize the potential function of the Sundanese cultural landscape of KBSB. The zones were designed to preserve the historical and cultural values of the area. The core area functioned as a center of relevant historical and cultural objects and attractions that tended to be well preserved such as the *imah gede* (the greatest house), the sacred buildings, the *leuweung larangan* (protection forest), or the archeological sites associated with the history of the Padjajaran Kingdom. This zone was supported by the buffer area, whose function was to strengthen the existing values and to connect the core zone with tourist facilities in the development zone. Access and circulation were divided into a sequential and exploration model, approaches that allow observation and visualization of all objects and attractions as a unity, and ensure continuity of experience in a planned touring plan. A greenery plan was proposed to maximize the function of plants to create a comfortable place. Native plant species such as *Cordyline fruitcosa* (L.) A. Chev. and *Arenga pinnata* (Wurmb) Merr. tended to be preserved.

Key findings showed that KBSB was originally planned based on ecological aspects closely related to the distribution of cultural properties to strengthen the sacredness of KBSB. The decision of how to determine the boundary of the planned cultural tourism zone was inspired by the traditional concept of *patanjala* (water flow concept similar to the watershed concept). The concept focused on linking sacred places (*kabuyutan*) that functioned as guardians of places. Most of the sacred places were symbolized by spring water which is perceived as a main source of life. This chapter concluded that *kabuyutan* in the Sundanese cultural landscape could play a major role in supporting optimal creative tourism activities by providing essential information to link historical, cultural, as well as ecological aspect in a landscape. Revitalizing the local resources were found to have the potential to increase visitors' knowledge and to provide interesting and interactive tourism experiences that would lead to tourism satisfaction.

6 GENERAL DISCUSSION

6.1. General characteristic of *kabuyutan*

Based on their historical and cultural value, *kabuyutan* are apperant as an ancestor's heritage that needs to be maintained not only by his descendants but also by people in general. The existence of *kabuyutan* is perceived by people who are living in the vicinity as well as the people who have relevance both physically and spiritually with the *kabuyutan*. The number of visitor from the outside of Ciomas Village was evident that people in general respect to *kabuyutan*. Findings in Chapter 3 and Chapter 4 showed that the presence of main elements in *kabuyutan* is ascertained as an important factor in forming the ecological and cultural characteristic of *kabuyutan*. Also, the perceived benefits of *kabuyutan* were the basis of considerations for society to behave. This matter needs to be understood because the role of people is crucial in sanctification, utilization, and protection of *kabuyutan*. *Kabuyutan* will be more guarded by the active participation of local people in its management (Sirivongs & Tsuchiya, 2012).

Results in Chapter 3 revealed that the ancestral graves, springs, and plants, in addition to other elements such as stones and proximity distance as part of the river flow, were found in the most *kabuyutan*. The ancestral graves are the most respected element compared to springs and plants respectively. Sanctification of ancestral graves is greatly linked to respect for the ancestors, while springs and plants become important due to historical and spiritual attachment to the ancestors regardless of ecological functions. In addition, findings in Chapter 4 showed that the lack of knowledge related to other essential roles underlays the poor people's appreciation. As a result, their appreciation is still limited to the participation in the annual tradition of *nyepuh* and *nyangku*, besides performing personal pilgrimages. Understanding the actual conditions of *kabuyutan*,

obtaining the blessing of God is the main perceived benefit derived from the pilgrimage as well as utilization of its natural resources. These practices are attempted to appreciate their ancestors (Bhardwaj, 1998; Bulai et al., 2016; Fadillah, 2006; Wessing, 1999).

Ecologically, the existence of *kabuyutan* is closely related to the water resources as an integral part of the hydrological system. *Kabuyutan* are scattered across the landscape and majority placed on or close to an agricultural land area with vary in size. Based on their arrangement, *kabuyutan* play a major role in maintaining stability among the elements within the landscape. *Kabuyutan* provides a multifunction such as a boundary for watershed-based landscape and biodiversity hotspot for several plant species that existed within the large patches of *kabuyutan*, even for the smaller patches that function as the stepping stone such as used by palm civet or sometimes as a gene pool due to the existence of endangered or rare species (see Chapter 3). This characteristic shows the similarity with the Shinto shrines that located along the river from the peak of mountain, springs, riparian, until nearby ocean (Shimada & Yamane, 2010) and also spread over the landscape (Ishii et al., 2010).

As an effort to deeper understanding regarding the general characteristics of *kabuyutan* and also as a basis for consideration in formulating a sustainable management strategy, *kabuyutan* are classified into three categories (Figure 6.1): (1) *kabuyutan* as the burial place of the ancestors; (2) *kabuyutan* associated with the ancestor's history; and (3) *kabuyutan* in general. *Kabuyutan* in the first category is the actualization of respect the ancestors who have contributed to the people as an initiator of dwelling development, or as a missionary in spreading the Islamic teaching. In this category, the sacred graves become the essential element as a point of pilgrimage and obtain the blessing (see Chapter 3). *Kabuyutan* in the second category is formed by connectedness with the life history of the ancestors. *Kabuyutan* in this category is characterized by special places that store ancestral heritages such as springs and other special places. The third category is *kabuyutan* in general which characterized by a spring, plants, and other markers without connectedness neither historically nor culturally with *kabuyutan* in the first category in particular. These *kabuyutan* are indicated by the absence of the historical story of *kabuyutan*. An attempt in the management by taking into consideration the character of each object in a landscape and particularly in the sacred natural sites, is essential to deal with the needs of proper and applicable solutions (Ormsby & Bhagwat, 2010).

6.1.1. Reverence for ancestors (1st category)

The existence of ancestral graves become an important symbol of the twelve *kabuyutan* in this category, in addition to various types of plant species that exist within *kabuyutan*. *Eyang Panghulu Gusti*, *Eyang Mangkubumi*, *Eyang Semang*, *Eyang Wargabangsa*, *Eyang Mulud* ('*eyang*' means the local name of ancestor, and the accompanying name is the concerned ancestor's name) together with the other ancestors are buried at the particular site. Most *kabuyutan* located on land owned by the government with an average area of 1.7 ha. Application of the rules relating to the government land-use has adversely affected the level of damage to *kabuyutan*. This is also the fact that the activity in these *kabuyutan* was dominated by the pilgrimage with particular reason to get the blessing as an implementation of religious teaching. In addition to the prohibition of the visitation and utilization, the limited activities in *kabuyutan* also caused by the

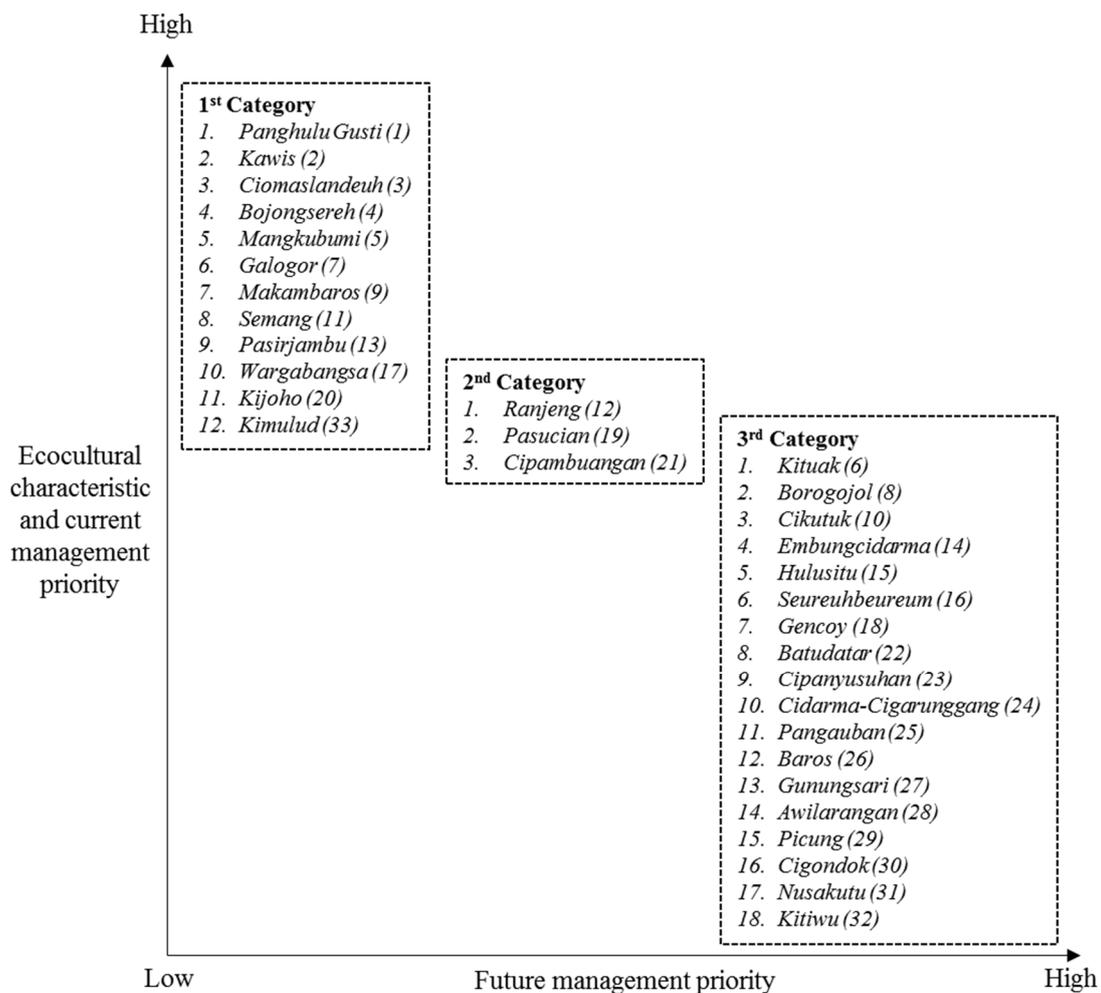


Figure 6.1. Three categories of *kabuyutan* based on ecocultural characteristic and its management priority. Number in parenthesis indicates the order of *kabuyutan* in Figure 3.6, Table 3.3, and Appendix 4 for details.

obedience of people from the taboos as the interpretation of religious teachings that actualized in customary laws (see Chapter 3). *Nyepuh* tradition as the biggest annual event conducted in *Kabuyutan Panghulu Gusti* (KPG) to begin the pilgrimage tradition in other local *kabuyutan* was carried out to express their gratitude to the God and honor to the ancestors. The maintenance of *kabuyutan* was conducted at least once a year in the early or the end of the tradition. The role of custodian was essential to ensure the implementation of rules as ancestor's mandate to be perceived and realized by descendants. Currently, however, only KPG that managed by the custodian, even though local people recognize the leadership applies in a whole *kabuyutan* in the Ciomas Village (see Chapter 4).

The general description of the first category of *kabuyutan* is more focused on the sanctification of ancestral graves. Respect for the ancestors is performed as an expression of gratitude for their struggle, especially in spreading the teachings of Islam. The custodian revealed in an interview, "*Alhamdulillah, upami sanes ku jasa aranjeuna, urang moal ngaraoskeun Islam*" which can be translated as, "*All Praise be to Allah, if not because of their attempts, we cannot embrace Islam.*" As a proper person to carry out the ancestor's mandate, the expression becomes a significant evidence that their devotion in maintaining *kabuyutan* is solely for the expression of gratitude and thanks to the God as well as the ancestors. This supports previous studies related the main reason of sanctifying the ancestral graves and designating as a pilgrimage destination, such as people who visit the tomb of Saints in Indonesia, especially in Java (Fadillah, 2006), or even some cases of pilgrimage in Europe (Kim et al., 2016) and Asia (Shuo et al., 2009). Scholars agree that respect is the main reason people visit the grave as honor to the ancestors with full compliance.

In this case, the legitimacy of the sacredness could be a tool in managing *kabuyutan*. People feared to do contrary something to the ancestor's mandate such as the prohibition on cutting trees, illegal hunting, taking resources without permission of custodian, or simply getting into *kabuyutan* unless it is permitted by the custodian (Iskandar, 2009; Wessing, 1999). However, the absence of the custodian in management is a critical challenge for *kabuyutan* (see Chapter 4). The evidence showed by an informant's concern, "*Abdi mah hariwang mun kuncen teu aya, bade kumaha ieu tempat karomah*" which can be translated as, "*I worry if the custodian was absence (die), what will happen to this*

sacred place." The essential role of the custodian, however, is limited by space and time. To date, a high dependence to the custodian's role, particularly in storing critical information related to the *kabuyutan* caused a lack of people's knowledge regarding history, the resources, and its benefits, or other functions except for the religious or spiritual function. This condition is prevalent in the traditional landscape that stores historical and cultural heritage and their associated customary laws where the people further demonstrate to deal with the rules set by their elders with resignation (Studley, 2010; Vodouhê et al., 2010).

Also, although the land where *kabuyutan* exist owned by the government, there is no a guarantee will be protected from the excessive use beyond the predefined rules, such as occurs in *Kabuyutan Kawis* (see Chapter 3). Nowadays, the people around this *kabuyutan* have access to utilize the cemetery's surrounding area. The reason to maximize land-use becomes a primary consideration for local government to give a permission such as planting crops combined with trees (agroforestry system). However, this is assumed will be an opportunity to claim the ownership rights over the land due to negligence and poor implementation of related rules. Evidence showed in *Kabuyutan Kimulud* where the grave of *Eyang Mulud* located in the hilly which should be maintained as a water catchment area with the dominance of tree stands (see Chapter 3). However, until the mid-1900s (around 1950), the status of the land turned into personally owned land. Consequently, land-use changes have been occurring and only the small patch of grave remains, whereas by the end of the 1900s an informant reported that there were three large trees within its compound (see Chapter 3). Similar conditions are presumed to realize and particularly for *kabuyutan* placed within the agricultural areas. Previous studies indicated that the poor implementation of the rule has led to the loss of many ecologically and culturally significant areas in nature (Rutte, 2011; Verschuuren, 2010).

6.1.2. Importance of history (2nd category)

Kabuyutan Ranjeng, pasucian, and cipambuangan are classified into the second category because of its association with the history of the ancestral life. The graves were not found in these places, besides springs and tree stands that considered sacred by the people. These *kabuyutan* become part of the history of the Panjalu and/or the Galuh Kingdom who had ruled in the area around Ciomas Village. *Ranjeng* and *cipambuangan* are two of the nine springs that are required in performing the annual *nyangku* tradition.

As for a *pasucian* is the first place where the storage of the kingdom's heritages named *bumi alit* exist, before being moved to the Panjalu Village. Two of the three *kabuyutan* located on private land with an average area of 0.4 ha, while *ranjeng* placed on government land with the area about 0.7 ha and become a part of Lengkong Lake (the outlet of water).

The ties between *kabuyutan* and the ancestral history become the reason people treat them similar to *kabuyutan* in the first category. People understand that respect for ancestors would not be complete without appreciating the journey of their life. As a result, those *kabuyutan* are still maintained even though the land belongs to the personal ownership. An interesting result in this category showed that people appreciate the essential elements of *kabuyutan* besides the graves with the condition of their relationship with the history of major *kabuyutan*, although besides the religious or spiritual function (blessing) are not considered yet. This study emphasizes that the continuity of historical aspect in a landscape is important in managing a cultural landscape where historical values were integrated and reflected in its characteristic. The historical aspect cannot be eliminated regardless of a bad story that potentially could serve as a lesson for future generation.

Challenges arise when the history is disconnected or even lost (see Chapter 4). It was proven on *Kabuyutan Pasucian* where lost the important elements (*bumi alit*). This is mainly caused by the absence of the local custodian who has a right to disseminate the history of *kabuyutan*. Although, *Kabuyutan Ranjeng* is managed by a gate operator who is appointed officially by the government not culturally by the main custodian in Ciomas Village, indicating a vital role of the local manager in organizing the outlet for the Lengkong Lake as well as in maintaining the continuity of *nyangku*. Therefore, besides the existence of the main custodian who is responsible to all the *kabuyutan*, the presence of local custodian will be crucial to ensure its continuity. The status of land ownership can be considered more as an effort to control the utilization beyond that permitted by the custodian. Results showed that the customary laws to preserve *kabuyutan* are not well understood by the landowner yet (see Chapter 3). The abandonment of *pasucian*, in addition to the loss of essential elements (*bumi alit*) and the absence of custodian, also due to the lack of local people knowledge related the function of *kabuyutan*. As a result, agricultural activities were carried out within this *kabuyutan*.

6.1.3. Vulnerability of springs (3rd category)

This study showed that more than half of *kabuyutan* in Ciomas classified into this third category. Eighteen *kabuyutan* did not compose by ancestral graves as its main elements as well as by other elements that have a historical linkage to the Ciomas's ancestors. Precisely in this category, the springs exist in three-fourth of *kabuyutan* (72.2%), and only three *kabuyutan* belong to the government land. The extent of *kabuyutan* for this category was measured on average of 0.4 ha and most of them located in the agricultural areas. The narrowness of the area of *kabuyutan*, indicating the loss of a large buffer zone compared to the minimum area for protecting springs around 12.6 ha. Private land ownership is suspected to be the main driver which entitles the landowners to use the land in accordance with their interest. The poor community participation in management is another impact as a consequence of personal management by the owners. The informant's response, "*..bade ngabantosan oge da sakumaha nu gaduhna*" which means "*..wanted to help but depend on landowners*" shows the limitations of public participation in the management. The abandoned area such as *kabuyutan* which indicates the extensive maintenance applied by the landowners, showing local people's attitudes, in general, are rather negative to participate in the management (Ruskule et al., 2013).

Facts revealed that the people have a different perception and treatment of *kabuyutan* in this category. The absence of sacred elements, indicating a low or even lost of the intercession of the grave (*karomah*). Unlike *kabuyutan* in the second type that has a historical linkage, springs or plants and other elements considered as a profane object. Under the circumstance, the presence of springs in this *kabuyutan* become a major concern for future management. The actual conditions demonstrated the severely effect on *kabuyutan*. Gradually, loss of water as an indicator of the water scarcity will rapidly occur without considering some prevention efforts (Rijsberman, 2006). Nevertheless, the fact that the whole spring can still be used, indicating the presence *kabuyutan* on private land potentially to be preserved, despite the loss of buffer area remains an importance to be considered. Therefore, the knowledge related the importance of springs and associated environment needs to be delivered. Referring to several cases in the second category of *kabuyutan*, research related to the historical aspect needs to be done as a foundation in fostering public awareness and particularly landowners along with recommended maintenance collectively.

6.2. Adaptive management of *kabuyutan*

Similar to other natural sacred sites in around the world, *kabuyutan* are facing serious challenges in dealing with the threats of development and global change both regarding social, cultural and environmental aspect. Three categories of *kabuyutan* described previously have provided a general characteristic of *kabuyutan* based on their actual conditions. Many of *kabuyutan* in Ciomas show a vulnerability due to the existence of a fragmented and isolated within agricultural areas, the low of public awareness as a result of lack of knowledge related to the vital functions of *kabuyutan*, and the role of policy makers who could not optimize their potential role (see Chapter 3 and 4). It is not an uncommon case in the natural sacred sites, as reported by previous studies (Dudley et al., 2010; Khan et al., 2008; Rutte, 2011). Thus, an adaptive management of *kabuyutan* is an urgent need before losing both structure and function of these important places. In this case, the local knowledge-based management is recognized can adapt well to the local conditions with optimal results.

A management based on watershed (*pangauban*) is addressed in the management of *kabuyutan* as an implementation of the ancestral Sundanese people's mandates (see Chapter 1 and Appendix 1). The concept of *pangauban* is implemented through the three scales, namely the management in micro-scale (*kasaliraan*), meso-scale (*kabalareaan*), and macro-scale (*kabuanaan*) which apply to both spatial and temporal aspects. This management is focused on capacity building of individuals and small to larger communities within the scope of *pangauban*. Accordance with the hydrological system in Ciomas village, Cidarma River is set as the macro-scale boundary, as for small rivers and springs in every part of the watershed are considered as the meso-scale and micro-scale respectively. Based on the customary laws, implementation of the recommended management strategies is focused on a setting the time for learning the major issues (stage of *kadewaan*) that conducted after setting the major issues in management (stage of *kabataraan*) which consist of the delimitation of the area, the calculation of the extent of damages as well as the recovery time and the carrying capacity of the region. Through this approach, a sustainable landscape is expected not a fiction or utopia (Antrop, 2006), but could be realized with fully regards to the local aspect. A sustainability that is perceived as a condition that provides all-time blessing (see Appendix 10).

6.2.1. Empowering individual (micro-scale)

Findings that the lack of public awareness in general and particularly landowners (both state and personal), indicating the main cause of changes in *kabuyutan* (see Chapter 3). Awareness will come into sight by the existence of the adequate understanding of the benefits (Allendorf et al., 2014; Singh et al., 2014; Vodouhê et al., 2010). Benefits of a religious aspect is a part of the extent of other *kabuyutan*'s benefits. The existence of springs and also plants which show a mutual relationship is important in maintaining the life of living things (see Chapter 3 and 4). Thus, attempts to increase individual awareness through dissemination of knowledge is essential which will stimulate the active participation in the management of *kabuyutan*. As a result, the level of involvement in the *kabuyutan* management will increase either voluntary or regulatory supported by the implementation of governmental regulations (Honig et al., 2015; Kamal et al., 2015).

The increasing of awareness can be done as an early mitigation effort before the consolidation strategy as a result of transferring the land tenure to the state. However, the designation of *kabuyutan* as a government land should be supported by the strictly and precisely implementation of rules. For example, a conflict of interest between governments and local people in case of coffee cultivation has shown a poor implementation of the rules (see Chapter 3). *Kabuyutan Cipanyusuhan* where located on the government land has lost its essential element of standing trees due to the uncontrolled coffee plantation. Arrangement both the protection area (*leuweung larangan*) and conservation area (*leuweung tutupan*) based on traditional calculation are necessary to be considered in determining the production area in the forested area (upstream). Similarly, the designation of *Kabuyutan Panghulu Gusti* as national cultural heritage forces to abide by the government rules without considering the priorities of the customary laws. Supplying plant seeds as the government aid for *nyepuh* tradition at least since 2006 without taking into account ecological and cultural aspects of plant species has a severe impact on the increasing of exotic plant species (see Chapter 3).

Local people participation in all activities related *kabuyutan*, particularly in the implementation of an annual tradition of *nyepuh* and *nyangku*, shows their respect, obedience and a strong dependence on the custodian. The custodian's role in the management of *kabuyutan* is very vital due to their connectedness with cultural and religious aspects. This requires the empowerment not solely custodian and also the

candidate who will keep the continuity of the custody. Transparency in the restriction of customary and religious rules need to be appreciated as an initial step for the dissemination of knowledge for the successors and people in general. Facts revealed that people's confidence in the custodian as an authorized people to receive and deliver related information of *kabuyutan* is found in this study (see Chapter 4). However, the existence of the only custodian of KPG who manages the entire *kabuyutan* in Ciomas and surrounding area, indicating the loss of a central role in the management of each local *kabuyutan*. Thus, the recognition of the custodian's role through the legitimacy by the governmental regulation is important as an award for their attempts.

Through empowerment at the individual level, as a result of the increased knowledge that influences the perception is expected to foster people's awareness to behave fairly and wisely to the environment. In consequence of that, the essential elements of *kabuyutan* will be maintained and their functions could be optimally utilized. Furthermore, the responsive and adaptive behavior to the landscape changes that have occurred or potentially may occur would be minimized or even prevented. For example, an increasing in the knowledge related to the function of native plant species can prevent the pressure of introducing species. A fact showed in the *nyepuh* tradition on 2016 when the successful dissemination of knowledge influences the custodian to carefully select tree species to ensure the compliance with locality (see Chapter 3). The donors were asked to consider the origin of tree species before participating in the tradition. Similarly, in the knowledge of the function of spring's buffer zone is expected to land rehabilitation through the massive afforestation program which can be applied with actively people participation. According to the study which conducted to determine people's attitude towards a landscape, this study supports the previous studies that enriching knowledge as a starting point for making up the positive perception is important to elevate their awareness and motivation in the management (Allendorf et al., 2012; Allendorf et al., 2014; Sirivongs & Tsuchiya, 2012).

6.2.2. Connectivity through a history (meso-scale)

The fact that the inter-connectedness among *kabuyutan* shows the importance of connectivity of landscape elements (see Chapter 3). As an example, the existence of *Kabuyutan Batudatar*, *cigondok*, *kitiwu*, *nusakutu*, and *kawis* in Ciceuri Hamlet was connected to one another through the hydrological system. Through this understanding,

connectivity between *kabuyutan* by extracting related cultural information needs to be strengthened both regarding to the historical, cultural, and ecological aspect. Further, the study results showed that the myths formed from the in-depth understanding of the ancestors to the environmental conditions could describe the status of the structure, function, as well as the potential change of the places (see Chapter 3).

However, changes in land-use which occurred in four *kabuyutan* except in *kawis*, show the limitations of a myth which is understood as an imaginary of the past and not as an ancestral wisdom in interacting with nature. A challenge is to give a logical reason as an effort in dealing with a changing paradigm of modern society who consider more on logic rather than intuition. Exploring information related traditional ecological knowledge needs to be initiated as an initial step in the process of adaptation and transformation of local wisdom. As a result, the connectedness of the historical or cultural aspect will have an impact on the ecological connectivity. For example, a distribution of the river or range of vegetation as a corridor (hedgerows) and also the area around *kabuyutan* might reveal the connectivity among *kabuyutan* as a medium for distributing material and species (Forman & Godron, 1986; Fukamachi et al., 2011). Related knowledge of historical and cultural connectivity become an important point in supporting the stability of the ecological system among *kabuyutan*. Local people, landowners, and government are encouraged to accomplish the sustainability of the entire *kabuyutan* rather than solely *kabuyutan*. This indicates the importance of collaboration among stakeholders in the management of landscape and sacred natural sites in particular, such as implementation of three basic rules, religious, customary, and official regulation, that perceived by people.

6.2.3. Interdependence with agricultural landscape (macro-scale)

Findings revealed that *kabuyutan* as an integral part of the agricultural landscape (see Chapter 3). Most *kabuyutan* located in the agriculture area shows their important roles to contribute to achieving sustainability of landscape. Given the condition which is relatively natural, *kabuyutan* is potential as a provider of environmental services such as gene pools, as a source of fertile soil and fresh water, or as a protector from the wind, pests, and diseases (Thomas & Kevan, 1993). This strengthens the function of the semi-natural landscape distribution in supporting the sustainability of agricultural activities in rural areas (Jackson et al., 2007; Liu et al., 2013; Swift et al., 2004) even though within the isolated area with small extents (Crocini et al., 2008).

Considering the functions and benefits of *kabuyutan* in the landscape scale, the related knowledge needs to be explored and disseminated from and to the relevant stakeholders. The concept of connectivity is enhanced to be applied at the landscape scale that emphasizes the connectivity of structure and function of *kabuyutan* with the surrounding environment. The arrangement of four *kabuyutan* that delineates the boundary of Cidarma Watershed, indicating the connectivity of a landscape based on a hydrological system (see Chapter 3). Considering the particular elements by their function in a whole landscape is important to understand ecological complexity (Farina, 2001; Fukamachi, 2016). Traditional ecological knowledge has provided a clear example of how to maintain the connectivity. Land classification for land and water conservation purposes is the initial information in the determination of particular *kabuyutan* area. The conservational map in Chapter 3 shows the connectivity across the landscape both in the core zone of *kabuyutan* (*leuwueng larangan*) and its buffer zone (*leuwueng tutupan*) such as riparian and susceptible areas (*lemah mala*). In this phase, the communities within the *pangauban Cidarma* are encouraged to participate collectively together with other small communities who responsible for their rivers. The awareness that every little effort applied on the springs (*seke*) will affect small river afterwards (*susukan*) and continue until the middle river (*wahangan*) and ends at the large river (*walungan*), in addition to the implementation of the hierarchical theory, this is essential to be encouraged to foster the readiness of local people in the participatory environmental management.

6.3. Framework for a sustainable landscape management

The study revealed that the lack of people knowledge and poor implementation of existing rules related *kabuyutan* alleged to be two cultural aspects that affect the loss of native species and vulnerability to water resources as a result of land-use change or land degradation, particularly in the area of *kabuyutan* (see Chapter 3, 4, and Notes for related rules). The consequences of the changes occur in the *kabuyutan* require adaptive management strategies through a participatory approach. Management efforts that have been described previously are carried out in response to obtaining the appropriate solutions at the local scale but have a wide impact on the global level. The urgency of adaptive management also revealed in case of the traditional rural landscape of *satoyama* which indicates that a collaboration between government and local people is necessary (Koike, 2014; Nakagawa, 2003; Takeuchi, 2010)

Residents understand the concept of sustainability through a concept of 'blessing' which more elaborated into three main strategies. These strategies are expected to accomplish the achievement of a sustainable landscape management by emphasizing on the availability of water resources as a foundation for achieving the diversity of native plant species as part of the buffer springs, strengthening institutional and law enforcement to legitimate the role and participation of the local people, and further for retaining the identity of the Sundanese people as *urang cai* and *urang gunung* (Figure 6.2). Furthermore, the implementation of this strategy will potentially achieve the target of Sustainable Development Goals to secure the sustainability of water (see Chapter 1). People are encouraged to practice their traditional ecological knowledge to ensure its availability. this approach is the application of the first of two key perspectives for achieving the sustainability of a landscape.

6.3.1. Appropriate rules

The existence of rules in the management is necessary to ensure the continuity of its management system. Previous studies explained that the sacred natural site issues had been a concern of international organizations such as UNESCO and IUCN due to its importance as a provider of ecological and cultural functions. Similar to the case in Indonesia, although there are no specific rules related to the sacred natural sites, at least there are some rules that can be used as a legal aspect for its management. For example, the Act related to the cultural heritage^a which is set to protect the existence of historical and culture relics. This regulation can be applied to protect the existence of *kabuyutan* in the first category and some *kabuyutan* the second category which characterized by the presence of the sacred graves (*makam karomah*) and other associated elements.

As for protecting *kabuyutan* in the third category with the springs and plant species as their essential elements, can be approached with the Act related to the protected areas^a which covering almost all core and buffer zone of *kabuyutan* as well as the Act concerning the conservation of natural resources and ecosystems. According to these regulations, the terms of arranging *leuweung larangan*, *leuweung tutupan*, and *leuweung baladahan* can be further strengthened by the technical rules such as the buffer zone for springs and riparian along the river around 200 m and 100 m respectively. Further, the protection of a whole part of river would be enforced by the government regulation concerning the river^a.

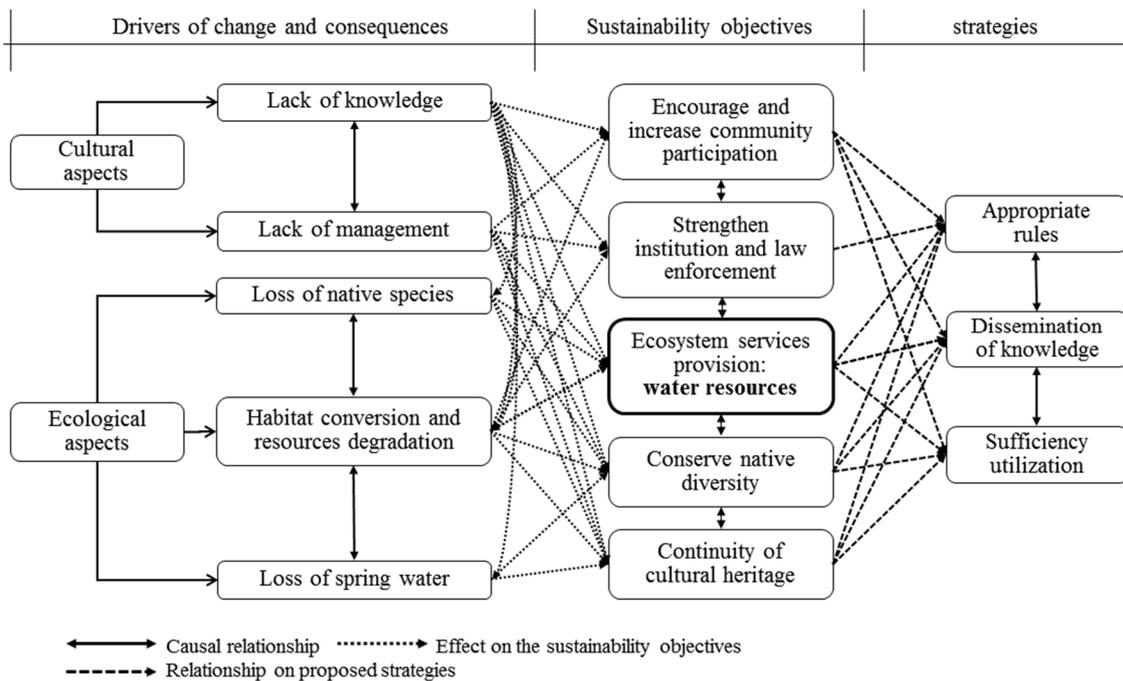


Figure 6.2. Framework of management strategies towards sustainable landscape

Furthermore, on the aspect of biological resources, especially plant species, *kabuyutan* composed of various types of plant habitus as well as its species could potentially be protected by the Act related to the conservation of biological resources^a. In this rule, the conservation efforts are emphasized on endangered species which lead to extinction due to habitat destruction or excessive utilization. The use of this rule could strengthen customary laws that stipulate the limited use of *kabuyutan* resources and particularly of native and rare plant species, regardless of the understanding by the scientific background of species endemism. Similarly, regarding spatial extent where *kabuyutan* are tied closely to cultural values, it needs a recognition of the cultural territory as a space to express their cultural values. Since 2012, following the Court's decision^a regarding the rights of indigenous forest returned to indigenous communities, indicating an excellent opportunity for *kabuyutan* to be managed independently by the local people.

However, the application of this rule emphasized in consideration of indigenous peoples should be legally recognized by the local government with the terms of recognition is pretty hard to be implemented in case of Ciomas people. Based on the definition of indigenous peoples set out in the ministerial regulation^a, Ciomas people tend to be categorized as indigenous people, but the regulation does not explain the degree of

influence of customary laws and also external influences that affect people's lives such as types of clothing used or other household facilities. As a solution, the Act related to the village forest^a provides an opportunity to strengthen the existence of *kabuyutan*. In this case, some *kabuyutan* in the first category which particularly functioned as a common burial area as well as the third category of *kabuyutan* are potential to be protected due to their location on the governmental land functions as village forest.

Concerning the various governmental regulations that could potentially protect *kabuyutan*, challenges arise regarding its implementation. Conflicts of interest among stakeholders particularly relevant authorities and their associated rules which sometimes conflicts with each other. Designation of *kabuyutan* as part of protected area located in forested or agricultural production area, for instance, could potentially create a conflict of interest which is, in fact, the economic interests remain a priority. Conflicts in *Kabuyutan Cipanyusuhan* which coffee plantation become popular in the forest-village community development program showed that economic function takes precedence over ecological functions. Previous studies in the case of production forest managed by the national forestry enterprise (PERHUTANI) confirms that conflicts often occur because of the robust regulations that support the utilization of the area as a production area thoroughly despite protected area exist within its extent (Karminarsih, 2012).

Under the circumstance, the customary laws as a result of long-term interaction process are perceived to provide a new approach to interact with the environment. Implementation of the rules through watershed-based approach (*pangauban*) become one of traditional ecological knowledge which can provide a better influence on the environmental management, especially in maintaining the stability of the land and water (Brandes et al., 2005; Karadağ, 2013; Lalika et al., 2015). Watershed-based environmental management capable of linking ecological and cultural unit to achieve optimal management for fulfilling the needs of creatures who live thereof (Brandes et al., 2005). Furthermore, the application of the concept of *patanjala* (see Chapter 1) through field surveys and determination of springs as a basis in zoning is considered to be the appropriate method regarding to the function of water as the main natural element to support the life of human being and other living things (Karadağ, 2013). According to the concept of 'river culture' introduced by Wantzen et al. (2016), the idea of *patanjala* is proposed to prioritize the management of riverscape and associated element including

human being, to provide an adaptive management, and to transform the traditional ecological knowledge into modern condition rather than attempting to preserve the past. Deliberating the dynamic of the landscape which changes continuously (Antrop, 2006), the last strategy is considered to be important to obtain the benefits of traditional ecological knowledge without taking more into consideration the ideal condition of the past (Fischer et al., 2012; Saini, 2006). Furthermore, views of nature as an integral part of the human body becomes the foundation philosophy of Sundanese people to have a positive perception regarding the presence of soil and water (*lemah cai*). Soil is perceived as a symbol of body or land that provides a place for living, as for water is understood as a soul that generate the life of human being and other living creatures (Purnama, 2007)

The fact that the blessing of God was the main reason for the majority of people visiting and utilizing the resources of *kabuyutan*, showing a strong influence of religion in shaping people perceptions and attitudes towards *kabuyutan* (see Chapter 4). This also indicates a change in the paradigm of individuals due to the change in the polytheism which thrived in the classical period into monotheism of Islam (*tawhid*). Islam requires the followers to pure worship and hope in God alone, despite the fact that there are some classic influences have been acculturating in the implementation. Furthermore, the understanding of the teachings of Islam that differs among individuals tends likely to be a conflict. The fact that losing a sacred tree in *Kabuyutan Baros* pointed to the disagreement with aspects of religion which considers sacred trees tend to idolatry without noticing other aspects such as the ecological function for the surroundings (see Chapter 1, 3 and 4). Such conflicts are reported often occur as a response to the spiritual development of a society (Fadillah, 2006; Kartakusuma, 2006). Thus, this study suggests that strengthening a mutual understanding would be the appropriate solution.

However, the influence of religion cannot be separated in the people's life. As explained by Jenkins (2011) that religion covers a broad range of social phenomena and associated experiences. Understanding the religious aspect becomes the essential requirement for understanding the phenomena that occur in the community (Abdul-Matin, 2010; Mangunjaya, 2009; Zuhud, 2009), including the phenomena of natural sacred sites. Rules of religion as a reflection of the values of teaching has the potential to lead its followers in the pursuit of happiness of life. This rule can be used as a legal basis and be a reinforcement to the customary laws and governmental regulations. The findings in

Chapter 4 showed how a religious law that serves as a foundation in every procession in the tradition of *nyepuh* and *nyangku* is effective in controlling the people and also in protecting the environment. For example, the reason of *halal* which ensure every utilization of *kabuyutan*'s resource must comply with Islamic law (*sharia*) is understood by the people to be the essential requirement to obtain the God's blessing. Similarly, in the rules of pilgrimage accordance with the *sharia* that point to remember the death, and pray to God for the deceased, instead of praying to deceased³. Similar to other scholars who stated that religion has a major role in guiding the human's behavior towards a wise manner during their interaction with nature (Abdul-Matin, 2010; Mangunjaya, 2009; Philpot, 2011), this study emphasizes that there is an opportunity for the religious laws together with the customary laws and the governmental regulations in formulating management strategies of *kabuyutan* and surrounding area towards a sustainable management.

Also, the interpretation of customary laws and the governmental regulations from the religion viewpoint could be the way in aligning these rules. As an example, a myth as an *uga* (traditional forecast) which states that if the stone located in the *Kabuyutan Batudatar* encounter the stone in the *nusakutu* was intended as a reminder of the susceptible land to damages. This particular area could potentially to be designated as the protected area under the governmental regulation. Furthermore, according to the teachings of Islam this phenomenon can be understood through the Holy Qur'an in the chapter 2 verse 74 (Ali, 1987) which mentions, "...for among rocks there are some from which rivers gush forth; others there are which when split asunder send forth water; and others which sink for fear of Allah...". The fallen stone can be analogous to a landslide that caused many materials collapsed. The reason for fear of the Creator as an evidence of obedience and sincerity toward a foreordained destiny to Him. This is a reminder for people always to be alert for any activities carried out on themselves, other people, and their environments. This case illustrates that the application of religious teaching would play an important role in understanding the worldly phenomena in a more thoughtful way. Islamic teaching, for instance, through the Holy Qur'an as the words of God has provided a detail guidance for a human being in interacting with nature as well as presented a fundamental scientific nature as a foundation for the development of science (Thayyarah, 2013).

6.3.2. Dissemination of knowledge

Notwithstanding a positive perception regarding religious functions, yet the knowledge of the other functions of *kabuyutan* need to be addressed adequately and appropriately. The spread of knowledge owned by related stakeholders is necessary to provide a whole perspective of *kabuyutan*. Therefore, the role of the three actors in the watershed-based landscape management (*pangauban*) is required to be encouraged and empowered to ensure the continuity of the successful dissemination of knowledge (see Appendix 1). *Rama* who is mandated to deeply understand the phenomena which will be a trigger for *resi* to interpret the hidden meaning with more logical reasons, and to compile as a recommendation for *ratu* to implement the message through a set of regulation.

As an exploratory study based on a phenomenological approach, a fact showed how the role of the three actors influences each other in the management system. Since the implementation of the forest-village community development program by introducing coffee plantation on the conservation forest managed by the national forestry enterprise (PERHUTANI) in the late 1900s, many of the local people involved in the program. However, a long-term production period and the economic benefits are disproportionate to the environmental damages which affect the people who are living underneath. Droughts and landslides become the major disasters that often occur within the last decade. Moreover, this was a concern of the custodian and the elders as the *rama* who commands, "*cik atuh teang ka gunungna! (please investigate to the mountain and verify the actual condition!)*" and moreover the custodian states, "...*sok sieun kakeunaan ku jaman nista, anu namina tos jaman nista ayeuna ge tos seueur conto di kidul kalerna tos seueur anu rempag alam bebenah ku anjeuna (I worry if we experience a massive damage, which in the east and the west has often occurred due to the nature recovers by himself)*". Then, some representative of local communities (*resi*) together with the local government (*ratu*) represented by PERHUTANI and the natural resources conservation board (BKSDA) held a direct observation. As a result, they found an uncontrolled environmental damage due to the excessive use outside the permitted area. This information was relayed to the custodian and has been responded with a strength statement, "*Urang kakarak ngurus gunung neupi kakieuna ... lila saha ngurus gunung? heula saha ngurus gunung? (As long as I maintain the mountain, only this time such damage occurred ... who are longer and earlier took care of the mountain?)*".

An excerpt of these facts illustrates how the critical role of *rama* provides the actual information that is usually obtained from meditation and in-depth understanding. The ability to understand nature is not merely based on the real view but also reinforced with the inner view as a specificity owned by the custodian. The phrase "...*alam rempang bebenah ku anjeuna*" is an allegory that has a very deep meaning. Nature will experience the dynamics with the ability to recovery by itself. However, the role of human strongly influences the process, whether to speed up or slow down the damages and their recovery.

As a guidance for *ratu*, *rama* and *resi* recommend to apply the customary laws as follows: *gunung kaian* (mountains planted by trees), *gawir awian* (slopes planted by bamboo), *cinyusu rumateun* (springs strictly protected), *sampalan kebonan* (abandoned land used as mix gardens), *pasir talunan* (hills used as forest gardens), *dataran sawahan* (flat areas used as paddy fields), *lebak caian* (valleys used as water reservoirs), *legok balongan* (hollows used as fish ponds), *situ pulasaraeun* (lakes strictly protected), *lembur uruseun* (settlements must be maintained), *walungan rawateun* (rivers strictly protected), and *basisir jagaen* (coastal area strictly protected). This is also the direction in applying the classification of land and plant species for land and water conservation. The role of *ratu* is directed to adopt these rules to the policies, and government regulations were subsequently conveyed to the general people, with the help of *rama* in its implementation respectively. A collaboration between relevant stakeholders is assumed to be an appropriate way in encouraging *rama* to sincerity to realize the phenomena in nature, fostering *resi* to explain the messages with full responsibility, and empowering *ratu* to set the regulations respectively (Figure 6.3).

6.3.3. Sufficiency utilization

The condition of local people with adequate knowledge and also supported by a set of rules resulting from the combination of *sharia* laws, customary laws, and governmental regulations leads to increase their awareness in the utilization of *kabuyutan* and the surrounding environment. The improvement in an understanding of the function other than the religious function of *kabuyutan* and ecological functions, in particular, is expected to provide an opportunity for people to participate actively in its management. The awareness of water resources, for instance, no longer understood for individual use. As a consequence, the whole system of *patanjala* (water flow) becomes the collective

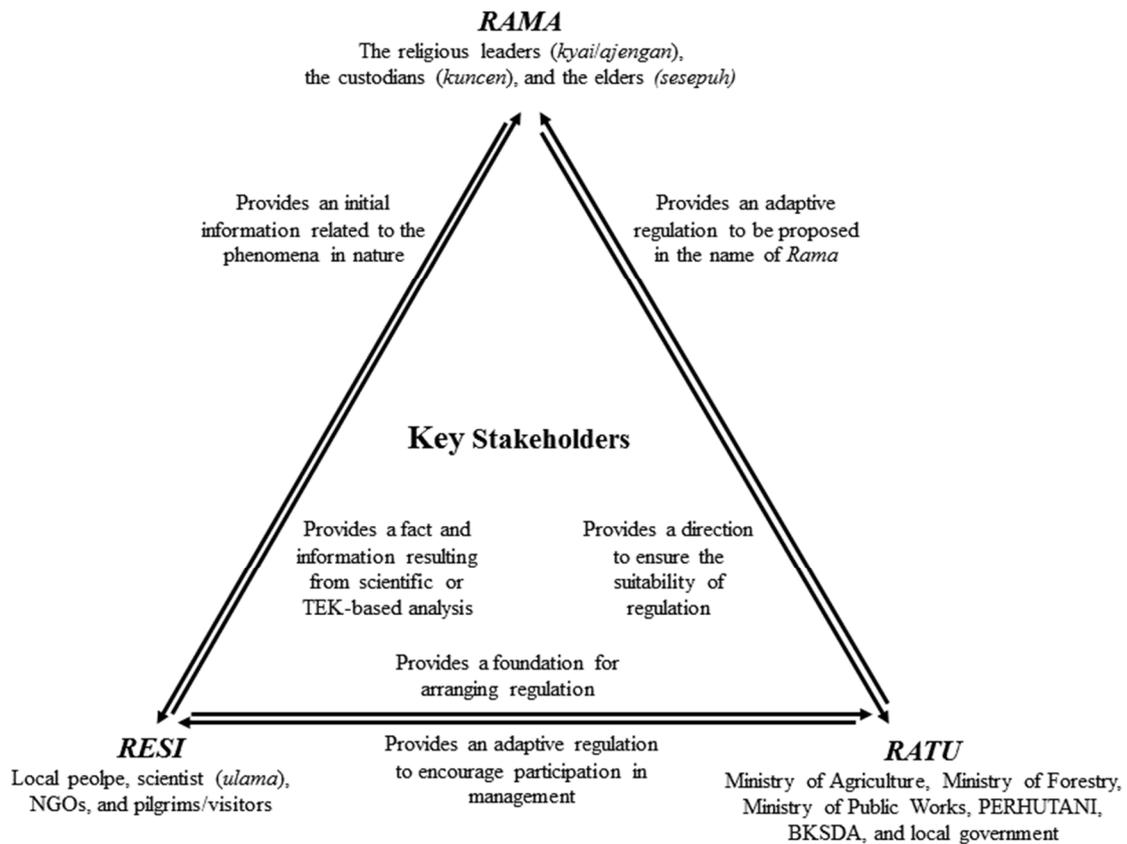


Figure 6.3. Distribution of rules for three main actors in the *pangauban* concept

responsibility of the custodian, people, and government. Resource utilization based on the concept of ‘sufficiency’ is potential as an appropriate solution to relish a various function of *kabuyutan* without compromising the benefits for future generations.

Also, resourcefulness and efficiency are considered as one of the appropriate ways to achieve sufficiency. These practices are focused on utilizing what the people have carefully (Abdul-Matin, 2010) to deal promptly with difficulties. Given the ecological condition with a high level of rainfall and terraced landscape, the local resources could be optimally beneficial by considering the resourcefulness and the efficiency. In the utilization of water resources, for instance, people are encouraged to maintain the ability of water catchment area by planting trees in the hilltops together with bamboo in the ridges or slopes area to optimally harvesting the rainwater during the rainy season. Besides to harvest water from the springs, the maintenance or even construction of water basins such as lakes, dams, or small ponds are necessary to deal with the decreasing amount of water during dry season.

Furthermore, in practical aspect, a dry paddy field system (*huma*) which has not been regularly cultivated by local people and these related species tend to be forgotten is proposed to be reimplemented with the improvement of the management system. This traditional system has been adapted well to the ecological condition of Sundanese region (Adimihardja, 1984; Rosidi, 1984; Wessing, 2006). In addition, a historical fact showed that *huma* system had been implemented during or even before the existence of the Sundanese Kingdom (Atja & Danasasmita, 1981c; Hafidz, 2014)

Resourcefulness is applied in multilayered utilization, while efficiency is conducted on the optimal utilization to avoid waste. Both of these practices support the sufficiency by encouraging the awareness of people to utilize natural and cultural resources that can reduce or even eliminate the adverse environmental impacts. Furthermore, Abdul-Matin (2010) proposed a conviction⁷ that '*the earth is a mosque, and everything in it is sacred.*' It would strongly influence the sensitivity of people who majority as Muslim in living in harmony with nature. Acknowledging the function of the mosque as a sacred place for worshipping the God may encourage people to play their important role on the earth as a sincere worship. This understanding will improve the awareness of individuals to utilize the resources without compromising future generation's right (Ibrahim et al., 2013).

6.4.Potential of *kabuyutan* as touristic object and attraction

Considering the second key perspective to the sustainability of landscape proposed by (Antrop, 2006), combining the potential elements to be creatively used by local as an beneficial object is essential in achieving its sustainability. This study revealed another fact that the existence of *kabuyutan* is potential to be designated as a touristic object and attraction (see Chapter 5). The existence of *kabuyutan* in the Sindang Barang Village attracted the tourist's interest to visit and to learn the historical and cultural aspects of *kabuyutan* and associated values. The tourism aspects related to *kabuyutan* are focused on utilization of functions and the main structure of *kabuyutan* and their surrounding environment. Objects and attractions of *kabuyutan* could be derived from the existing elements or as a result of the reconstruction of the space and time setting. Thus, a different characteristic of *kabuyutan* combined with the surrounding environment shows a great potential to be proposed as an alternative solution towards a sustainable management of landscape and *kabuyutan* in particular.

The significance of *kabuyutan* and associated values is an essential condition to propose a *kabuyutan*-related area as a tourist destination based on nature, culture, and special interests. Compliance with the three types of tourism set out in the regulation of the Republic of Indonesia shows a great potential in its development. However, this study revealed that the readiness of the local people as a provider as well as the organizer of the tourist activity is the main challenge (see Chapter 5). A better understanding can be reached through results from the study on *Kampung Budaya Sindang Barang* (KBSB) in Bogor Regency as a reconstruction of the Sundanese's settlement area which established owing to the initiation of the custodian's family and the study on Ciomas Village which set by the local government as one of the religious tourist destinations (pilgrimage) in Ciamis Regency.

Findings in KBSB (see Chapter 5) indicated a positive result in the utilization of *kabuyutan* for a tourist destination. Several important aspects are considered, especially in terms of providing the authority right to the custodian and local people in its management. In this case, the government's role is limited to monitor the continuity of management system. As a privately-owned tourist area, the fund has not been an obstacle. Through an empowerment program for potential tourist destinations, the government provides an unconditional fund allocated to support the operational management without engaging much more in the implementation of customary laws. KBSB which is reconstructed and designated for the educational purposes needs the qualified human resources with the adequate knowledge, skills, and experiences to manage a cultural tourism landscape. Recently, this requirement cannot be fulfilled by the local people. As a consequence, the qualified resources from the outside of KBSB were employed, and this tends to reduce the level of residents participation.

In contrast with KBSB (see Chapter 4), the religious tourism that takes place in the Ciomas Village is not initiated by the custodian's family, but a directive from the government due to a great potential possessed by *kabuyutan* that existed in the Ciomas Village. Since the existence of *kabuyutan* (*makam karomah*), however, Ciomas has been visited by people who come for the purpose of pilgrimage without considering as a religious tourism destination. A natural process in the formation of tourism area due to the function of *kabuyutan* tends to provide an opportunity for local people to participate in its management. Challenges arise precisely at the time of the designation as a tourist

destination followed by the increasing number of visitors. The demand of financial support has been increasing in line with the changing of various accommodation types for visitors. Through a conditional fund, the role of government has a significant influence on the implementation of the customary laws. As evidence, the provision of tree seedlings in the implementation of *nyepuh* ceremony has reduced the authority of the custodian as well as the local people in the management of *kabuyutan* (see Chapter 3).

Considering the two cases, this study emphasizes that the readiness of local people is necessary for the utilization of *kabuyutan* as a tourism destination. In case of KBSB, the capacity of local people in providing and managing tourism area, especially for deliberately created as tourist area needs to be empowered rather than employing the outsiders. Likewise, the *kabuyutan* where tourist activity has been performed for long-term periods, but later designated by the government as an official tourism destination, the readiness of local people including the custodian is crucial in dealing with the increasing number of visitors. Moreover, the vital role of the government is expected to be encouraged as a supporter rather than as a regulator. By considering the local knowledge, experience, and institutions, as well as by granting a full privilege to the local people, the purposes of tourism would be achieved. Another fact as evidence to propose *kabuyutan* as tourism object and attraction was the presence of pilgrimage as the main activity in visitation and utilization of *kabuyutan*. Pilgrimage is meant merely as a visitation a place, but more emphasis on the religious or spiritual expectation which obtained by a visitor during his/her visitation (Bhardwaj, 1998; Collins-Kreiner & Kliot, 2000; Jafari & Scott, 2014; Kim et al., 2016). In addition to essential elements of *kabuyutan* and associated environment, the pilgrims become important as a social capital for tourism development.

To foster the role of local people in engaging in tourism activities, it is crucial to develop a creative tourism as an alternative solution that capable of actively involving stakeholders. This study suggests that ecotourism is expected to be one of the appropriate solutions to link the cultural and ecological aspects including the aspect of religion in a comprehensive tourism concept (Cobbinah, 2015; Coria & Calfucura, 2012; Jalani, 2012; Sirivongs & Tsuchiya, 2012) and to making meaning of places (Soica, 2016). The concept emphasizes on optimal utilization of local resources that exist in a landscape without compromising respect for the local values (Cobbinah, 2015; Nicula & Spânu, 2014). In

case of rural development in *satoyama* landscape of Japan, Fukamachi (2016) stated that considering the locality such as respecting the local values and appreciating the uniqueness of local landscape elements is important to achieve its sustainability and similar conclusion also presented by Koike (2014). The local people are given a greater opportunity to plan, design, and manage the region to become a tourist destination. The involvement of local communities in every development process is expected to raise awareness of the richness of their local resources. Moreover, they are able to have a well-adaptation to deal with the changes that occur as a result of tourism activities carried out in their landscape (Cobbinah, 2015; Lozano-Oyola et al., 2012; A. Ormsby & Edelman, 2010; Santarém & Paiva, 2015).

Therefore, this study stresses that without providing a full privilege to the local people to express their potential, the purpose of ecotourism would not be successfully achieved. Furthermore, regarding to the source of knowledge, finding revealed that the informants had a good understanding but the custodian's family had more crucial role in maintaining and keeping up the knowledge related to their landscape and *kabuyutan* in particular (see Chapter 3, 4 and 5). Thus, enriching experience and strengthening interaction of local people, as well as encouraging custodian to share their knowledge and experiences are crucial to have a closer and better relationship with *kabuyutan*.

7 GENERAL CONCLUSION

7.1. *Kabuyutan* and future management

The study on *kabuyutan* as one of a hundred or even over a million of sacred natural sites where distribute all over the world shows a significant contribution to enriching the repertoire of knowledge as well as to expand the range of study related sacred natural sites issue. Specifically, Indonesia as a country with many ethnic groups with diverse cultures provides ample opportunity for researchers to contribute actively in exploring and disseminating the relevant values of the existence of sacred natural sites in Indonesia.

Based on the understanding of the ecological characteristic of *kabuyutan*, the existence of *kabuyutan* closely related to the water resources. As an integral part of the hydrological system, *kabuyutan* play a major role in maintaining the stability and continuity of human being life and other living creatures. They provide a significant role in keeping the effectivity of the upper area to catch and harvest the rainfall, the efficiency of water supply from springs and rivers, the optimally of water storages, until the stability of the oceans as the main water basin before being used back into the rain. Their importance is reinforced by the existence of various plant species that mostly dominated by the trees as well as some native and endangered species exist within *kabuyutan*. The lack of local people's awareness according to the critical role of *kabuyutan* causes the vulnerability of water bodies especially springs to damage. Dissemination of knowledge in line with encouragement of the important role of custodian is crucial to make up a positive perception of people that have a high impact on their awareness and behavior to be more wisely in interacting with *kabuyutan* and the surrounding environment. The strategy is expected to maintain the existence of *kabuyutan* both located on the private and government land. Implementation of this strategy may improve the active community

participation both landowners and people in general, either voluntary or regulatory-based approach such as by implementing land consolidation policy to preserve the extinction of *kabuyutan* in particular.

Furthermore, as an element of history and culture, the better known of the term *karomah* than *kabuyutan* show a change in the people's perception due to the influence of the Islamic teachings which is believed by the majority of local people. Under the circumstance, religious reasons such as to obtain the blessing of God during the visitation and utilization of *kabuyutan* are crucial in influencing perceptions and attitudes towards *kabuyutan*. This fact leads to the *kabuyutan* with ancestral sacred graves more respected and prioritized in management such as regularly visited during pilgrimage season. Also, this finding gives an opportunity for religion to be a foundation in establishing or supporting the customary laws as well as the governmental regulations. The existence of custodian as a respected figure based on his/her wisdom both in cultural and religious aspect is vital to develop a guideline for people as well as for government in establishing policies and regulations. Conflicts of interest that have been occurring could be reduced or even avoided through the appropriate rules in accordance with a deep understanding of people about their environment and also the need of stakeholders as the basis for adaptive and participative management efforts.

Dissemination of knowledge related *kabuyutan* regarding the creation history, various benefits, and also aspects related to the management of which is strengthened by the establishment of appropriate rules may encourage people's attitudes in the utilization of *kabuyutan* in a proper manner. An optimal (resourcefulness) and prudent (efficiency) utilization should be encouraged to prevent the excessive use of *kabuyutan*'s excessively as well as the environment surrounding to it. More importantly, both practices would encourage people to limit the utilization of resources by what they need (sufficiency). Consequently, it does not generate waste or even impacts on environmental degradation.

To deal with government policy on regional development which potentially to be designated as a tourism destination, the readiness of the local people is necessary to be taken into consideration. The importance of government is expected to be a partner to control the sustainability of the tourism system together with the community as an appreciation of the locality. An unconditional fund as one of the government's policy is imperative to ensure the authority rights of local people that are expected to enhance their

role and participation in tourism activities. The concept of ecotourism can be proposed as an alternative solution to merge between cultural and ecological as well as religious aspects in an entire concept of tourism. Attention needs to be paid on the optimal utilization of local resources without compromising respect for the values believed by the local people. Taking into account the variety of essential elements both ecologically and culturally, *kabuyutan* and associated environments, as well as the potential of pilgrimage tradition with its fundamental value are expected to provide a creative tourism destination as one of the adaptive solutions for a sustainable landscape management.

As summary, the first research question, “how is the function of *kabuyutan* in the current Sundanese landscape?”, can be answered by the results from Chapter 3 and 4 which state that: (1) *kabuyutan* play a major role in maintaining the stability and continuity of environment based on hydrological system and enhanced by the existence of the native plant species; (2) the lack of local people’s awareness causes the vulnerability of *kabuyutan*, especially where spring and endangered species exist; (3) the existence of custodian is vital to develop a guideline for establishing policies and regulations; (4) there is an opportunity for religion of which to be a foundation in establishing or supporting the customary laws as well as the governmental regulations; and (5) dissemination of knowledge of which is strengthened by the establishment of appropriate rules may encourage people’s attitude in the utilization of *kabuyutan* in a proper manner. As for the second question, “what is the alternative solution for the sustainability of *kabuyutan*?”, can be answered by the findings from the Chapter 5 which state that: (1) ecotourism provides a wide opportunity to wisely use of *kabuyutan*, and (2) the readiness of local people and the importance of government is expected to be a partner in controlling the sustainability of the potential ecotourism as well as on appreciating the locality.

7.2.Directions for future study

The study related the sacred natural sites is expected will be increasing due to its critical role in a landscape that has not been revealed. The existence of these sacred place that culturally or spiritually respected by the people who co-exist surrounding the places has successfully stored the valuable information about the interplay between human and nature. This is the reason why many researchers agree that sacred natural sites deserve to be a living museum that stores a variety of physical and cultural elements and associated

values whether set as a repository of knowledge or biocultural hotspot. Moreover, this issue has been recognized by the international organizations such as UNESCO and IUCN that made up as a particular concern to protect its existence regarding biological resources as well as of historical and cultural values of the people who created them.

To face the challenges of global change such as the change in the paradigm of the environment, the in-depth study of socio-economic aspects including culture and religion need to be more elaborated. For example, in addition to the importance of knowledge, changes in land use that assumed as a result of the excessive utilization of natural resources should be more considered from the standpoint of socio-economic, such as related to the basic needs of landowners or farm laborers who might influence the expansion of their arable lands. Similarly, regarding the potential of combining the three types of law in the management landscape, namely religious laws (*sharia*), customary laws, and governmental regulations should be elaborated further to produce an adaptive, appropriate, and solution-based management strategies, and not contradict each other.

Through this study, a combination method between landscape ecology and cultural landscape in understanding about phenomena of sacred natural sites shows a positive result and a potential to be further developed in the future study. The use of a hierarchical theory correspond to the traditional ecological knowledge of the Sundanese people indicates a high capability of this approach in providing sufficient information to understand the general characteristics of *kabuyutan* at a different scale and notifying a foundation for setting strategies and recommendations based on locality. Also, through this study, the structure, function, changes, as well as the connectivity among the elements in a landscape can be explored. Implementation of landscape ecology principles is highly recommended to support the continuity of those basic landscape components. However, creatively exploring local people's knowledge is a challenge to deal with a lack of documented data. Further, the study also guides to understand the phenomena in a cultural landscape that need to be conducted through interdisciplinary or even transdisciplinary approaches. Moreover, understanding the dynamic of people's culture as well as their landscape, an adaptive approach is highly recommended with considering the locality as a basis for sustainable landscape management.

SUMMARY

Kabuyutan known as one of sacred natural sites in Indonesia that sanctified for generations by the Sundanese people who inhabits the western region of Java Island. Sundanese landscape as a living place for Sundanese people has predicted to keep a variety of *kabuyutan*'s forms and functions as a source of information to understand the development of Sundanese culture. As an explorative study towards an actual phenomenon case, this study was emphasized on three objectives: (1) to analyze the ecological conditions of *kabuyutan*, (2) to analyze the status of the culture associated with *kabuyutan*, and (3) to analyze the potential tourism as a solution for sustainable management of *kabuyutan*. Participant observation methods included field surveys, in-depth interviews, and focus group discussions (FGD) with informants who have a relatively good knowledge of the object study were conducted to highlight the existence of *kabuyutan* and potential of *kabuyutan* in tourism during February 2015 and June 2016. A landscape ecological approach was applied to identify the structure and function of *kabuyutan* as well as changes occur in *kabuyutan*. In addition, ethnobotanical approaches consist of free listing method that verified by vegetation survey, were used to explore and identify the ecological significance based on the existence of plant species. The results were analyzed qualitatively through a content analysis method by looking closely at the words they use and searching the corpus to find theme to understand what people are talking about. Data related to spatial aspect were analyzed by applying GIS-based analysis through patch analysis and land-use change analysis. As for ethnobotanical data, endemism and endangered plant analysis method were used, while tourism object and attraction analysis method was used by valuing the potential of *kabuyutan*.

Thirty three *kabuyutan* were found and identified to have a unique structure compare to surrounding landscape which specifically covered by plant species and marked by springs, graves, or stones. *Kabuyutan* varied in characteristic depending on their physical features, and the proximity to the water bodies greatly influences each character. Several *kabuyutan* functions as the boundary of water catchment area and delineate the watershed boundary to protect the stability of soil as well as the continuity of the hydrological system. The lack of local people's awareness according to the critical role of *kabuyutan* causes the vulnerability of water bodies especially springs to damage. Dissemination of knowledge is crucial to make up a positive perception of people that have a high impact on their awareness and behavior to be more wisely in interacting with *kabuyutan* and the surrounding environment as well as may improve the active community participation both landowners and people in general, either voluntary or regulatory-based approach. In addition, the finding that a third four of plant species in Ciomas Village exist in *kabuyutan* and 130 of plant species could be identified for land and water conservation reinforce the potential of *kabuyutan* to be a biodiversity hotspot. However, some preventive efforts should be applied to prevent the dominance of exotic

species as well as the extinction of the endangered species. Further, encouraging and strengthening the custodian's role as a representative both cultural and religious person may be a crucial step to ensure sustainable knowledge-sharing.

The preference to use the term *karomah* rather than *kabuyutan* showed the influence of the Islamic teachings which is believed by the majority of local people. Religious reason was crucial in influencing people's perceptions and attitudes which mainly to obtain the blessing of God when visiting and utilizing the *kabuyutan*. There is a potential to combine religious laws, customary laws, and governmental regulations in the management strategy to ensure the sustainability of *kabuyutan*. Furthermore, the establishment of appropriate rules may encourage people's attitudes toward the wise use of *kabuyutan*. An optimal (resourcefulness) and prudent (efficiency) utilization should be encouraged to prevent the excessive use of *kabuyutan* and associated environment. More importantly, both practices would encourage people to limit the utilization of resources by what they need (sufficiency) to avoid waste or even impacts on environmental degradation.

This study revealed the other fact that the existence of *kabuyutan* was potential as a touristic object and attraction. The readiness of the local people is necessary to be taken into consideration and the good partnership of government is critical to strengthen the sustainability of the tourism system. Providing an unconditional fund was imperative to ensure the authority rights of local people that are expected to enhance their role and participation. As an alternative solution, this study proposed the concept of ecotourism to optimally utilize local resources without compromising respect for the locality as an adaptive solution for achieving a sustainable landscape management. This approach would ensure the sustainability of a whole landscape and particularly to strengthen the identity of Sundanese people as a *urang cai* and *urang gunung*. Finally, this study revealed that an application of landscape ecological method in understanding about phenomena of sacred natural sites in a cultural landscape shows a positive result and a potential to be further developed in the future study. The use of a hierarchical theory correspond to the traditional ecological knowledge of the Sundanese people indicates a high capability of this approach in providing sufficient information to understand the general characteristics of *kabuyutan* at a different scale and notifying a foundation for setting strategies and recommendations based on locality. Further, combination among religious laws (*sharia*), customary laws (*adat*), and governmental regulations should be elaborated and no to be contradicted.

NOTES

- ¹ *Kabuyutan* and associated activities that tend to idolatry (shirk) are also a concern of the custodian. As an effort to avoid the misguidance, the custodian strongly recommended to firmly adhere to the teachings of Islam which is mandated by the ancestors. In case of manners (*adab*) in pilgrimages, for instance, and associated restrictions on the grave such as building structures over graves, assuming grave as a mosque, or holding a celebration that is not accordance with the teaching Islam have been implemented and encouraged to the descendant. Furthermore, the custodian emphasized in case of the cultism of the ancestors or other spirits as a subject that provides benefits to be avoided. The custodian forbade to beg the ancestor for something, indeed urged to pray to God for the goodness of the ancestors. According to the religious teaching, the negative impact of the existence of grave in *kabuyutan* has been a concern of Islamic scholars (Al-Jauziyyah, 2005). The Prophet Muhammad *Saw* put his critical concern on that thing by delivering some particular rules related to the activities in the cemetery to avoid the mistakes in performing a worship. Moreover, the scholar reported that shirk could begin from the cultism of the people who are considered holy (saints). This condition occurs similarly when the first polytheism happens in the world on the days of the Prophet Noah. On that time, people exalted religious person among them, appreciated their efforts, and led in worshiping them (see *Mawaridul Aman Al-Muntaqamin Ighatsatul Lahfan fi Mashayidisy Syaithan* for more detail explanation).
- ² Panjalu in Figures 2016. Statistics Indonesia of Ciamis Regency. Retrived November 22, 2016, from https://ciamiskab.bps.go.id/new/website/pdf_publicasi/Kecamatan-Panjalu-Dalam-Angka--2016--.pdf
- ³ Tamansari in Figures 2016. Statistics Indonesia of Bogor Regency. Retrived December 26, 2016, from https://bogorkab.bps.go.id/new/website/pdf_publicasi/Kecamatan-Tamansari-Dalam-Angka-2016.pdf
- ⁴ Tree crop estates statistics of Indonesia. Retrived July 20, 2017, from <http://ditjenbun.pertanian.go.id/tinymcpuk/gambar/file/statistik/2017/Kopi-2015-2017.pdf>
- ⁵ The letter of Assignment issued by the local Department of Culture and Tourism of Ciamis Regency (for example in Year 2011, No. 800/013/-Disparbud.2011) for the custodian of *Kabuyutan Panghulu Gusti* (KPG) shows the recognition of *kabuyutan* as cultural heritage. However, the official registration is essential.
- ⁶ Pilgrimage (*ziarah*) is the main activity that encourage by the custodian to be implemented while maintaining compliance with Islamic teaching. This is not contrary to what the Prophet Muhammad *Saw* said (Al-Albani, 1999), “*I had prohibited you from visiting the graves, but now I encourage you to visit them*” [Sahih Muslim (977)]. In other narrations it reads, “*I had prohibited you from visiting the graves, but now I encourage you to visit them, because they are a reminder of the Hereafter*” [Sunan Abi Dawud (3235) and Musnad Ahmad (23005)] or “... and may your visiting them increase you in goodness...” [Sunan An-Nasai (4429 and 5653)]. In the past, the Prophet *Saw* forbade his companion from visiting graves as a preventive effort. When the strong faith has rooted in their hearts, then the Prophet *Saw* encourage them for visiting graves in accordance with his command and forbid them from saying sinful words (therein). Therefore, whoever is visiting graves not in accordance with the tenets of the Islamic teaching, then *ziarah* to the graves was not allowed. Furthermore, the ugliest words in the grave is shirk, either word or deed (Al-Jauziyyah, 2005).
- ⁷ The first sentence, “*the earth is a mosque*” is derived from one of the hadith of the Prophet Muhammad *Saw* as completely as follows: “*the earth is a mosque, except for grave and bathroom.*” [Sunan Abi Dawud (492), Tirmidzi (317), and Ibn Majah (745)]. In this case, Al-Jauziyyah (2005) explains that this hadith concerning the prohibition of performing prayer at the grave. Meanwhile, Abdul-Matin (2010) emphasizes the implicit meaning of the mosque that is perceived as a sacred, so that the earth is regarded as something sacred. The meaning is expected to provide an understanding for a Muslim to act wisely on the earth like behaves in a sacred mosque. Furthermore, Muslim are strictly encouraged to implement the prohibition of the Prophet Muhammad *Saw* to avoid performing prayer at the cemetery include in building a mosque.
- ^a Act No. 26 Year 2007 Concerning the Spatial Planning. Retrieved December 26, 2016, from <http://peraturan.go.id/uu/nomor-26-tahun-2007.html>
- ^b Government Regulation No. 26 Year 2008 Concerning the National Spatial Planning. Retrieved February 5, 2017, from <http://pelayanan.jakarta.go.id/download/regulasi/peraturan-pemerintah-nomor-26-tahun-2008-tentang-rencana-tata-ruang-wilayah-nasional.pdf>

- ^c Presidential Decree of the Republic of Indonesia No. 32 Year 1990 Concerning the Management of Protected Areas. Retrieved February 5, 2017, from <http://www.hukumonline.com/pusatdata/download/lt4e944f2251dd3/node/21942>
- ^d Government Regulation No. 38 Year 2011 Concerning the River. Retrieved December 26, 2016, from <http://peraturan.go.id/pp/nomor-38-tahun-2011-11e44c4f085b3040ad98313231383235.html>
- ^e Regional Regulation No. 2 Year 2006 Concerning the Protected Area Management. Retrieved December 26, 2016, from <http://www.bphn.go.id/data/documents/06pdprovjabar002.pdf>
- ^f Act No. 5 Year 1990 Concerning the Conservation of Natural Resources and Ecosystems. Retrieved December 26, 2016, from <http://peraturan.go.id/uu/nomor-5-tahun-1990.html>
- ^g Act No. 41 Year 1999 Concerning the Forestry. Retrieved December 26, 2016, from <http://peraturan.go.id/uu/nomor-41-tahun-1999.html>
- ^h Ministerial Decree of the Minister of Forestry of the Republic of Indonesia No. 89 Year 2014 Concerning the Forest Village. Retrieved December 26, 2016, from <http://peraturan.go.id/permen/kemenhut-nomor-p.89-menhut-ii-2014-tahun-2014.html>
- ⁱ Act No. 7 Year 2004 Concerning the Water Resources. Retrieved December 26, 2016, from <http://peraturan.go.id/uu/nomor-7-tahun-2004.html>
- ^j Act No. 11 Year 2010 Concerning the Cultural Heritage. Retrieved December 26, 2016, from <http://peraturan.go.id/uu/nomor-11-tahun-2010.html>
- ^k Government Regulation No. 78 Year 2007 Concerning the Ratification of the Convention for the Safeguarding of the Intangible Cultural Heritage. Retrieved February 5, 2017, from <http://www.hukumonline.com/pusatdata/downloadfile/lt5228111bd1e59/parent/lt522810c539cac>
- ^l Regional Regulation No. 14 Year 2014 Concerning the Preservation and Development of Language, Literature, and Literacy. Retrieved February 5, 2017, from <http://peraturan.go.id/perda/provinsi-jawa-barat-nomor-14-tahun-2014.html>
- ^m Regional Regulation No. 15 Year 2014 Concerning the Preservation of Art. Retrieved February 5, 2017, from <http://peraturan.go.id/perda/provinsi-jawa-barat-nomor-15-tahun-2014-11e579321793ea6487fe303935393335.html>
- ⁿ Regional Regulation No. 16 Year 2014 Concerning the Management of Archaeological, Historical, Traditional Values and Museum. Retrieved February 5, 2017, from <http://peraturan.go.id/perda/provinsi-jawa-barat-nomor-16-tahun-2014-11e579317c75e492bccb303935353135.html>
- ^o Constitution of the Republic of Indonesia Year 1945 Article No. 18b. Retrieved December 26, 2016, from https://portal.mahkamahkonstitusi.go.id/eLaw/mg58ufsc89hrsg/UUD_1945_Perubahan.pdf
- ^p Ministerial Decree of the Minister of Home Affairs of the Republic of Indonesia No. 52 Year 2014 Concerning the Guidelines for the Recognition and Protection of Indigenous Peoples. Retrieved December 26, 2016, from <http://peraturan.go.id/permen/kemendagri-nomor-52-tahun-2014.html>
- ^q Act of the Republic of Indonesia No. 37 Year 2014 Concerning the Soil and Water Conservation. Retrieved December 26, 2016, from <http://peraturan.go.id/uu/nomor-37-tahun-2014.html>
- ^r Government Regulation No. 37 Year 2012 Concerning the Watershed Management. Retrieved December 26, 2016, from <http://peraturan.go.id/pp/nomor-37-tahun-2012-11e44c4f067fec0a8a8313231383232.html>
- ^s Act No. 32 Year 2009 Concerning the Protection and Environmental Management. Retrieved December 26, 2016, from <http://peraturan.go.id/uu/nomor-32-tahun-2009.html>
- ^t A Act No. 10 Year 2009 Concerning the Tourism. Retrieved July 21, 2017 from http://www.kemenpar.go.id/userfiles/file/4636_1364-UUTentangKepariwisataannet1.pdf
- ^u Regional Regulation No. 8 Year 2008 Concerning the Implementation of Tourism. Retrieved December 26, 2016, from <http://www.bphn.go.id/data/documents/08pdprovjabar008.pdf>
- ^v Governor Regulation No. 88 Year 2015 Concerning the *Someah Hade Ka Semah* in the Development and Tourism Development in West Java Province. Retrieved December 26, 2016, from <http://bpmpd.jabarprov.go.id/downloadlot.php?file=Pergub%2088%20Tahun%202015%20-%20salinan.pdf>

REFERENCES

- Abdul-Matin, I. (2010). *Green Deen: what Islam teaches about protecting the planet* (1st ed.). San Francisco, CA: Barrett-Koehler Publishers, Inc.
- Adimihardja, K. (1984). Pertanian: Mata Pencapaian Hidup Masyarakat Sunda. In E. S. Ekadjati (Ed.), *Masyarakat Sunda dan Kebudayaanannya* (pp. 163–205). Jakarta: Girimukti Pasaka.
- Adimihardja, K. (2009). Leuweung titipan: Hutan keramat warga Kasepuhan di Gunung Halimun. In H. Soedjito, Y. Purwanto, & E. Sukara (Eds.), *Situs Keramat Alami-Peran Budaya dalam Konservasi Keanekaragaman Hayati* (pp. 78–85). Jakarta: Yayasan Obor Indonesia.
- Agnoletti, M. (2014). Rural landscape, nature conservation and culture: Some notes on research trends and management approaches from a (southern) European perspective. *Landscape and Urban Planning*, *126*, 66–73. <https://doi.org/10.1016/j.landurbplan.2014.02.012>
- Al-Albani, M. N. (1999). *Tuntunan Lengkap Mengurus Jenazah (Translated from Ahkaamul-Janaa'iz wa Bid'ihaa)*. (A. M. Basalamah, Ed.) (1st ed.). Jakarta: Gema Insani Press.
- Al-Jauziyyah, I. Q. (2005). *Manajemen Qalbu: Melumpuhkan Senjata Syetan (Translated from Mawaridul Aman Al-Muntaqa min Ighatsatul Lahfan fi Mashayidisy Syaithan)*. (A. H. U. A. Thayib, Ed.) (6th ed.). Jakarta: Darul Falah.
- Alam, M. S., & Paramati, S. R. (2016). The impact of tourism on income inequality in developing economies: Does Kuznets curve hypothesis exist? *Annals of Tourism Research*, *61*, 111–126. <https://doi.org/10.1016/j.annals.2016.09.008>
- Ali, A. Y. (1987). *The Holy Qur'an: text, translation and commentary*. New York: Tahrike Tarsile Qur'an Inc.
- Allendorf, T. D., Aung, M., & Songer, M. (2012). Using residents' perceptions to improve park-people relationships in Chatthin Wildlife Sanctuary, Myanmar. *Journal of Environmental Management*, *99*, 36–43. <https://doi.org/10.1016/j.jenvman.2012.01.004>
- Allendorf, T. D., Brandt, J. S., & Yang, J. M. (2014). Local perceptions of Tibetan village sacred forests in northwest Yunnan. *Biological Conservation*, *169*, 303–310. <https://doi.org/10.1016/j.biocon.2013.12.001>
- Andreasen, J., Lund, H., Aadahl, M., Gobbens, R. J. J., & Sorensen, E. E. (2017). Content validation of the Tilburg Frailty Indicator from the perspective of frail elderly. A qualitative explorative study. *Archives of Gerontology and Geriatrics*, *61*(3), 392–399. <https://doi.org/10.1016/j.archger.2015.08.017>
- Andriotis, K. (2009). Sacred site experience: A Phenomenological Study. *Annals of Tourism Research*, *36*(1), 64–84. <https://doi.org/10.1016/j.annals.2008.10.003>
- Ansari, M. A., Deodhar, A., Kumar, U. S., & Khatti, V. S. (2015). Water quality of few springs in outer Himalayas – A study on the groundwater–bedrock interactions and hydrochemical evolution. *Groundwater for Sustainable Development*, *1*(1), 59–67. <https://doi.org/10.1016/j.gsd.2016.01.002>
- Antrop, M. (1997). The concept of traditional landscapes as a base for landscape evaluation and planning. The example of Flanders Region. *Landscape and Urban Planning*, *38*(1), 105–117. [https://doi.org/10.1016/S0169-2046\(97\)00027-3](https://doi.org/10.1016/S0169-2046(97)00027-3)
- Antrop, M. (2006). Sustainable landscapes: contradiction, fiction or utopia? *Landscape and Urban Planning*, *75*(3), 187–197. <https://doi.org/10.1016/j.landurbplan.2005.02.014>
- Arsyad, S. (2010). *Konservasi Tanah dan Air*. Bogor: IPB Press.
- Ashton, P. (1998). *Dipterocarpus retusus*. The IUCN Red List of Threatened Species 1998: e.T32400A9702185. <https://doi.org/http://dx.doi.org/10.2305/IUCN.UK.1998.RLTS.T32400A9702185.en>
- Atja, & Danasasmita, S. (1981a). *Amanat dari Galunggung*. Bandung.
- Atja, & Danasasmita, S. (1981b). *Carita Parahiyangan*. Bandung.
- Atja, & Danasasmita, S. (1981c). *Sanghiyang Siksakanda Ng Karesian (Naskah Sunda Kuno Tahun 1218 Masehi)*. Bandung.
- Barrow, E. G. C. (2010). Falling between the “cracks” of conservation and religion: The role of stewardship for sacred trees and Groves. In B. Verschuuren, R. Wild, J. McNeely, & G. Oviedo (Eds.), *Sacred natural sites: conserving nature and culture* (pp. 42–52). London & Washington, DC: Earthscan. Retrieved from <https://portals.iucn.org/library/sites/library/files/documents/2010-045.pdf>
- Berkes, F., Colding, J., & Folke, C. (2000). Rediscovery of Traditional Ecological Knowledge as Adaptive

- Management. *Ecological Applications*, 10(5), 1251–1262. <https://doi.org/10.2307/2641280>
- Bernard, H. R. (2006). *Research methods in anthropology: qualitative and quantitative approaches* (4th ed.). Oxford, UK: AltaMira Press. Retrieved from http://www.dphu.org/uploads/attachements/books/books_476_0.pdf
- Bernbaum, E. (2010). Sacred mountain and global changes: Impact and responses. In B. Verschuuren, R. Wild, J. McNeely, & G. Oviedo (Eds.), *Sacred natural sites : conserving nature and culture* (pp. 33–41). London & Washington, DC: Earthscan.
- Bhardwaj, S. (1998). Non-Hajj Pilgrimage in Islam: A Neglected Dimension of Religious Circulation. *Journal of Cultural Geography*, 17(2), 69–87. <https://doi.org/10.1080/08873639809478321>
- Brandes, O. M., Ferguson, K., M’Gonigle, M., & Sandborn, C. (2005). *At a watershed: Ecological governance and sustainable water management in Canada*. Victoria BC. Retrieved from http://poliswaterproject.org/sites/default/files/report4_full_1.pdf
- Brundtland, G. H. (1987). *Report of the World Commission on Environment and Development: Our Common Future*. Oslo. Retrieved from <http://www.un-documents.net/our-common-future.pdf>
- Bulai, M., Eva, M., & Rosu, L. (2016). Analysis of tourism features and development strategy for memorial complex “Imam Al Bukhari Mausoleum”, Samarkand region, Uzbekistan. *Tékhne - Review of Applied Management Studies*, 14(2), 134–143. <https://doi.org/10.1016/j.tekhne.2016.11.001>
- Burkhard, B., Müller, A., Müller, F., Grescho, V., Anh, Q., Arida, G., ... Settele, J. (2015). Land cover-based ecosystem service assessment of irrigated rice cropping systems in southeast Asia—An explorative study. *Ecosystem Services*, 14, 76–87. <https://doi.org/10.1016/j.ecoser.2015.05.005>
- Chang, M. (2012). *Forest Hydrology: An Introduction to Water and Forests* (Third). Boca Raton, FL: CRC Press.
- Chen, B., Nakama, Y., & Zhang, Y. (2017). Traditional village forest landscapes: Tourists’ attitudes and preferences for conservation. *Tourism Management*, 59, 652–662. <https://doi.org/10.1016/j.tourman.2016.09.007>
- Christanty, L., Abdoellah, O. S., Marten, G. G., & Iskandar, J. (1986). Traditional Agroforestry in West Java: The Pekarangan (Homegarden) and Kebun Talun (Annual Perennial Rotation) Cropping Systems. In G. G. Marten (Ed.), *Traditional Agriculture in Shouteast Asia: A Human Ecology Perspective* (p. 358). Boulder, Colorado: Westview Press. Retrieved from <http://www.gerrymarten.com/traditional-agriculture/pdfs/Traditional-Agriculture-chapter-06.pdf>
- Cobbinah, P. B. (2015). Contextualising the meaning of ecotourism. *Tourism Management Perspectives*, 16, 179–189. <https://doi.org/10.1016/j.tmp.2015.07.015>
- Collins-Kreiner, N., & Kliot, N. (2000). Pilgrimage tourism in the Holy Land: The behavioural characteristics of Christian pilgrims. *GeoJournal*, 50(1), 55–67. Retrieved from <http://www.jstor.org/stable/41147449>
- Cook, N. A., Sarver, E. A., Krometis, L. H., & Huang, J. (2015). Habitat and water quality as drivers of ecological system health in Central Appalachia. *Ecological Engineering*, 84, 180–189. <https://doi.org/10.1016/j.ecoleng.2015.09.006>
- Coria, J., & Calfucura, E. (2012). Ecotourism and the development of indigenous communities: The good, the bad, and the ugly. *Ecological Economics*, 73, 47–55. <https://doi.org/10.1016/j.ecolecon.2011.10.024>
- Croci, S., Butet, A., Georges, A., Aguejdad, R., & Clergeau, P. (2008). Small urban woodlands as biodiversity conservation hot-spot: a multi-taxon approach. *Landscape Ecology*, 23(10), 1171–1186. <https://doi.org/10.1007/s10980-008-9257-0>
- Dahlan, M. Z. (2009). *Perencanaan lanskap kawasan wisata budaya di Kampung Budaya Sindang Barang, Desa Pasir Eurih, Kecamatan Tamansari, Kabupaten Bogor (Pendekatan Community Based Planning)*. Institut Pertanian Bogor.
- Danasasmita, S. (1987). *Sewaka Darma, Sanghiyang Siksakandang Karesian, dan Amanat dari Galunggung*. Bandung.
- Darsoprajitno, H. S. (2006). Tata Lingkungan Alam yang Membentuk Perilaku Budaya Sunda. In A. Rosidi, E. S. Ekadjati, & A. C. Alwasilah (Eds.), *Konferensi Internasional Budaya Sunda Jilid 2* (pp. 393–401). Bandung: Yayasan Kebudayaan Rancage.
- Daye, D. D., & Healey, J. R. (2015). Impacts of land-use change on sacred forests at the landscape scale. *Global Ecology and Conservation*, 3, 349–358. <https://doi.org/10.1016/j.gecco.2014.12.009>
- Debuse, V. J., King, J., & House, A. P. N. (2007). Effect of fragmentation, habitat loss and within-patch habitat characteristics on ant assemblages in semi-arid woodlands of eastern Australia. *Landscape Ecology*, 22(5), 731–745. <https://doi.org/10.1007/s10980-006-9068-0>
- Dewi, Y. (2002). *Etnobotani pada masyarakat adat Kampung Naga, Desa Neglasari, Kecamatan Salawu,*

- Kabupaten Tasikmalaya, Propinsi Jawa Barat. Bogor Agricultural University.
- Djubiantono, T. (2006). Peninggalan Arkeologi Sunda. In A. Rosidi, E. S. Ekadjati, & A. C. Alwasilah (Eds.), *Konferensi Internasional Budaya Sunda Jilid 1* (pp. 241–249). Bandung: Yayasan Kebudayaan Rancage.
- Dramstad, W. F., Olson, J. D., & Forman, R. T. T. (1996). *Landscape Ecology Principles in Landscape Architecture and Land-Use Planning*. Washington, DC: Harvard University Graduate School of Design.
- Duckworth, J. W., Timmins, R. J., Choudhury, A., Chutipong, W., Willcox, D. H. A., Mudappa, D., ... Xu, W. (2016). *Paradoxurus hermaphroditus*. The IUCN Red List of Threatened Species 2016: e.T41693A45217835. <https://doi.org/http://dx.doi.org/10.2305/IUCN.UK.2016-1.RLTS.T41693A45217835.en>
- Dudley, N., Bhagwat, S., Higgins-Zogib, L., Lassen, B., Verschuuren, B., & Wild, R. (2010). Conservation of biodiversity in sacred natural sites in Asia and Africa: a review of the scientific literature. In B. Verschuuren, R. Wild, J. McNeely, & G. Oviedo (Eds.), *Sacred natural sites: conserving nature and culture* (pp. 19–32). London & Washington, DC: Earthscan. Retrieved from <https://portals.iucn.org/library/sites/library/files/documents/2010-045.pdf>
- Echeverría, C., Newton, A. C., Lara, A., Benayas, J. M. R., & Coomes, D. A. (2007). Impacts of forest fragmentation on species composition and forest structure in the temperate landscape of southern Chile. *Global Ecology and Biogeography*, 16(4), 426–439. <https://doi.org/10.1111/j.1466-8238.2007.00311.x>
- Ekadjati, E. S. (1984). Sejarah Sunda. In E. S. Ekadjati (Ed.), *Masyarakat Sunda dan Kebudayaannya* (pp. 76–124). Jakarta: Girimukti Pasaka.
- Ekadjati, E. S. (1995). *Kebudayaan Sunda (Suatu Pendekatan Sejarah)*. Jakarta: Dunia Pustaka Jaya.
- Ekadjati, E. S. (2006). Naskah Sunda: Sumber Pengetahuan Budaya Sunda. In A. Rosidi, E. S. Ekadjati, & A. C. Alwasilah (Eds.), *Konferensi Internasional Budaya Sunda Jilid 1* (pp. 196–217). Bandung: Yayasan Kebudayaan Rancage.
- ESRI. (2011). ArcGIS Desktop: Release 10. Redlands, CA: Environmental Systems Research Institute.
- Fadillah, M. A. (2006). Pengultusan Orang Suci pada Masyarakat Sunda: Sebuah Kontinuitas Unsur Budaya Lokal dalam Ritual Keagamaan Islam. In A. Rosidi, E. S. Ekadjati, & A. C. Alwasilah (Eds.), *Konferensi Internasional Budaya Sunda Jilid 1* (pp. 419–432). Bandung: Yayasan Kebudayaan Rancage.
- Fagerholm, N., Käyhkö, N., & Van Eetvelde, V. (2013). Landscape Characterization Integrating Expert and Local Spatial Knowledge of Land and Forest Resources. *Environmental Management*, 52(3), 660–682. <https://doi.org/10.1007/s00267-013-0121-x>
- Farina, A. (2000). The Cultural Landscape as a Model for the Integration of Ecology and Economics. *BioScience*, 50(4), 313. [https://doi.org/10.1641/0006-3568\(2000\)050\[0313:TCLAAM\]2.3.CO;2](https://doi.org/10.1641/0006-3568(2000)050[0313:TCLAAM]2.3.CO;2)
- Farina, A. (2001). Landscape and Their Ecological Components. *The Living World*, 4, 435–448.
- Farina, A. (2006a). Introduction to landscape ecology. In *Principles and methods in landscape ecology: Toward a Science of Landscape* (pp. 1–52). Dordrecht: Springer Netherlands. https://doi.org/10.1007/978-1-4020-5535-5_1
- Farina, A. (2006b). Methods in landscape ecology. In *Principles and methods in landscape ecology: Toward a Science of Landscape* (pp. 313–391). Dordrecht: Springer Netherlands. https://doi.org/10.1007/978-1-4020-5535-5_8
- Farina, A. (2006c). Principles for landscape conservation, management and design. In *Principles and methods in landscape ecology: Toward a Science of Landscape* (pp. 267–312). Dordrecht: Springer Netherlands. https://doi.org/10.1007/978-1-4020-5535-5_7
- Farina, A. (2006d). Principles of landscape dynamics. In *Principles and methods in landscape ecology: Toward a Science of Landscape* (pp. 229–266). Dordrecht: Springer Netherlands. https://doi.org/10.1007/978-1-4020-5535-5_6
- Fischer, J., Hartel, T., & Kuemmerle, T. (2012). Conservation policy in traditional farming landscapes. *Conservation Letters*, 5(3), 167–175. <https://doi.org/10.1111/j.1755-263X.2012.00227.x>
- Forman, R. T. T., & Godron, M. (1986). *Landscape Ecology*. Canada: John Wiley & Sons, Inc.
- Fukamachi, K. (2016). Sustainability of terraced paddy fields in traditional satoyama landscapes of Japan. *Journal of Environmental Management*. <https://doi.org/10.1016/j.jenvman.2016.11.061>
- Fukamachi, K., Miki, Y., Oku, H., & Miyoshi, I. (2011). The biocultural link: isolated trees and hedges in Satoyama landscapes indicate a strong connection between biodiversity and local cultural features. *Landscape and Ecological Engineering*, 7(2), 195–206. <https://doi.org/10.1007/s11355-011-0164-1>
- Garna, J. K. (1984). Gambaran Umum Daerah Jawa Barat. In E. S. Ekadjati (Ed.), *Masyarakat Sunda dan*

- Kebudayaan* (pp. 9–75). Jakarta: Girimukti Pasaka.
- Garna, J. K. (2006). Sunda Wiwitan: Orang Baduy dari Pancer Bumi, Kanekes. In A. Rosidi, E. S. Ekadjati, & A. C. Alwasilah (Eds.), *Konferensi Internasional Budaya Sunda Jilid 1* (pp. 433–443). Bandung: Yayasan Kebudayaan Rancage.
- Gold, S. M. (1980). *Recreation Planning and Design*. New York: McGraw-Hill Book Co.
- Gomez-Beloz, A. (2002). Plant Use Knowledge of the Winikina Warao: The Case for Questionnaires in Ethnobotany. *Economic Botany*, 56(3), 231–241. Retrieved from <http://www.jstor.org/stable/4256576>
- Gunn, C. A. (1994). *Tourism Planning, Basics, Concepts, Cases*. USA: Taylor and Francis.
- Hafidz, H. (2014). *Pasundan dari Masa ke Masa* (1st ed.). Bogor: Balai Seni Sekar Pakuan.
- Hans, W. (1976). *A Dictionary of Modern Written Arabic*. Ithaca, NY: Spoken Language Services, Inc.
- Harrop, S. R. (2007). Traditional agricultural landscapes as protected areas in international law and policy. *Agriculture, Ecosystems & Environment*, 121(3), 296–307. <https://doi.org/10.1016/j.agee.2006.12.020>
- Hellier, A., Newton, A. C., & Gaona, S. O. (1999). Use of indigenous knowledge for rapidly assessing trends in biodiversity: a case study from Chiapas, Mexico. *Biodiversity & Conservation*, 8(7), 869–889. <https://doi.org/10.1023/A:1008862005556>
- Hessel, R., van den Berg, J., Kaboré, O., van Kekem, A., Verzandvoort, S., Dipama, J.-M., & Diallo, B. (2009). Linking participatory and GIS-based land use planning methods: A case study from Burkina Faso. *Land Use Policy*, 26(4), 1162–1172. <https://doi.org/10.1016/j.landusepol.2009.02.008>
- Hidayat, S. (2009). *Ethnobotanical study of local people at Dukuh Cultural Village Garut Regency, West Java*. Bogor Agricultural University.
- Hoffman, B., & Gallaher, T. (2007). Importance indices in ethnobotany. *Ethnobotany Research and Applications*, 5, 201–218. Retrieved from www.ethnobotanyjournal.org/vol5/i1547-3465-05-201.pdf
- Honig, M., Petersen, S., Shearing, C., Pintér, L., & Kotze, I. (2015). The conditions under which farmers are likely to adapt their behaviour: A case study of private land conservation in the Cape Winelands, South Africa. *Land Use Policy*, 48, 389–400. <https://doi.org/10.1016/j.landusepol.2015.06.016>
- Hu, L., Li, Z., Liao, W., & Fan, Q. (2011). Values of village fengshui forest patches in biodiversity conservation in the Pearl River Delta, China. *Biological Conservation*, 144(5), 1553–1559. <https://doi.org/10.1016/j.biocon.2011.01.023>
- Hung, K., Sirakaya-Turk, E., & Ingram, L. J. (2010). Testing the Efficacy of an Integrative Model for Community Participation. *Journal of Travel Research*, 50(3), 276–288. <https://doi.org/10.1177/0047287510362781>
- Hycner, R. H. (1985). Some guidelines for the phenomenological analysis of interview data. *Human Studies*, 8, 279–303.
- Ibrahim, I., Hua, K. P., Aziz, N. A., & Hanifah, N. A. (2013). Hima as “Living Sanctuaries”: An Approach to Wetlands Conservation from the Perspective of Shari’a Law. *Procedia - Social and Behavioral Sciences*, 105, 476–483. <https://doi.org/http://dx.doi.org/10.1016/j.sbspro.2013.11.050>
- Inagurasi, L. H. (2006). Tinjauan Nilai-Nilai Lama pada Tinggalan *Kabuyutan* di Indramayu. In A. Rosidi, E. S. Ekadjati, & A. C. Alwasilah (Eds.), *Konferensi Internasional Budaya Sunda Jilid 1* (pp. 444–449). Bandung: Yayasan Kebudayaan Rancage.
- Indrawardana, I. (2014). Berketuhanan dalam perspektif kepercayaan Sunda Wiwitan. *International Journal of Philosophy and Religion (Melintas)*, 105–118.
- Ishii, H. T., Manabe, T., Ito, K., Fujita, N., Imanishi, A., Hashimoto, D., & Iwasaki, A. (2010). Integrating ecological and cultural values toward conservation and utilization of shrine/temple forests as urban green space in Japanese cities. *Landscape and Ecological Engineering*, 6(2), 307–315. <https://doi.org/10.1007/s11355-010-0104-5>
- Iskandar, J. (2009). Pelestarian daerah mandala dan keanekaragaman hayati oleh orang Baduy. In H. Soedjito, Y. Purwanto, & E. Sukara (Eds.), *Situs Keramat Alami-Peran Budaya dalam Konservasi Keanekaragaman Hayati* (pp. 86–111). Jakarta: Yayasan Obor Indonesia.
- IUCN. (2012). The IUCN Red List of Threatened Species. Retrieved December 27, 2015, from https://cmsdata.iucn.org/downloads/iucn_redlist_brochure2.pdf.
- Jaafar, M., Noor, S. M., & Rasoolimanesh, S. M. (2015). Perception of young local residents toward sustainable conservation programmes: A case study of the Lenggong World Cultural Heritage Site. *Tourism Management*, 48, 154–163. <https://doi.org/10.1016/j.tourman.2014.10.018>
- Jackson, L. E., Pascual, U., & Hodgkin, T. (2007). Utilizing and conserving agrobiodiversity in agricultural landscapes. *Agriculture, Ecosystems & Environment*, 121(3), 196–210. <https://doi.org/10.1016/j.agee.2006.12.017>

- Jafari, J., & Scott, N. (2014). Muslim world and its tourisms. *Annals of Tourism Research*, 44, 1–19. <https://doi.org/10.1016/j.annals.2013.08.011>
- Jalani, J. O. (2012). Local People's Perception on the Impacts and Importance of Ecotourism in Sabang, Palawan, Philippines. *Procedia - Social and Behavioral Sciences*, 57, 247–254. <https://doi.org/10.1016/j.sbspro.2012.09.1182>
- Jelincić, D. (2012). *Contemporary Identity: A drive for Successful Cultural Tourism Management*. Istanbul.
- Jenkins, W. (2011). Sustainability. In W. A. Bauman, R. R. Bohannon II, & K. J. O'Brein (Eds.), *Grounding Religion: A Field Guide to the Study of Religion and Ecology* (pp. 96–112). New York, NY: Routledge.
- Jepson, A., Clarke, A., & Ragsdell, G. (2014). Investigating the Application of the Motivation–Opportunity–Ability Model to Reveal Factors Which Facilitate or Inhibit Inclusive Engagement Within Local Community Festivals. *Scandinavian Journal of Hospitality and Tourism*, 14(3), 331–348. <https://doi.org/10.1080/15022250.2014.946230>
- Joshi, B. K. (2006). Hydrology and nutrient dynamics of spring of almora-binsar area, indian central himalaya: Landscapes, practices, and management. *Water Resources*, 33(1), 87–96. <https://doi.org/10.1134/S0097807806010106>
- Kahmad, D. (2006). Agama Islam dan Budaya Sunda. In A. Rosidi, E. S. Ekadjati, & A. C. Alwasilah (Eds.), *Konferensi Internasional Budaya Sunda Jilid 1* (pp. 321–329). Bandung: Yayasan Kebudayaan Rancage.
- Kamal, S., Kocór, M., & Grodzińska-Jurczak, M. (2015). Conservation opportunity in biodiversity conservation on regulated private lands: Factors influencing landowners' attitude. *Environmental Science & Policy*, 54, 287–296. <https://doi.org/10.1016/j.envsci.2015.07.023>
- Karadağ, A. A. (2013). Use of Watersheds Boundaries in the Landscape Planning. In M. Özyavuz (Ed.), *Advances in Landscape Architecture* (pp. 105–130). InTech. <https://doi.org/http://dx.doi.org/10.5772/55765>
- Karimpour, R., & Ruhe, G. (2017). Evolutionary robust optimization for software product line scoping: An explorative study. *Computer Languages, Systems & Structures*, 47, 189–210. <https://doi.org/10.1016/j.cl.2016.07.007>
- Karminarsih, E. (2012). *Unit pengelolaan hutan rakyat lestari skala kecil: Kasus di Kecamatan Cikalong, Kabupaten Tasikmalaya, Jawa Barat*. Bogor Agricultural University. Retrieved from <http://repository.ipb.ac.id/handle/123456789/54110>
- Kartakusuma, R. (2006). Situs (*Kabuyutan*) Kawali di Ciamis, Jawa Barat: Ajaran Sunda di dalam Tatanan Tradisi Megalitik. In A. Rosidi, E. S. Ekadjati, & A. C. Alwasilah (Eds.), *Konferensi Internasional Budaya Sunda Jilid 1* (pp. 254–271). Bandung: Yayasan Kebudayaan Rancage.
- Khan, M. L., Khumbongmayum, A. D., & Tripathi, R. S. (2008). The sacred groves and their significance in conserving biodiversity: An overview. *International Journal of Ecology and Environmental Sciences*, 34(3), 277–291.
- Kim, B., Kim, S. S., & King, B. (2016). The sacred and the profane: Identifying pilgrim traveler value orientations using means-end theory. *Tourism Management*, 56, 142–155. <https://doi.org/10.1016/j.tourman.2016.04.003>
- Koesoemadinata, R. M. S. (2006). Arti Gunung-Gunung dalam Budaya Sunda. In A. Rosidi, E. S. Ekadjati, & A. C. Alwasilah (Eds.), *Konferensi Internasional Budaya Sunda Jilid 2* (pp. 432–440). Bandung: Yayasan Kebudayaan Rancage.
- Koike, O. (2014). Rural Landscape Conservation in Japan: Lessons from the Satoyama Conservation Program in Kanagawa Prefecture. In N. Kaneko, S. Yoshiura, & M. Kobayashi (Eds.), *Sustainable Living with Environmental Risks* (pp. 253–263). Tokyo: Springer Japan. https://doi.org/10.1007/978-4-431-54804-1_20
- Kremen, C., Raymond, I., & Lance, K. (1998). An Interdisciplinary Tool for Monitoring Conservation Impacts in Madagascar. *Conservation Biology*, 12(3), 549–563. Retrieved from <http://www.jstor.org/stable/2387236>
- Lalika, M. C. S., Meire, P., & Ngaga, Y. M. (2015). Exploring watershed conservation and water governance along Pangani River Basin, Tanzania. *Land Use Policy*, 48, 351–361. <https://doi.org/10.1016/j.landusepol.2015.06.010>
- Lester, S. (1999). An introduction to phenomenological research. Retrieved January 18, 2017, from https://www.researchgate.net/profile/Stan_Lester/publication/255647619_An_introduction_to_phenomenological_research/links/545a05e30cf2cf5164840df6.pdf
- Liu, Y., Duan, M., & Yu, Z. (2013). Agricultural landscapes and biodiversity in China. *Agriculture, Ecosystems & Environment*, 166, 46–54. <https://doi.org/10.1016/j.agee.2011.05.009>

- Lozano-Oyola, M., Blancas, F. J., González, M., & Caballero, R. (2012). Sustainable tourism indicators as planning tools in cultural destinations. *Ecological Indicators*, *18*, 659–675. <https://doi.org/10.1016/j.ecolind.2012.01.014>
- Lubis, N. H., Nugraga, A., Wildan, D., Dyanti, E. S., Sofianto, K., Falah, M., ... Djubiantono, T. (2003). *Sejarah Tatar Sunda Jilid I*. Bandung: Pusat Penelitian Kemasyarakatan dan Kebudayaan Lembaga Penelitian UNPAD.
- Ludwig, J. A., & Reynolds, J. F. (1988). *Statistical Ecology*. Canada: John Willey & Sons, Inc.
- Mack, N., Woodson, C., MacQueen, K. M., Guest, G., & Namey, E. (2005). *Qualitative Research Methods: A Data Collector's Field Guide*. North Carolina, USA: Family Health International. Retrieved from [https://www.fhi360.org/sites/default/files/media/documents/Qualitative Research Methods - A Data Collector's Field Guide.pdf](https://www.fhi360.org/sites/default/files/media/documents/Qualitative%20Research%20Methods%20-%20A%20Data%20Collector's%20Field%20Guide.pdf)
- MacKinnon, J., MacKinnon, K., & Thorsell, J. (1986). *Managing Protected Areas in the Tropics*. Switzerland: IUCN.
- Manerikar, V., & Manerikar, S. (2014). A note on exploratory research. *aWeshkar*, *17*(1), 95–96.
- Mangunjaya, F. M. (2009). Keramat alami dan kontribusi Islam dalam konservasi Islam. In H. Soedjito, Y. Purwanto, & E. Sukara (Eds.), *Situs Keramat Alami-Peran Budaya dalam Konservasi Keanekaragaman Hayati* (pp. 28–43). Jakarta: Yayasan Obor Indonesia.
- McGarigal, K., Cushman, S. A., & Ene, E. (2012). FRAGSTATS v4: Spatial Pattern Analysis Program for Categorical and Continuous Maps. Amherst: University of Massachusetts. Retrieved from <http://www.umass.edu/landeco/research/fragstats/fragstats.html>
- MFRI. (2013). The list of protected tree species in Indonesia. Retrieved May 25, 2015, from <http://www.dephut.go.id/Halaman/PDF/kalbar05/tabel-44.pdf>
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative Data Analysis* (2nd ed.). Thousand Oaks, CA: Sage Publications.
- Morimoto, Y. (2004). Ecological Dynamics Of Urban And Rural Landscapes - The Need For Landscape Planning That Considers That Considers The Biodiversity Crisis In Japan. In S.-K. Hong, J. A. Lee, B.-S. Ihm, A. Farina, Y. Son, E.-S. Kim, & J. C. Choe (Eds.), *Ecological Issues in a Changing World: Status, Response and Strategy* (pp. 325–336). Dordrecht: Springer Netherlands. https://doi.org/10.1007/978-1-4020-2689-8_20
- Mueller, J. G., Assanou, I. H. B., Dan Guimbo, I., & Almedom, A. M. (2010). Evaluating rapid participatory rural appraisal as an assessment of ethnoecological knowledge and local biodiversity patterns. *Conservation Biology: The Journal of the Society for Conservation Biology*, *24*(1), 140–150. <https://doi.org/10.1111/j.1523-1739.2009.01392.x>
- Mulyasana, D. (2008). *Kajian keanekaragaman jenis pohon pada berbagai ketinggian tempat di Taman Nasional Gunung Ceremai Propinsi Jawa Barat*. Bogor Agricultural University.
- Munandar, A. A. (2006). Sebaran Situs Arkeologi di Jawa Bagian Barat: Tinjauan terhadap Dasar Konsepsi Keagamaan. In A. Rosidi, E. S. Ekadjati, & A. C. Alwasilah (Eds.), *Konferensi Internasional Budaya Sunda Jilid 1* (pp. 330–342). Bandung: Yayasan Kebudayaan Rancage.
- Munandar, A. A. (2013). Kepurbakalaan Masa Hindu-Buddha di Jawa Bagian Barat. In D. P. Rini (Ed.), *Khasanah Budaya Jawa Barat* (pp. 62–114). Serang: Balai Pelestarian Cagar Budaya Serang, Kementerian Pendidikan dan Kebudayaan.
- Mutaqien, Z., & Junaedi, D. I. (2010). Diversity of tree communities in Mount Patuha Region, west Java. *Biodiversitas*, *11*(2), 75–81. Retrieved from <https://doaj.org/article/23f5fd6f337146cbb169973c24a1ffaa>
- Myers, N., Mittermeier, R. A., Mittermeier, C. G., da Fonseca, G. A. B., & Kent, J. (2000). Biodiversity hotspots for conservation priorities. *Nature*, *403*(6772), 853–858. Retrieved from <http://dx.doi.org/10.1038/35002501>
- Najib, T. (2006). Benda-Benda “Keramat” sebagai Bentuk Legitimasi Raja-Raja Masa Islam di Jawa Barat. In A. Rosidi, E. S. Ekadjati, & A. C. Alwasilah (Eds.), *Konferensi Internasional Budaya Sunda Jilid 1* (pp. 250–253). Bandung: Yayasan Kebudayaan Rancage.
- Nakagawa, S. (2003). Approaches to Satoyama Conservation. In K. Takeuchi, R. D. Brown, I. Washitani, A. Tsunekawa, & M. Yokohari (Eds.), *Satoyama: The Traditional Rural Landscape of Japan* (pp. 111–147). Tokyo: Springer Japan. https://doi.org/10.1007/978-4-431-67861-8_5
- Nassauer, I. J. (1995). Culture and changing landscape structure. *Landscape Ecology*, *10*(4), 229–237. <https://doi.org/10.1007/BF00129257>
- Nastran, M. (2015). Why does nobody ask us? Impacts on local perception of a protected area in designation, Slovenia. *Land Use Policy*, *46*, 38–49. <https://doi.org/10.1016/j.landusepol.2015.02.001>
- Naveh, Z. (2000). What is holistic landscape ecology? A conceptual introduction. *Landscape and Urban*

- Planning*, 50(1), 7–26. [https://doi.org/10.1016/S0169-2046\(00\)00077-3](https://doi.org/10.1016/S0169-2046(00)00077-3)
- NESDB. (2007). *Sufficiency economy: Implications and applications*. Bangkok. Retrieved from <http://tica.thaigov.net/main/contents/files/business-20161004-100342-502579.pdf>
- Nicula, V., & Spânu, S. (2014). Ways of Promoting Cultural Ecotourism for Local Communities in Sibiu Area. *Procedia Economics and Finance*, 16, 474–479. [https://doi.org/10.1016/S2212-5671\(14\)00827-2](https://doi.org/10.1016/S2212-5671(14)00827-2)
- Noorduyn, J., & Teeuw, A. (2006). *Three Old Sundanese Poems*. Leiden: Brill.
- Ormsby, A. A., & Bhagwat, S. A. (2010). Sacred forests of India: a strong tradition of community-based natural resource management. *Environmental Conservation*, 37(3), 320–326. <https://doi.org/10.1017/S0376892910000561>
- Ormsby, A., & Edelman, C. (2010). Community-based ecotourism at Tafi Atome Monkey Sanctuary, a sacred natural site in Ghana. In B. Verschuuren, R. Wild, J. McNeely, & G. Oviedo (Eds.), *Sacred natural sites : conserving nature and culture* (pp. 233–243). London & Washington, DC: Earthscan. Retrieved from <https://portals.iucn.org/library/sites/library/files/documents/2010-045.pdf>
- Orwa, C., Mutua, A., Kindt, R., Jamnadass, R., & Simons, A. (2009). Agroforestry Database: a tree reference and selection guide version 4.0. Retrieved February 6, 2016, from <http://www.worldagroforestry.org/treedb/>
- Pannell, C. M. (1998). *Aglaia elliptica*. The IUCN Red List of Threatened Species 1998: e.T33726A9805994. <https://doi.org/http://dx.doi.org/10.2305/IUCN.UK.1998.RLTS.T33726A9805994.en>
- Pei, S., Zhang, G., & Huai, H. (2009). Application of traditional knowledge in forest management: Ethnobotanical indicators of sustainable forest use. *Forest Ecology and Management*, 257(10), 2017–2021. <https://doi.org/10.1016/j.foreco.2009.01.003>
- Philpot, C. (2011). *Green Spirituality: One answer to global environmental problems and world poverty*. Central Milton Keynes, UK: AuthorHouse.
- Prawiro, A. M. B. (2013). Baduy pluralism: from myth to reality. *Borneo Journal of Religious Studies*, 2(1), 111–124.
- Pungetti, G. (2013). Biocultural Diversity for Sustainable Ecological, Cultural and Sacred Landscapes: The Biocultural Landscape Approach. In B. Fu & K. B. Jones (Eds.), *Landscape Ecology for Sustainable Environment and Culture* (pp. 55–76). Dordrecht: Springer Netherlands. https://doi.org/10.1007/978-94-007-6530-6_4
- Purnama, S. (2007). *Menelusuri Arsitektur Masyarakat Sunda*. Bandung: PT. Cipta Sastra Salura.
- Rahayu, M. I. F., Susanto, A. F., & Muliya, L. S. (2016). Model Pemberdayaan Hukum Lingkungan Religius – Kosmik sebagai Upaya Pelestarian Fungsi Lingkungan Hidup. *LITIGASI; Vol 15 No 1 (2014)*. Retrieved from <http://journal.unpas.ac.id/index.php/litigasi/article/view/71>
- Rasoolimanesh, S. M., Jaafar, M., Ahmad, A. G., & Barghi, R. (2017). Community participation in World Heritage Site conservation and tourism development. *Tourism Management*, 58, 142–153. <https://doi.org/10.1016/j.tourman.2016.10.016>
- Reid, A., Teamey, K., & Dillon, J. (2002). Traditional ecological knowledge for learning with sustainability in mind. *The Trumpeter*, 18(1), 113–137. Retrieved from <http://trumpeter.athabascau.ca/index.php/trumpet/article/view/124/137>
- Richards, G. (2009). Creative tourism and local development. In R. Wurzbürger, A. Pattakos, & S. Pratt (Eds.), *Creative Tourism: A global conservation* (pp. 78–90). Santa Fe: Sunstone Press.
- Richards, G., & Raymond, C. (2000). Creative tourism. *ATLAS New*, 23, 16–20.
- Rigg, J. (1862). *A Dictionary of the Sundanese Language of Java*. Batavia: lange & Co. Retrieved from <https://archive.org/details/sundaneselectgoog2>
- Rijsberman, F. R. (2006). Water scarcity: Fact or fiction? *Agricultural Water Management*, 80(1), 5–22. <https://doi.org/10.1016/j.agwat.2005.07.001>
- Rosidi, A. (1984). Ciri-Ciri Manusia dan Kebudayaan Sunda. In E. S. Ekadjati (Ed.), *Masyarakat Sunda dan Kebudayaan* (pp. 125–163). Jakarta: Girimukti Pasaka.
- Rosidi, A. (2000). *Ensiklopedia Sunda: Alam, Manusia, dan Budaya, termasuk budaya Cirebon dan Betawi*. Jakarta: Pustaka Jaya.
- Ruskule, A., Nikodemus, O., Kasparinskis, R., Bell, S., & Urtane, I. (2013). The perception of abandoned farmland by local people and experts: Landscape value and perspectives on future land use. *Landscape and Urban Planning*, 115, 49–61. <https://doi.org/10.1016/j.landurbplan.2013.03.012>
- Rutte, C. (2011). The sacred commons: Conflicts and solutions of resource management in sacred natural sites. *Biological Conservation*, 144(10), 2387–2394. <https://doi.org/10.1016/j.biocon.2011.06.017>
- Ryan, G. W., & Bernard, H. R. (2003). Techniques to Identify Themes. *Field Methods*, 15(1), 85–109.

- <https://doi.org/10.1177/1525822X02239569>
- Saini, K. M. (2006). Kebudayaan Sunda: Konservasi, Rekonstruksi, dan Transformasi. In A. Rosidi, E. S. Ekadjati, & A. C. Alwasilah (Eds.), *Konferensi Internasional Budaya Sunda Jilid 2* (pp. 73–80). Bandung: Yayasan Kebudayaan Rancage.
- Santarém, F., & Paiva, F. (2015). Conserving desert biodiversity through ecotourism. *Tourism Management Perspectives*, *16*, 176–178. <https://doi.org/10.1016/j.tmp.2015.07.016>
- Saringendiyanti, E. (1993). *Penempatan Situs Upacara Masa Hindu-Budha: Sebuah Kajian Lingkungan Fisik Kabuyutan di Jawa Barat*. FSUI.
- Schaaf, T., & Rossler, M. (2010). Sacred natural sites, cultural landscapes and UNESCO's action. In B. Verschuuren, R. Wild, J. McNeely, & G. Oviedo (Eds.), *Sacred natural sites : conserving nature and culture* (pp. 161–169). London & Washington, DC: Earthscan. Retrieved from <https://portals.iucn.org/library/sites/library/files/documents/2010-045.pdf>
- Senda, M. (1992). Japan's traditional view of nature and interpretation of landscape. *GeoJournal*, *26*(2), 129–134. <https://doi.org/10.1007/BF00241206>
- Sepúlveda, B. R., & Carrillo, A. A. (2015). Soil erosion and erosion thresholds in an agroforestry system of coffee (*Coffea arabica*) and mixed shade trees (*Inga* spp and *Musa* spp) in Northern Nicaragua. *Agriculture, Ecosystems & Environment*, *210*, 25–35. <https://doi.org/10.1016/j.agee.2015.04.032>
- Shimada, N., & Yamane, S. (2010). A study on the characteristics of the location of Shinto shrines along the Yasu River, The Shiga Prefecture. *Journal Architecture and Planning*, *75*(647), 111–118.
- Shuo, Y. (Sam) S., Ryan, C., & Liu, G. (Maggie). (2009). Taoism, temples and tourists: The case of Mazu pilgrimage tourism. *Tourism Management*, *30*(4), 581–588. <https://doi.org/10.1016/j.tourman.2008.08.008>
- Singh, H., Husain, T., Agnihotri, P., Pande, P. C., & Khatoon, S. (2014). An ethnobotanical study of medicinal plants used in sacred groves of Kumaon Himalaya, Uttarakhand, India. *Journal of Ethnopharmacology*, *154*(1), 98–108. <https://doi.org/10.1016/j.jep.2014.03.026>
- Sirivongs, K., & Tsuchiya, T. (2012). Relationship between local residents' perceptions, attitudes and participation towards national protected areas: A case study of Phou Khao Khouay National Protected Area, central Lao PDR. *Forest Policy and Economics*, *21*, 92–100. <https://doi.org/10.1016/j.forpol.2012.04.003>
- Soemarwoto, O. (1984). The talun-kebun system, a modified shifting cultivation, in West Java. *Environmentalist*, *4*(7), 96–98. <https://doi.org/10.1007/BF01907300>
- Soerianegara, I., & Indrawan, A. (1980). *Ekologi Hutan Indonesia*. Bogor: Fakultas Kehutanan, Institut Pertanian Bogor.
- Soica, S. (2016). Tourism as practice of making meaning. *Annals of Tourism Research*, *61*, 96–110. <https://doi.org/10.1016/j.annals.2016.09.003>
- Spoon, J. (2010). Tourism meets the sacred: Khumbu Sherpa place-based spiritual values in Sagarmatha (Mount Everest) National Park and buffer zone, Nepal. In B. Verschuuren, R. Wild, J. McNeely, & G. Oviedo (Eds.), *Sacred natural sites : conserving nature and culture* (pp. 87–97). London & Washington, DC: Earthscan. Retrieved from <https://portals.iucn.org/library/sites/library/files/documents/2010-045.pdf>
- Steingass, F. (1882). *English-Arabic dictionary for the use of both travellers and students*. London: W. H. Allen & Co.
- Studley, J. (2010). Uncovering the intangible values of earth care: Using cognition to reveal the eco-spiritual domains and sacred values of the peoples of Eastern Kham. In B. Verschuuren, R. Wild, J. McNeely, & G. Oviedo (Eds.), *Sacred natural sites : conserving nature and culture* (pp. 107–118). London & Washington, DC: Earthscan. Retrieved from <https://portals.iucn.org/library/sites/library/files/documents/2010-045.pdf>
- Suansa, N. I. (2011). *Application of Ethnobotanical knowledge for managing Baduy Indigenous Forest*. Bogor Agricultural University.
- Sudaryat, Y. (2014). The Interpretation of Sundanese Educational Philosophy in Traditional Idiomatic Expressions. *EDUCARE: International Journal for Educational Studies*, *6*(2), 119–128.
- Sunyoto, A. (2011). *Wali Songo: Rekonstruksi Sejarah yang Disingkirkan*. (A. Mun'im, Ed.) (1st ed.). Jakarta: Transpustaka.
- Suriawidjaja, S. (2006). Mengungkap Jati Diri Ki Sunda. In A. Rosidi, E. S. Ekadjati, & A. C. Alwasilah (Eds.), *Konferensi Internasional Budaya Sunda Jilid 1* (pp. 237–240). Bandung: Yayasan Kebudayaan Rancage.
- Suryalaga, H. R. H. (2003). *Kasundaan Rawayan Jati*. Bandung: Wahana Raksa Sunda.
- Swift, M. J., Izac, A.-M. N., & van Noordwijk, M. (2004). Biodiversity and ecosystem services in

- agricultural landscapes—are we asking the right questions? *Agriculture, Ecosystems & Environment*, 104(1), 113–134. <https://doi.org/10.1016/j.agee.2004.01.013>
- Takeuchi, K. (2010). Rebuilding the relationship between people and nature: the Satoyama Initiative. *Ecological Research*, 25(5), 891–897. <https://doi.org/10.1007/s11284-010-0745-8>
- Tallamy, D. W. (2009). *Bringing nature home: how you can sustain wildlife with native plants*. UK: Timber Press.
- Terkenli, T. S. (2005). New landscape spatialities: the changing scales of function and symbolism. *Landscape and Urban Planning*, 70(1), 165–176. <https://doi.org/10.1016/j.landurbplan.2003.10.012>
- Thayyarah, N. (2013). *Buku pintar sains dan Al-Quran: Mengerti mukjizat ilmiah firman Allah*. (A. M. Z., Nurkaib, I. Firdau, N. Hizbullah, & C. Ahmad, Eds.) (1st ed.). Jakarta: Zaman.
- Thomas, V. G., & Kevan, P. G. (1993). Basic principles of agroecology and sustainable agriculture. *Journal of Agricultural and Environmental Ethics*, 6(1), 1–19. <https://doi.org/10.1007/BF01965612>
- Tishler, W. H. (1998). Landscape tourism and the preservation of heritage places. In *Landscape Architecture Quest to The 21st Century: Responsibilities, Challenges, Opportunities* (pp. 1–7). Madison: Panorama Landscape & Communication.
- TPL. (2013). The Plant List Version 1.1. Retrieved January 1, 2017, from <http://www.theplantlist.org/>
- Turner, N. J. (1988). The importance of a rose: Evaluating the cultural significance of plants in thompson and lilloet interior salish. *Journal of American Anthropologist*, 90(2), 272–290.
- UNESCO. (1972). Convention concerning the Protection World Natural and Cultural Heritage. Retrieved February 5, 2017, from <http://whc.unesco.org/en/conventiontext/>
- UNESCO. (2005). *Basic Texts of the 1972 World Heritage Convention*. Paris. Retrieved from whc.unesco.org/document/101839
- UNESCO. (2011). *Operational Guidelines for the Implementation of the World Heritage Convention*. Paris.
- Ursache, M. (2015). Tourism – Significant Driver Shaping a Destinations Heritage. *Procedia - Social and Behavioral Sciences*, 188, 130–137. <https://doi.org/10.1016/j.sbspro.2015.03.348>
- van Bemmelen, R. W. (1949). *The Geology of Indonesia: Vol. IA General Geology of Indonesia and Adjacent Archipelagoes - The Bandung Zone*. Hague: Government Printing Office.
- Vasilyeva, M. (2005). Spatial Cognition and Perception. In *Encyclopedia of Social Measurement* (pp. 591–597). <https://doi.org/10.1016/B0-12-369398-5/00542-9>
- Verschuuren, B. (2010). Arguments for developing biocultural conservation approaches for sacred natural sites. In B. Verschuuren, R. Wild, J. McNeely, & G. Oviedo (Eds.), *Sacred natural sites : conserving nature and culture* (pp. 62–72). London & Washington, DC: Earthscan. Retrieved from <https://portals.iucn.org/library/sites/library/files/documents/2010-045.pdf>
- Verschuuren, B., Wild, R., McNeely, J., & Oviedo, G. (2010). Introduction: sacred natural sites the foundations of conservation. In B. Verschuuren, R. Wild, J. McNeely, & G. Oviedo (Eds.), *Sacred natural sites : conserving nature and culture* (pp. 1–14). London & Washington, DC: Earthscan. Retrieved from <https://portals.iucn.org/library/sites/library/files/documents/2010-045.pdf>
- Vidyasagan, K., Ajeesh, R., & Vikas, K. (2014). Field performance of *Ailanthus triphylla* sampling in municipal garbage as the potting media for reforestation in the tropics. *International Journal of Plant, Animal, and Environmental Science*, 4(3), 562–568.
- Vodouhê, F. G., Coulibaly, O., Adégbidi, A., & Sinsin, B. (2010). Community perception of biodiversity conservation within protected areas in Benin. *Forest Policy and Economics*, 12(7), 505–512. <https://doi.org/10.1016/j.forpol.2010.06.008>
- Wantzen, K. M., Ballouche, A., Longuet, I., Bao, I., Bocoum, H., Cissé, L., ... Teixeira, P. (2016). River Culture: an eco-social approach to mitigate the biological and cultural diversity crisis in riverscapes. *Ecology & Hydrobiology*, 16(1), 7–18. <https://doi.org/10.1016/j.ecohyd.2015.12.003>
- WCMC. (1998a). *Horsfieldia glabra* var. *javanica*. The IUCN Red List of Threatened Species 1998: e.T37200A10037923. <https://doi.org/http://dx.doi.org/10.2305/IUCN.UK.1998.RLTS.T37200A10037923.en>
- WCMC. (1998b). *Mangifera indica*. The IUCN Red List of Threatened Species 1998: e.T31389A9624842. <https://doi.org/http://dx.doi.org/10.2305/IUCN.UK.1998.RLTS.T31389A9624842.en>
- WCMC. (1998c). *Tetrameles nudiflora*. The IUCN Red List of Threatened Species 1998: e.T32376A9701897. Retrieved February 8, 2016, from <http://dx.doi.org/10.2305/IUCN.UK.1998.RLTS.T32376A9701897.en>
- Wessing, R. (1999). The sacred grove: founders and the owners of the forest in West java. *L'homme et La Foret Tropicale*, 59–74.
- Wessing, R. (2006). Telling the Landscape: Place and Meaning in Sunda. In A. Rosidi, E. S. Ekadjati, & A. C. Alwasilah (Eds.), *Konferensi Internasional Budaya Sunda Jilid 1* (pp. 450–474). Bandung:

Yayasan Kebudayaan Rancage.

- Wild, R. (2010). Nature saint and holy island, ancient values in a modern economy: The enduring influence of St Cuthbert and Lindisfarne, United Kingdom. In B. Verschuuren, R. Wild, J. McNeely, & G. Oviedo (Eds.), *Sacred natural sites: conserving nature and culture* (pp. 77–86). London & Washington, DC: Earthscan. Retrieved from <https://portals.iucn.org/library/sites/library/files/documents/2010-045.pdf>
- Wild, R., & McLeod, C. (Eds.). (2008). *Sacred Natural Sites: Guidelines for Protected Area Managers*. Gland, Switzerland: IUCN. Retrieved from https://cmsdata.iucn.org/downloads/pa_guidelines_016_sacred_natural_sites.pdf
- Włodarska, K., Pawlak-Lemańska, K., Khmelinskii, I., & Sikorska, E. (2016). Explorative study of apple juice fluorescence in relation to antioxidant properties. *Food Chemistry*, 210, 593–599. <https://doi.org/10.1016/j.foodchem.2016.05.007>
- Wright, R., & Stein, M. (2005). Snowball Sampling. In *Encyclopedia of Social Measurement* (pp. 495–500). Elsevier. <https://doi.org/10.1016/B0-12-369398-5/00087-6>
- Wu, J., & David, J. L. (2002). A spatially explicit hierarchical approach to modeling complex ecological systems: theory and applications. *Ecological Modelling*, 153(1), 7–26. [https://doi.org/10.1016/S0304-3800\(01\)00499-9](https://doi.org/10.1016/S0304-3800(01)00499-9)
- WWAP. (2015). *The United Nations World Water Development Report 2015: Water for a Sustainable World*. Paris. Retrieved from <http://unesdoc.unesco.org/images/0023/002318/231823E.pdf>
- Xu, J., Chen, L., Lu, Y., & Fu, B. (2006). Local people's perceptions as decision support for protected area management in Wolong Biosphere Reserve, China. *Journal of Environmental Management*, 78(4), 362–372. <https://doi.org/10.1016/j.jenvman.2005.05.003>
- Yogaswara, H. (2009). Situs keramat alami sebagai alternatif pengakuan hak-hak masyarakat adat: Kasus Kasepuhan Cibedug, Banten. In H. Soedjito, Y. Purwanto, & E. Sukara (Eds.), *Situs Keramat Alami-Peran Budaya dalam Konservasi Keanekaragaman Hayati* (pp. 112–129). Jakarta: Yayasan Obor Indonesia.
- Yondri, L. (2013). Kawasan Jawa Barat Kandungannya akan Tinggalan Era Prasejarah. In D. P. Rini (Ed.), *Khasanah Budaya Jawa Barat* (pp. 1–61). Serang: Balai Pelestarian Cagar Budaya Serang, Kementerian Pendidikan dan Kebudayaan.
- Zhang, C., Wu, J., Grimm, N. B., McHale, M., & Buyantuyev, A. (2013). A hierarchical patch mosaic ecosystem model for urban landscapes: Model development and evaluation. *Ecological Modelling*, 250, 81–100. <https://doi.org/10.1016/j.ecolmodel.2012.09.020>
- Zoetmulder, P. J. (2007). The Significance of the Study of Culture and Religion for Indonesian Historiography. In Soedjatmoko (Ed.), *An Introduction to Indonesian Historiography* (1st ed., pp. 326–343). Jakarta: Equinox Publishing.
- Zuhud, E. A. M. (2009). Tri-stimulus amar sebagai pendorong sikap konservasi: Kasus konservasi kedawung (*Parkia timoriana* (DC) Merr.) di Taman Nasional Meru Betiri. In H. Soedjito, Y. Purwanto, & E. Sukara (Eds.), *Situs Keramat Alami-Peran Budaya dalam Konservasi Keanekaragaman Hayati* (pp. 3–27). Jakarta: Yayasan Obor Indonesia.

APPENDIXES

Appendix 1. The nature of Sundanese concept through a philosophy of *tri tangtu Sunda*

Aspects	<i>Tri Tangtu Sunda (the three principal rules of Sunda)</i>				
Philosophy underlying a human-nature relationship	Upstream (sirah): similarity in structure and function as the controller of all parts of the human body and nature.	Midstream (tengah): similarity in structure and function as the balancer all parts of the human body and nature.	Downstream (dampal): similarity in structure and function as the strengthener all parts of the human body and nature.		
Result of relation	Experience (pengalaman): result of interaction between human and nature.	Knowledge (ilmu): result of interaction between human, nature, and experience.	Deed (amal): result of interaction between human, nature, experience, and knowledge.		
Actor of relation	Elder (karamaan): entrusted to the stability of the inner and outer aspects related to the philosophical aspects, ethics, aesthetics, logic, and so on.	Scientist (karesian): entrusted to analyze and provide a concept based on interpretation of <i>karamaan</i> about nature.	Government (karatuan): entrusted to implement the concept based on interpretation of <i>karamaan</i> and <i>karesian</i> about nature.		
Scale of implementation	Micro (kasaliraan): implementation of rules (<i>tangtu</i>) in the small-scale watershed.	Meso (kabalareaan): implementation of rules (<i>tangtu</i>) in the middle-scale watershed.	Macro (kabuanaan): implementation of rules (<i>tangtu</i>) in the large-scale watershed.		
Stage of implementation	Kabataraan: set the major issues in the management (arrangement of region, determination of damage, the calculation of the recovery period, and determine the carrying capacity per year). Final stage of <i>kabataraan</i> is marked by the planting of two trees as boundary marker in the two opposite ridges between protection and conservation zone.	Kadewaan: set a time of learning (the experiment on a small scale) for three years of implementation: <i>kasaliraan</i> stage (1 st year), <i>kabalareaan</i> stage (2 nd year), and <i>kabuanaan</i> (3 rd year).	Karatuan: carry out the whole process of recovery based on the results of <i>kabataraan</i> stage. In the beginning period (<i>nista</i>) is focused on the recovery of <i>kasaliraan</i> ; the middle period (<i>madya</i>) for recovery of <i>kabalareaan</i> , so involved in the restoration of small watershed in the vicinity; and ending period (primary) for recovery <i>kabuanaan</i> , thus engaging in large-scale watershed restoration.		
Principal area arrangement	Protection area (leuweung larangan): Restricted use for protection in the upstream (main spring including the water catchment area); the middle (each springs); and downstream (tributary or estuary)	Conservation area (leuweung tutupan): limited use for the buffer zone of upstream and downstream protection zone; the midstream (riparian); and dangerous land/ <i>lemah mala</i> (14 of 18 places based <i>Warugan Lemah</i> and 20 places based <i>Siksakandang Karesian</i> manuscript)	Production area (leuweung baladahan): restrained use for fulfilment of the basic human needs, particularly physical aspect in the upstream (upper settlement/ <i>lembur luhur</i>); the midstream (middle settlement/ <i>lembur tengah</i>); and the downstream (down settlement/ <i>lembur handap</i>)		
Damage criteria (d)	No damage (sri): fulfilment of basic human	Low damage (lungguh):	Moderate damage (dunya): physical needs	Heavy damage (lara):	Very heavy damage (pati): imbalance between

	needs spiritual and physical aspect or even excessive ('normal' about 0-15%)	both and aspect or excessive about 15-25%)	basic human needs are covered ('tolerant' about 15-25%)	slightly exceed spiritual needs ('caution' about 25-50%)	physical needs greatly exceed spiritual needs ('dangerous' about 50-75%)	two basic human needs ('very dangerous' $\geq 75\%$)
Recovery period calculation (<i>R</i>)	Understanding the history of the creation of nature based on the historical value/ <i>naktu</i> (<i>n</i>) for each area within:	the creation of nature based on the historical value/ <i>naktu</i> (<i>n</i>) for each area within:	Setting a recovery period for each area based on the river's capacity for recovery (<i>r</i>) in each class: river/ <i>walungan</i> (<i>r</i> =8 years); stream/ <i>wahangan</i> (<i>r</i> =6 years); creek/ <i>susukan</i> (<i>r</i> =4 years); and brook/ <i>solokan/seke</i> (<i>r</i> =2 years).	Setting a total recovery period by summing the results of calculation on the <i>nista</i> period with <i>madya</i> period (50% of <i>nista</i>), and <i>utama</i> period (10% of <i>nista</i>).		
	1. Protection area: head/ <i>sirah</i> (<i>n</i> =6), neck/ <i>beuheung</i> (<i>n</i> =1), and chest/ <i>dada</i> (<i>n</i> =2) in upstream; navel/ <i>udel</i> (<i>n</i> =1) and genital/ <i>kelamin</i> (<i>n</i> =1) in the midstream; and foot/ <i>dampal</i> (<i>n</i> =2) in the downstream),	1. Protection area: head/ <i>sirah</i> (<i>n</i> =6), neck/ <i>beuheung</i> (<i>n</i> =1), and chest/ <i>dada</i> (<i>n</i> =2) in upstream; navel/ <i>udel</i> (<i>n</i> =1) and genital/ <i>kelamin</i> (<i>n</i> =1) in the midstream; and foot/ <i>dampal</i> (<i>n</i> =2) in the downstream),	Formula used: $R = r^2d$ with recovery period in years (<i>R</i>); capacity for recovery in years (<i>r</i>); and level of damage in % (<i>d</i>).	For example: recovery period for <i>nista</i> about two years, <i>madya</i> one year, and <i>utama</i> 0.2 years. Thus, total recovery period is about 3.2 years.		
	2. Conservation area: solar plexus/ <i>ulu hati</i> (<i>n</i> =3) in the upstream; riparian (<i>n</i> =1) in the midstream; calf/ <i>betis</i> (<i>n</i> =1) and seashore/ <i>sempadan pantai</i> (<i>n</i> =1) in the downstream; and dangerous land/ <i>lemah mala</i> (<i>n</i> =1) spread within watershed;	2. Conservation area: solar plexus/ <i>ulu hati</i> (<i>n</i> =3) in the upstream; riparian (<i>n</i> =1) in the midstream; calf/ <i>betis</i> (<i>n</i> =1) and seashore/ <i>sempadan pantai</i> (<i>n</i> =1) in the downstream; and dangerous land/ <i>lemah mala</i> (<i>n</i> =1) spread within watershed;	For example: the recovery period is needed for heavy damage area/ <i>lara</i> (<i>d</i> =50%) in the brook/ <i>seke</i> area (<i>r</i> =2 years) is about 2 years for beginning/ <i>nista</i> .	Notes: Recovery in the protection area is performed naturally through succession process. As for recovery process with human involvement is done on the conservation and production area, and particularly for rehabilitation purpose is focused on protection area nearby production area.		
	3. Production area: outside of both protection and conservation.	3. Production area: outside of both protection and conservation.	Notes: (1) the calculation of costal area only on the class of river/ <i>walungan</i> , and (2) navel/ <i>udel</i> and genital/ <i>kelamin</i> counted more than one.			
Carrying capacity per year calculation (based on number of trees)	1. The number of tree is determined by the traditional size of planting area for conservation area between conservation and protection (3x3 m), within conservation (5x5 m), and between conservation and production area (7x7 m).	1. The number of tree is determined by the traditional size of planting area for conservation area between conservation and protection (3x3 m), within conservation (5x5 m), and between conservation and production area (7x7 m).	Formula used: $T = a/b$ with the number of trees (<i>T</i>); total recovery area in m^2 (<i>a</i>); and size of planting area in m^2 (<i>b</i>).			
	2. Carrying capacity per year is determined by river's capacity for recovery and level of damages.	2. Carrying capacity per year is determined by river's capacity for recovery and level of damages.	For example: the recovery for the 100 m^2 of upstream conservation area needs approximately 11 trees.			
			Formula used: $C = rd$ with carrying capacity per year in unit of number of trees (<i>C</i>); river's capacity for recovery (<i>r</i>); and level of damages (<i>d</i>).			
			For example: the carrying capacity per year for 100 m^2 of upstream conservation area with a heavy level of damages/ <i>lara</i> (50%) in the river class of creek (<i>r</i> =2 years) is approximately 7 trees. Thus, for recovery the 100 m^2 of upstream conservation area with a heavy level of damage/ <i>lara</i> (50%) in the small river is needed 11 trees at a spacing of 9			

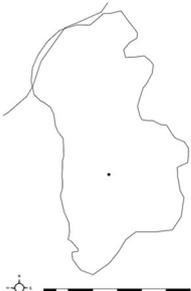
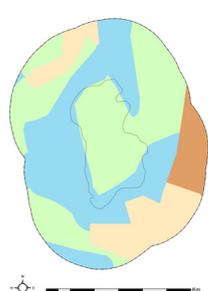
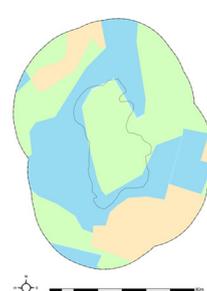
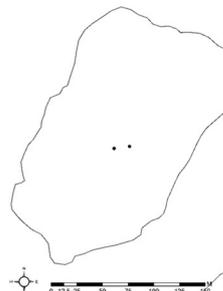
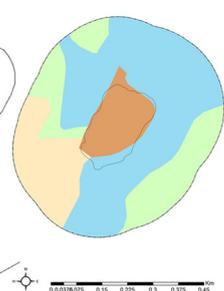
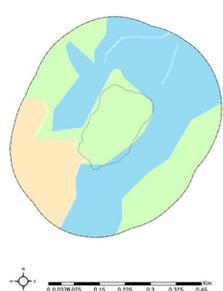
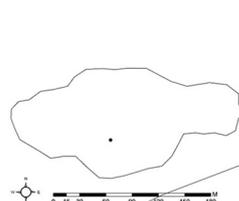
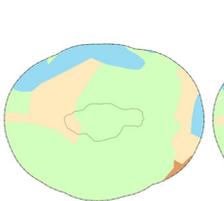
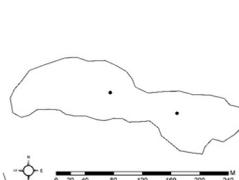
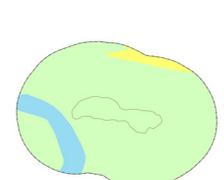
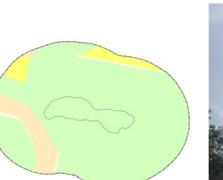
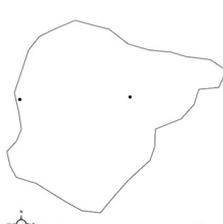
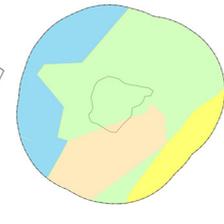
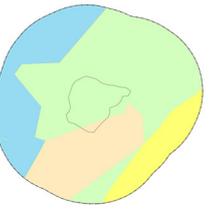
	m ² for period around 3.2 years with the carrying capacity of the area about 7 trees per year.		
Learning by doing in the <i>kabataraan</i> stage for duration about three years	The first year (<i>kasaliraan</i>): focused on developing the capacity of individual within a small-scale of <i>pangauban</i> (watershed). Plantation in the sample plot carried out by the end of the rainy season by planting 10 trees in the conservation area: upstream (2 trees); riparian (2 trees); midstream (2 trees); downstream (2 trees); and downstream conservation (2 trees). Trees are planted on two areas divided by river flows.	The second year (<i>kabalaraan</i>): focused on capacity building of communities within the middle-scale of <i>pangauban</i> (watershed). Plantation in the sample plot carried out by the end of the rainy season by planting 20 trees in the conservation area: upstream (4 trees); riparian (4 trees); midstream (4 trees); downstream (4 trees); and downstream conservation (4 trees). Trees are planted on the similar area with previous stage.	The third year (<i>kabuanaan</i>): focused on capacity building of communities within the large-scale of <i>pangauban</i> (watershed). Plantation in the sample plot carried out by the end of the rainy season by planting 40 trees in the conservation area: upstream (8 trees); riparian (8 trees); midstream (8 trees); downstream (8 trees); and downstream conservation (8 trees). Trees are planted on the similar area with previous stage.
Principal time arrangement (<i>pranata mangsa</i>)	Setting the system of time to guide people in managing three <i>pangauban</i> (watershed). For example, the timing for starting the planting season, harvest, opening land, and so on.		
Principal activity arrangement	Setting the system of behavior to guide people towards the provision place and time. For example, the ordinance for clearing the land in accordance with the specified place and time so still able to maintain a balance in addition to meet the necessities of life.		

Appendix 2. List of informants and their demographic characteristics (n=19)

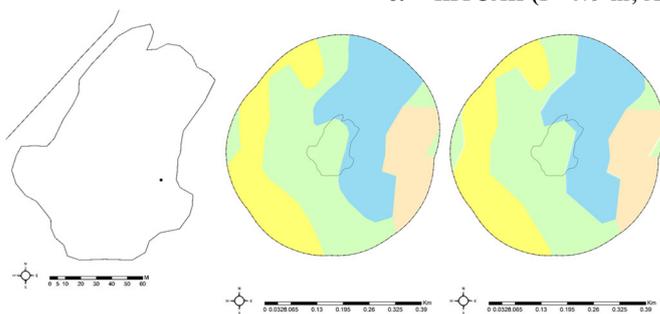
No.	Name	Gender	Age	Education	Occupation	Aspects	Criteria	Ind.	%
1	Informant 1	M	42	ES	NA	Gender	Male	17	89.5
2	Informant 10	M	53	ES	A		Female	2	10.5
3	Informant 11	M	53	ES	NA	Age	51 years old in average		
4	Informant 12	M	49	ES	A	Education	Elementary School (ES)	15	78.9
5	Informant 13	M	69	ES	A		Junior High School (JHS)	1	5.3
6	Informant 14	M	69	ES	A		Senior High School (SHS)	3	15.8
7	Informant 16	M	42	JHS	NA		University (U)	2	10.5
8	Informant 17	M	63	ES	A	Occupation	Agriculture (A)	13	68.4
9	Informant 18	M	37	ES	A		Non-agriculture (NA)	6	31.6
10	Informant 19	M	43	SHS	NA				
11	Informant 2	M	40	U	A				
12	Informant 4	M	39	ES	NA				
13	Informant 5	M	46	ES	A				
14	Informant 6	M	50	ES	A				
15	Informant 8	M	80	ES	A				
16	Key informant 1	M	51	ES	A				
17	Key informant 2	F	37	SHS	A				
18	Key informant 3	M	38	SHS	NA				
19	Key informant 4*	F	58	ES	A				

*The custodian

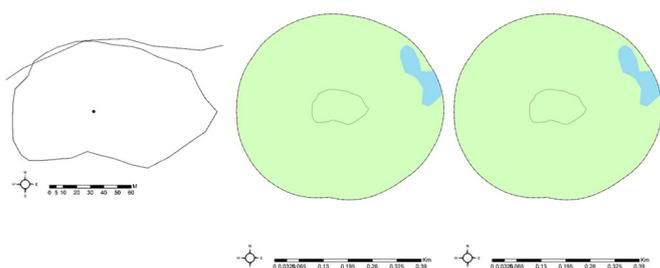
Appendix 4. Characteristic of identified 33 *kabuyutan* within Ciomas Village.

Structure	Dynamic		Figure
	2000	2014	
1. PANGHULU GUSTI (P=1,239 m; A=65,906 m²)			
			
2. KAWIS (P=738 m; A=33,256 m²)			
			
3. CIOMASLANDEUH (P=654 m; A=21,916 m²)			
			
4. SEREH (P=786 m; A=21,063 m²)			
			
5. MANGKUBUMI (P=536 m; A=16,689 m²)			
			

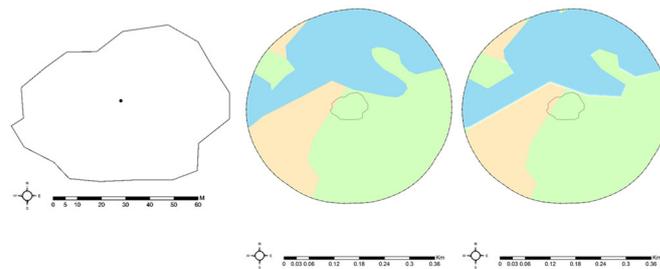
6. KITUAK (P=479 m; A=11,984 m²)



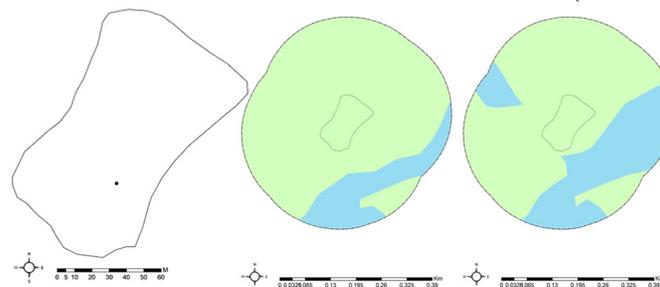
7. GALOGOR (P=399 m; A=10,592 m²)



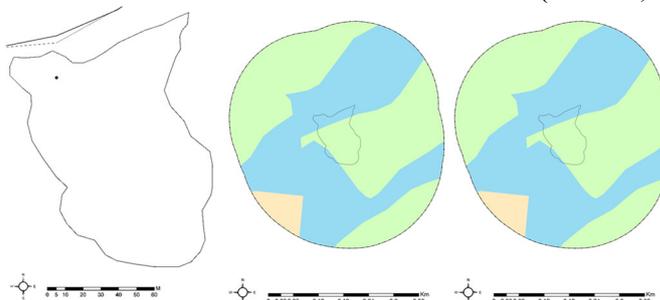
8. BOROGOJOL (P=253 m; A=4,270 m²)



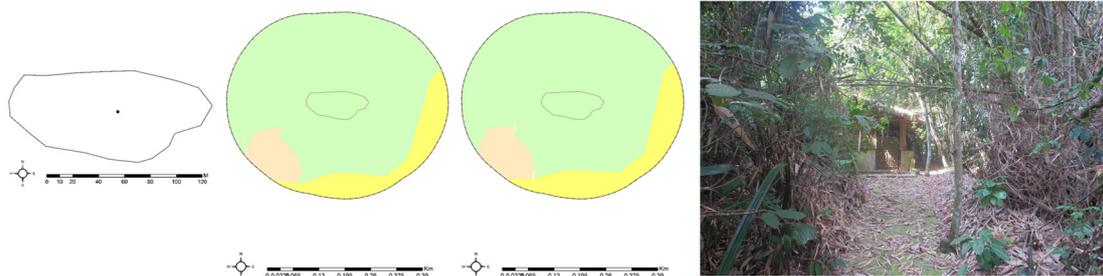
9. MAKAMBAROS (P=422 m; A=10,422 m²)



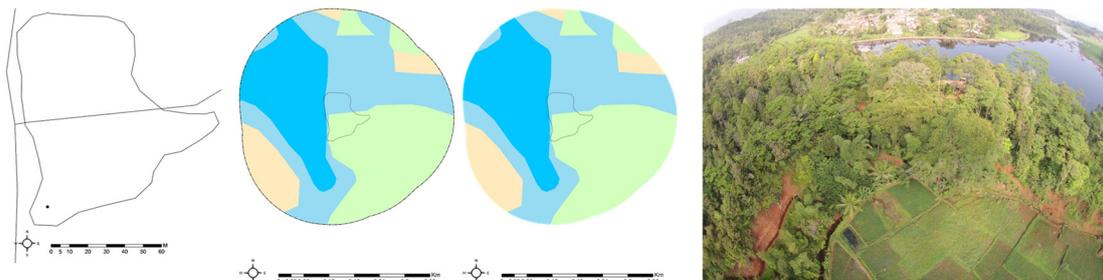
10. CIKUTUK (P=451 m; A=10,036 m²)



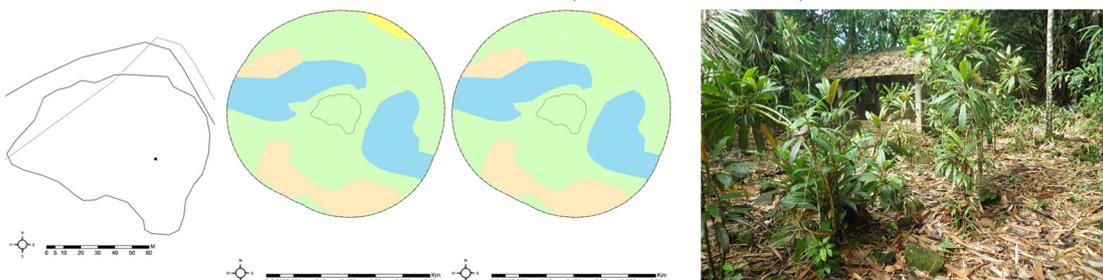
11. SEMANG (P=375 m; A=8,227 m²)



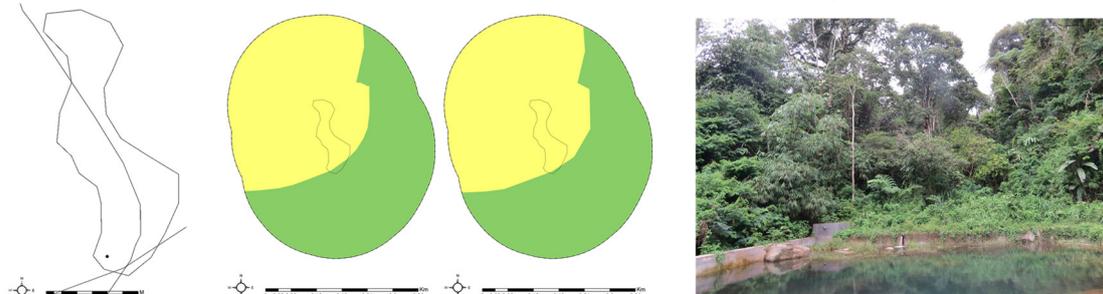
12. RANJENG (P=386 m; A=7,424 m²)



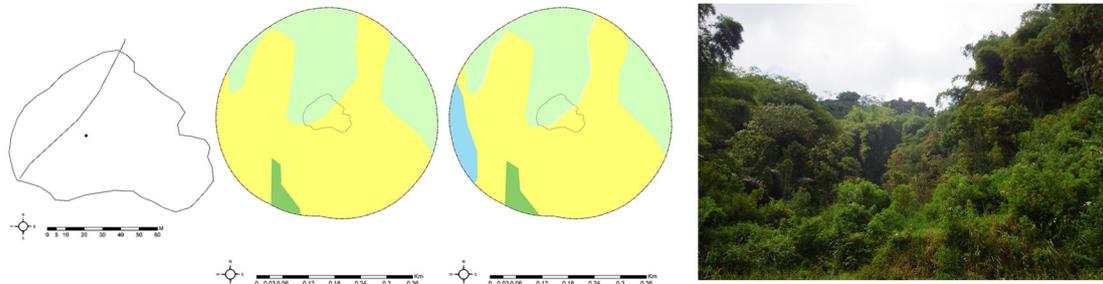
13. PASIRJAMBU (P=343 m; A=7,241 m²)



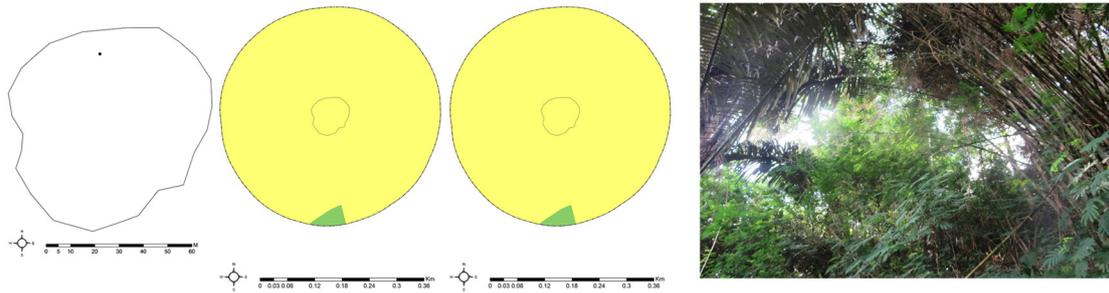
14. EMBUNGCIDARMA (P=458 m; A=6,945 m²)



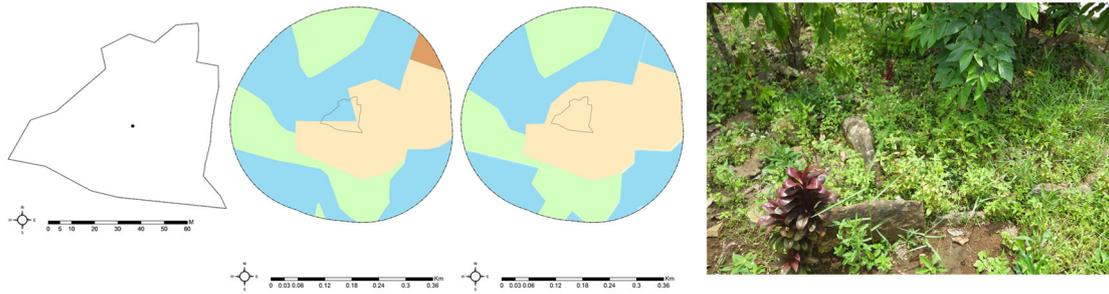
15. HULUSITU (P=328 m; A=6,429 m²)



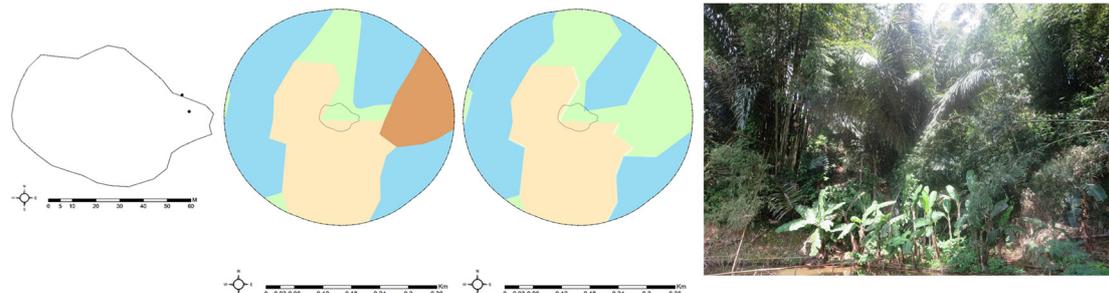
16. SEUREUHBEUREUM (P=207 m; A=5,367 m²)



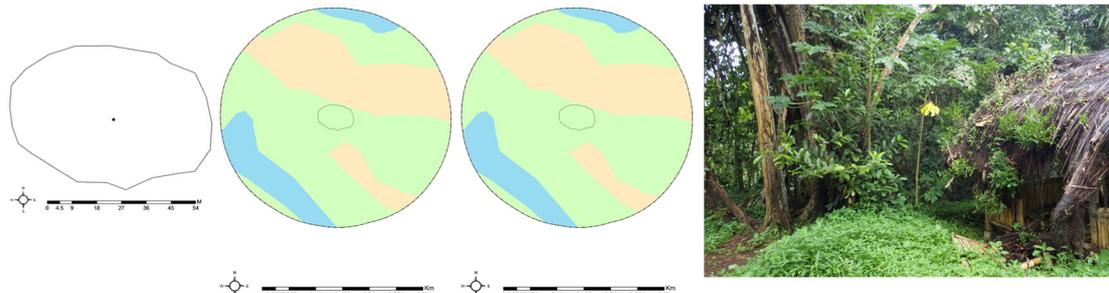
17. WARGABANGSA (P=257 m; A=4,131 m²)



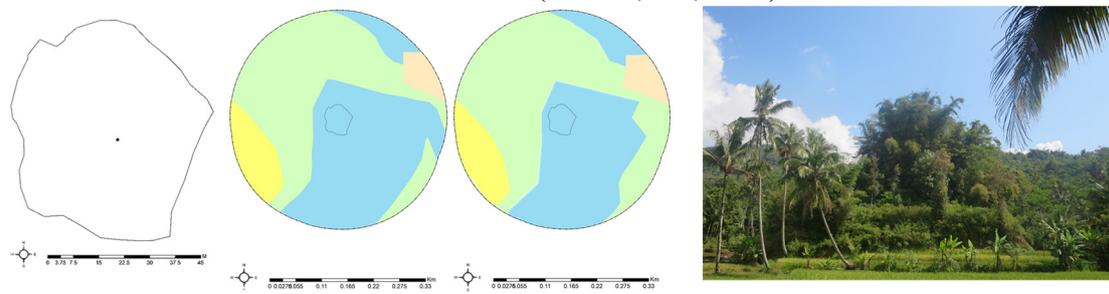
18. GENCOY (P=228 m; A=3,418 m²)



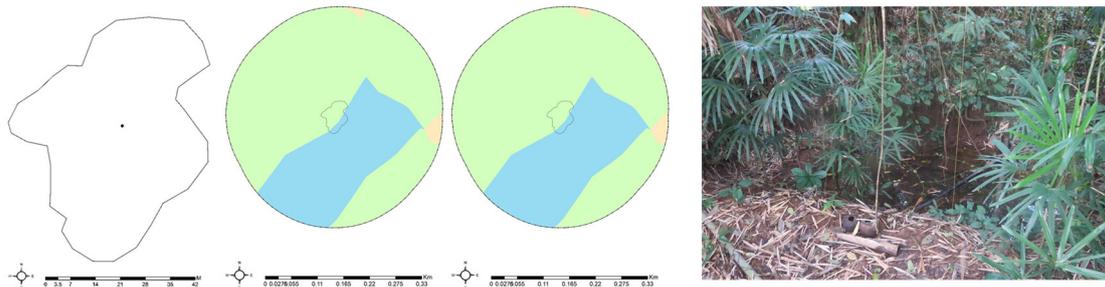
19. PASUCIAN (P=204 m; A=3,026 m²)



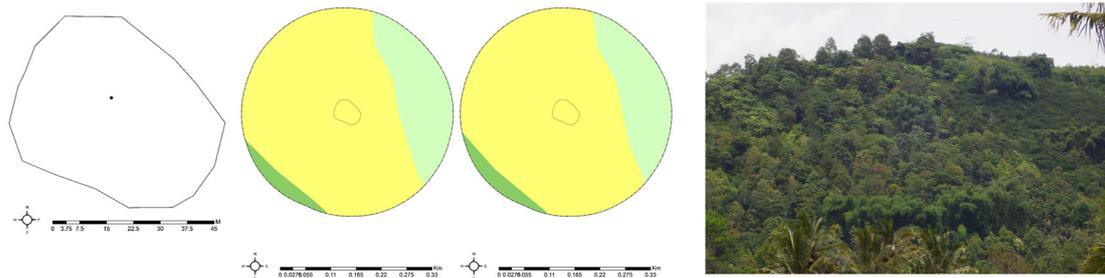
20. KIJHO (P=203 m; A=2,813 m²)



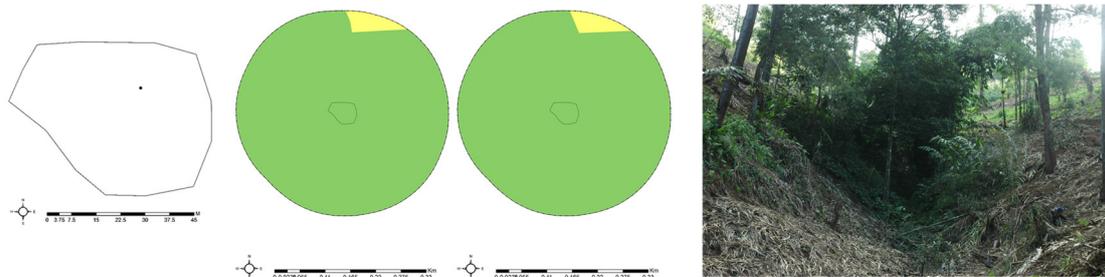
21. *CIPAMBUANGAN* (P=212 m; A=2,445 m²)



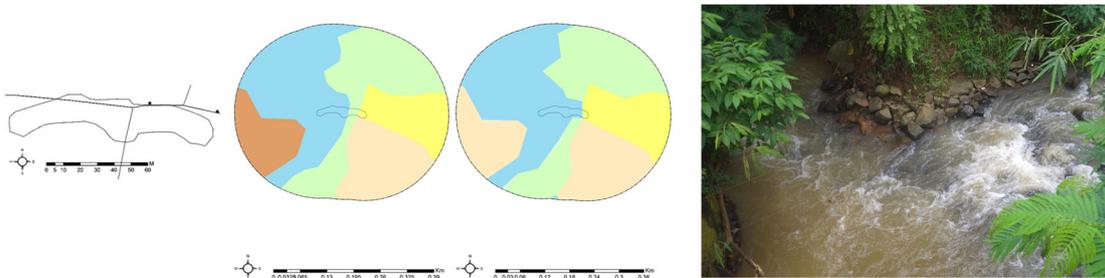
22. *BATUDATAR* (P=177 m; A=2,302 m²)



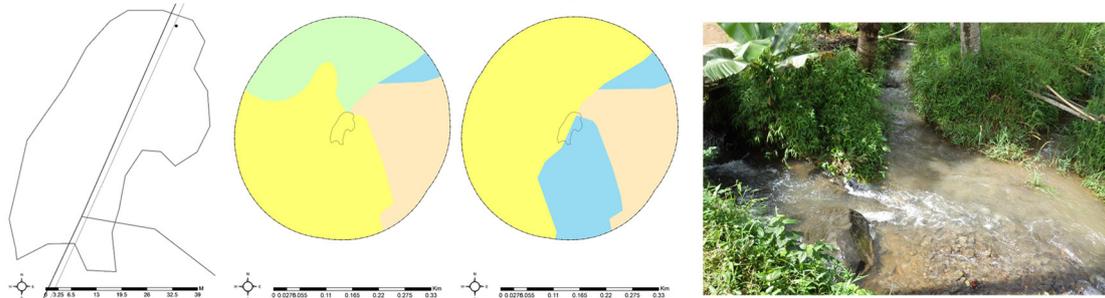
23. *CIPANYUSUHAN* (P=180 m; A=2,260 m²)



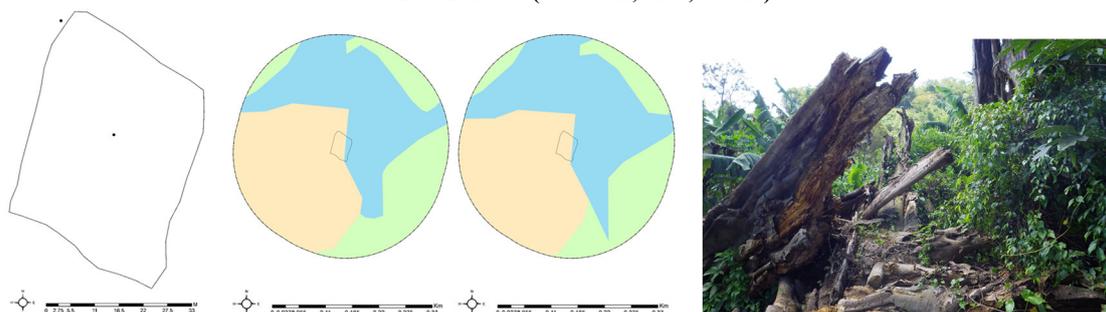
24. *CIDARMA-CIGARUNGGANG* (P=278 m; A=2,016 m²)



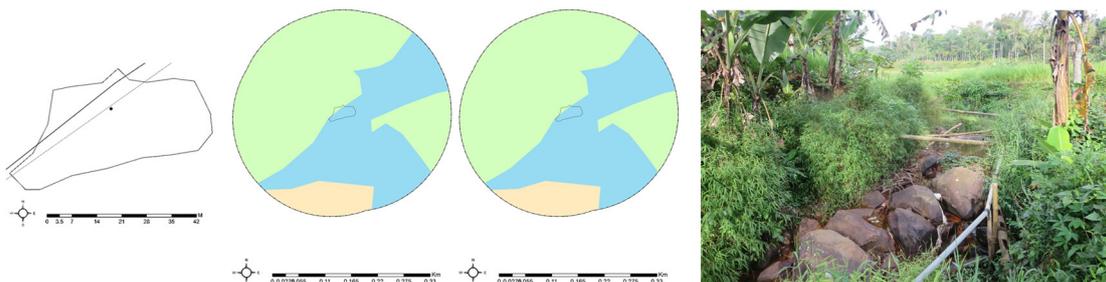
25. *PANGAUBAN* (P=209 m; A=1,997 m²)



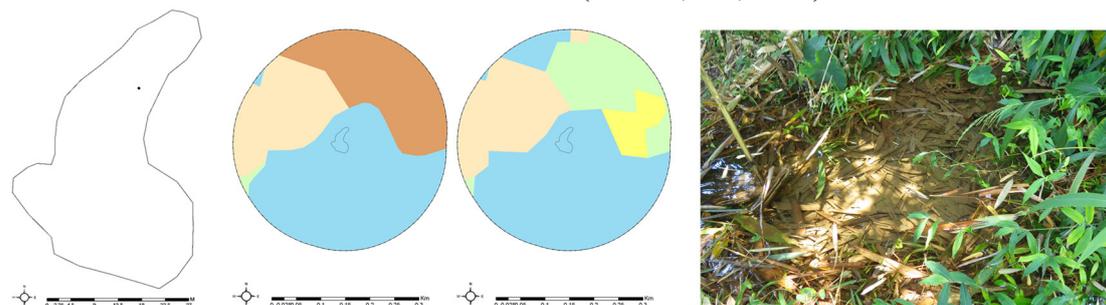
26. *BAROS* (P=168 m; A=1,787 m²)



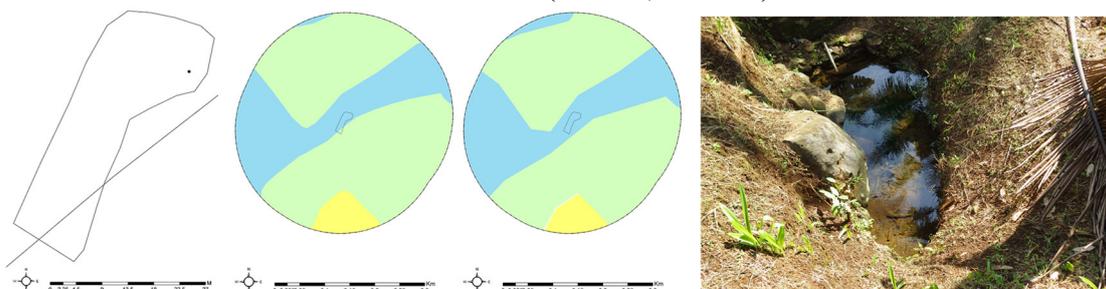
27. *GUNUNGSARI* (P=149 m; A=1,129 m²)



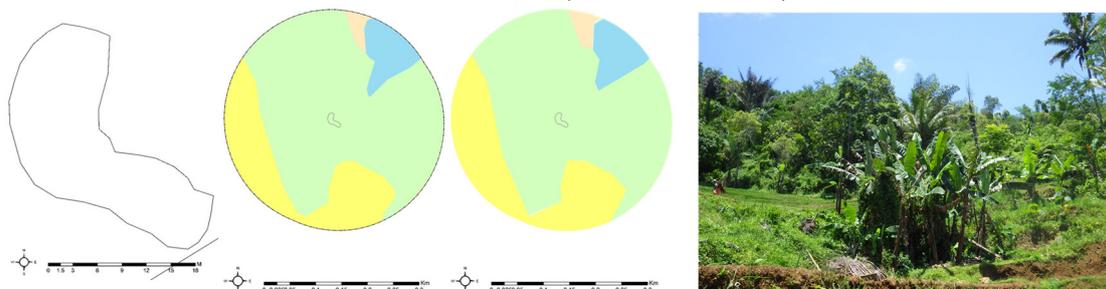
28. *AWILARANGAN* (P=154 m; A=1,054 m²)



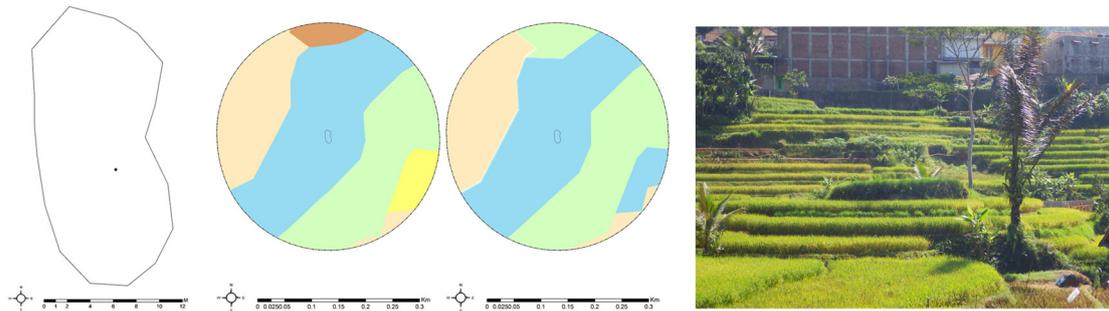
29. *PICUNG* (P=121 m; A=620 m²)



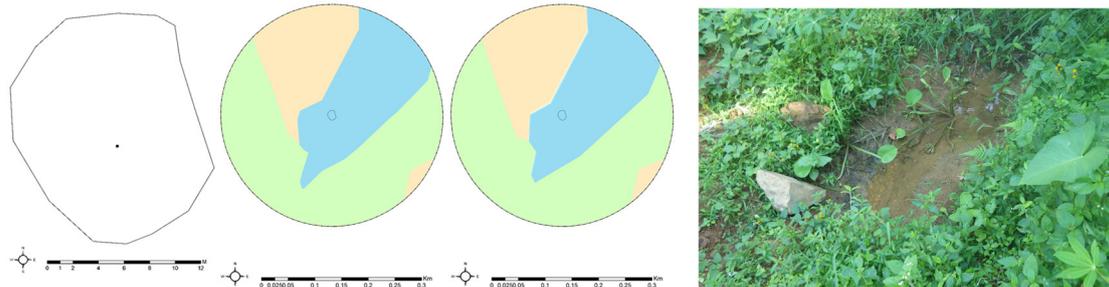
30. *CIGONDOK* (P=85,5 m; A=326 m²)



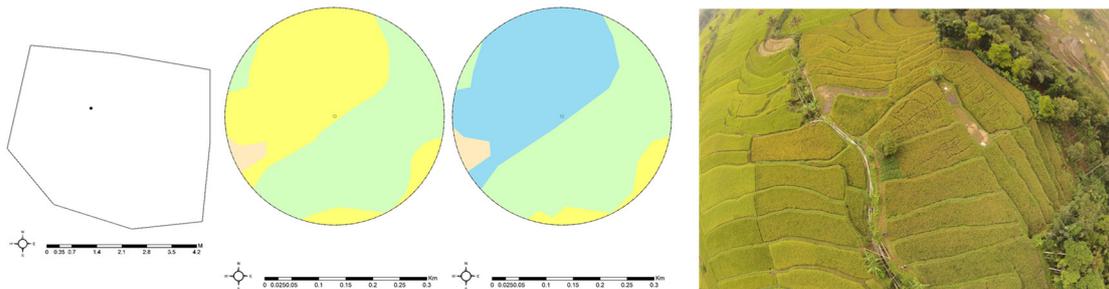
31. *NUSAKUTU* (P=61,3 m; A=226 m²)



32. *KITIWU* (P=53,8 m; A=215 m²)



33. *KIMULUD* (P=18,7 m; A=23,9 m²)



Legend:

Land-use types

- Natural forest
- Artificial forest
- Crop field
- Pasture
- Paddy field
- Settlement

Notes: Changes in land-use types during 14 years (2000-2014) indicating the dynamic of surrounding area of *kabuyutan* within radius 200 m.

Abbreviation: perimeter (P) and area (A)

Source: all figures were taken by author except figure of *Kabuyutan Cipanyusuhan* and *embungcidarma* (KATCI).

234	<i>Colocasia gigantea</i> (Blume) Hook f.	Apocynaceae	<i>Talenus</i>	Taro	Herb	Exotic K, F, FG, MG, HG, PF	R	L	L									Wild	Abundant	Much		
235	<i>Colocasia esculenta</i>	Araceae	<i>Talenus hideung</i>	Taro	Herb	Exotic K, F, FG, MG	R	L	L	L								Wild	Abundant	Enough		
236	<i>Xanthosoma sagittifolium</i> (L.) Schott	Araceae	<i>Talenus leawesung</i>	Taro	Herb	Exotic K, F, FG		L	L									Wild	Adequate	Little		
237	<i>Claoxylon indicum</i>	Euphorbiaceae	<i>Talingkup</i>	Nappy Plant	Tree	Exotic K, F, FG											W	Wild	Inadequate	Little		
238	<i>Litsea garciae</i> Vidal	Lauraceae	<i>Tangkalak</i>	Litsea	Tree	Exotic K, F	Fr										W	Wild	Inadequate	Little		
239	<i>Gnetum gnetum</i>	Gnetaceae	<i>Tangkal</i>	Melinjo	Tree	Native K, FG, MG	L, Fr	L	L, Fr		St	St						Wild	Adequate	Enough		
240	<i>Aglaia elliptica</i> Blume, Bijdr	Meliaceae	<i>Tanglar</i>	Lao	Tree	Native K, F	Fr			B, L		St					W	Least concern	Wild	Inadequate	Little	
241	<i>Mimusops elengi</i> L.	Sapotaceae	<i>Tanjung leawesung</i>	Medlar, Ballet Wood	Tree	Native K, F				F, Fr							W	Wild	Inadequate	Little		
242	<i>Curcuma xanthorrhiza</i> Roxburgh	Zingiberaceae	<i>Temulawak</i>	Temulawak	Herb	Native K, F, FG, MG, HG, PF						Rh						Wild	Abundant	Enough		
243	<i>Elingera solaris</i> (Blume) R. M. Sm.	Zingiberaceae	<i>Tapus</i>	Ginger	Herb	Exotic K, F, FG, MG						Rh						Wild	Adequate	Little		
244	<i>Artocarpus elasticus</i> Reinw.	Moraceae	<i>Teurusp, Benda</i>	Terap	Tree	Native K, F	Fr					St					W	Wild	Inadequate	Little		
245	<i>Hibiscus macrophyllus</i> Roxb. Ex. Hornem	Malvaceae	<i>Tisuk</i>	Largeleaf Rosemallow	Tree	Exotic K, F, FG, MG			L	L		St	St	L			W	W	St	Wild	Abundant	Much
246	<i>Vanilla griffithii</i> Reichb.	Orchidaceae	<i>Vanilli</i>	Vanilli	Liana	Exotic K, FG, MG			Fr										Wild	Adequate	Enough	
247	<i>Cucurbita moschata</i> Duch.	Cucurbitaceae	<i>Waluh gede</i>	Pumpkin	Liana	Exotic K, FG, MG, HG, PF	Fr				Fr								Wild	Abundant	Much	
248	<i>Rhapis excelsa</i>	Arecaceae	<i>Waregu</i>	Broadleaf Lady Palm	Shrub	Exotic K, F, FG, MG, HG											W	W		Cultivated	Abundant	Much
249	<i>Hibiscus decaspermus</i> Koord & Valetou	Malvaceae	<i>Waru</i>	Largeleaf Rosemallow	Tree	Native K, F, FG, MG		L	L		St	St	L				W	W	St	Wild	Abundant	Much

Note: *Ministerial Decree of Ministry of Agriculture No. 54/Kpts/Um/2/1972 on 5 Februari 1972

** Ministerial Decree of Ministry of Forestry No. 261/Kpts-IV/1990 on 18 Mei 1990

Appendix 6b. List of 96 plants species found within 33 *kabuyutan* in Ciomas Village.

No.	Scientific Name	Indigenous Name	Habitus	Origin	IUCN Status	National Status
1	<i>Maesopsis eminii</i> Engl.	<i>Afrika</i>	Tree	Exotic		
2	<i>Albizia falcataria</i> (L.) Fosberg	<i>Alba</i>	Tree	Exotic		
3	<i>Persea gratissima</i> Gaertn.	<i>Alpukat</i>	Tree	Exotic		
4	<i>Pterocarpus indicus</i> Willd.	<i>Angsana</i>	Tree	Native		
5	<i>Merremia vitifolia</i> (Burm.f.) H. Hallier	<i>Areuy</i>	Liana	Native		
6	<i>Gigantochloa apus</i> (J.A. & J.H. Schultes) Kurz.	<i>Awi apus, Awi tali</i>	Bamboo	Exotic		
7	<i>Dendrocalamus asper</i> Backer.	<i>Awi betung</i>	Bamboo	Exotic		
8	<i>Gigantochloa pseudoarundinaceae</i> (Steudel) Widjaja	<i>Awi gombong</i>	Bamboo	Native		
9	<i>Bambusa tuldoidea</i>	<i>Awi haur</i>	Bamboo	Exotic		
10	<i>Pinanga coronata</i> (Blume ex. Martelli) Blume	<i>Bingbin</i>	Palm Tree	Native		
11	<i>Plectocomia elongata</i> Martelli ex Blume	<i>Bubuay</i>	Liana	Exotic		
12	<i>Premna tomentosa</i> Willd.	<i>Bungbulang</i>	Tree	Exotic		
13	<i>Lagerstroemia ovalifolia</i> Teijsm. & Binnend	<i>Bungur</i>	Tree	Exotic		
14	<i>Ficus glabella</i> Blume	<i>Bunut</i>	Tree	Exotic		
15	<i>Steleocharpus burahol</i> (Blume) Hook.f & Thomson	<i>Burahol</i>	Tree	Native		
16	<i>Michelia champaka</i> L.	<i>Campaka</i>	Tree	Native		
17	<i>Pandanus furcatus</i> Roxburgh	<i>Cangkuang</i>	Pandanus	Exotic		
18	<i>Morinda citrifolia</i> L.	<i>Cangkudu</i>	Tree	Native		
19	<i>Ficus benjamina</i> L.	<i>Caringin</i>	Tree	Exotic		
20	<i>Musa</i> sp.	<i>Cau koyut</i>	Herb	Exotic		
21	<i>Syzygium aromaticum</i> (L.) Merr.& L.M.Perry	<i>Cengkeh</i>	Tree	Exotic		
22	<i>Erythrina lithosperma</i> Miq.	<i>Dadap</i>	Herb	Exotic		
23	<i>Lansium domesticum</i> Corr.	<i>Dukuh</i>	Tree	Native		
24	<i>Elaeocarpus angustifolius</i> Blume	<i>Ganitri</i>	Tree	Exotic		
25	<i>Acacia concinna</i> (Willd.) DC. Var. <i>rugata</i> (Benth.) Baker	<i>Garut</i>	Liana	Exotic		
26	<i>Corypha elata</i> Roxb.	<i>Gebang</i>	Palm Tree	Exotic		
27	<i>Carica papaya</i> L.	<i>Gedang</i>	Herb	Exotic		
28	<i>Ficus ampelas</i>	<i>Hampelas</i>	Tree	Exotic		
29	<i>Gratophyllum pictum</i> (L.) Griff.	<i>Handeuleum</i>	Shrub	Exotic		
30	<i>Cordyline frutescens</i> (L.) A. Chev.	<i>Hanjuang</i>	Herb	Exotic		
31	<i>Bellucia axinanthera</i> Triana	<i>Harendong leuweung</i>	Tree	Exotic		
32	<i>Calamus adspersus</i> Blume	<i>Hoe</i>	Liana	Native		
33	<i>Litsea chinensis</i> Lamk.	<i>Huru</i>	Tree	Exotic		
34	<i>Psidium guajava</i> L.	<i>Jambu batu</i>	Tree	Exotic		
35	<i>Dacrydium imbricatum</i> (Blume) de Launbenf.	<i>Jamuju</i>	Tree	Native		
36	<i>Tectona grandis</i> L.f.	<i>Jati</i>	Tree	Native		
37	<i>Gmelina arborea</i> Roxb.	<i>Jati bodas</i>	Tree	Exotic		
38	<i>Pithecelobium lobatum</i> Benth.	<i>Jengkol</i>	Tree	Native		

39	<i>Durio zybenthinus</i> Murray	<i>Kadu</i>	Tree	Exotic	Protected
40	<i>Cocos nucifera</i> L.	<i>Kalapa</i>	Palm Tree	Exotic	
41	<i>Ailanthus triphyssa</i>	<i>Kalapa ciung</i>	Tree	Exotic	
42	<i>Caliandra haematocephala</i> Hassk.	<i>Kaliandra</i>	Tree	Exotic	
43	<i>Bridelia monoica</i> (Lour.) Merr.	<i>Kanyere</i>	Tree	Exotic	
44	<i>Terminalia catappa</i> L.	<i>Katapang</i>	Tree	Exotic	
45	<i>Arenga pinnata</i> (Wurmb) Merr.	<i>Kawung</i>	Palm Tree	Native	Protected
46	<i>Cinamomum burmanii</i> (Ness & T. Ness) Blume	<i>Kayu manis</i>	Tree	Native	Protected
47	<i>Murraya paniculata</i> (L.) Jack	<i>Kemuning</i>	Tree	Exotic	
48	<i>Cananga odorata</i> (Lamk.) Hook.	<i>Kenanga</i>	Tree	Native	
49	<i>Ficus calophylla</i> Blume	<i>Ki ara</i>	Tree	Exotic	
50	<i>Rhodamnia cinerea</i> Jack.	<i>Ki beusi</i>	Tree	Exotic	
51	<i>Dysoxylum macrocarpum</i> Blume	<i>Ki haji</i>	Tree	Native	
52	<i>Albizia procera</i> (Roxb.) Benth	<i>Ki hiyang</i>	Tree	Native	
53	<i>Glochiclon molle</i> Blume	<i>Ki huut</i>	Tree	Exotic	
54	<i>Celtis cinnamomea</i> Lindl. ex Planch.	<i>Ki sampang</i>	Tree	Exotic	
55	<i>Diospyros polyalthioides</i> Korth ex. Hiern	<i>Ki teja</i>	Tree	Native	Protected
56	<i>Ficus variegata</i> Blume	<i>Kondang</i>	Tree	Native	
57	<i>Coffea robusta</i> Lind De Wild.	<i>Kopi</i>	Tree	Exotic	
58	<i>Syzygium pycnanthum</i> Merrill & Perry	<i>Kopo</i>	Tree	Native	
59	<i>Alstonia scholaris</i> (L.) R. Br.	<i>Lame, Pule</i>	Tree	Native	
60	<i>Euphoria longana</i> Lamk.	<i>Lengkeng</i>	Tree	Exotic	
61	<i>Mangifera foetida</i> Lour.	<i>Limus</i>	Tree	Exotic	
62	<i>Switenia mahagoni</i> (L.) Jacq.	<i>Mahoni</i>	Tree	Exotic	
63	<i>Mangifera indica</i> L.	<i>Mangga, Buah</i>	Tree	Exotic	Data Deficient
64	<i>Garcinia mangostana</i> L.	<i>Manggu, Manggis</i>	Tree	Native	
65	<i>Magnolia blumei</i> Prantl.	<i>Manglid</i>	Tree	Native	
66	<i>Glochidion borneense</i> (Mull. Arg.) Boerl.	<i>Mareme</i>	Tree	Exotic	
67	<i>Artocarpus heterophyllus</i> Merr.	<i>Nangka</i>	Tree	Native	
68	<i>Annona muricata</i> L.	<i>Nangka walanda</i>	Tree	Exotic	
69	<i>Angiotesis evecta</i>	<i>Pakis munding</i>	Fern	Exotic	
70	<i>Pandanus amaryllifolius</i> Roxb.	<i>Pandan leuweung</i>	Pandanus	Native	
71	<i>Mangifera laurina</i> Blume	<i>Pari</i>	Tree	Native	
72	<i>Filicium decipiens</i> (Wight & Arn.) Thwaites.	<i>Paris</i>	Tree	Exotic	
73	<i>Quercus lineata</i> Blume	<i>Pasang beureum</i>	Tree	Native	
74	<i>Lithocarpus elegans</i> (Blume) Hastus. Ex Soepadmo	<i>Pasang bodas</i>	Tree	Native	
75	<i>Parkia speciosa</i> Hassk.	<i>Peuteuy</i>	Tree	Native	
76	<i>Pangium edule</i> Reinw.	<i>Picung</i>	Tree	Exotic	
77	<i>Pinus merkusii</i> Jungh. De Vriese	<i>Pinus</i>	Tree	Exotic	
78	<i>Lansium domesticum</i>	<i>Pisitan, Kokosan</i>	Tree	Exotic	

79	<i>Oroxylum indicum</i> (L.) Kurz	<i>Pongporang</i>	Tree	Exotic	
80	<i>Laportea stimulans</i> Miq.	<i>Pulus</i>	Tree	Native	
81	<i>Schima wallichii</i> (DC.) Korth.	<i>Puspa beureum</i>	Tree	Native	
82	<i>Altingia excelsa</i> Noronha.	<i>Rasamala</i>	Tree	Exotic	
83	<i>Syzygium polynatum</i> (Wigh) Walp	<i>Salam</i>	Tree	Native	
84	<i>Castanopsis javanica</i> (Blume) DC.	<i>Saninten</i>	Tree	Exotic	
85	<i>Pouteria campechiana</i> Baehani	<i>Sawo walanda</i>	Tree	Exotic	
86	<i>Paraserienthes falcata</i> (L.) Nielsen	<i>Sengon</i>	Tree	Native	
87	<i>Cymbopogon nardus</i> L.	<i>Sereh gunung</i>	Herb	Native	
88	<i>Artocarpus communis</i> Forst.	<i>Sukun</i>	Tree	Exotic	
89	<i>Toona sureni</i> Merr.	<i>Suren</i>	Tree	Native	Protected
90	<i>Litsea garciae</i> Vidal	<i>Tangkalak</i>	Tree	Exotic	
91	<i>Aglaia elliptica</i> Blume, Bijdr	<i>Tanglar</i>	Tree	Native	Least concern
92	<i>Mimusops elengi</i> L.	<i>Tanjung leuweung</i>	Tree	Native	
93	<i>Artocarpus elastica</i> Reinw.	<i>Teureup, Benda</i>	Tree	Native	
94	<i>Hibiscus macrophyllus</i> Roxb. Ex. Hornem	<i>Tisuk</i>	Tree	Exotic	
95	<i>Rhapis excelsa</i>	<i>Waregu</i>	Shrub	Exotic	
96	<i>Hibiscus decaspermus</i> Koord. & Valetton	<i>Waru</i>	Tree	Native	

Appendix 6c. Distribution of 96 plant species were found within 33 *kabuyutan*.

No.	Scientific name	Indigenous name	Kabuyutan																																	Total occurrence
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	
1	<i>Maesopsis eminii</i> Engl.	Afrika	1	1	1	1	1	1	1			1	1	1																						9
2	<i>Albizia falcataria</i> (L.) Fosberg	Alba	1						1																	1									3	
3	<i>Persea gratissima</i> Gaertn.	Alpukat																		1															1	
4	<i>Pterocarpus indicus</i> Willd.	Angsana	1										1																						2	
5	<i>Merremia vitifolia</i> (Burm.f.) H. Hallier	Areuy	1										1																						2	
6	<i>Gigantochloa apus</i> (J.A. & J.H. Schultes) Kurz.	Awī apus, Awī tali	1	1	1		1	1		1	1	1			1	1					1	1	1		1								1	15		
7	<i>Dendrocalamus asper</i> Backer.	Awī betung	1	1	1	1	1	1			1	1			1				1		1	1	1								1			14		
8	<i>Gigantochloa pseudoarundinaceae</i> (Steudel) Widjaja	Awī gombong	1			1						1				1				1		1	1											7		
9	<i>Bambusa tuldoidea</i>	Awī haur	1	1	1	1	1	1			1	1	1		1	1			1		1													13		
10	<i>Pinanga coronata</i> (Blume ex. Martelli) Blume	Bingbin				1																													1	
11	<i>Plectocomia elongata</i> Martelli ex Blume	Bubuay	1																																1	
12	<i>Premna tomentosa</i> Willd.	Bungbulang				1																													1	
13	<i>Lagerstroemia ovalifolia</i> Teijsm. & Binnend	Bungur	1																																1	
14	<i>Ficus glabella</i> Blume	Bunut	1		1	1														1	1												1		7	
15	<i>Steleocharpus burahol</i> (Blume) Hook.f & Thomson	Burahol																																	1	
16	<i>Michelia champaka</i> L.	Campaka	1																																1	
17	<i>Pandanus furcatus</i> Roxburgh	Cangkuang	1									1																							2	
18	<i>Morinda citrifolia</i> L.	Cangkudu								1																									1	
19	<i>Ficus benjamina</i> L.	Caringin	1	1	1				1				1								1														6	
20	<i>Musa</i> sp.	Cau koyut	1							1									1	1	1				1	1	1	1	1	1	1	1	1	1	14	
21	<i>Syzygium aromaticum</i> (L.) Merr. & L.M.Perry	Cengkeh	1						1															1											3	
22	<i>Erythrina lithosperma</i> Miq.	Dadap							1																										1	
23	<i>Lansium domesticum</i> Corr.	Dukuh						1																											1	
24	<i>Elaeocarpus angustifolius</i> Blume	Gantri										1																							1	
25	<i>Acacia concinna</i> (Willd.) DC. Var. <i>rugata</i> (Benth.) Baker	Garut										1																							1	
26	<i>Corypha elata</i> Roxb.	Gebang	1									1																							2	
27	<i>Carica papaya</i> L.	Gedang																			1														1	
28	<i>Ficus ampelas</i>	Hampelas	1										1		1								1												5	
29	<i>Gratophyllum pictum</i> (L.) Griff.	Handeuleum				1																													1	
30	<i>Cordyline frutescens</i> (L.) A. Chev.	Hanjuang																											1						1	
31	<i>Bellucia axinantha</i> Triana	Harendong leuweung																									1								1	
32	<i>Calamus adspersus</i> Blume	Hoe	1																																1	
33	<i>Litsea chinensis</i> Lamk.	Huru	1								1			1																					3	
34	<i>Psidium guajava</i> L.	Jambu batu	1																								1						1		3	
35	<i>Dacrydium imbricatum</i> (Blume) de Launbenf.	Jamuju	1																																1	
36	<i>Tectona grandis</i> L.f.	Jati	1							1																1									3	
37	<i>Gmelina arborea</i> Roxb.	Jati bodas	1																											1					2	
38	<i>Pithecelobium lobatum</i> Benth.	Jengkol				1				1	1																									4
39	<i>Durio zybenthinus</i> Murray	Kadu								1														1			1								4	
40	<i>Cocos nucifera</i> L.	Kalapa																																	7	
41	<i>Ailanthus triphysa</i>	Kalapa ciung	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15		
42	<i>Caliandra haematocephala</i> Hassk.	Kaliandra									1				1																				3	
43	<i>Bridelia monoica</i> (Lour.) Merr.	Kanyere				1																													2	
44	<i>Terminalia catappa</i> L.	Katapang	1																																1	
45	<i>Arenga pinnata</i> (Wurmb) Merr.	Kawung	1		1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14		
46	<i>Cinamomum burmanii</i> (Ness & T. Ness) Blume	Kayu manis	1																																1	
47	<i>Murraya paniculata</i> (L.) Jack	Kemuning	1		1																														2	
48	<i>Cananga odorata</i> (Lamk.) Hook.	Kenanga	1																																1	
49	<i>Ficus calophylla</i> Blume	Ki ara	1			1	1	1	1			1			1													1							8	
50	<i>Rhodamnia cinerea</i> Jack.	Ki beusi																																	2	
52	<i>Dysoxylum macrocarpum</i> Blume	Ki haji	1			1	1	1			1	1			1																				7	
52	<i>Albizia procera</i> (Roxb.) Benth	Ki hiyang				1																													1	
53	<i>Glochiclon molle</i> Blume	Ki huut	1		1	1			1	1																									6	

Appendix 6d. Number of individual 74 tree species were found within 33 *kabuyutan*.

No.	Scientific name	Indigenous name	<i>Kabuyutan</i>																																	Total individual trees per species
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	
1	<i>Maesopsis eminii</i> Engl.	<i>Afrika</i>	34		1	7	7		8	3			1	5																					66	
2	<i>Albizia falcataria</i> (L.) Fosberg	<i>Alba</i>	14										1												1									16		
3	<i>Persea gratissima</i> Gaertn.	<i>Alpukat</i>																																1		
4	<i>Pterocarpus indicus</i> Willd.	<i>Angsana</i>	1												2																			3		
5	<i>Premna tomentosa</i> Willd.	<i>Bungbulang</i>					1																											1		
6	<i>Lagerstroemia ovalifolia</i> Teijsm. & Binnend	<i>Bungur</i>	1																															1		
7	<i>Ficus glabella</i> Blume	<i>Bunut</i>	1			3	1														1	1					1					1		9		
8	<i>Steleocharpus burahol</i> (Blume) Hook.f & Thomson	<i>Burahol</i>	1																															1		
9	<i>Michelia champaka</i> L.	<i>Campaka</i>	5																															5		
10	<i>Morinda citrifolia</i> L.	<i>Cangkudu</i>												1																				1		
11	<i>Ficus benjamina</i> L.	<i>Caringin</i>	3	1		1							1												1									8		
12	<i>Syzygium aromaticum</i> (L.) Merr. & L.M.Perry	<i>Cengkeh</i>	2										1																					4		
13	<i>Lansium domesticum</i> Corr.	<i>Dukuh</i>													1																			1		
14	<i>Elaeocarpus angustifolius</i> Blume	<i>Ganitri</i>																																2		
15	<i>Ficus ampelas</i>	<i>Hampelas</i>	3																						1									8		
16	<i>Bellucia axinanthera</i> Triana	<i>Harendong leuweung</i>																									1							1		
17	<i>Litsea chinensis</i> Lamk.	<i>Huru</i>	4										1																					7		
18	<i>Psidium guajava</i> L.	<i>Jambu batu</i>	2																													1		4		
19	<i>Dacrydium imbricatum</i> (Blume) de Launbenf.	<i>Jamuju</i>	1																															1		
20	<i>Tectona grandis</i> L.f.	<i>Jati</i>	4										1																			6		11		
21	<i>Gmelina arborea</i> Roxb.	<i>Jati bodas</i>	2																														1		3	
22	<i>Pithecelobium lobatum</i> Benth.	<i>Jengkol</i>					2																												4	
23	<i>Durio zybenthinus</i> Murray	<i>Kadu</i>																																	7	
24	<i>Ailanthus triphysa</i>	<i>Kalapa ciung</i>	9	1	1	2	4		2	1	1			5	2	3																			37	
25	<i>Caliandra haematocephala</i> Hassk.	<i>Kaliandra</i>	2																																13	
26	<i>Bridelia monoica</i> (Lour.) Merr.	<i>Kanyere</i>					2																												3	
27	<i>Terminalia catappa</i> L.	<i>Katapang</i>																																	0	
28	<i>Cinamomum burmanii</i> (Ness & T. Ness) Blume	<i>Kayu manis</i>	3																																3	
29	<i>Murraya paniculata</i> (L.) Jack	<i>Kemuning</i>	1				1																												2	
30	<i>Cananga odorata</i> (Lamk.) Hook.	<i>Kenanga</i>	1																																1	
31	<i>Ficus calophylla</i> Blume	<i>Ki ara</i>	4				1	1	1																										11	
32	<i>Rhodamnia cinerea</i> Jack.	<i>Ki beusi</i>																																	6	
33	<i>Dysoxylum macrocarpum</i> Blume	<i>Ki haji</i>	6				1	2		1				1																					16	
34	<i>Albizia procera</i> (Roxb.) Benth	<i>Ki hiyang</i>					1																												1	
35	<i>Glochiclon molle</i> Blume	<i>Ki huut</i>	2				2	1					1																						9	
36	<i>Celtis cinnamomea</i> Lindl. ex Planch.	<i>Ki sampang</i>	5				1	1																											11	
37	<i>Diospyros polyalthioides</i> Korth ex. Hiern	<i>Ki teja</i>					1							2																					7	
38	<i>Ficus variegata</i> Blume	<i>Kondang</i>	1																																3	
39	<i>Coffea robusta</i> Lind De Wild.	<i>Kopi</i>																																	41	
40	<i>Syzygium pycnanthum</i> Merrill & Perry	<i>Kopo</i>					1	1	1																										4	

Appendix 7. List of 130 conservational plant species found within the KPG.

No.	Scientific Name	Indigenous Name (Sundanese)	Habitus	Origin	IUCN Status	National Status
1	<i>Maesopsis eminii</i> Engl.	<i>Afrika</i>	Tree	Exotic		
2	<i>Acacia mangium</i> Willd.	<i>Akasia</i>	Tree	Exotic		
3	<i>Albizia falcataria</i> (L.) Fosberg	<i>Alba</i>	Tree	Exotic		
4	<i>Persea gratissima</i> Gaertn.	<i>Alpukat</i>	Tree	Exotic		
5	<i>Spathodea campanulata</i> Beauv.	<i>Ambon, Ki acret</i>	Tree	Exotic		
6	<i>Pterocarpus indicus</i> Willd.	<i>Angsana</i>	Tree	Native		
7	<i>Merremia vitifolia</i> (Burm.f.) H. Hallier	<i>Areuy</i>	Liana	Native		
8	<i>Tamarindus indica</i> L.	<i>Asem jawa</i>	Tree	Exotic		
9	<i>Gigantochloa apus</i> (J.A. & J.H. Schultes) Kurz.	<i>Awi apus, Awi tali</i>	Bamboo	Exotic		
10	<i>Dendrocalamus asper</i> Backer.	<i>Awi betung</i>	Bamboo	Exotic		
11	<i>Gigantochloa pseudoarundinaceae</i> (Steudel) Widjaja	<i>Awi gombong</i>	Bamboo	Native		
12	<i>Bambusa tuldooides</i>	<i>Awi haur</i>	Bamboo	Exotic		
13	<i>Bambusa</i> sp.	<i>Awi kirisik</i>	Bamboo	Exotic		
14	<i>Bambusa vulgaris</i> Schard.	<i>Awi koneng</i>	Bamboo	Exotic		
15	<i>Bambusa multiplex</i> (Lour.) Raeusch. Ex Schult.f.	<i>Awi pringganan</i>	Bamboo	Exotic		
16	<i>Dendrocalamus</i> sp.	<i>Awi surat</i>	Bamboo	Exotic		
17	<i>Magnolia macklottii</i> (Korth.) Dandy	<i>Baros</i>	Tree	Native		
18	<i>Crescentia cujete</i> L.	<i>Berenuk</i>	Tree	Exotic		
19	<i>Pinanga coronata</i> (Blume ex. Martelli) Blume	<i>Bingbin</i>	Palm Tree	Native		
20	<i>Melochia umbellata</i> (Houtt.) Stapf.	<i>Bintinu</i>	Tree	Exotic		
21	<i>Plectocomia elongata</i> Martelli ex Blume	<i>Bubuy</i>	Liana	Exotic		
22	<i>Lagerstroemia ovalifolia</i> Teijsm. & Binnend	<i>Bungur</i>	Tree	Exotic		
23	<i>Antidesma bunius</i> (L.) Spreng	<i>Buni, Huni</i>	Tree	Native		
24	<i>Ficus glabella</i> Blume	<i>Bunut</i>	Tree	Exotic		
25	<i>Steleocharpus burahol</i> (Blume) Hook.f & Thomson	<i>Burahol</i>	Tree	Native		
26	<i>Michelia champaka</i> L.	<i>Campaka</i>	Tree	Native		
27	<i>Michelia montana</i> Blume.	<i>Campaka leuweung</i>	Tree	Native		
28	<i>Pandanus furcatus</i> Roxburgh	<i>Cangkuang</i>	Pandan Tree	Exotic		
29	<i>Ficus benjamina</i> L.	<i>Caringin</i>	Tree	Exotic		
30	<i>Plectronia glabra</i> Benth.& Hook.	<i>Caruluk</i>	Tree	Exotic		
31	<i>Musa</i> sp.	<i>Cau ambon</i>	Herb	Exotic		
32	<i>Musa</i> sp.	<i>Cau emas</i>	Herb	Exotic		
33	<i>Musa</i> sp.	<i>Cau kole</i>	Herb	Exotic		
34	<i>Musa</i> sp.	<i>Cau koyut</i>	Herb	Exotic		
35	<i>Musa</i> sp.	<i>Cau nangka</i>	Herb	Exotic		
36	<i>Musa</i> sp.	<i>Cau raja</i>	Herb	Exotic		
37	<i>Syzygium aromaticum</i> (L.) Merr.& L.M.Perry	<i>Cengkeh</i>	Tree	Exotic		
38	<i>Garcinia dioica</i> Bl.	<i>Ceuri</i>	Tree	Native		
39	<i>Dracontomelon mangiferum</i> Bl.	<i>Dahu</i>	Tree	Exotic		
40	<i>Cocos nucifera</i> L. var. <i>viridis</i>	<i>Dawegan</i>	Palm Tree	Exotic		
41	<i>Elaeocarpus angustifolius</i> Blume	<i>Ganitri</i>	Tree	Exotic		
42	<i>Corypha elata</i> Roxb.	<i>Gebang</i>	Palm Tree	Exotic		
43	<i>Ficus ampelas</i>	<i>Hampelas</i>	Tree	Exotic		
44	<i>Cordyline fruticosa</i> (L.) A. Chev.	<i>Hanjuang</i>	Herb	Exotic		

45	<i>Sterculia rubiginosa</i> Vent.	Hantap	Tree	Exotic	
46	<i>Bellucia axinanthera</i> Triana	Harendong leuweung	Tree	Exotic	
47	<i>Calamus adpersus</i> Blume	Hoe	Liana	Native	
48	<i>Litsea chinensis</i> Lamk.	Huru	Tree	Exotic	
49	<i>Tetrameles nudiflora</i> R. Br.	Binong	Tree	Exotic	Least concern
50	<i>Litsea angulata</i> Blume	Huru munding	Tree	Exotic	
51	<i>Areca cotechu</i> L.	Jambe	Palm Tree	Exotic	
52	<i>Digitaria rhopalotricha</i> Buese.	Jampang	Herb	Exotic	
53	<i>Dacrycarpus imbricatus</i> (Blume) de Launbenf.	Jamuju	Tree	Native	
54	<i>Tectona grandis</i> L.f.	Jati	Tree	Native	
55	<i>Gmelina arborea</i> Roxb.	Jati bodas	Tree	Exotic	
56	<i>Lophatherium gracile</i> Brongn.	Jukut awi	Bamboo	Native	
57	<i>Commelina nudiflora</i> L.	Jukut tali said	Herb	Exotic	
58	<i>Asplenium nidus</i> L.	Kadaka	Epifit	Exotic	
59	<i>Spondias pinnata</i> (L.f.) Kurz	Kadongdong leuweung	Tree	Exotic	
60	<i>Durio zybenthinus</i> Murray	Kadu	Tree	Exotic	Protected
61	<i>Cocos nucifera</i> L.	Kalapa	Palm Tree	Exotic	
62	<i>Ailanthus triphysa</i>	Kalapa ciung	Tree	Exotic	
63	<i>Caliandra haematocephala</i> Hassk.	Kaliandra	Tree	Exotic	
64	<i>Lithocarpus</i> sp.	Kalimorot	Tree	Exotic	
65	<i>Bridelia monoica</i> (Lour.) Merr.	Kanyere	Tree	Exotic	
66	<i>Terminalia catappa</i> L.	Katapang	Tree	Exotic	
67	<i>Arenga pinnata</i> (Wurmb) Merr.	Kawung	Palm Tree	Native	Protected
68	<i>Moringa oleifera</i> Lamk.	Kelor	Herb	Exotic	
69	<i>Murraya paniculata</i> (L.) Jack	Kemuning	Tree	Exotic	
70	<i>Cananga odorata</i> (Lamk.) Hook.	Kenanga	Tree	Native	
71	<i>Ficus calophylla</i> Blume	Ki ara	Tree	Exotic	
72	<i>Horsfieldia glabra</i> (Blume) Warb.	Ki beo	Palm Tree	Exotic	Vulnerable D2
73	<i>Rhodammia cinerea</i> Jack.	Ki beusi	Tree	Exotic	
74	<i>Dysoxylum macrocarpum</i> Blume	Ki haji	Tree	Native	
75	<i>Albizia procera</i> (Roxb.) Benth	Ki hiyang	Tree	Native	
76	<i>Samanea saman</i> (Jacq.) Merr.	Ki hujan	Tree	Exotic	
77	<i>Glochicium molle</i> Blume	Ki huut	Tree	Exotic	
78	<i>Eupatorium inulifolium</i> H.B. Kunth.	Ki rinyuh	Shrub	Exotic	
79	<i>Celtis cinnamomea</i> Lindl. ex Planch.	Ki sampang	Tree	Exotic	
80	<i>Cinnamomum iners</i> Reinw. Ex. Blume	Ki sereh	Tree	Exotic	
81	<i>Diospyros polyalthioides</i> Korth ex. Hiern	Ki teja	Tree	Native	Protected
82	<i>Metroxylon</i> sp.	Kiray	Palm Tree	Exotic	
83	<i>Lansium aqueum</i> (Jack.) Miq.	Kokosan	Tree	Native	
84	<i>Dysoxylum caulostachyum</i> Miq.	Kokosan monyet	Tree	Native	
85	<i>Ficus variegata</i> Blume	Kondang	Tree	Native	
86	<i>Syzygium pycnanthum</i> Merrill & Perry	Kopo	Tree	Native	
87	<i>Alstonia scholaris</i> (L.) R. Br.	Lame, Pule	Tree	Native	
88	<i>Arenga olatusifolia</i>	Langkap	Palm Tree	Native	
89	<i>Ficus</i> sp.	Leles	Tree	Exotic	
90	<i>Ficus glomerata</i>	Loa	Tree	Native	
91	<i>Switenia mahagoni</i> (L.) Jacq.	Mahoni	Tree	Exotic	
92	<i>Mangifera indica</i> L.	Mangga, Buah	Tree	Exotic	Data Deficient

93	<i>Magnolia blumei</i> Prantl.	<i>Manglid</i>	Tree	Native		
94	<i>Shorea macrophylla</i> (de Vr.) Ashton	<i>Maranti</i>	Tree	Exotic	Vulnerable Species	Protected
95	<i>Glochidion borneense</i> (Mull. Arg.) Boerl.	<i>Mareme</i>	Tree	Exotic		
96	<i>Artocarpus heterophyllus</i> Merr.	<i>Nangka</i>	Tree	Native		
97	<i>Cycas rumphii</i>	<i>Pakis haji</i>	Fern	Native		
98	<i>Angioteris evecta</i>	<i>Pakis munding</i>	Fern	Exotic		
99	<i>Cibotium baranetz</i> J. Sm.	<i>Paku</i>	Fern	Exotic		
100	<i>Mangifera laurina</i> Blume	<i>Pari</i>	Tree	Native		
101	<i>Filicium decipiens</i> (Wight & Arn.) Thwaites.	<i>Paris</i>	Tree	Exotic		
102	<i>Quercus lineata</i> Blume	<i>Pasang beureum</i>	Tree	Native		
103	<i>Lithocarpus elegans</i> (Blume) Hastus. Ex Soepadmo	<i>Pasang bodas</i>	Tree	Native		
104	<i>Parkia speciosa</i> Hassk.	<i>Peuteuy</i>	Tree	Native		
105	<i>Pangium edule</i> Reinw.	<i>Picung</i>	Tree	Exotic		
106	<i>Pinus merkusii</i> Jungh. De Vriese	<i>Pinus</i>	Tree	Exotic		
107	<i>Lansium domesticum</i>	<i>Pisitan, Kokosan</i>	Tree	Exotic		
108	<i>Oroxylum indicum</i> (L.) Kurz	<i>Pongporang</i>	Tree	Exotic		
109	<i>Alstonia angustiloba</i>	<i>Pulai</i>	Tree	Native		
110	<i>Laportea stimulans</i> Miq.	<i>Pulus</i>	Tree	Native		
111	<i>Schima wallichii</i> (DC.) Korth.	<i>Puspa beureum</i>	Tree	Native		
112	<i>Ceiba pentandra</i> L. Gaertn.	<i>Randu</i>	Tree	Native		
113	<i>Altingia excelsa</i> Noronha.	<i>Rasamala</i>	Tree	Exotic		
114	<i>Gluta reinghas</i> L.	<i>Reunghas</i>	Tree	Native		
115	<i>Abrus precatorius</i> L.	<i>Saga</i>	Liana	Exotic		
116	<i>Syzygium polynatum</i> (Wigh) Walp	<i>Salam</i>	Tree	Native		
117	<i>Castanopsis javanica</i> (Blume) DC.	<i>Saninten</i>	Tree	Exotic		
118	<i>Paraserienthes falcataria</i> (L.) Nielsen	<i>Sengon</i>	Tree	Native		
119	<i>Cymbopogon nardus</i> L.	<i>Sereh gunung</i>	Herb	Native		
120	<i>Clerodendrum serratum</i> (L.) Moon.	<i>Singugu</i>	Tree	Exotic		
121	<i>Artocarpus communis</i> Forst.	<i>Sukun</i>	Tree	Exotic		
122	<i>Toona sureni</i> Merr.	<i>Suren</i>	Tree	Native		Protected
123	<i>Claoxylon indicum</i>	<i>Talingkup</i>	Tree	Exotic		
124	<i>Litsea garciae</i> Vidal	<i>Tangkalak</i>	Tree	Exotic		
125	<i>Aglaiia elliptica</i> Blume, Bijdr	<i>Tanglar</i>	Tree	Native	Least concern	
126	<i>Mimusops elengi</i> L.	<i>Tanjung leuweung</i>	Tree	Native		
127	<i>Artocarpus elastica</i> Reinw.	<i>Teureup, Benda</i>	Tree	Native		
128	<i>Hibiscus macrophyllus</i> Roxb. Ex. Hornem	<i>Tisuk</i>	Tree	Exotic		
129	<i>Rhapis excelsa</i>	<i>Waregu</i>	Shrub	Exotic		
130	<i>Hibiscus decaspermus</i> Koord.& Valetton	<i>Waru</i>	Tree	Native		

Appendix 8. List of twenty-two open-ended questions.

Aspects	Open-ended questions
A. History	A1. What is the meaning of the term of <i>kabuyutan</i> ?
	A2. What is the local name or other name of <i>kabuyutan</i> ?
	A3. How the creation story of <i>kabuyutan</i> ?
	A4. What is the meaning of <i>kabuyutan</i> in the past?
B. Accessibility	B1. When do you enter <i>kabuyutan</i> ?
	B2. How often do you enter <i>kabuyutan</i> ?
	B3. How to enter <i>kabuyutan</i> ?
	B4. What is the reason?
C. Utilization	C1. What kind of benefits do you know?
	C2. What kind of resources do you use and for what reason?
	C3. How often is allowed?
	C4. How much is allowed?
D. Management	D1. What kind of rules do you know?
	D2. Who makes the rules?
	D3. What kind of punishments do you know?
	D4. What kind of problems do you know?
	D5. How local people mitigate the problems?
	D6. How local people manage <i>kabuyutan</i> in the past and present?
	D7. How traditional rules manage <i>kabuyutan</i> ?
	D8. How formal rules manage <i>kabuyutan</i> ?
	D9. What do you think about sustainable management of <i>kabuyutan</i> ?
	D10. How to achieve sustainable management of <i>kabuyutan</i> ?

Appendix 9. List of informants and their demographic characteristics (n=67).

No.	Name	Gender	Age	Education	Occupation	Aspects	Criteria	Ind.	%
1	Informant 1	M	42	ES	NA	Gender	Male	34	54.0
2	Informant 2	M	40	U	A		Female	29	46.0
3	Informant 3	M	39	SHS	NA	Age	44 years old in average		
4	Informant 4	M	35	SHS	A	Education	Elementary School (ES)	35	55.6
5	Informant 5	M	38	ES	NA		Junior High School (JHS)	11	17.5
6	Informant 6	M	32	SHS	NA		Senior High School (SHS)	14	22.2
7	Informant 7	M	34	SHS	NA		University (U)	3	4.8
8	Informant 8	F	38	ES	A	Occupation	Agriculture (A)	45	71.4
9	Informant 9	M	29	SHS	A		Non-agriculture (NA)	18	28.6
10	Informant 10	F	43	ES	A				
11	Informant 11	M	40	SHS	NA				
12	Informant 12	M	43	JHS	A				
13	Informant 13	M	35	JHS	A				
14	Informant 14	F	64	ES	A				
15	Informant 15	F	53	ES	A				
16	Informant 16	M	35	JHS	A				
17	Informant 17	F	39	ES	A				
18	Informant 18	M	37	JHS	A				
19	Informant 19	M	46	SHS	A				
20	Informant 20	M	50	JHS	NA				
21	Informant 21	M	24	ES	A				
22	Informant 22	M	50	ES	A				
23	Informant 23	F	63	ES	A				
24	Informant 24	F	34	ES	A				
25	Informant 25	M	51	U	NA				
26	Informant 26	F	46	ES	A				
27	Informant 27	F	50	ES	A				
28	Informant 28	F	28	U	A				
29	Informant 29	F	32	ES	A				
30	Informant 30	M	58	JHS	NA				
31	Informant 31	F	42	SHS	A				
32	Informant 32	F	46	ES	A				
33	Informant 33	F	46	ES	A				
34	Informant 34	F	34	ES	A				
35	Informant 35	F	32	ES	A				
36	Informant 36	M	49	JHS	NA				
37	Informant 37	F	71	ES	A				
38	Informant 38	F	66	ES	A				
39	Informant 39	F	68	ES	A				

40	Informant 40	M	80	ES	A
41	Informant 41	M	25	SHS	NA
42	Informant 42	F	56	ES	A
43	Informant 43	F	61	ES	A
44	Informant 44	F	29	ES	A
45	Informant 45	F	32	ES	A
46	Informant 46	M	53	SHS	NA
47	Informant 47	F	47	ES	A
48	Informant 48	F	65	ES	A
49	Informant 49	M	49	JHS	A
50	Informant 50	M	69	ES	A
51	Informant 51	F	37	SHS	A
52	Informant 52	F	24	ES	A
53	Informant 53	M	42	JHS	NA
54	Informant 54	M	41	JHS	NA
55	Informant 55	F	62	ES	A
56	Informant 56	F	15	ES	A
57	Informant 57	M	29	JHS	NA
58	Informant 58	M	63	ES	A
59	Informant 59	M	41	SHS	NA
60	Informant 60	M	24	SHS	NA
61	Informant 61	M	36	ES	A
62	Informant 62	M	37	ES	A
63	Informant 63	M	43	SHS	NA
64	Key informant 1*	F	58	ES	C
65	Key informant 2	M	51	ES	C
66	Key informant 3	F	37	UN	C
67	Key informant 4	M	38	SHS	C

*The custodian

Appendix 10. Informants' responses about cultural aspect of *kabuyutan* in Ciomas Village.

Aspects	Responses	Respondents	%
A1	Sacred place	51	81.0
	Historical place	2	3.2
	Protected place	3	4.8
	No response	7	11.1
A2	Sacred grave (<i>makam karomah</i>)	56	88.9
	Protected forest	7	11.1
	No response	0	0.0
A3	Associated with KH. Panghulu Gusti	19	30.2
	Associated with protected forest	3	4.8
	Associated with Panjalu Kingdom	5	7.9
	No response	36	57.1
A4	Sacred place (inherited)	22	34.9
	Protected place by taboo (<i>pamali</i>)	7	11.1
	No response	34	54.0
B1	Special event (<i>nyepuh</i>)	46	73.0
	Common event	17	27.0
	No response	0	0.0
B2	Once a year	34	54.0
	Once a month	17	27.0
	Once a week	12	19.0
	Everyday	0	0.0
	No response	0	0.0
B3	Obey the custodian's rules	43	68.3
	Accompanied by custodian	6	9.5
	Cleaning body and soul	14	22.2
	No response	0	0.0
B4	Pilgrimage (<i>ziarah</i>)	40	63.5
	Social gathering (<i>silaturahmi</i>)	7	11.1
	Preserve tradition	16	25.4
	No response	0	0.0
C1	Obtain the Allah's blessing	49	77.8
	Strengthen community	8	12.7
	Conserve environment	6	9.5
	No response	0	0.0
C2	Water for drinking	47	74.6
	Plant species for ceremony	7	11.1
	Water for agriculture	9	14.3
	No response	0	0.0
C3	Once a year	17	27.0
	Once a month	14	22.2
	Once a week	9	14.3
	Tentative	23	36.5
	Everyday	0	0.0

	No response	0	0.0
C4	Sufficient amount	56	88.9
	Limited amount	7	11.1
	No response	0	0.0
D1	Enter with permission	16	25.4
	Utilize with permission	31	49.2
	Weekly maintenance	11	17.5
	Manage the surrounding area	5	7.9
	No response	0	0.0
D2	Custodian (<i>kuncen</i>)	58	92.1
	Government	5	7.9
	No response	0	0.0
D3	Curse (<i>kuwalat</i>)	19	30.2
	Attention from custodian	37	58.7
	No response	7	11.1
D4	No problems occurred	57	90.5
	Natural problem (landslide)	2	3.2
	Anthropogenic problem (illegal bird hunting)	4	6.3
	No response	0	0.0
D5	Implementation of custodian's rules	34	54.0
	Participation in <i>nyepuh</i>	29	46.0
	No response	0	0.0
D6	Implementation of custodian's rules	47	74.6
	Management in the surrounding area	16	25.4
	No response	0	0.0
D7	Application of taboo (<i>pamali</i>)	23	36.5
	Preservation of <i>nyepuh</i>	29	46.0
	No response	11	17.5
D8	Designation of cultural heritage	12	19.0
	Designation of protected forest	2	3.2
	No response	49	77.8
D9	Provide blessings (<i>berkah</i>)	37	58.7
	Long-term utilization	17	27.0
	No response	9	14.3
D10	Led by an appropriate custodian	14	22.2
	Transfer knowledge and experience	11	17.5
	Sufficient utilization	29	46.0
	Preserve <i>nyepuh</i>	9	14.3
	No response	0	0.0

Appendix 11. List of forty-two open-ended questions.

No.	Aspects	Questions
A	History	1. Do you know the term of <i>kabuyutan</i> ?
		2. Do you know the local name or other name of <i>kabuyutan</i> ?
		3. Do you know the creation story of <i>kabuyutan</i> ?
		4. Do you know the meaning of <i>kabuyutan</i> in the past?
B	Accessibility	1. Do you ever enter <i>kabuyutan</i> ?
		2. When do you enter <i>kabuyutan</i> ?
		3. How often do you enter <i>kabuyutan</i> ?
		4. How to enter <i>kabuyutan</i> ?
		5. What is the reason?
C	Utilization	1. Does <i>kabuyutan</i> have benefits? What kind of benefits do you know?
		2. Do you use resources from <i>kabuyutan</i> ? What kind of resources do you use?
		3. How to use the resources?
		4. How often is allowed?
		5. How much is allowed?
D	Management	1. Does <i>kabuyutan</i> have rules? What kind of rules do you know?
		2. Who makes the rules?
		3. Does the rules have punishments? What kind of punishments do you know?
		4. Does <i>kabuyutan</i> ever have problems? What kind of problems?
		5. How local people mitigate the problems?
		6. How local people manage <i>kabuyutan</i> in the past and present?
		7. How traditional rules manage <i>kabuyutan</i> ?
		8. How spiritual-culture rules manage <i>kabuyutan</i> ?
		9. How government policy manages <i>kabuyutan</i> ?
		10. How about sustainable landscape management of <i>kabuyutan</i> ?
		11. How to achieve a sustainable landscape management of <i>kabuyutan</i> ?
E	Ecology	1. What is the main natural element that support the existence of <i>kabuyutan</i> ?
		2. How they can support the identity of <i>kabuyutan</i>
		3. How do you conserve them?
		4. What do you think about the water scarcity?
		5. How do you preserve the water resources?
F	Culture	1. How do you preserve the existence of culture?
		2. What kind of important cultures do you have?
		3. Do you know the creation history of your cultures?
		4. Do you think that the meaning of cultures will be preserved by performing it?
		5. How the current KBSB support the cultures?
		6. How do you support the existence of cultures?
		7. Are you ready to practice your cultures in front of visitors?
		8. What do you have to prepare for serving the visitors?
		9. What do you think about the histori-cultural sites?
		10. What do you think if these sites designated as tourism object?
		11. What do you think to provide a better plan for KBSB?
		12. What should KBSB do for future management?

Appendix 12. List of informants and their demographic characteristics (n=17).

No.	Name	Gender	Age	Education	Occupation	Aspects	Criteria	Ind.	%
1	Informant 1*	M	52	U	NA	Gender	Male	14	82.4
2	Informant 2	M	58	ES	A		Female	3	17.6
3	Informant 3	M	43	ES	NA	Age	42 years old in average		
4	Informant 4	M	47	SHS	A	Education	Elementary School (ES)	5	29.4
5	Informant 5	M	48	SHS	A		Junior High School (JHS)	2	11.8
6	Informant 6	M	45	ES	A		Senior High School (SHS)	9	52.9
7	Informant 7	M	46	SHS	A		University (U)	1	5.9
8	Informant 8	M	35	SHS	A	Occupation	Agriculture (A)	6	35.3
9	Informant 9	M	36	ES	NA		Non-agriculture (NA)	11	64.7
10	Informant 10	M	46	SHS	NA				
11	Informant 11	M	43	SHS	NA				
12	Informant 12	M	35	SHS	NA				
13	Informant 13	M	26	JHS	NA				
14	Informant 14	M	33	SHS	NA				
15	Informant 15	F	25	SHS	NA				
16	Informant 16	F	42	JHS	NA				
17	Informant 17	F	55	ES	NA				

*The custodian

Appendix 13. Informants' responses related to *kabuyutan* in KBSB.

Aspects	Responses
A1	Yes (4); No (13); sacred place
A2	Yes (14); No (3); sacred grave, sacred forest, sacred spring
A3	Yes (4); No (13); related to history of Padjajaran Kingdom
A4	Yes (4); No (13); place for worshiping God or respecting ancestors
B1	Yes (15); No (2)
B2	When annual ceremony of seren taun; when accompanying visitors
B3	At least once a year or tentatively depend on the visitors
B4	Must be permitted by custodian and keep purify of intention
B5	To respect the ancestor by visiting their heritages
C1	Yes (17; No (0); place for respecting ancestors; attracting place for tourism
C2	Yes (17); No (0); sacred spring
C3	Must be permitted by custodian and keep purify of intention
C4	Sufficient amount
C5	Sufficient amount
D1	Yes (17); No (0); visiting is allowed by permission from Custodian; visiting only to respect ancestors
D2	Custodian and family members
D3	Yes (17); No (0); curl
D4	Yes (17); No (0); located in personal land/property; decreasing or even lost of meaning due to lack of knowledge;
D5	Disseminating the knowledge about the importance of <i>kabuyutan</i>
D6	Protecting the <i>kabuyutan</i> and surrounding area from the un appropriate activity to <i>kabuyutan</i>
D7	Regullar visitation to the <i>kabuyutan</i> ; maintaining the meaning of <i>kabuyutan</i> at least for Custodian and family
D8	Maintaining the meaning of <i>kabuyutan</i> and respecting the intention of ancestor who mandates these sacred places
D9	Surveying, identifying, and designating as national cultural heritage
D10	The long-term existence of <i>kabuyutan</i> as a mandated heritage to be preserved by the descendant
D11	Maintaing its existence and associated values for future generations
E1	Mt. Salak and Mt. Gede-Pangrango; Ciapus River; springs within the village; particular plant and animal species; unique structure of stones; fertile soils and fresh air; abundant of water resources from high annual precipitation; warmest condition along all seasons
E2	Kabuyutan are part of the whole landscape, thus all landscape elements will support <i>kabuyutan</i> by providing such as a plenty of water resource, a beautiful scenary, and cultural identity based on local biodiversity
E3	Using it with fully respect to the God
E4	Source of life, water support human and other cratures life. No water, no life
E5	Protecting the spring and the associated ecological and cultural elements
F1	Practice and share it to descendant and others
F2	(1) Traditional agricultural system such as Sundanese agroecosystems (forest garden, mixed garden, dry paddy field, home garden, etc.) or agricultural techniques (<i>huma</i>); (2) Traditional art and performance (dance, music instrument, daily activity's tools, etc.); (3) Traditional building and structure (serveral type of housing and its parts); 4. Histori-cultural heritages (altar, dolmen, springs, etc.)

F3	Yes (7); No (10)
F4	Yes (17); No (0)
F5	KBSB provides an appropriate place and opportunity for practicing the cultures
F6	By performing the cultures in daily life and promoting it to share the value of cultures
F7	Yes (17); No (0)
F8	Increasing a capability in foreign language; concern to the manner with different cultures
F9	The place where the story of ancestor's life has been taken and must be preserved as a gratefulness of them
F10	There is a possibility, but preserving the values is important rather than only visiting the sites.
F11	(1) Creating places and activities to promote Sundanese cultures, especially to fulfil the requirement of traditional Sundanese village; (2) Considering the ecological function of each plan; carrying capacity of landscape; (3) Connecting places based on Sundanese values such as <i>tri tangtu Sunda</i> (concept of <i>luhur-handap, kaca-kaca, lemah-cai</i>)
F12	(1) Strengthening the relationship with local people by providing a wider opportunity to contribute in KBSB; (2) Collaborating with government to support the existence of <i>kabuyutan</i> and KBSB in general

Appendix 14. List of 57 *kabuyutan* were surveyed within KBSB

No.	<i>Kabuyutan</i>	Elements
1	<i>Batu Congklak</i>	Stone
2	<i>Batu Bergores</i>	Stone
3	<i>Batu Kursi Dukuh Menteng</i>	Stone
4	<i>Batu Bergores Dukuh Menteng</i>	Stone
5	<i>Sindang Barang 1</i>	Menhir
6	<i>Punden Cibangke</i>	Altar
7	<i>Punden Dukuh Menteng</i>	Altar
8	<i>Batu Temu Gelar Pasir Keramat</i>	Stone
9	<i>Batu Bergores Batu Karut 1</i>	Stone
10	<i>Batu Bergores Batu Karut 2</i>	Stone
11	<i>Batu Kursi Batu Karut</i>	Stone
12	<i>Punden pasir keramat</i>	Altar
13	<i>Punden Batu Karut</i>	Altar
14	<i>Temu Gelang Batu Karut</i>	Menhir
15	<i>Batu Dakon Leuweung Kramat 1</i>	Stone
16	<i>Batu Bergores Leuweung Kramat 1</i>	Stone
17	<i>Temu Gelang Sawah Lega</i>	Stone
18	<i>Batu Segi Tiga</i>	Stone
19	<i>Leuweung Kramat 3</i>	Altar
20	<i>Punden Surawisesa</i>	Altar
21	<i>Batu Ki Majusi 2</i>	Stone
22	<i>Batu Meja</i>	Stone
23	<i>Batu Tapak Sungai Cipamali</i>	Stone
24	<i>Batu Kursi Mbah Gabuk</i>	Stone
25	<i>Punden Sindang Barang 3</i>	Altar
26	<i>Punden Ki Majusi 2</i>	Altar
27	<i>Cineng</i>	Spring
28	<i>Cipamali</i>	Spring
29	<i>Cikubang</i>	Spring
30	<i>Cimaeja</i>	Spring
31	<i>Cimalipah</i>	Spring
32	<i>Ciputri</i>	Spring
33	<i>Sumur Jala Tunda</i>	Spring
34	<i>Makam Ki Majusi 1</i>	Grave
35	<i>Makam H. Ali</i>	Grave
36	<i>Makam Ki Muewalih/Mbah Cemplang</i>	Grave
37	<i>Makam Paranggong Jaya</i>	Grave

38	<i>Makam Keluarga Pupuhu</i>	Grave
39	<i>Cieureun</i>	Menhir
40	<i>Menhir Sindang Barang 3</i>	Menhir
41	<i>Taman Sri Bagenda</i>	Pond
42	<i>Pohon Paku Jajar</i>	Tree
43	<i>Batu Bolong</i>	Stone
44	<i>Kabandungan</i>	Menhir
45	<i>Makam Mbah Dalem</i>	Grave
46	<i>Temu Gelang</i>	Stone
47	<i>Kodok Budug</i>	Stone
48	<i>Punden Hunyur Cikareo</i>	Altar
49	<i>Batu Bangkong</i>	Stone
50	<i>Batu Cicolawing</i>	Stone
51	<i>Tugu Cicolawing</i>	Stone
52	<i>Punden Cilegok 1</i>	Altar
53	<i>Batu Kursi Cilegok</i>	Stone
54	<i>Batu Lisung</i>	Stone
55	<i>Batu Tapak</i>	Stone
56	<i>Batu Congklak</i>	Stone
57	<i>Batu Congklak Laladon</i>	Stone