

Common Pool Resources Of Lake Takapan

Environment degradation, institution, and solution

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Abstract—since 1980, the welfare of Dayak population living in the vicinity of Lake Takapan, Palangraya City, has gradually declined. Today, native community living in the middle of Kalimantan Island, Indonesia, cannot afford to meet their daily needs as a result of the serious damage that has been inflicted on Lake Takapan, their main source of livelihood. This research attempted to analyze factor responsible for that phenomenon, with the ultimate goal of identifying policies that can be put in place to remedy the situation. The assumption which underpinned this research was that the quality of environment on and around Lake Takapan constitute a Common Pool Resources, which depend very much on the quality of institutional management, that in turn determines the welfare of the community and population whose livelihood depend on it. To that end, this research conducted and analysis of the difference in quality of institutional management of Lake Takapan prior to and after 1980, and how that relate to the quality of environment and welfare of the community whose livelihood depends on it.

Thus, this research examined history, culture, formal and informal organization's aspects, activities, and dynamics of all actors who are involved directly and otherwise in the formation and management of Lake Takapan such as members of society, the government, and private sector. The research used qualitative methodology. Data were collected using in-depth interviews with key informants, supplemented by direct observation, and review of extant literature that included policy reports, practices, and previous empirical research.

The research came with key findings. First, prior to 1980, the institutional management of Lake Takapan was ideal. During that period, the management of Lake Takapan was based on Dayak values and beliefs which placed a lot of emphasis of environmental conservation. Consequently, environmental conservation was upheld, which in turn ensured that the needs of the population were met. Secondly, after 1980, institutional management of Lake Takapan was no longer ideal, and was characterized by an interaction of three actors all of whom espoused behaviors that were not commensurate with environmental conservation. Dayak society has since then adopted consumptive behavior and materialism as an adverse impact of development and infiltration of new religious beliefs and culture. Equally important was the decision by the government and private sector to turn Lake Takapan into a vital source of illicit revenue and

income. Consequently, Lake Takapan has experienced severe environmental degradation, which has adverse impact on welfare of the community.

To overcome the problem, the research makes a number of policy recommendations. The process must involve all the three key actors. Meanwhile, the government should put in place a policy that transforms Lake Takapan into an ecotourism area, which should be preceded by implementing other supporting policies and measures. Leveraging on the rich cultural values, norms and beliefs of the Dayak community should go a long way to stem the causes as well as mitigate and eventually eradicate behavior and practices that have led to environmental degradation and damage to Lake Takapan and concomitant impact on people's livelihood. However, the implementation of the above recommendation, will require investment of time, efforts and resources by all stakeholders, state, private, and community alike, which is why well thought design, planning, and execution is required.

Key Words: *Common Pool Resources, Institution, Policy, Environment, and Ecotourism*

I. INTRODUCTION

“Trying to catch fish even for a day's meal has become harder. Today, the much one can get is 5 kg at most, which is in stark contrast to how things used to be in the past when one could catch 3 quintals(300 kg) a day”

(Atis, 65 year old, Panjehang village)

The quotation above reflects a very serious problem that is affecting Lake Takapan area, Palangkaraya city, Borneo Island, Indonesia. Over the last few years, the quality of the environment around Lake Takapan has experienced immense deterioration, with adverse impact on the society, especially those living in the vicinity of the lake. While in the past members

of society could meet their daily needs by utilizing abundant economic potential of Lake Takapan, during the 1980s that was no longer possible. This is the problem which is the centerpiece of this research. This analyzes the problem that relates to the management of Lake Takapan area from the perspective of preserving the environment. The research is based on the assumption that the quality of institutional management of Lake Takapan has strong relationship with the quality of the environment, which in turn impacts of the whether or not, the needs of the population who eke out a living from the lake and the surrounding areas.

A. BACKGROUND

Today there is stark difference in the condition on Lake Takapan before and after 1980. Prior to 1980, Lake Takapan was a vast stretch of pristine natural environment thanks to the vital role it played in the economy, politics, and culture of Dayak society. Consequently, the adoption of sound environmental conservation practices by the Dayak made the lake ideal place for the spawning and growth of various kinds of fresh water fish. Pristine water coupled with abundant nutrients provided natural feedstock for more than 30 kinds of fresh water fish. The weight of some fish was in the order of 8kg/ unit, and fetched IDR 50,000/kg. Such conditions were sufficient to fulfill the needs of the local population, especially those who eked out a living from fishing. Fish catch from Lake Takapan was afterwards sold to markets to earn income that was used to meet other basic needs.

Nonetheless, after 1980, environmental condition in Lake Takapan deteriorated. The quality of the environment around the lake declined. What used to be pristine water prior to 1980, became murky, contaminated, and deficient in nutrients. Consequently, the variety and weight of fish declined.

In fact some types of fish became rare to find, and some have since become extinct. Besides, since 1980, the weight of fish caught in Lake Takapan has decreased. Inevitably, the decline in fish catch has had adverse effects on the local community as are no longer able to meet their needs. The quotation, which is cited above, is an apt description of the drastic decrease in income which the population living around Lake Takapan has experienced as a direct result of the plummet in fish catch on the Lake. If prior to 1980, the quantity of fish a fisherman caught was in the order of 300kg/day, today the typical fisherman can only catch 5kg a day. The impact of a decrease in the quantity of fish catch has led to a 1.7% decline in household, which constitutes a very critical development.

This research used the approach of developments that affect the types of goods and institutions to investigate the above problem. Firstly, from the theoretical standpoint, Lake Takapan is categorized as Common Pool Resources (CPR). This is reflected in the fact that fish in Lake Takapan is accessible to all members of the general public, which implies that use of the resource by one individual does not preclude others from using the resource. Based on many pundits, characteristics of CPR often lead to problems, especially the absence of any individual or agency that has responsibility for ensuring compliance with environmental preservation. Consequently, deterioration of the environment or The Tragedy of the Commons as it is often

referred to, has gripped Lake Takapan. Secondly, institutions is another factor that has played an important role in CPR (Hardin, 1968; Ostrom, 1990, 1994, 2002; Adrianto and Aziz, 2006). To that end, the decline in environmental preservation and institutional management are two issues that are inseparable.

In the backdrop of the description above, this research formulated a number of issues. First, what has been the influence of institutional change on the management of Lake Takapan over time, and impact on the environment and people living in surrounding areas. Secondly, in relation to that, what solution to solve the problem, and in which manner should it be delivered.

B. THEORETICAL FRAMEWORK

The formulation of the research issue can arise from observation of four types of goods. Extant literature identifies four types of goods, interalia public goods, private goods, toll goods, and CPR. The three types of goods are depicted in the table below:

Table I Division of Kinds of Goods

		Subtractability	
		Low	High
Exclusion	Difficult	Public Goods	Common Pool Resources (CPR)
	Easy	Toll Goods	Private Goods

Source: Ostrom (1994: 97)

As Table 1 shows, the categorization of types of goods is based on the criterion of subtractability with two dimensions low and high, and criterion of "exclusion" which has two dimensions : easy and difficult.

Based on the four types of goods above, extant literature considers CPR as the main source of the Tragedy of Common problem, which is a situation whereby every individual exploits natural resources without control, which eventually degenerates into environmental degradation. The problem is attributable to the confluence of CPR characteristics and human rationality. On one hand, CPR has economic value that makes it attractive to anybody with the consequence that whatever quantity that each individual takes away, contributes to the reduction of economic value for other parties, without anybody being accountable for the environmental destruction that ensues. Meanwhile, human rationality drives human beings to engage in actions that generate benefits for themselves. Consequently, everybody extracts economic benefits from CPR without control (Hardin, 1968; Ostrom, 1990, 1994, 2002; Murombedzi, 1998; and Saunders 2014). To that end, experts contend that strengthening institutional management If CPR is the best way to prevent environmental degradation.

In relation to that, Ostrom (Saunders, 1994: 639) propose several key points foster the creation of ideal institutions for CPR management. Such suggestions, among others include:

1. Existence of well-defined limits on membership and physical boundaries;

2. Regulations that take into account local conditions;
3. Involvement of everybody in modification of operational rules;
4. Supervision of uses of natural resources to ensure accountability;
5. Existence of sanctions for those who violate the regulations and rules;
6. Existence of conflict resolution mechanisms;
7. Existence of recognition of rights to regulate the use of natural resources;
8. Natural resources constitute part of a large system.

Nevertheless, the ideas which Ostrom proposed received criticisms from several experts. Experts criticize Ostrom's view that rationality underpins human behavior. In reality, history and culture are important elements that influence human behavior, which cannot be ignored. In a nutshell, Scott (2001) and McCay (2002) the existence of an institution is underpinned by the influence of history, culture, and interaction between formal and informal elements of an organization. Figure 1 illustrates conditions that bear influence on an institution:

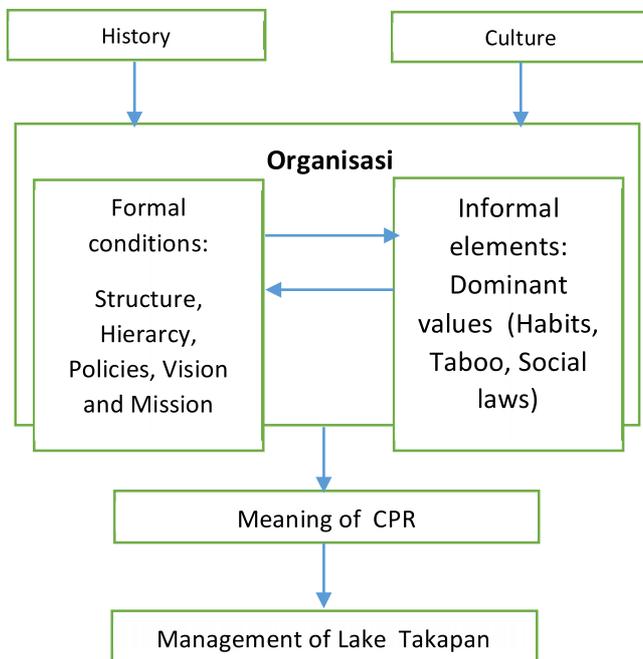


Fig. 1 Conditions that influence actors to form forming an institution

Subsequently, the formation of an institution is driven by dynamics among actors also plays an important role. Based on good governance approach, interaction between the government, society, and the private sector finally crystallizes in the formation of a certain institution (IFAD, 1999:1; Kauman et al, 2000; Avellaneda, 2006: 2; Renukumar, 2015), which in this context is the management of a lake. In other words, there are three actors who are interact in the process that leads to the formation of Lake Takapan institutional management. The

actors interalia are: the government, members of society, and the private sector.

In the backdrop of the discussion above, the theoretical framework which this research uses is very clear. History, culture, formal and informal organizations that belong to the government, society and private sector influence institutional management of Lake Takapan. If the quality institutional management obtains, good quality institutional management Lake Takapan ensues. And the converse is true. The existence of good institutional management in Lake Takapan, translates into good environmental quality, and the converse is also true. This is depicted in the following figure:

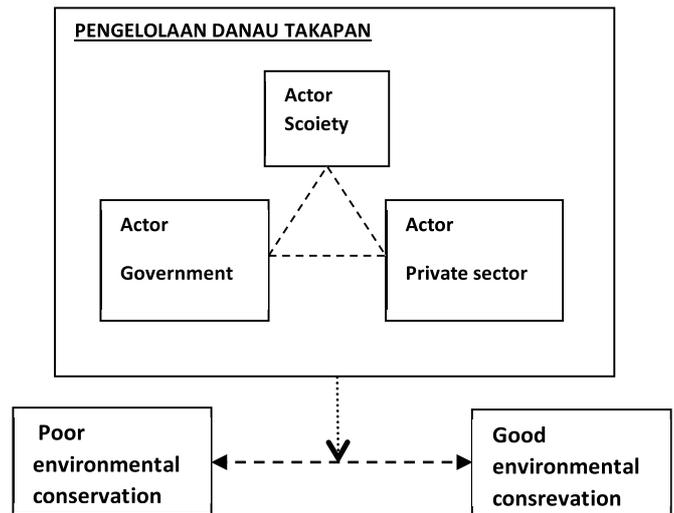


Fig. 2 Conceptual framework

Connecting the condition of the local population that ekes out a living from the surrounding environment, the condition faces become even clearer. The existence of good institutional management of Lake Takapan generates improvement in the quality of the environmental conservation, which in turn increases the capacity of the Lake to meet the needs of the local population. Contrariwise, deterioration of the quality of institutional management of Lake Takapan, leads to the decline in the capacity of the lake to need needs of the local population.

C. METHODS

This research is qualitative in nature but used two types of data, primary and secondary. Primary data was obtained by conducting in-depth interviews and observation. In-depth interview were conducted with informants who were considered knowledgeable and have a good understanding of local wisdom values that relates to the environmental preservation and management of Lake Takapan in the past and today. Informants comprised local community opinion leaders, private sector practitioners, and government officials. In all 50 informants were interviewed, out of which 15 informants from the government (9 officials and 6 supporting staff), 4 members of the business community (two fish traders, two people involved in preparing and serving fish), 15 informants drawn from local

opinion leaders (three families from each two people were drawn) and eight informants from local fisher folks and two informants drawn from local NGO.

The collection of observation and secondary was done separately. Observation data was obtained by paying visits to upstream and downstream that surrounds Lake Takapan. Observation of the downstream area was aimed at the activities of gold miners as well as interaction between gold miners and some bad members of local law enforcement, which is very important in order to understand dynamics of activities that occur in areas that are located near Lake Takapan, and activities of eateries and gold shops in Palangkaraya city. Meanwhile, secondary data, which comprised decision statements and regulations on the management of rivers and Lake, research findings, official local and central government documents, and relevant statistics on contamination and pollution of the river water, illicit gold mining and other relevant data.

Meanwhile, descriptive analysis and SWOT techniques were used in analyzing data. Descriptive analysis technique consisted of several steps. First, data was coded in accordance with the topic of discussion in the chapters, Secondly, data was grouped in accordance with the attached codes. Thirdly, meaning was attached to data in accordance with the conceptual framework. Fourthly, each meaning was collated with other meanings in accordance with the conceptual framework, which was later used to draw conclusions. Meanwhile, the conduct of SWOT analysis entailed the examination of strengths, weaknesses, opportunities and threats of the organization in formulating actionable solutions for problems faced.

II. LAKE TAKAPAN AS CPR

The area around Lake Takapan is famous for its fresh water catch, which is the largest in Palangkaraya city, and is assumed great importance in Central Kalimantan province. However, later on gold was discovered in the vicinity of Lake Takapan. Everybody is free to mine gold and catch fish, and there is nobody who is charged with ensuring that the two economic activities were in compliance with environmental preservation of the surrounding area. This is the special characteristic that has become associated with Lake Takapan.

The following Table shows that Lake Takapan is a habitat for tens of types of fresh fish that vary in both size and price:

Table II types and prices of fresh water fish in Lake Takapan

No.	Name of fish	Weight (Kg)	Price (,000/kg)
1.	Patin	8	50
2.	Tahuman	8	30
3.	Tapah	7	40
4.	Bakut Bsr/Kcl	5	50/20
5.	Kalui	5	40
6.	Pipih	5	60
7.	Kalabau	3	40
8.	Lais Tabiring	3	40
9.	Baung	3	35
10.	Jalawat	3	50

11.	Lais Bamban	2	50
12.	Sanggung	2	30
13.	Haruan	2	30
14.	Tambubuk	2	35
15.	Karandang	1	30
16.	Kihung	1	30
17.	Jalawat Batu	1	40
18.	Riyu	1	20
19.	Lais Bantut	1	20
20.	Biawan	0,3-0,5	10
21.	Papuyu Bsr/Kcl	0,2-0,5	50/20
22.	Patung	0,3-0,7	24
23.	Puyau	0,4-0,5	7
24.	Kakapar	0,3	27
25.	Darap	0,4	10
26.	Papuntin	0,3	15
27.	Sapat	0,2	10
28.	Manangin	0,2	10
29.	Udang Bsr/Kcl	0,2	50/30
30.	Saluang	0,1	40

Source: Office of Agriculture, Fisheries and Livestock Palangkaraya City, 2014.

Some fish variants can weigh as much as 8kg a piece and beyond, fetching prices as high as Rp. 50,000/kg. The fisheries resource potential is the main source of livelihood for the local population, which is why the largest section of the population earns a living as fisher folks.

In addition to fisheries, Lake Takapan also has a huge gold mineral deposit. The gold mineral potential is found in watershed areas of rivers that flow into Lake Takapan such as River Kahayan and Rungan, as well as in Lake Takapan waters itself. The discovery of gold deposits has attracted many people from various locations, near and far. Moreover, what people reap from mining gold in the area is substantial in the order of Rp. 50 million (EUR 3,346) from mining activity of two weeks duration using semi modern equipment.

The potential of fisheries and gold in areas around Lake Takapan is not only large but also certain. Whenever one fisher folks catches fish from Lake Takapan, the impact such an activity has on other fisher folks is the reduction of the fish catch they can get from the same resource. Besides, overfishing in the lake is bound to accelerate the rate at which fisheries potential decline due to lower fishing breeding than quantity caught. The same also applies to gold mining. Mining of gold by an individual reduces the capacity and output that other gold miners can get from the same resource. Like other natural resources, the evolution of gold takes millions of years.

Another important feature of Lake Takapan is the open access it has to all. All people who live in the areas around the Lake have right of access to exploit the two natural resources. In other words, there is no limit for anyone to catch as much fish or mine as much gold as they have the capacity and ability to do, in areas around and in Lake Takapan, using traditional and semi modern tools alike.

III. MANAGEMENT OF LAKE TAKAPAN PRIOR TO 1980

A. CHARACTERICS OF DAYAK SOCIETY

The history and culture of Dayak people has strong influence on institutional management of Lake Takapan. From the historical perspective, Dayak society are descendants of immigrants from South China who decided not to return to their place of origin after staging an attack on Singosari Kingdom on Java island. The implication of that is that Dayak do not recognize the existence of kings, princes, or a feudal system. In other words, Dayak society do not recognize the a command system (Siyok et al., 2014). Meanwhile, with regards to culture, the concept of God and social organization which Dayak have is different from what is common in other societies. Dayak society believes that lies in the sky, and the natural environment constitutes an intermediary medium that facilitates communication between god and human beings. To that end, every individual has the responsibility and obligation to preserve the natural environment. Moreover, from the vantage point of social organization, Dayak espouse the concept of “Huma Betang”, which is a long and expansive house that is home for tens of families. Another important concept which Dayak espouses is the equality of right of access and responsibility. In other words, Dayak society believes and condones equality in their social system.

Besides, Dapak society has formal and informal organizations that are important to know. First, formal organizational culture of Dayak society consists of various levels, reflecting different tiers of government administration. For instance, Dayak have a *Mantir* who is the head of village or hamlet, the *Kademangan* who is the head of the sub district, and the sub district council of representatives for the district administrative level. Secondly, Dayak social organization is far stronger that government organizational system. Thirdly, Dayak society have succeeded to condone and act in accordance with history and cultural values they believe in.

In light of the above, the perspective and meaning which Dayak society attaches to Lake Dayak becomes clear. On one hand, Dayak people believe and practice equality in social relations, consider the environment as very important in their daily lives, and are open to immigrants or new comers. On the other, Dayak society has in place a strong and comprehensive social organizational structure comprehensive, and uphold and live in accordance with the values they uphold. To that end, the meaning which the Dayak attach to Lake Takapan is a natural expanse that is very vital for their daily lives, to which all members of society both native and immigrants have equal right of access but also obligation to preserve the environment around and in Lake Takapan.

Nonetheless, prior to 1980s, the government and private sector did not have strong influence in the formation of institutional management for Lake Takapan. Using various regulations, the governments has showed its recognition of the importance and relevancy of regulating the management of area that is in the vicinity of the Lake, which in turn should foster the preservation of the environment by Dayak society. Meanwhile, the private sector in its part, understands the fact that the

management of Lake Takapan must in the hands of the local population. Through such ways, sustainable exploitation of the resources should be guaranteed.

B. MODEL FOR MANAGEMENT OF LAKE TAKAPN PRIOR TO 1980

The three factors above generated conditions that fostered the creation of an institutional management model for Lake Takapan, which is depicted in the following diagram:

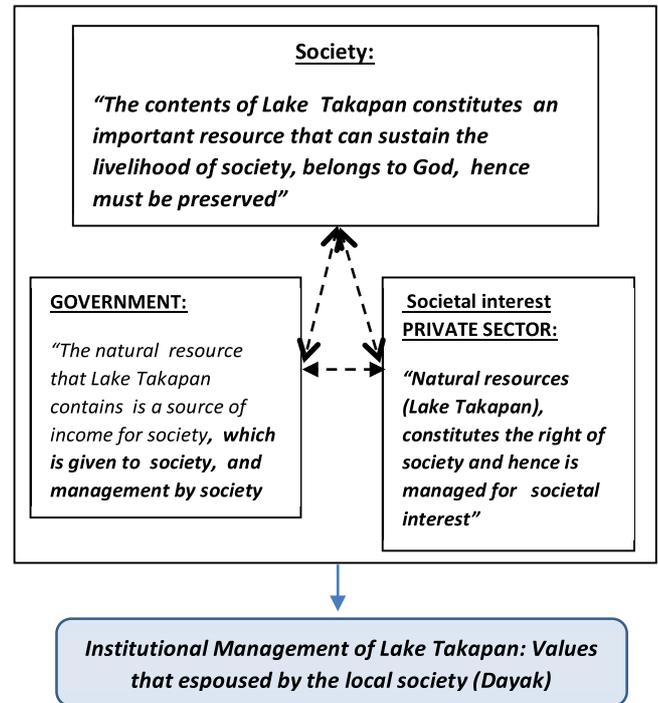


Fig. 3 Institutional Management of Lake Takapan Prior to 1980

It is evident from the figure above that society was the most important and driving factor that underpinned institutional management of Lake Takapan prior before 1980. Firstly, society has the belief that natural resource in Lake Takapan constitutes a source of livelihood and a medium of ‘communication’ with God, which has to be preserved to posterity. Secondly, in the same vein, the government that Lake Takapan is an important source of income for the local population hence its management must be in the hands of the Dayak people. Thirdly, private sector actors also espoused the view that Lake Takapan area was a vital source of livelihood for the local population, hence its control and management must in the hands of society.

The combination of the three perspectives about the management of Lake Takapan translated into the evolution of a certain kind of institutional management of Lake Takapan. Institutional management for Lake Takapan were underpinned by local wisdom that were drawn from values and beliefs system that were upheld by Dayak people. As the basis of the management institutions of Lake Dayak at the time was ideal

Dayak perspective on the relationship between natural resource management, livelihood, and God, the process paved way for sound institutions. Consequently, the preservation of Lake Takapan was successfully done, which in turn ensured that members of society were able to earn a decent livelihood from the lake. It is such conditions that ensured that Lake water was pristine before 1980, contained a lot of natural nutrition, which provided sustenance for various types of fish. It is such abundant fish resources that provided ample livelihood for the local population.

IV. MANAGEMENT OF LAKE TAKAPAN AFTER 1980

A. DYNAMICS OF THREE ACTORS

After 1980, Dayak society faced six fundamental changes that changed their behavior. Firstly, customary/ traditional institutions which played key role in preserving local wisdom were gradually ignored and left in abeyance. Such a condition contributed to the ineffectiveness of traditional values in various aspects of people's lives, which induced disinterestedness and abandonment. Secondly, the influence that Dayak social organizations have on society surpasses that of the government. A fitting example relates to conflicts in society, which are often solved through customary laws and not positive laws. Thirdly, Dayak elites have experienced disorientation by spending a lot of enough and resources in resolving problems that have emerged as a result of the existence of Kaharingan and proselytization efforts of foreign religious beliefs in Dayak society. Subsequently, all the above have been translated into practical politics that in turn have undermined the internalization of values in daily lives of society. Fourth, adverse impact of development have transformed Dayak people into an increasingly consumptive society. Today, Dayak society attaches great importance on such things as automobiles, refrigerators, and motor cycles as social status symbols, ignoring the essential functions of such goods in the process. One informant who stays in the depth of the forest in Palangkaraya contended that possession of a car is the best indication that individual has become rich. This is the case, in spite of the reality that roads are in poor condition, and cars that people own are rarely used. Fifthly, Dayak society does not internalize cultural values into their families. It is not a secret that many adults acknowledge the fact that they have forgotten most of their cultural values because their parents did not take sufficient time to teach them. Sixthly, most members of Dayak society do not know and understand the value and importance of preserving the environment. The environment, for them, is an accumulation and collection of economic potential that is there to be exploited to the full by everyone who has the capacity and ability.

The implication of the foregoing, coupled with its history and cultural traditions that espoused egalitarianism and openness, has been drastic for Dayak society. Since 1980, Dayak people have developed the dearth and interest in exploiting natural resources and environment, despite the fact that such acts flout customary values they revere dearly. To aggravate matters, Dayak, today tolerate new comers who exploit the environment. With respect to the existence of Lake Takapan, the change in perspective, Dayak people consider Lake Takapan as a natural

resource for exploitation to meet all their needs. Consequently, Dayak exploit the fish and gold deposits using tools and equipment that damage Lake Takapan environment.

In the meantime, government actors face four major problems. Firstly, government organizations which are charged with the task of ensuring that the process of exploiting natural resources on and around Lake Takapan must comply with the regulations on environmental preservation tend to do their work partially due to sectoral outlook and perspectives. For instance, any problem that relates to environmental degradation of Lake Takapan is deflected by the central government as the responsibility of local government, while the latter considers it the responsibility of the former. At the local level, the regional environment agency finds it difficult to deal with issues of environmental degradation that occur simply because their efforts lack the support of local public safety police (SatpolPP). Secondly, some government officials consider excessive exploitation of natural resources as a source of additional income hence fertile ground for self-enrichment. The police, according to many sources, demands substantial payments to leak any information about any impending impromptu checks that are staged to tackle illicit activities including those that damage the environment. Thirdly, insufficient number of officials who are charged with investigations into illicit activities (PPNS) – a functional position in the local government that handles the supervision of discipline of civil servants falls far short of minimum level that was set by the central government. Today, Palangkaraya city has 2 employees (PPNS), which is far below the ideal total of 35. Fourth, limited authority in the hands of Satpol PP in tackling activities that excessively exploit natural resources around and in Lake Takapan. This is due to the strong support and backing that perpetrators of such practices receive from the police and military establishment. On many occasions, SatpolPP conducts impromptu seize and capture operations to deal with perpetrators of activities that damage the environment only for the perpetrators to seek protection of the police and military institutions. It must be noted that SatpolPP are trained by the police and the military, which implies that the local security agency finds it difficult to deal with anybody who seeks protection from the two institutions. The above condition generate very serious problems. Due to the fact that the government takes a partial outlook with respect to the management of Lake Takapan, it considers the natural resource in Lake Takapan as an illegal income that lies outside its legal capacity to control. Consequently, the government has ignored all existing problems as it cites its inability to take action, and the collusion and connivance of some governments in the process to obtain what to them is substantial extra income.

Lastly, today the perspective and behavior of the private sector has also experienced fundamental change compared with what it espoused prior to 1980. Firstly, private sector actors are very much aware that natural resources in Lake Takapan constitutes a major trading commodity in the area. Secondly, some private sector actors participate and collude in the exploitation of natural resources as the process enhances their revenues. In other words, private sector actors perceive the existence of Lake Takapan as the place where a commercial commodity is located, hence support those members of society who exploit it.

B. MANEGEMENT INSTITUTIONS OF LAKE TAKAPAN AFTER 1980

Fundamental change in perspectives of every actor had implications for the meaning and importance attached to Lake Takapan. Consequently, the quality of institutional management for Lake Takapan experienced major change. The change is illustrated in the following diagram:

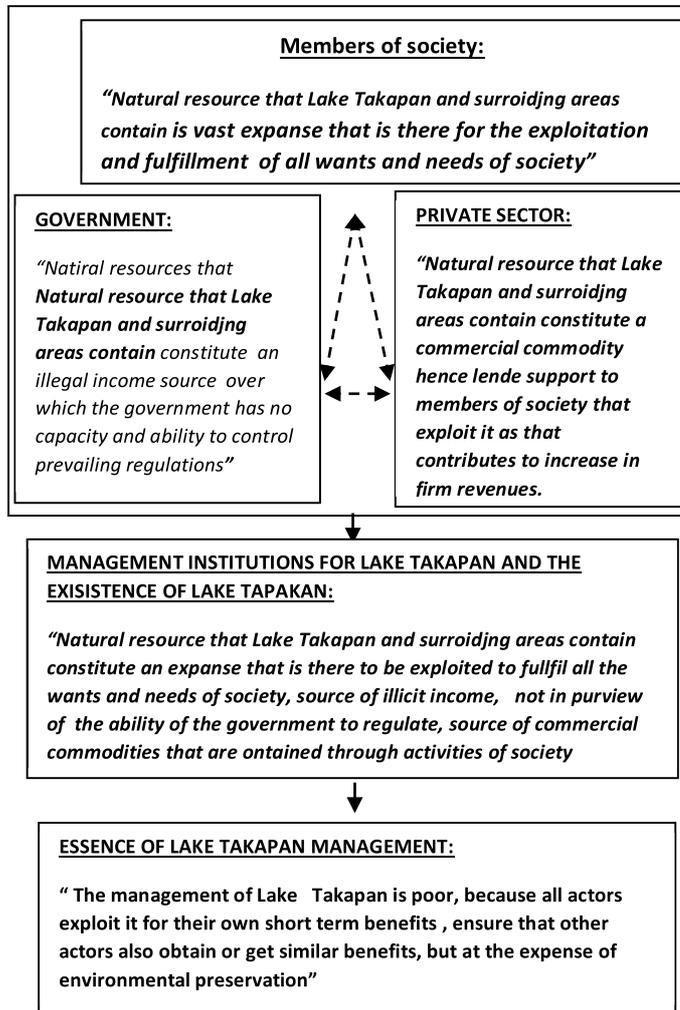


Fig. 4 Institutional management for Lake Takapan after 1980

Based on the above illustration, it is apparent that the meaning actors attach to the existence of Lake Takapan and surrounding areas is dynamic. On one hand, members of society consider Lake Takapan as a vast expanse which is there to fulfill all their needs. On the other hand, the government perceives Lake Takapan as a source of income as an embodiment of illicit activities and income over which it has limited ability to regulate using prevailing regulatory framework. To that end, the government lacks the capacity to exercise control over its management in an ideal manner. Lastly, private sector perceive Lake Takapan as a commercial commodity the trading of which must be supported and facilitated to generate as much revenue as it can to firm coffers.

The combination of the three perspectives has created a certain type of institutional management. The model, which is characterized by excessive exploitation of natural resource that the Lake and surrounding areas contain drive by the motive of fulfilling their short term needs , The implication of that has been the deterioration of the environment. The deterioration of the environment in its turn, has meant that the capacity of the natural environment to fulfil the needs of society has declined over time. To that end, the natural environment as embodied in the lake and surrounding areas no longer lives to the expectations of society as an important resource that can contribute to enhancing their welfare.

V. MANAGEMENT MODEL FOR LAKE TAKAPAN: REVITALIZING THE MANAGEMENT OF LAKE TAKAPAN

Based on the above discussion, it is apparent there are certain policies that can be implemented to overcome problems that relate to the management of Lake Takapan. Closer observation of the problems points to the need for the existence of clear and well streamlined management of the huge economic potential which Lake Takapan and surrounding areas have, underpinned by preservation of the environment. To that end, this research proposes a number of policy alternative, which were obtained through a two phase process. The two phases entailed the conduct of strategy analysis, which was followed by formulation of the strategies in the context of strategic policies. Analysis and formulation of strategic policies was based on SWOT technique. In brief, the entire process culminated into the development of strategic policy alternatives that are tailored toward developing Lake Takapan area into a vital ecotourism destination in Palangkaraya City and Central Kalimantan province.

A. STRATEGY ANALYSIS

To overcome the existing problems, this research used the SWOT techniques to formulate alternative solutions. SWOT which stands for Strengths, Weaknesses, Opportunities, and Threats. In brevity, the above strategies can be categorized into the following several strategies:

1. Use Palangka Raya city budget potential and facilities to enhance the management of the economic potential of Lake Takapan area in accordance with local wisdom values through the empowerment of the local population, underpinned by findings of extant research.
2. Facilitate or provide enabling conditions for private sector to invest in Palangkaraya city area.
3. Optimize the implementation of city mayor regulations on the management of river and Lake Tapakan areas within the framework of increasing the awareness of the private sector and empowerment of the local population.
4. Utilize the budget to promote the local population to preserve the environment around and in Lake Takapan in accordance with government programs and activities.

5. Create destinations for tourists.

To that end, the five policy alternatives will serve as the basic strategies which can be used in creating solutions for problems that face Lake Takapan.

B. POLICY DIRECTION

To ensure that the strategies that are identified are implemented, the strategies that defined and translated into policies. The following table contains policies that have been drawn from alternative strategies that were formulated during SWOT analysis.

TABLE IV Strategies and policies for the management of Lake Takapan

No	Strategy	Policy
1.	Utilize the potential of the Palangraya city government and facilities it has to manage the vast economic potential of Lake Takapan based on local wisdom through people empowerment, in accordance with prevailing empirical results on the problems and actionable solutions.	The policy of Restocking fish seedlings using local species
		Develop policies that utilize the ecological potential based on local wisdom and community participation
2.	Provide facilities and incentives to the private sector to invest in Palangkaraya city.	Adopt an expedient operational permits policy
		Adopt a policy that exempts practitioners from paying tax for a certain period
3.	Enhance the implementation of City Mayor regulations on the management of the River catchment areas and Lake Takapan area to increase the awareness of the private sector and empower local population	Create city government office forum that specifically tackles problems that relate to the environment on Lake Takapan and surrounding areas.
4.	Use the city budget to encourage the local community and population preserve the environment on Lake Takapan and surrounding areas dan in accordance with government programs.	Implement a policy that gives incentives to coastal population to preserve the environment on Lake Takapan
5.	Develop and promote the area as an eco-tourism destination	Ecotourism Policy at Lake Takapan Area

Source: Analysis of primary data 2016

*Beje = fish pond which is created in accordance with certain geographical characteristics and is placed in the middle of the forest and plantations.

In principle, the above policies can be formulated in such a manner they are all tailored toward the development of an integrated Lake Takapan ecotourism development policy. The explanation below gives the details:

1. The incentive policy for participants in Lake Takapan environmental preservation program.

The main goal of the policy is to preserve the environment, as well as fulfil the needs of the local population who dwell in the vicinity of Lake Takapan area. It is well established the population that is living and eking out a living either by fishing or extracting gold from the Lake Takapan and surrounding areas do so in such manner that has proved detrimental to the environment. The motivation for doing so is to fulfil their basic needs, which the decline in the resources means that overtime they use tools and equipment that have become increasingly becoming damaging to the common resource pool. To that end, the only way Palangraya city government can stop such methods is to give certain incentives that are conditional on complying with environmental preservation of Lake Takapan area in accordance with government programs.

The size of the incentive, which every head of family will receive will be Rp.1, 8 million per month, which is the minimum wage for Palangka Raya city. Based on the data obtained from relevant PalangRaya city offices, the budget allocation for such programs is enough to finance the incentive policy for all heads of households that earn a living by fishing and extracting gold from Lake Takapan area. Moreover such a policy if implemented would be supported by an existing complementary policy that offers free education and health services to the local population. The policy of preserving the environment will entail forbidding fisher folks to catch fish in excessive amounts, not engage in extraction and mining of gold, and participate in the preservation of the environment by monitoring and supervising those that perpetrate activities that harm the environment. The expectation is that the policy will last for three years.

2. Implement an expedient operational permit processing policy.

To attract private investors in the coming 5 to 10 years, there is urgent need for a special policy. Such a policy will entail making the processing and giving of operational permits far easier than it is today. It is common knowledge that Lake Takapan area has vast economic potential which can be developed as a vibrant ecotourism destination in future. However, most of the land in the area does not have official land certificates. In light of that, there is need for Palangkaraya city government to expedite the processing of operational permits for investors, by for example based on cultural ownership claims that is supported by local traditional leaders. If such an approach is taken, there is little doubt that private investors will start investing in Lake Takapan area.

3. Policy of exempting tax for certain period of time.

The policy bear close relations to the above policy, which is the creation of an enabling environment that is conducive to

investors to invest in Lake Takapan area. Technically, to qualify for tax exemption investors should be required to involve the local population in investments they make in the Lake Takapan area. The implementation of tax exemption should be done in such a way that the investor is exempted from tax obligations entirely, in the second year, third year, and fourth year, s(he) pays 25%, 50%, 75%, and 100% of the tax obligations, respectively. That way, PalangRaya city government will attract investors to come to the area to invest in Lake Takapan area.

4. Implement the policy of restocking local fish seedlings.

It has been noted that the amount and variety of fish in Lake Takapan has declined drastically. Yet, there are various ways that Palangraya city government can rectify the above situation. Firstly, Palangkaraya city government has a fisheries nursery station, which has so far succeeded to produce local fish variants such as Papuyu and Klotok. To that end, the government should in future make extra efforts to breed other local fish species such as Gabus, Toman, and Tapah. Secondly, Universitas Palangka raya, especially the Faculty of Agriculture has succeeded in cross breeding local fish varieties on a large scale. In light of that, there is need to harness cooperation between Palangka Raya city government and the Faculty of Fisheries and Universitas Palangka Raya. The policy of restocking local fish stocks will serve as the main source of fish supply to meet the demand for fish in Lake Takapan area.

5. Develop a policy that promotes exploitation of ecological potential underpinned by local wisdom and the participation of private sector.

The second policy in fact has connection with the first above. One of the problems that have undermined fish stocks in Lake Takapan is the low ratio of fish seedlings that survive after being transferred from the wild into the river Rungan and Lake Takapan waters. The main problem for that is the failure of fish to adapt to new conditions. As a remedy, the breeding of fish should be done using Beje method as such a method ensures that fish breeding occurs in natural waters in the middle of the forests.

There are several factors that make the Beje method logical and appropriate to use for the breeding fish. Firstly, based on history, Beje has a concave topography in the middle of an undulating terrain which makes it possible for water to rise whenever there is rainfall. Today, water level rises to about 100 meters during a normal rainy season. To that end, fish from the Rivers and Lake Takapan always move toward the inland waters in search of food or for laying eggs. That means that whenever water subsides, fish is trapped in beje formations. The local population afterwards go to Beje formation to catch fish in abundance. In light of that therefore, Beje method is a method and technique that is very common and well understood by the local population that live in and around the Lake Takapan area. Secondly, most heads of households have land that is larger than 2.5 ha, which contain Beje formations.

In line with that, the city government can facilitate the construction of 10 beje for each family head, five of which can be used for restocking and the remaining 5 are managed using natural ways. Palangkaraya city government can lend support to

the process of beje making that depends on the needs of the community, and conditions that are agreed up on beforehand.

The policy that follows next is the use of local wisdom in planting Jabon and Sengon trees. The two trees are well not only well known among the local community from the culture stand point but also because of the high economic value they command. Based on estimates of the relevant city government offices one m³ of Jabon fetches Rp. 800,000.00. With the assumption that planting 1200 trees on a hectare of land, 0.5 hectare of land can produce profit of 250 million for the duration of five years. The strategy will to plant 0.5 ha every year, with the expectation that harvest occurs in the fifth year. To that end, right from the fifth year members of society will earn Rp.250 million per year on a continual basis. The Palangraya city government will provide the seedlings, while the private sector will serve as the buyers of the produced wood.

Honey farming as another husbandry is another policy that is related to local wisdom. From the cultural perspective, apiary farming is very well known among the local community especially those who live in areas around Lake Takapan. The economic value of apiary farming is very high. For instance, 330 ml of forest honey fetches a price of Rp. 100 000. To that end, trees have high potential of becoming hosts of forest bees which can in turn produce forest honey that fetches high value. In this regard, the government and the private sector will play similar roles.

Overall, all the policies will constitute an entirety that will form a lucrative combination for the community. For 2.5 ha of land, a number of beje structures will be constructed and managed naturally, and the remainder will be used to plant trees such as Jambon or Sengon trees, and forest bees (for forest honey). That way, the income of the community will increase.

6. Create a special forum of city government offices which will specifically charge with handling the problem of environmental preservation on Lake Takapan.

Implementation of the above policies will require preservation of ecological conditions of Lake Tapakan and surrounding areas. To that end, the whole process must start with the formation of a forum of city government offices. The city government offices to participate in the forum will include the environmental preservation agency, fisheries and agriculture office, local security SatPol PP, the police, and other relevant organizations that are important in the preservation of the environmental in Lake Takapan area.

All the above policies culminate into the creation of programs that will support the emergence and development of Lake Takapan and surrounding areas as an ecotourism attraction. If society will increase its awareness about environmental preservation and live to that expectation, and making use of local wisdom to exploit natural resources in such a manner that takes into consideration the need to conserve the environment, there is no doubt that private sector will invest their money in the area. Moreover, with the increase in private sector investment, other spillover effects such as producing goods for the community, serving as market for goods that are produced by society, while the government will provide the necessary financial assistance and requisite regulatory

framework. It is expected that if all the above policies are in place, it will be a matter of time that Lake Takapan and surrounding areas will emerge as a new center of ecotourism that will become the destination of local and foreign tourists. Subsequently, the in the number of tourists by contributing to an increase for the local population, will in turn increase the need, importance among the local community to preserve the environment in Lake Takapan and surrounding areas.

The above policies are strategically important for a number of reasons. Firstly, the policies will help to streamline and clarify roles actors involved in Lake Takapan area will play in the management of the natural resource in a sustainable manner. Such a process will inevitably foster collaboration among the three actors in an ideal manner. Secondly, the above policies will serve as a guideline and direction of programs that will be tailored to increasing the welfare of people living in and around Lake Takapan. To that end, the main goal of institutions will be to ensure that natural resources in and around Lake Takapan will be managed in a sustainable manner for interest of society and underpinned by preservation of the environment.

Based on the above exposition, the three policies complement the CPR model which this research proposes. The final model proposed is depicted below:

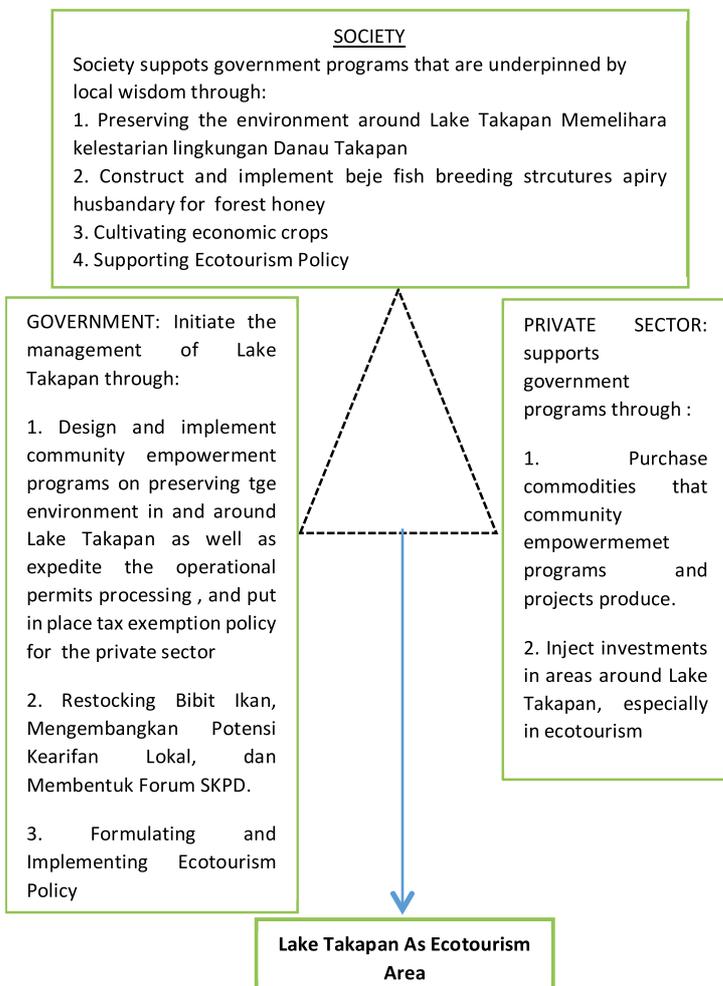


Fig. 5 Alternative Model for the Management of Lake Takapan

It is evident that the model , which this research proposes underscores the management of natural resources in and around Lake Takapan in an ideal manner in such a manner that the exploitation of economic potential in and around Lake Takapan is underpinned by preserving the environment and tailored toward fulfilling interest of society. The model is society based because members of society have interest in meeting their daily needs, which is why they play the most important role in preserving the environment around Lake Takapan, through the tree planting, using local knowledge and skills that are transferred from one generation to another and providing support to ecotourism programs. On the other hand, the government has keen interest to ensure that its duties and obligations to preserve the environment must go hand in hand with other noble goals of increasing the welfare of society through people empowerment programs, expedition of operational permits processing and tax exemption programs for the private sector, implement fish restocking programs, making use of local economic potential, establish city government office forum, and implement the ecotourism policy. Lastly, the private sector which is motivated by profit concerns, has interest in ensuring that commodities that members of society produce are bought, invest in the area, and support ecotourism policy. The gamut of issues above will culminate into Lake Takapan becoming a vibrant ecotourism area in Central Kalimantan.

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