

# Water Resources Management through Government Policy and Local Wisdom in Bukit Kelam Nature Tourist Park Sintang Regency West Kalimantan Indonesia

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**Abstract:** *The purpose of this study is to describe and analyze the management of water resources through government policy and local wisdom; factors that support and impede the management; and the ideal policy model in water resources management in the conservation area of Bukit Kelam Nature Tourist Park (NTP). The research method was descriptive with qualitative analysis approach presented data obtained from interviews, field observation and secondary data. Model of water management was compiled through Focus Group Discussion (FGD) to find the expected model by involving all research subjects such as Sintang Conservation Area Section II, Tourism Office, Kelam Permai Sub district, businessman and community in deep discussion group. Management of water resources through local government policy and local wisdom in the conservation area of Bukit Kelam NTP apply the Law and other regulation. Regional Regulation about Spatial Planning of Regency is accommodating utilization zone in natural forest park area of Bukit Kelam mentioning that the importance of conservation of natural resources one of them water. The government is still dominant in its role over the local community, and it is full of state rights. This study showed that supporting factors for water resource management were the existence of abundant natural resources including water, social and cultural environment and openness of society as well as awareness to participate in maintaining the region. While the factors that hamper the management of was the implementation of centralized policy, the unclear line of the boundaries of areas between forest park and supporting area, the weak coordination and cooperation between agencies and insufficient number of ranger in the conservation area. The ideal policy model for water resources management is incremental, which puts forward decisions based on compromise and collective agreements between many participants, because the local communities of four Kebong, Kelam Sejahtera, Mepak and Samak villages want a joint regulation based on the local wisdom values of the community applying a 70% pattern of water retribution to community rights intended for rural development, and 30% deposited to the local treasury.*

**Keywords:** Water Resources Management, Policy, Local Wisdom, Conservation

## 1. Introduction

As human population growth and natural resource degradation, there is pressure to implement top-down management, command and increased control over natural resource management. This is manifested in efforts to control ecosystems and socio-economic institutions that respond to uncertain ecosystem behavior with greater control. At the same time, the role of natural managers, especially the government becomes powerfully increasing [1].

The conservation area of Bukit Kelam NTP located in Sintang regency West Kalimantan Indonesia keeps the natural wealth, one of which is the water source. It is estimated that water availability will continue to decline in the future due to the increasing population and high demand for clean water. The existence of logging, stones mining for building materials and clearing of oil palm plantations around the area will further exacerbate the destruction of the area that was originally a buffer of water availability.

People's need for quality and safe drinking water to be

consumed is increasing accompanied by free market development and competition in the business world. Many business actors are establishing refill drinking water depots in this area. Therefore, the use of water in the area has the potential to cause conflict due to water competition among users. Based on the above situation, the Government of Sintang Regency responded to demand for water regulation by issuing Circular Letter 1 of 2014 about Water Utilization Permit and Water Energy Utilization Permit as well as technical considerations for application of water utilization permit in wildlife reserves, national parks, forest parks, and nature tourism parks. These Permits derived from Local Regulation Number 20 of 2015 on the Region Spatial Plan that accommodates the utilization zone in the Bukit Kelam NTP [2]. The management of water resources will be chaotic if not regulated properly [3]. Command and control, however, usually results in unforeseen consequences for natural ecosystems and human welfare in the form of collapsing resources, social and economic strife, and losses of biological diversity [1]. The provision is clear that the water entrepreneur shall have business license, pay retribution and other compensation as a result of the

construction implementation in accordance with the provisions of legislation, protect and maintain the continuity of the function of water resources, maintain and secure the surrounding water resources infrastructure, and ensure the continuity of water fulfillment for people's daily necessities. Comply with the provisions of the permit, prevent social unrest resulting from water use activities, and provide access to monitoring, evaluation, monitoring and inspection. The effectiveness of the applied policy relies heavily on the support of existing stakeholders. In designing the policy should be bottom-up, in which people who feel the direct impact of the policy desperately need to be empowered [4]. The purpose of this study is to describe and analyze the management of water resources through government policy and local wisdom; factors that support and impede the management; and the ideal policy model in water resources management in the conservation area of Bukit Kelam Nature Tourist Park (NTP).

## 2. Methods

This research was conducted in Kelam Permai Sub regency, Sintang Regency, West Kalimantan, Indonesia. Distance of research location with capital of Sintang Regency is about 34 km. Data collection techniques used are through direct observation of water resource objects, interviews and a focus group discussion with stakeholders.

A series of deep interviews was conducted in order to identify the implementation of government regulation on water resource utilization from the key informants. The interviews were done with key persons from several offices such as Head of Sintang Conservation Area Section II as the executor of the management and is very aware of issues that occur in the field, Head of Tourism Office, and Head of Kelam Permai Sub regency and Heads of Village around Bukit Kelam area administratively located in the region, people and water entrepreneurs.

Information and data obtained from the field and informants through interviews is not structured in depth, observation, and documentation studies. Researchers used methodological triangulation to extract data on water resource utilization permits through in-depth interviews, limited participant observation and secondary data analysis. The informants were selected using snowball sampling technique; the researcher must know several key informants first and then ask them to introduce another informant who can interview the interviewer. The documentation of secondary data extracted from the documents in the form of: monograph, archives, data statistic, and other materials from relevant sources and do literature review to various was used to support data interview. Model of water management was compiled through Focus Group Discussion (FGD) to find the expected model by involving all research subjects such as Sintang Conservation Area Section II, Tourism Office, Kelam Permai Sub district, businessman and community in deep discussion group.

## 3. Results and Discussion

### 3.1 Management of water resources through government policies and local wisdom in the conservation area of Bukit Kelam NTP

The defined water resources management policy referred to Law Number 11 of 1974 on Irrigation [5], Minister of Forestry Regulation Number P.64 of 2013 on the use of water and water energy in the Wildlife Sanctuary, National Park, Forest Park and Nature Tourist Park [6], Government Regulation of the Republic of Indonesia Number 28 of 2011 on Management of Nature Reserve Area and Nature Conservation Area [7]. Furthermore, a circular Letter Number 1 of 2014 on Water Utilization Permit and Water Energy Utilization Permit (IPEA) [8] as well as technical considerations for application of those in wildlife reserves, national parks, forest parks and nature tourist parks as well as Local Regulation Number 20 of 2015 on Spatial Planning of Sintang Regency Year 2015-2035 [2].

Bukit Kelam water resources companies were spread in three sub districts: Kelam Permai as many as seven water depots, Sintang as much as sixty one water depots as many as thirteen water depots. The government was dominant in its role over the local community, and it was full of state rights. The principle of harmony between social interests, the environment, and the economy is far from the principles of justice and sustainability. The management of water resources was supported by the potential of natural resources; the social and cultural environment is very good and open. The scope of the boundaries of areas with community settlements is unclear, due to boundary mapping, local communities are excluded.

The preservation of the region still encounters various crucial issues that require an integrated follow-up effort. Weak coordination between related agencies and lack of accountability, transparency and stakeholder participation in water resources management is at least a serious concern from various parties, especially managers. Last, the situation may increase conflict among users due to business competition.

The water utilization system cannot be separated from the knowledge of water and its problems, such as: the presence of water, distribution and distribution by referring to the principle of joint effort and kinship. The destruction of forest vegetation in Bukit Kelam's natural forest park has caused a decrease in water discharge [9]. Likewise, water resources management organizations that have not been specially formed also become problems with the accuracy of hydrological data and water quality that must be collected. The local government of Sintang District along with Sintang Conservation Section II in May 2017 has determined the utilization zone of water resources intended for the protection and cultivation function as well as the area. The result of determining the zone of utilization of water resources will be used as the basis of hydrological research and measurement. The determination of water allocation at the water source in Bukit Kelam area was carried out to determine the carrying

capacity of the water source, the number and distribution of the population and its growth projection, the calculation and projection of water resource requirements, the utilization of existing water. According to Geoffrey [10] water conservation has two important parts: conservation of water resources and conservation of water supply. The conservation of water resources includes efficient methods of storage and water allocation while water supply conservation involves minimization of leakage and consumption without waste. Water supply and storage is related to the volume of water available in the area. The existence of these springs is strongly influenced by the condition of land and vegetation (plants) that exist in the catchment area. The existence of the forest degradation caused by human activities left empty areas that had to be replanted. Therefore, some parties do tree replanting activities in the area. The following data tree planting conducted by the Department of Tourism in cooperation with Sintang Conservation Section II Sintang from 2012-2015 (Table 1)

**Table 1:** Data of tree planting in Bukit Kelam NTP

Year	Species	Number (individuals)	Task force
2012	Sungkai ( <i>Veromenna carnessen</i> )	4000	- Tourism Office - Forestry Office - Sintang Conservation - Area Section II
2014	Sungkai ( <i>Veromenna carnessen</i> )	1300	Kapuas University Sintang
2015	Gaharu ( <i>Gaharru Sp.</i> )	3000	Tanjung Pura University Pontianak

Source: Sintang Conservation Area Section II

Sustainable forest protection and conservation planning, inter-agency coordination in integrated water management may overcome the problems that occur in the region. Conservation requires the formulation of funding mechanisms for water resources protection activities such as environmental services as well as partnership development with universities, local communities, non-governmental organizations, legislatures and businesses as well as utilizing environmentally friendly local wisdom.

Utilization of water resources was done as an effort to organize, provide, and preserve water resources optimally in order to enable utilized by all parties. Tree planting efforts should be in accordance with regional characteristics such as: the type of local plants; age and seedlings of the plant adapted to local conditions; planting location was done outside forest area and near springs; easy access; easy maintenance access; land for planting sites not owned by private or individuals; to facilitate control. If the location of the plantation belongs to an individual or private, the local government shall release the land which is then designated as a local protected area and coordinate with the relevant agencies. Policies for the utilization of water resources through the repair of damaged water supply networks, the construction of facilities and infrastructure such as ponds, the dam is absolute in order to store abundant water during the rainy season.

The collection of information for the purposes of water management concerning the number of available water sources showed in Table 2.

**Table 2:** Hydrology potential in Bukit Kelam NTP

Village	Potency Hydrology	Water Volume (M <sup>3</sup> )
Kebong	Mata Kelam river spring	5
	Repian Remaung spring	4
	Putau River	3.5
	Seluti and Kebong River	2
Merpak	Pun Petai spring	3
	Sungai Tapang spring	2.5
	Kolam Nalot spring	2
	Kolam Ragu spring	2
	Riam Besi spring	3
Kelam Sejahtera	Telaga Dalam spring	3,5
	Tepian Lajur spring	3,5
	Telaga Tapang Pening spring	2
	Telaga Lantai spring	2
	Telaga Batu Air spring	3
	Rian Sibau spring	2,5
Samak	Telaga Beji spring	3,5
	Tepian spring	3,5
	Telaga Beruang spring	2
	Telaga Rimau spring	2
	Telaga Labuk Air spring	3

This study observed that communities around the Bukit Kelam area have not been considered fully as an integral part of policy management, but only played in their positions as objects within the framework of decision making. Failure of roles occurs more as a result of actors as policy makers and decision makers, as compared to their counterparts in relation to the activity of performing their roles. Selection of types of tree planted in Bukit Kelam area were sometimes done without consultation with local communities who know the exact condition of the area. Several trees were died because they are planted in the wrong season or unsuitable seeds in the area. The community wished that the trees be planted to provide economic benefits such as fruits, perennial plants and bamboo that can store plenty of water. The low educational level of the community leads to lack of courage to advise or suggest to the local government of Sintang District and Sintang Conservation Area Section II officers.

The local people certainly not only see themselves as mere social communities, but also as ecological communities because of their existence with the values of local wisdom. This study revealed forms of local community wisdom as follow:

**a) Nyelapat**

*Nyelapat* means harvest celebration or a thanksgiving activity for the Dayak tribe community after harvest. Dayak people have their agricultural calendar that marked the harvest celebration with this ceremony that marks the ending of cultivating season activities. This calendar is a kind of timing for harvesting heritage associated with rainy and dry seasons [11].

**b) Teeth cut**

Teeth cut is one of the ceremonies performed on a child who

has grown up with purpose that the child has long aged and kept away from all the calamities that can harm him/her.

**c) Ngemaik Manik**

*Ngemaik Manik* is a ritual of bathing of a child asking the nature spirits to purify the child and protect from any negative force. This event carries out by people in rivers or lakes that exist in the area of Bukit Kelam against a child who was 5 years old.

**d) Bepentik**

*Bepentik* is a customary ritual always done by indigenous peoples which aims to reject calamities, expelling all spirits that are disturbing or wreaking havoc. *Bebentik* always use the type of wood **Kumpang** as many as 30 species formed to resemble the human body and planted near the road and must face the jungle.

**e) Bedarak**

*Bedarak* is a customary ritual performed before opening the fields to plant rice including before harvesting rice. This ritual aims to ask permission to God (*Puyang Gana*) that is the ruling ruler over the forest and the universe. For the word Puyang Gana God is the oldest of the genealogy 7 (seven) descendants of *Sabung Menyulur* and his wife *Pukat Mengawang* as residents of Bukit Kujau in pre-history era. The descendants of *Sabung Beringgur* are the ones who are considered the first to find land in the Sintang area.

**f) Nyemanang**

*Nyemanang* is a sick man's healing ritual by reciting mantras or mixing various types of leaves and roots of wood as a

healing process for the treatment.

The principles outlined above were part of the local wisdom of the community in the Bukit Kelam area inherited from generation to generation as a social institution that was able to organize the behavior of people with nature and with each other. The values of local wisdom contain values of technology integration, religious values, socio-cultural values, practical value, environmental balance, and sustainability that have the functions of protection, conservation, control and preservation of natural resources, one of which was water for people in the region. Respect for nature was then formatted in the form of customary law which forbids the destruction of nature as a place to live and its contents were taboo because it is the same as harassing the ancestors. Protective measures, conservation rescue of the Bukit Kelam wildlife park area along with special regulations on water resources management should be based on policies and decisions that are accommodated from local or indigenous thinking.

The conservation of biological natural resources and their ecosystems is implemented in order to realize the lethal biological natural resources, and can provide ecosystem balance through the protection of life buffer systems, preservation of the diversity of plants and animals and their ecosystems and the sustainable utilization of their natural resources. The management that has been running so far has not shown the real role of local people and trying to sterilize the people from the region. The following case data that occurred in Bukit Kelam NTP were presented in Table 3.

**Table 3: Community Description surrounding Bukit Kelam NTP**

Scope	Empirical fact	Community Participation	Community Participation Action
Age group	Most of the people 25-50 year old	The productive age has the potential to actively participate in the management of the area and has a high activity in utilizing forest products	Conducting various activities to raise awareness of water resources conservation to the community through socialization and counseling.
Education level	Primary or Junior High School graduates	If the level of education supports the better understanding of the water resources conservation	Conducting socialization and counseling of conservation through cultural and familial approach, coming home of people and community leaders around the area
Income level	Mostly below 1 million rupiah	Low income encourages people to do activities utilization of natural resources in the region.	Carry out empowerment activities by developing handicraft woven fabrics and planting brown rice.
Job	Mostly farmer	The higher level of community dependence on the utilization of natural resources is increasingly threatened its sustainability	Organize plantation and craft based training and skills as an effort to reduce dependency
Settlement duration	Mostly inhabit more than 40 years	The longer a person lives in the environment where they live the stronger the psychological bond with the environment.	Providing understanding to the community to maintain the environment and involve in preserving the region.
Number of Family Counts	Average dependent: 2-6 persons	Impacts on the number of family members who help farming and plantation activities, and utilize them	Conducting conservation and education activities and empowerment for the community

The magnitude of the government's role in the management of Bukit Kelam's natural forest park area gives almost no room for local people. Laws and regulations made by the government do not mention the regulation of the role of local communities. Actually, local communities in various places have institutions, knowledge and experience of natural resource conservation. The arrangements granted to the public solely relate to the obligations and restrictions imposed with criminal penalties. The legal facts show that the

issues related to the management of the conservation area are based more on the issue of legal substance than the rules that provide the basis for the operation of that law. The rule of law in a country should be in accordance with the ideals of law and the reality of the society in which the law provides services. The systems and order contained in laws and regulations have not been fully oriented towards values, approaches, souls (souls) including equilibrium values. The Law and Ministerial Regulation applied still have the



potential to cause conflict in the middle of society, and this is proven not yet clear the boundaries of the conservation area of Bukit Kelam with the settlement of the community because the mapping of the area is done unilaterally. This situation conforms to a study that revealed the implementation of top-down management, command and increased control over natural resource management [1]. This management system intends to control ecosystems and socio-economic institutions. An ultimate management mistaken emerges when resource management agencies, through initial success with command and control, lose sight of their original purposes, and focus on efficiency of control. They then become isolated from the managed systems and inflexible in structure. Consequently, through overcapitalization, society becomes dependent upon command and control, demands it in greater intensity, and ignores the underlying ecological change or collapse that is developing. Generally, the community becomes unconcerned and tries to exploit natural resources. In this study, several human activities may threaten the natural resources (Table 4).

The conservation of biological natural resources and their ecosystem in the view of this law is a state affair which is then implemented by the central government. The local government can only do this if it gets delegated authority or runs it as a duty of assistance from the central government. The laws and regulations of the Minister of Forestry that are run are understood by the public to be full of the state's rights and do not provide much of the rights of the local people. The nature of the law has the potential to trigger conflict and repression to the communities surrounding the Bukit Kelam wildlife park which should be part of the conservation effort. The pattern of water resources management in Bukit Kelam Nature Park is not comprehensive yet to integrate spatial planning in relation to the potential of water resources and actual facts in the field as well as adversely affect the area, since it is not yet covered by special regulations on water. Regulations should better protect the interests of weak economic community groups by applying water resource management principles that are capable of harmonizing social, environmental, and economic functions.

**Table 4:** Case in several villages in Bukit Kelam NTP

Village	Actors and case
Kebong	1. Installation of the boundary of vs. Society 2. Water Resources Retrieval Society 3. Retrieval of community business vs. entrepreneurs 4. Logging trees by the community 5. Illegal water pipe installation in community vs. area.
Kelam Sejahtera	1. Installation of the boundary of vs. Society 2. Water Retention vs. Society 3. Community rock collection 4. Logging trees by the community 5. Illegal water pipe installation in community vs. area.
Kelam Sejahtera	1. Installation of the boundary of vs. Society 2. Water Retention vs. Society 3. Community rock collection 4. Logging trees by the community 5. Illegal water pipe installation in community vs. area.
Samak	1. Installation of the boundary of vs. Society 2. Water Retention vs. Society 3. Timber tree felling by the community 4. Illegal water pipe installation in community vs. area.

### 3.2 Supporting and Inhibiting Factors

This study showed that supporting factors for water resource management were as follows:

- The presence of abundant natural resources such as water;
- Good social and cultural environment; and
- Openness of society as well as awareness to participate in maintaining the region.

On the other hand, the factors that hamper the management of water resources were as follows:

- Centralistic policy implementation;
- Unclear scope of boundaries of areas with community settlements, as local community mapping is not involved.
- The local government has not paid special attention to the management of bukit kelam water and the settlement of boundary clarity;
- Weak coordination and cooperation between agencies and with the community; and
- Insufficient number of human resource for preservation (ranger) in the conservation area.

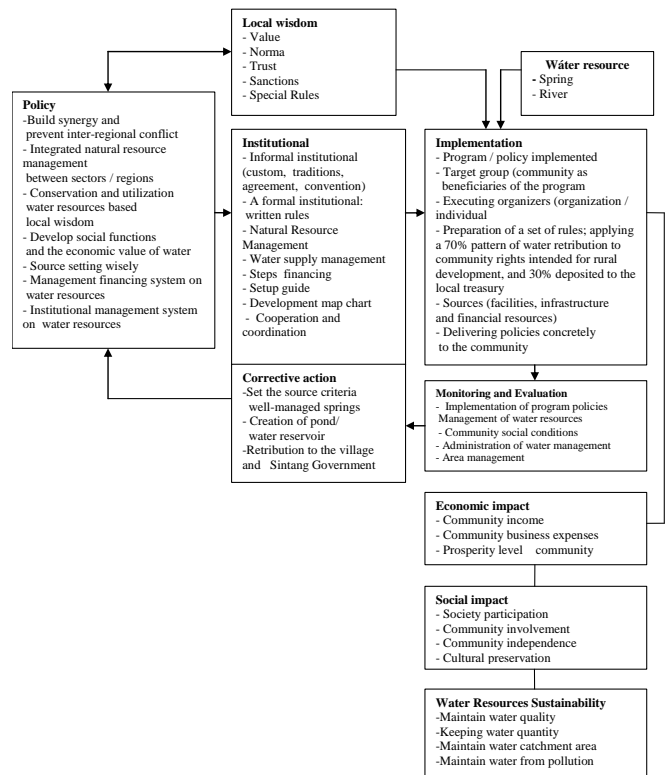
Sintang Tourism Office has built various facilities in Bukit Kelam area that expected to support various activities running smoothly. Some of the factors that influence the participation of development societies are: internal factors are factors of within the community that are influential in the program of community participation. While external factors come from outside the community concerning social aspects, education level, poverty, social position and believe in yourself. Community participation in protected forest area management is influenced by basic livelihoods, dominant by the old and generally done seasonally. In addition it is related to income. Another problem that is problematic in the management of water resources is infrastructure in the area that has not been adequate. Many secondary forests are used to meet housing needs. Most of the secondary forests within the utilization zone are opened and cut down for the purpose of shifting cultivation. Current forms of utilization include timber (carpentry and firewood) and non-timber forest products, forest renewal (for regeneration purposes). Secondary forests have the most important economic significance as a source of wood supply and as a reserve area in shifting cultivation systems. Another challenge facing the community is due to the low level of income and land productivity, since almost one hundred percent of the people depend on land productivity, and many turn to the use of environmental water services. Water business opportunities that are considered to rapidly increase family income have prompted some members of the community to sell springs in the zone of utilization to entrepreneurs.

### 3.3 The Ideal Policy Model in Water Resources Management in the Conservation Area of Nature Park

The basic principles of constitutional policy adopted by the government have not prioritized the improvement of social imperfection in the management of water resources. The West Kalimantan provincial policy on water resources management is regulated through Local Regulation No.

7/2008 concerning the Long Term Development Plan of the Year 2007-2027 namely: Water resources are managed by one management unit and not based on administrative boundaries by taking into account the various interests of the community in each region so that there is a balance of interests between sectors, between central agencies, between provinces, between districts that can finally realize the synergy between stakeholders and prevent conflict both horizontally and vertically. In line with what is expressed by the people around the Bukit Kelam Area in managing the area together with the potential in it is similar to the concept of incremental model that views public policy as a continuation of the activities that have been carried out by the government in the past by only making changes as necessary. Incremental decision-making is essentially remedial and directed more towards improvements to today's obvious social imperfection than promoting future social goals.

The decisions taken from this model resulted in compromise and mutual agreement between many participants. Water resources management in the area should be found compromise approach, where the utilization of water resources not only oriented to profitability, but still maintain and respect local rights. Thoughts submitted by communities around the area as water users are in accordance with what is described by Jacks and Gustafasson [12] that to reduce the problems required cooperation at all levels with stakeholders and communities at the lowest level on policy planning and decision making, where water is an asset and a right for all human beings and should be utilized in the right quantity and quality. However, from that opinion is not enough just to build cooperation, maintaining human relations with water through respect based on beliefs and local custom values. So the biggest problem about water is not just about water supply and scarcity, but from the mistake of deciding on water policy. The main priority should be on how to use or manage water resources wisely. Therefore, it is necessary to manage water resources based on the principle of eco-efficiency, with low cost minimize negative impact on the environment. Eco-efficiency has two principles namely the optimization of environmental carrying capacity and the principle of improving the efficiency of raw materials because it will save water usage. The ideal policy model for water resources management is incremental, which puts forward decisions based on compromise and collective agreements between many participants, because the local communities of four Kebong, Kelam Sejahtera, Merpak and Samak villages want a joint regulation based on the local wisdom values of the community applying a 70% pattern of water retribution to community rights intended for rural development, and 30% deposited to the local treasury (Figure 1).



**Figure 1: Policy Model in Water Resources Management in the Conservation Area of Nature Park**

Management arrangements need to adapt to local conditions, physical and contain fairness principles for all users; strengthening coordination, integration, synchronization and simplification between existing agencies. Apply a clear legal basis at the local level. Community participation in water resources management through the Air Care Forum of Bukit Kelam Nature Tourism Area is of course important to be supported. Improvements in the quality of water resources management such as institutional infrastructure and the recognition of the tribal rights of local communities should be understood as citizens together an indigenous legal partnership based on the similarity of residence and harmony.

#### 4. Conclusion

Management of water resources through local government policy and local wisdom in the conservation area of Bukit Kelam NTP apply the law and other regulation. Regional Regulation About Spatial Planning of Regency is accommodating utilization zone in natural forest park area of Bukit Kelam mentioning that the importance of conservation of natural resources one of them water. The government is still dominant in its role over the local community, and it is full of state rights. Water resources management policies implemented so far have not fully demonstrated the principle of harmony between social, environmental, economic, and far-reaching interests from the principles of justice and sustainability, norms, standards, guidelines and criteria, community interests and local wisdom.

Supporting factors are the existence of abundant natural resources such as water, social and cultural environment is

very good and openness of society as well as awareness to participate in maintaining the region. While the factors that hamper the management of water resources is the implementation of policy is still centralized, the scope of the boundaries of areas with community settlements that have not been clear, because the local community mapping is not involved, the weak coordination and cooperation between agencies with and the number of tbsp in the conservation area is still lacking.

The ideal policy model for water resources management is incremental, which puts forward decisions based on compromise and collective agreements between many participants, because the local communities of four Kebong, Kelam Sejahtera, Merpak and Samak villages want a joint regulation based on the local wisdom values of the community applying a 70% pattern of water retribution to community rights intended for rural development, and 30% deposited to the local treasury. Management arrangements need to adapt to local conditions, physical and contain fairness principles for all users; strengthening coordination, integration, synchronization and simplification between existing agencies. Apply a clear legal basis at the local level. Community participation in water resources management through the Air Care Forum of Bukit Kelam Nature Tourism Area is of course important to be supported. Improvements in the quality of water resources management such as institutional infrastructure and the recognition of the tribal rights of local communities should be understood as citizens together an indigenous legal partnership based on the similarity of residence and harmony.

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