



The IAD method in analyzing the transfer of right of water utilization at Gunung Gede Pangrango National Park, Indonesia

¹Rudy D. Siswanto, ²Hariadi Kartodihardjo, ²Hendrayanto, ³Dudung Darusman

¹ Study Program of Natural and Environmental Resource Management, Graduate School Faculty, IPB University, Bogor, Indonesia 16880; ² Forest Management Department, Faculty of Forestry, IPB University, Bogor, Indonesia 16880; ³ Silviculture Department, Faculty of Forestry, IPB University, Bogor, Indonesia 16880. Corresponding author: R. D. Siswanto, rudy_siswanto@apps.ipb.ac.id

Abstract. This study aims to examine the transfer of water utilization rights in Mount Gede Pangrango National Park (TNGGP). The study uses a multi-factor approach with institutional analysis and an institutional analysis and development (IAD) model to assess the implementation of the transfer of water utilization rights from the TNGGP area. Based on the research results, the high transaction costs as a characteristic of water resources taken from TNGGP as well as the gap between rules in form and rules in use in water utilization had an impact on the implementation of commercial and non-commercial use problems. The asymmetric information between managers caused the unclear implementation of regulations related to the management of the proportion of water volume that could be utilized based on Regulation of The Minister of Environment and Forestry of The Republic Indonesia Number P.18/2019. In addition, the mismatch of contract designs in rules creation did not adjust to the social and economic conditions of IPA (water utilization permit) holders and IUPA (water utilization business permit), which caused adverse selection behavior and moral hazard in the form of opportunistic behavior, including rent-seeking and negligence. Opportunities for increasing the use of water intake from TNGGP include measuring the proportion of water utilization immediately, minimizing asymmetric information by involving agents, and applying the principle of equality between agents and principals in making regulations, as well as evaluating the design of the IPA and IUPA contracts.

Key Words: asymmetric information, high transaction cost, IAD, transfer of right.

Introduction. Mount Gede Pangrango National Park (Taman Nasional Gunung Gede Pangrango or TNGGP) has a very strategic role as a catchment area that functions as a source of water for the location below. The TNGGP area is one of the mainstays to support the economic growth of the surrounding area. However, the contribution of forest benefits in providing flowing water all the time has not received proper appreciation from water users/beneficiaries of water environmental services (USAID Indonesia 2006).

The problem of managing natural resources is very important for current and future economic development. On the other hand, without proper regulation, natural resources will continue to degrade, especially in terms of usage to achieve business and economic goals. This problem often arises as a result of misleading policies because these policies affect conflicts resolution. As Ribot et al (2006) said that the weakness of forestry development policies so far is the result of previous mistakes, which are the unclear definition of problems and institutional aspects of forest management.

In many cases, the emergence of environmental problems involves an unequal distribution of benefits and burdens. In the end, the benefits go to those who have power, while the burden is mostly borne by those who are weak. Thus, the stark differences in rights between various layers of society are one of the main causes of natural resource and environmental problems (Sanginga et al 2007). Ratner et al (2013) stated that very unequal ownership rights that take away the rights of many people and

even basic means of living can lead to conflicts. This is the impact of the problem of institutional strengthening failure.

The alleged failure to strengthen the institutional utilization of water intake from TNGGP, among others, is related to (1) policy narratives that tend to assume that legal instruments or legality aspects are the main and even single reference in solving problems. For example, when there is a mismatch between Regulation of The Minister of Environment and Forestry of The Republic Indonesia Number P.18/2019 Regarding the Use of Water and Water Energy in Wildlife Reserves, National Parks, Grand Forest Parks, and Nature Tourism Parks with Law Number 17 of 2019 concerning Water Resources, BBTNGGP (Balai Besar Taman Gunung Gede Pangrango National) chose to wait for regulations derived from the Law to resolve the problem. In other words, legal and authority aspects do not always have sufficient regulatory power; (2) The role of the BBTNGGP manager is weak because it often emphasizes outputs, not outcomes. The BBTNGGP management works based on the prevailing laws and regulations, which refers to the performance of administrative aspects, for example, IPA and IUPA requirements, as the fulfillment of administrative requirements not as an effort to conserve the environment. So, the problem is how to get around the conflicting conditions in this rule. In the short term, efforts that can be made are to overcome the occurrence of the policy trap above.

The change in the orientation of the water use policy in TNGGP is divided into three phases, namely the pre-FORPELA phase (before 2006), the FORPELA phase (2006-2013), and the Regulation of The Minister of Environment and Forestry of The Republic Indonesia Number P.64/Menhut-II/2013 phase. Previously, regulations related to water utilization activities in nature conservation areas were not yet available, so since 2006, the use of water in TNGGP has been managed under a partnership concept. This is done through the formation of FORPELA (Forum Peduli Air or Water Care Forum) and TNGGP, whose members are direct water users from the TNGGP area. This partnership is manifested in the form of a cooperation agreement between users and BBTNGGP.

In 2013, the issuance of the Regulation of The Minister of Forestry of The Republic Indonesia Number P.64/2013 regarding the Use of Water and Water Energy in Wildlife Reserves, National Parks, Grand Forest Parks, and Nature Tourism Parks caused FORPELA to gradually fail so that water use institutions changed. Regulation of The Minister of Environment and Forestry of The Republic Indonesia Number P.64/Menhut-II/2013 stated that each user must have IPA and IUPA permits. IPA and IUPA permits are managed by BBTNGGP. The IPA permit is issued by TNGGP while the IUPA permit is issued by the Minister of Environment and Forestry. FORPELA has gradually ceased to function since the enactment of The Minister of Forestry Regulation Number P.64/2013, which was subsequently updated with The Minister of Environment and Forestry Regulation Number P.18/2019. The Minister of Forestry Regulation Number P.64/2013 and The Minister of Environment Forestry Regulation Number P.18/2019 do not have significant differences. The difference is only in The Minister of Environment Forestry Regulation Number P.18/2019 the process and issuance of commercial permits is carried out through an Electronically Integrated Business Licensing or Online Single System (OSS).

According to Page (2005), a fundamental change in policy orientation to avoid major problems is important, especially as a result of the environmental damage consequences. A change in policy orientation can only be done if a certain phenomenon can be comprehensively understood from various perspectives. In addition, changes in value also have an important role. Oftentimes, attempts at institutional change, in this case, are a rule of the game, and instruments are not followed by a renewal of the philosophical foundation and framework usage. As a result, regulations have multiplied, institutions have multiplied, institutional names have changed frequently, but the types of policies implemented have not changed. In fact, there is no change in the field. As noted by Kestler et al (2019), "institutionalization involves infusing a structure with value".

Based on the description above, it is necessary to perform an institutional analysis because the institution is an important factor that can determine the success of the right to water utilization from conservation areas (TNGGP). Institutions are often insufficient to

ensure long-term forest management since rights to natural resources can be represented by realizable access due to certain socio-political relations (Ribot & Peluso 2003). The purpose of this study is to determine the effect of water resources characteristics on the arena of action, examine rules in form and rules in use, examine action arenas in the context of transferring rights and examine forms of right transfer improvement to improve water use performance in TNGGP.

Material and Method

Research approach. This study combined a multi-factor approach with an Institutional Analysis Development (IAD) analysis and development model to assess the implementation of water use from TNGGP. In the study of natural resource management, it is necessary to use a multi-factor approach framework with an institutional analysis development model (IAD) (Ostrom 2011).

Location and time of research. The research was conducted from December 2019 to February 2020. The research locations were in the Cianjur and Sukabumi Management Areas, Mount Gede Pangrango National Park, which are administratively located in Sukabumi and Cianjur Districts, West Java Province. The research location is shown in Figure 1.

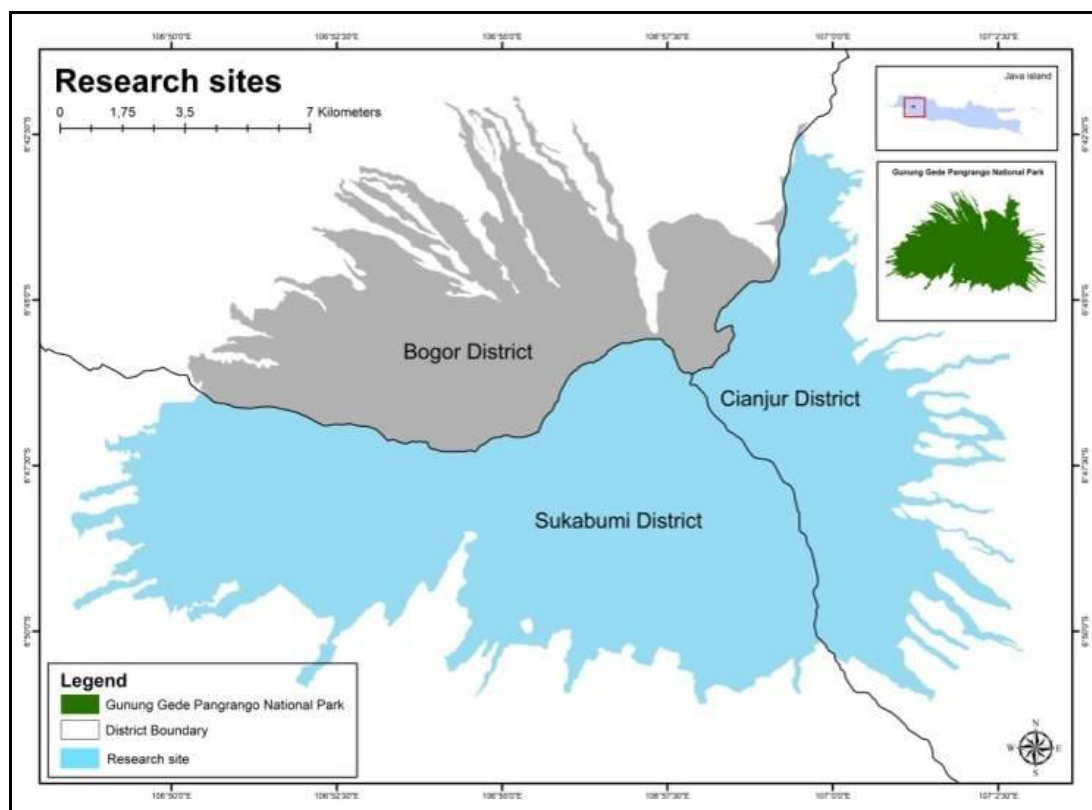


Figure 1. Map of research locations in Cianjur and Sukabumi Districts
Map source: Rupa Bumi Indonesia (2016), Map of Forest Areas from the Ministry of Environment and Forestry (2017).

Method of collecting data. Data collection was done through focus group discussion (FGD) and in-depth interviews with stakeholders, consisting of BBTNGGP staff, resort chiefs, non-commercial water users, commercial water users, and village heads/village officials. In addition, we used secondary data through literature studies conducted on previous research, documents, and relevant literature.

Data analysis. The IAD analysis model was chosen because it is easily adaptable to various contexts and has been applied to various analyzes of institutional failures in natural resource management. This framework considers the existence of exogenous factors which are conditions that influenced the action arena of actors, which determine the institutional functions that can work, and how to place local communities as subjects. This approach allows the inclusion of contextual factors following field conditions. As a dynamic framework, performance will in turn be incorporated into and influence the context and arena of subsequent action (Ostrom 2008). The exogenous factors in the figure combined three factors, namely: (a) natural resources characteristics, (b) natural resources users, and (c) governance including “special rules” determined the use of natural resources in the field (Ostrom 2011) (Figure 2).

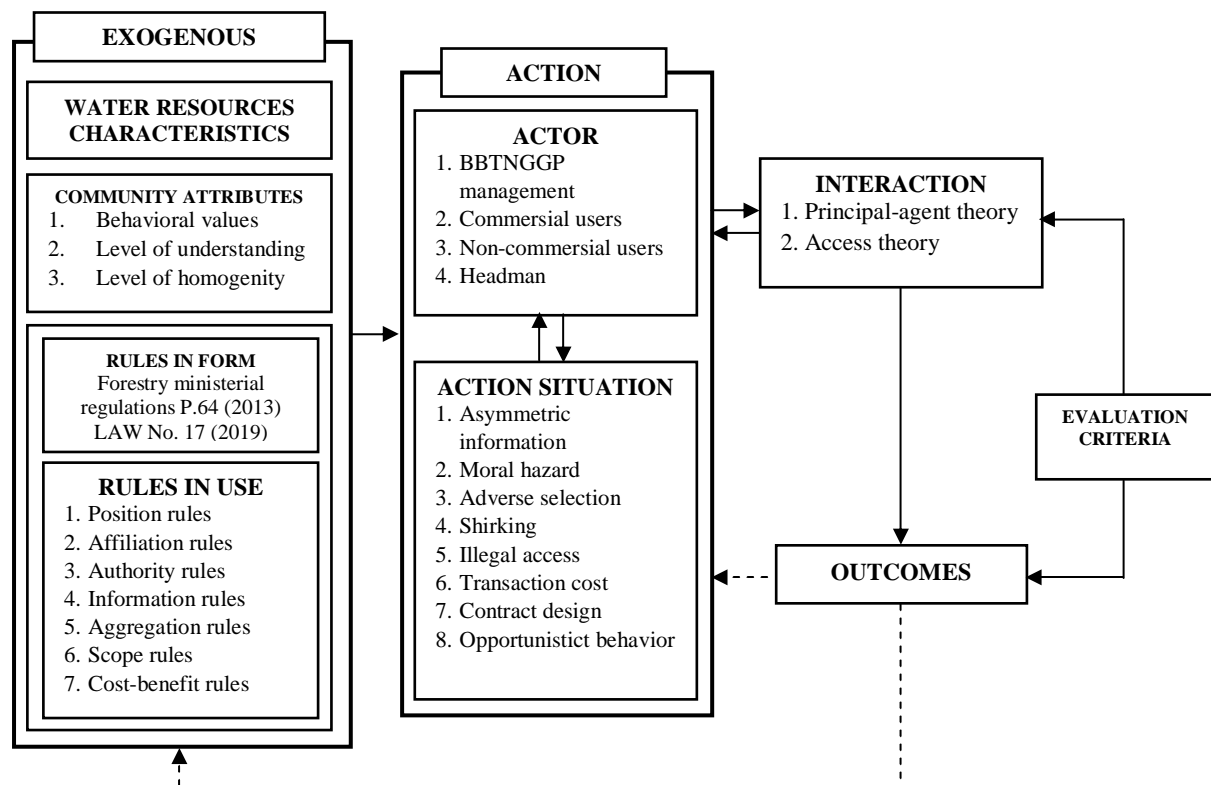


Figure 2. The research framework based on the IAD analysis model (Ostrom 2011).

Results and Discussion

Natural resource characteristics, community attributes and rules of the game

Natural resource characteristics. Ordinary people generally consider water sources from conservation areas as public property, such as the use of water from TNGGP. This makes it difficult for water users to understand the rights to use water and obligations in water management. In addition, based on the FGD with BBTNGGP managers and non-commercial water users, the potential value of water is difficult to clearly define, and the uncertainty of conditions such as drought during the dry season causes information between the parties involved to be different. This silo information results in a price for finding information which is called a transaction fee. According to Kartodihardjo et al (2015), natural resource management is characterized by high transaction costs, mainly due to a lack of valid information and policy processes. Without adequate information and policy processes, various decisions and transactions between parties involved and affected by the management of natural resources and the environment will not proceed as expected, resulting in high transaction costs.

According to Williamson (1981), information is not only about the amount of natural resources reserves, but also about the allocation and usage of natural resources,

damage to natural resources, the process of making and substance of policy, as well as research results. Information gaps also affect the performance of development policy implementation. Thus, transaction costs are not only costs of obtaining information about natural resources and the environment, but also include costs for coordination, policy-making, policy evaluation, and also establishing and controlling contracts between certain parties. The transaction costs mentioned are not official fees set by the government, but rather informal costs. In terms of utilizing water from TNGGP, transaction costs are billed for the following needs: preparation of proposals for submission, preparation and implementation of Annual Work Plans, construction of facilities and infrastructure, maintenance, and also coordination between related parties.

In connection with the matters previously described, the more asymmetric information, the higher the transaction costs incurred by the parties (Williamson (1975) in Bergh et al (2019)). This is inseparable from institutional elements and policy instruments that have not functioned effectively to make people aware of the importance of water management so that weak integration of technical aspects and institutional systems has occurred in water resource management conflicts. Therefore, according to Kartodihardjo & Jhamtani (2006), two of the many benchmarks for the success of institutional arrangements are an increase in information availability and a decrease in transaction costs. This statement is supported by Williamson (1981) that the economic approach in studying organizations uses transaction cost analysis that focuses on efficiency.

Community attributes. Apart from natural resource characteristics, community attributes also influence the arena of action. The community attributes associated with the research consist of (a) behavioral values, (b) the level of homogeneity, and (c) the level of understanding (Ostrom 2011). Behavioral values in the context of utilizing water intake from TNGGP consist of: (a) community ignorance of water utilization regulations and water resource conservation, (b) shifting local cultural values that result in moral hazard and adverse selection, and (c) commercial users prefer illegal access because the issued capital is smaller. This information is based on the interview with the resort chief (part of BBTNGGP management), non-commercial water users, and village officials. The level of homogeneity in the context of extracting water utilization from TNGGP consists of (a) various interests and individual preferences, and (b) diversity of knowledge and information. This information is based on the interviews with BBTNGGP managers, resort heads, non-commercial water users, commercial water users, and village officials. Besides, the different perception related to the source of water intake from TNGGP is between BBTNGGP managers and users.

Rules. Apart from the resource characteristics and attributes of the community, what influences the arena of action is the rules of the game. The rules of the game in question are rules in form and rules in use. Before Law no. 17 of 2019 concerning Water Resources was issued, the rules used in the management of water extraction from TNGGP were the Regulation of The Minister of Environment and Forestry of The Republic Indonesia Number P.18/2019. The concept of rules used by Ostrom (2011) consisted of position rules, boundary rules, options for rules, aggregation rules, information rules, coverage rules, and payment rules. The findings in the regulatory analysis are based on the concept of rules used to consist of position rules, boundary rules, choice rules, scope rules, and payment rules (Table 1).

Table 1

The comparison between rules in form and rules in use in water utilization in TNGGP

	<i>Rules in form</i>		<i>Rules in use</i>
	<i>Forestry ministerial regulations P. 18/2019</i>	<i>LAW 17/19</i>	
Position rules	The BBTNGGP issues an IPA for non-commercial user. Director General for forest protection and conservation, Minister of Environment and Forestry, through OSS (<i>Online Single Submission</i>) issues an IUPA for commercial user.	Provincial / District / City Government as regulator, determinant, and issuer of permits for the use of water resources for non-commercial water users.	Based on the results of interviews with non-commercial water users and village apparatus, users who do not have an IPA take advantage of social relations with the BBTNGGP manager so that they can access water without having to have an IPA.
Boundary rules	Stages of obtaining IPA and IUPA: administrative requirements, the annual work plan, verification and assessment, issuance of IPA and construction of facilities and infrastructure. An additional requirement for IUPA is the payment of dues.	Non-commercial water users must have licensing from the Central Government, Provincial Government, Regency / City Government in accordance with their respective jurisdictions.	Based on the results of interviews with BBTNGGP staff, some communities have complied with the regulations, but there are still many communities who use illegal access, especially commercial users.
Choice rules	<ul style="list-style-type: none"> - The rights of IPA and IUPA: to carry out water utilization activities according to the permit granted and to receive services and guidance; - Obligations of IPA and IUPA holders: compile and implement the annual work plan, and submit activity reports; - IUPA holders also have the obligation to pay water utilization fee and process an environmental permit. 	<ul style="list-style-type: none"> - The communities have the right to use water for the fulfillment of their minimum daily basic needs, smallholder agriculture, and non-business activities; obtain information; as well as filing reports and complaints; - The communities as water users have the obligation to protect and maintain the continuity of the function of water resources. 	Observations show that the communities do their rights but rarely carry out their obligations if they are not accompanied.
Aggregation rules	None	None	Based on the results of FGD, when there is a conflict between non-commercial and commercial water users, BBTNGGP becomes the intermediary. This is a downside, given the importance of a "solution" mechanism when there is disagreement between participants.

Information rules	None	None	The mechanism for conveying information regarding the water utilization permit process is submitted to BBTNGGP which manages the conservation area.
Scope rules	The use of water is classified into non-commercial and commercial activities. Non-commercial use of water includes household needs and social interests. The use of commercial water includes bottled drinking water; local water company; agricultural, forestry, plantation, tourism and other industrial activities.	People's rights to water include daily basic needs, people's agriculture, drinking water supply systems, while the utilization of water resources in nature reserves and nature conservation areas is prohibited except for the fulfillment of daily basic needs which are not used as a form of business.	Based on the results of interviews with BBTNGGP staff, the rules used before the issuance of Law 17/2019 were Forestry Ministerial Regulations P.64/2013 and Environment and Forestry Ministerial Regulations P.18/2019. After the issuance of Law 17/2019 there was confusion with the management of BBTNGGP.
Pay-off rules	- The source of funding for the construction of water utilization facilities and infrastructure is planned by the permit applicant; - Holders of IUPA have the obligation to pay water utilization fee.	Funding for water resources management can come from: state budget, regional budget, and other legal sources in accordance with statutory regulations.	The source of funding for the construction of water utilization facilities and infrastructure is planned by the permit applicant. However, many commercial users do not apply for permits due to objections to the amount of fees that must be paid. It is better if discussions are held with entrepreneurs in order to have an agreement on the balance of costs borne and benefits obtained.

Agency relationship. An agency relationship is a contract in which one or more people (principal) assign another person (agent) to exercise part of the principal's authority and includes the delegation of a portion of the authority to make decisions (Jensen & Meckling 1976). The concept of the principal-agent relationship in managing the water utilization intake is practiced in the process of transferring rights through IPA and IUPA, where the government as the principal gives the authority to manage water extraction from TNGGP to business entities or community groups as agents.

The transfer of rights through IPA and IUPA has been carried out by BBTNGGP after performing an inventory of water resources. In fact, based on the results of interviews with BBTNGGP managers, the minimum and maximum water flow calculations had not been carried out until the time the research was conducted. Based on regulations, the volume of water that can be utilized is at most 50% of the minimum water discharge in the utilization area, according to the results of the water resources inventory. For non-commercial interests, the maximum percentage is 30% and for commercial purposes, the percentage is 20%. A minimum water debit inventory in the utilization area had been carried out, but the predetermined use proportion had not been implemented (BBTNGGP 2018). This is evidenced by the absence of water meters on

both commercial and non-commercial utilization intake tanks. In addition, the absence of no water meters on both commercial and non-commercial tanks confirms the phenomenon of asymmetric information between principals (Ministry of Forestry and BBTNGGP managers), agents (commercial and non-commercial users), and between the actors themselves.

The phenomenon of asymmetric information caused adverse moral hazards and adverse selection (Stiglitz 2002). Moral hazard behavior due to asymmetric information carried out is related to transaction costs where commercial users object to the licensing fees. As a result, opportunistic behavior among commercial users can be observed by choosing illegal access over legal access because they do not need to arrange permits or pay PNBP. This happens because the principal is not able to control and supervise the agent in the manufacture of the water intake and distribution tanks or negligence (shirking).

It is not only commercial users who engage in moral hazard due to information asymmetry, but also the surrounding non-commercial communities. They ventured into rent-seeking activities, which is by distributing water intake to commercial users. Rent-seeking is a form of opportunistic behavior. According to Jensen & Meckling (1976), the theory and concept of transaction costs stated that in principle, the high transaction cost situation that occurs will cause moral hazard behavior from the parties involved. Moral hazard behavior in forest management is a form of opportunistic behavior or free riding, which includes suboptimal behavior, neglect, rent-seeking, and corruption.

Asymmetric information relating to non-commercial users related to licensing administration and preparation of Annual Work Plan documents. Based on the BBTNGGP (2018) assessment and the results of the FGD with BBTNGGP managers and non-commercial water users, the implementation of the Annual Work Plan by water users had not been carried out properly. The preparation of licensing documents and Annual Work Plans for non-commercial users who did not pay attention to the capacity and socio-economic conditions of the community was the cause of poor implementation of the Annual Work Plan. This was related to the contract design that did not go through the stages of involving the community as water users in drafting regulations.

The phenomena of asymmetric information, shirking, and rent-seeking cause conflicts of use and unequal distribution. Based on the interviews with non-commercial water users, conflicts arise between non-commercial users are due to drought (small water discharge). In addition, the social jealousy phenomenon of illegal commercial users who receive water distribution is abundant compared to non-commercial ones. When non-commercial users experience a long drought, some people plug their pipes into illegal commercial users. On the other hand, weaknesses related to authority regulations occur due to the absence of regulations that impose sanctions on administering users (construction of facilities and infrastructure) without an IUPA permit. In addition, if the commercial water utilization permit is not regulated, it will not prevent business actors from utilizing water extraction from TNGGP and will instead encourage an increase in illegal use and the loss of potential Non-Tax State Revenue.

Water use access strategy. Access, in theory, has a different understanding from conventional access understanding as generally studied in the framework of property rights. Access to water intake utilization from TNGGP is divided into two, namely legal access and illegal access. Based on the interviews with resort chiefs and commercial water users, the procedures for legal access to commercial water use have gone through the application stage of utilization by meeting administrative requirements, technical considerations, assessments, payment orders, issuance of IUPA permits, and also facilities and infrastructure construction. Meanwhile, the stage of illegal access is only through communication with village governments and the direct construction of facilities and infrastructure. Stages of legal access for non-commercial users through the application stage for utilization by fulfilling administrative requirements, prepare an annual work plan, statement of technical considerations, assessment, IPA permits issuance, and build facilities and infrastructure. Meanwhile, the stages of illegal access

passed are only communication with the resort chiefs and the facilities and infrastructure construction.

The power used in the utilization of commercial water intake from TNGGP consists of capital, social relations, and knowledge. Power capital is the most influential variable related to water utilization access. Based on the interviews with resort chiefs and non-commercial water users, there is a disincentive for the general public to follow the access process legally due to the long process. Thus, they prefer to access illegally. Legal access will require licensing documents, taxes, and infrastructure development, while illegal access to capital will only require infrastructure development. Meanwhile, the power used for non-commercial use consists of social identity, social relations, and knowledge. Access to knowledge is the most significant determinant of a person having access to water for non-commercial use. This is due to non-commercial illegal negligence in the preparation of permit documents and the preparation of Annual Work Plan documents. This is following the opinion of Blaikies' in Ribot & Peluso (2003) which explains that capital and social identity affect who prioritizes access to resources.

Evaluation criteria. Institutional performance that has not been good is indicated by the large number of users who do not have utilization permits. This results in a conflict of utilization so that evaluation is necessary. The evaluation criteria consist of the structural, behavioral, and performance of the situation. The structural criteria consist of regulatory disharmony (there are inconsistencies in the design of the IPA and IUPA permits), minimal involvement of agents causing asymmetric information, and conflict of rules due to asymmetric information in management principles (Table 2). According to Armitage et al (2009), responding to complex socio-ecological systems requires adaptive co-management, which includes innovative institutional arrangements and opportunities to link science with policy. According to Diamond (2005), the failure to learn in various nations is caused by the weakness of decision-makers to understand the existence of complex social conditions (complex society). Characteristics of a complex society include centralized decisions, high information flow, high coordination, instruction by formal authorities, and concentration of resources. The existence of complex societies without the institutional capacity to cope with them almost always fails.

Table 2

Evaluation criteria

<i>Structure and situation</i>	<i>Behavior and performance</i>	<i>Input improvements</i>
<p>Structure</p> <p>1. Regulatory disharmony: incompatibility of IPA and IUPA contract designs;</p> <p>2. Lack of agent involvement: asymmetric information;</p> <p>3. Clash of rules;</p> <p>4. Asymmetric information in principal management.</p> <p>Situation</p> <p>High transaction cost.</p>	<p>1. Asymmetric information in management principal causes unclear implementation of rules related to the management of the proportion of use. Procurement and supervision of intake meters as control of utilization proportion is not available;</p> <p>2. Criteria for contract design are not in accordance with the social and economic conditions of both commercial and non-commercial users, causing opportunistic behavior, triggering high transaction costs, rent-seeking, adverse selection, moral hazard and shirking. This behavior leads to illegal access, which leads to unfair distribution and conflict of use.</p>	<p>1. The BBTNGGP operator will immediately measure the proportion of water use as mandated in Permenhut P.64 / 2013;</p> <p>2. Minimizing asymmetric information by involving agents and implementing the principle of equality between agent and principal in making regulations. In addition, it is necessary to align the regulations so that there is no confusion in the implementation due to regulatory conflicts;</p> <p>3. It is necessary to evaluate the contract design for both IUPA and IPA.</p>

Conclusions. There are several conclusions from this study. First, there are high transaction costs as a characteristic of water resources from BBTNGGP and the gap between rules in form and rules in use, which resulted in problems in implementing commercial and non-commercial water utilization. Second, asymmetric information in principal management causes the unclear implementation of regulations related to the management of the proportion of water volume that can be utilized based on the Regulation of the Minister of Environment and Forestry of The Republic of Indonesia Number P.64/Menhut-II/2013. In addition, the contract design is mismatched, and the rules made have not adjusted to the socio-economic conditions of both the IPA and IPA permit holders. This causes adverse selection behavior and moral hazard in the form of opportunistic behavior, including rent-seeking and shirking. This behavior leads to illegal access, which leads to unfair distribution and conflicts of utilization. Third, opportunities to improve water utilization from BBTNGGP include measuring the proportion of water use as mandated in the Regulation of the Minister of Environment and Forestry of the Republic of Indonesia Number P.64/Menhut-II/2013, minimizing information asymmetry by involving agents, implementing the equality principles between agents and principles in making regulations, and evaluating contract designs for both IPA and IUPA permits.

This study recommends input for improvement through installing water meters in the collection tanks and measuring the proportion of water utilization, minimizing asymmetric information, and also evaluating the IPA and IUPA contract designs as described above. The administrative requirements for the licensing of artists, making activity plan documents and preparing Annual Work Plans, should be carried out by the BBTNGGP management and the community together.

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Authors:

Rudy Dwi Siswanto, Study Program of Natural and Environmental Resource Management, Graduate School Faculty, IPB University, Academic Ring Road Campus IPB Dramaga, 16680 Bogor, Indonesia, e-mail: rudy_siswanto@apps.ipb.ac.id

Hariadi Kartodihardjo, Forest Management Department, Faculty of Forestry, IPB University, Academic Ring Road Campus IPB Dramaga, 16680 Bogor, Indonesia, e-mail: hakabgr@gmail.com

Hendrayanto, Forest Management Department, Faculty of Forestry, IPB University, Academic Ring Road Campus IPB Dramaga, 16680 Bogor, Indonesia, e-mail: hendrayanto@gmail.com

Dudung Darusman, Silviculture Department, Faculty of Forestry, IPB University, Academic Ring Road Campus IPB Dramaga, 16680 Bogor, Indonesia, e-mail: dudungdarusman@gmail.com

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