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REGULAR RESEARCH ARTICLE

Assessing Integration of Science in Policy-Making Process of the Utilization of Abandoned Lands in Indonesia: Case of Bogor Regency

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ABSTRACT

Science cannot directly influence policy without a process of knowledge transfer and integration into policy-making called the science-policy interface. On the other hand, not all scientists intend to use their knowledge and findings to influence policy-makers. This condition causes a gap between science and policy. The main objective of this study is to identify various "knowledge products" that have varying amounts of policy space, understand the power relations between actors, and identify and analyze the process of integrating knowledge products into the policy-making process for abandoned land in Bogor Regency. The primary method used in this study is the RAPID (Research and Policy in Development) analytical framework. The study indicates that policy-makers will adopt the scientific evidence if they follow their organization's Main Performance Indicators (KPI) or gain political or economic benefits. The role of the lower-level bureaucracy as the implementing agency is crucial in the policy adoption process. The people "behind the organization" and "policy intrapreneurs" have an essential role in integrating scientific knowledge and policy. Scientific products, such as modeling, are often more effective in convincing policy-makers. The scientific evidence will become good advice and have a more significant impact when they meet policy-makers' interests. The study concludes that it is challenging to integrate science into policy-making without mutual trust amongst formal and informal network actors who have access to policy-makers to utilize abandoned lands in Bogor Regency.

KEYWORDS

Abandoned Lands; Landuse Policy; Policy Adoption; Product of Knowledge; Science-Policy Interface

1. INTRODUCTION

A policy formulation resulting from scientific evidence or the product of knowledge cannot directly influence policy without a process of knowledge transfer and integration into policy-making (Miller, 2009; Nurrochmat et al., 2020). According to Ascher (2000), the process of making a policy is complicated, where four sources of complexity can hinder the transfer of knowledge to policy-makers, namely (1) the complexity of the objectives (trade-off); (2) procedure complexity (intra-organization); (3) the complexity of the system, and (4) the complexity of the doctrine and approach. On the other hand, not all scientists intend to use their scientific knowledge or research findings to influence policy-makers (Jones et al., 2008; Godfrey et al., 2010; Gill & Johnston, 2010; Pielke Jr., 2007).

Many works of literature conclude that improving the integration of scientific evidence into the policy-making process could be done by advocating to mediate scientists with policy-makers (Wonosaputra, 2015; Pielke Jr. 2007; Ekayani et al., 2016). However, there is no consensus on what mediation should be and how it should

be organized, and there is little empirical evidence on how mediation works (Cash et al., 2003; Choi et al., 2005; Box & Engelhard; 2006). Therefore, researchers must consider how science can contribute to policy-making (Pielke Jr. 2007; Ekayani et al. 2015).

According to Böcher and Krott (2016), the end product of the science-policy interface is adopting policies that can be in the form of political action, practical action, and scientific publications. According to the Institute Development Study (IDS) (2006), three factors influence policy adoption: knowledge or discourse, actors or networks, and politics or interests. If these three factors are met, the scientific knowledge and evidence will have an excellent opportunity to adopt policy-makers or have more significant policy space (Böcher & Krott, 2016; Ekayani et al. 2016; Nurrochmat et al. 2017).

The Directorate of Strategic Studies and Agricultural Policy (KSKP IPB) and the Directorate of Student Affairs and Career Development (DITMAWAPK IPB) reported the indication of abandoned lands in 2013 and 2020. Totally, 29 activities have been implemented, consisting of 11 scientific publications, 17 practical actions, and one political action (Table 1). New knowledge is produced by bringing the scientific evidence into policy-making, often called a science-policy interface process.

According to Kartodihardjo (2017), policy-making is a gradual, complex, and non-linear political process that can be interrupted or run slowly and heavily, an iterative process and often based on experience, learning from mistakes, and taking lessons from past policies. Moreover, policy-making almost always involves competition and overlapping agendas, leading to a debate between actors and interests (Sahide et al., 2015; Harbi et al., 2016; Nurrochmat et al., 2017; Erbaugh & Nurrochmat, 2019). In this regard, understanding the process of integrating scientific evidence into policy-making is very important to increase scientists' access to the policy-making process.

Generally, policy-makers cannot immediately adopt scientific evidence or knowledge products from political actions, practical actions, and scientific publications. According to Beam (1996) in deLeon & Vogenbeck (2007), policy analysis is filled with fear, paranoia, worry, and resistance. Heineman et al. (2002) in deLeon and Vogenbeck (2007) state that scientific knowledge access to policy improvement is still relatively low. Therefore, a proposed policy formulation cannot automatically affect to change of policy. According to Nigro & Nigro (1980), factors that can influence policy-makers are external pressure, old habits (conservative), personal traits, groups from outside, and past circumstances (Nurrochmat et al., 2016). Furthermore, modern public policy analysis reveals that, in reality, the policy adoption process is often not linear, and the policies issued do not always have to be the solution to a problem (Böcher & Toller, 2012). The rational space for science-based solutions is, in fact, much smaller than theory. Actors will follow their interests without fully exploring the use of science (Braun & Benninghoff, 2003). Therefore, a scientific adoption depends on the science's quality and usefulness for the concerned actors (Ekayani et al., 2015).

Policies regarding the use of abandoned land will lead to interrelationships in the social, economic, political, legal, and cultural fields, which in practice also involve the interests of various actors. The analysis of interrelationships in the management of abandoned land is similar to forest resource management (SDH). According to Nugroho et al. (2015), this management at least includes 1) preferred allocation; 2) multi-stakeholder and multi-sectoral interests; 3) can influence other actors in a positive (economic externality) or negative (externality dis-economic) both intra- and inter-generational and 4) must be fairly distributed. The interrelationships between these actors then need to be arranged in a game rule that can regulate and control the behavior of individuals in society or organizations to prevent opportunistic and mutually detrimental behavior. Therefore, the behavior of individuals and organizations in

maximizing their welfare can be more predictable (Kasper & Streit, 1998; North, 1990; Rodgers, 1994). About 97% of the indicated abandoned lands in this study are categorized as private property. According to Nugroho (2016), it is clear who the owner is and who will benefit and bear the loss from mismanagement in private ownership. Management inefficiencies will directly impact the owners and encourage them to take immediate action. Although the land indicated as abandoned in this study is included in private property, it is also related to the public interest in maximizing mutual welfare. In this context, the Bogor Regency government needs to adopt a scientific-based policy to increase the utilization of abandoned lands.

This study will discuss the following research questions: first, what product of knowledge typology has the most prominent policy space; second, how to understand the power relations between actors in integrating science into policy; and third, how to understand the process of integrating knowledge into policy-making for land use indicated as abandoned in Bogor Regency. This research aims to identify various "knowledge products" with varying amounts of policy space, understand the power relations between actors, and identify and analyze the process of integrating knowledge products into the policy-making process for abandoned land in Bogor Regency.

2. MATERIALS AND METHODS

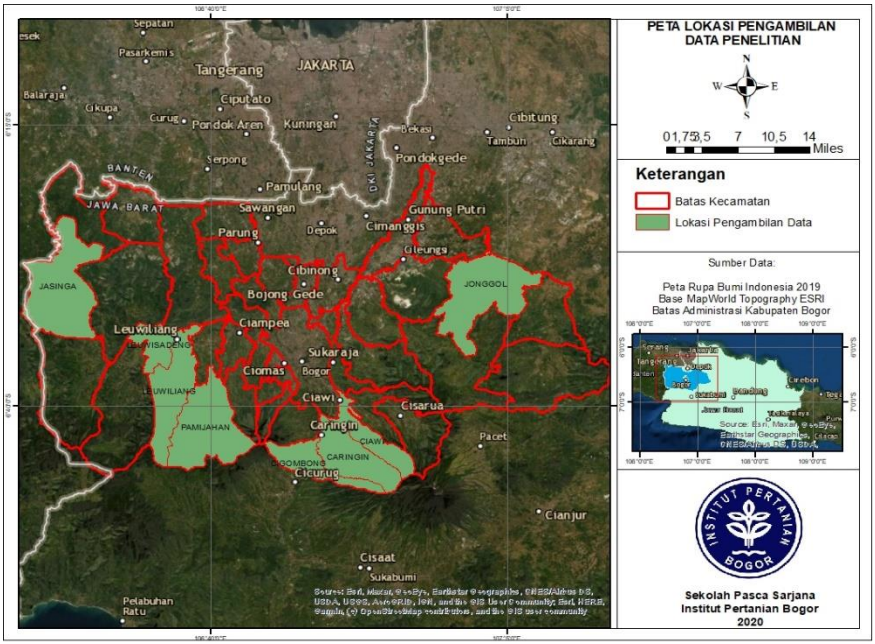

Figure 1. Research site

This study defined indicated abandoned land as the land outside forest areas and licensed areas with land cover in the form of reeds, shrubs, and vacant land included in the cultivation area in the spatial pattern of the Regional Spatial Plan (RTRW) with non-critical land conditions and has agricultural land capability class I–IV (Direktorat Kajian Strategis dan Kebijakan Pertanian IPB, 2013). Land managers consist of land-owners, land guards, and land cultivators. This study was conducted in 40 villages spreading across 14 sub-districts in Bogor Regency (Figure 1) from 2013 to 2020. The research sites indicated various abandoned lands in Bogor Regency, both privately-owned

companies Islamic boarding schools and owned by the regional government of Bogor Regency.

Table 1 shows the adoption of new knowledge products regarding abandoned land in Bogor Regency proposed by IPB University.

Table 1. Adoption of New Knowledge Products proposed by IPB University

No	Production of knowledge	Year	Implementing Actors	Actions (*)		
				a	b	C
1	Mapping indicated abandoned land in Bogor Regency	2013	KSKP IPB	0	1	0
2	A Survey of land characteristics indicated abandoned	2013–2019	Land-owner, village chiefs, land-keeper in 25 villages	0	1	0
3	Modeling	2014	KSKP IPB, local partners in Taman Sari village,	0	1	0
4	Modeling	2014	KSKP IPB, partner of Cibilik village, *Feedloter* company, and PT. MNC Lido	0	1	0
5	The declaration of abandoned land use	2014	KSKP IPB, Regency Government of Bogor, House Representative (DPRD) of Bogor Regency, and local partners of Tamansari village	0	1	0
6	Harvest	2014	IPB Rector, Regency Head, Vice Chairman of DPRD, Muspika, local partners of Ciasihan village	0	1	0
7	Model of land use	2016	KSKP IPB; Chief of Cikeas Udik village	0	1	0
8	Model of land use	2016	KSKP IPB, land-workers, farming councilors (mediator), land-owner, land-keeper, PT Aneka Tambang in Bojong Nangka village	0	1	0
9	*Workshop* on land use	2016	KSKP IPB, KPH Bogor, BAPPEDALITBANG, DISNAKAN, DPRD, land owner indicated abandoned	0	1	0
10	The land-use model indicated abandoned	2016	KSKP IPB, local partners in Cipendewa village	0	1	0
11	Indicated use of abandoned land through HPT cultivation	2016	PT Aneka Tambang (Antam), KSKP IPB, Koperasi Sinar Sugih Mukti; Partners and chief villages of Antajaya and Sukarasa, DISNAKAN, Food Security Service, Directorate General of Livestock	0	1	0
12	Land use indicated abandoned in Islamic boarding schools	2018	DITMAWAPK-IPB, Coordinating Ministry for the Economy, Sunan Gunung Jati Ba'lawy boarding school, PT Astra Internasional	0	1	0

No	Production of knowledge	Year	Implementing Actors	Actions (*)		
				a	b	C
13	Socialization of land use indicated abandoned	2018	DITMAWAPK-IPB, Coordinating Ministry for the Economy, Jam'iyyah Ahlith Thariqah Al Mu'tabarah An Nahdliyyah boarding school	0	0	1
14	Land use indicated abandoned in Islamic boarding schools	2018	DITMAWAPK-IPB, Medco Foundation, Coordinating Ministry for the Economy, *Pemberdayaan Ummat* boarding school	0	1	0
15	MoU between IPB and Medco Foundation	2018	DITMAWAPK-IPB, Medco oundation	0	1	0
16	Inauguration of Training Center for *Santripreneurs* and Young Farmers	2018	DITMAWAPK-IPB, Coordinating Ministry for the Economy, Medco Foundation, Pemprov Jawa Barat provincial government, Pemkab Bogor, LSM Qiara, Pesantren	0	1	0
17	Mou between IPB and Bank Mandiri, BRI and BNI	2019	DITMAWAPK-IPB, Bank Mandiri, BRI, BNI	0	1	0
19	Scale-up of land use indicated abandoned		DITMAWAPK-IPB, PT Astra, Ministry of Village PDTT, Jabar provincial government, SKPD, village government, BUMDeas, UMKM, and cooperatives	0	1	0
20	Making scientific publications related to the use of abandoned land in Bogor Regency		Lecturers and students of IPB	11	0	0
			Total	11	17	1
			Percentage	**38%**	**59%**	**3%**

(*) Notes: a) Scholarly Publication; b) Practical Actions; c) Political actions

Source: Processed primary data (2020)

2.1 Data Collection

The data collected in this study used a document study approach and respondent investigation. The study used the distribution map of abandoned land in 2013 in Bogor Regency, reports from KSKP IPB, DITMAWAPK IPB, and other relevant documents. In addition, observations and map verification were carried out at the research location that had been determined by conducting structured interviews with respondents consisting of land-owners, land guards, or land cultivators with a total of 108 people.

Respondents were determined by purposive sampling combined with the snowball method. In addition, in-depth interviews and Focus Group Discussions (FGD) were conducted with key figures such as the Village Head, the Regional Apparatus Work Unit (SKPD) staff, and several members of the Regional People Representative Council (DPRD). The sources of data in this study are divided into two: primary data and secondary data. The primary data were obtained from interviews, FGDs, and observations, while the secondary data were obtained from scientific journals, reports, and other relevant sources.

2.2 Data Analysis

The secondary and primary data collected were analyzed using quantitative and qualitative methods. First, spatial analysis is used to determine the area of land indicated as abandoned. At the same time, power relations are approached by analyzing the influence and interests of stakeholders using Participatory Prospective Analysis. Next, identifying the variety of knowledge products with the most significant policy space is analyzed using the approach method developed by the Institute of Development Studies (IDS) in 2006. Finally, the subsequent analysis stage uses the RAPID (Research and Policy in Development) analytical framework to influence policies and practice.

3. RESULTS

3.1 Typology of Science Product with Significant Policy Space

Based on the 2014 to 2019 IPB activity report documents (KSKP IPB and DITMAWAPK IPB), the Bogor regency government has carried out seven activities related to the use of land indicated as abandoned (Table 2). Based on the final product of the science-policy interface (Böcher & Krott 2016), these activities can be classified into six practical actions and one political process, while there are no actions in the form of scientific publications.

Table 2 shows that 82% of the new knowledge local governments have adopted is practical actions such as making maps and models of land use indicated as abandoned and coordinating meetings with various related actors. The new knowledge products concerning abandoned lands have been discussed in the policy process of the regency's regulation plans for the 2020 fiscal year. However, the policy implementation was delayed because of the COVID-19 pandemic. The adoption of scientific publications by local governments has not yet been implemented.

Table 2. Adoption of Knowledge Products carried out by the Bogor Regency Government

No	Product of Knowledge	Year	Implementing Actors	Actions (*)		
				a	b	C
1	Land mapping indicated abandoned	2014	BAPPEDALITBANG Bogor Regency	0	1	0
2	Inventory of abandoned land in Bogor Regency	2015	BAPPEDALITBANG, DISNAKAN	0	1	0
3	Coordination meeting on the use of data collection on less productive agricultural land	2016	KSKP-IPB; BAPPEDALITBANG; DISNAKAN Bogor Regency	0	1	0
4	The land-use model is indicated to be abandoned in the Kunak Livestock Area	2016	KSKP IPB, DISNAKAN, partners in Gunung Menyan village	0	1	0
5	Bogor Regency Government's indicated abandoned land-use model for Small Ruminant Nursery Station	2017	KSKP IPB, DISNAKAN, partner in Sipak village	0	1	0
6	The land-use coordination meeting indicated abandoned	2017	KSKP IPB, BAPPEDALITBANG	0	1	0
7	Preparation of documents for the development of superior agricultural	2018	BAPPEDALITBANG	0	1	0

No	Product of Knowledge	Year	Implementing Actors	Actions (*)		
				a	b	C
	commodities in Bogor Regency by BAPPEDALITBANG Bogor Regency					
8	Preparation of documents for the development of superior agricultural commodities in Bogor Regency by BAPPEDALITBANG Bogor Regency	2018	BAPPEDALITBANG	0	1	0
9	Preparation of planning documents for the development of leading plantation commodities in Bogor Regency by BAPPEDALITBANG Bogor Regency	2019	BAPPEDALITBANG	0	1	0
10	Strategic Development Planning Scope of Food and Agriculture Security	2020	BAPPEDALITBANG	0	0	1
11	Discussion of the Regency Head's Regulation regarding the use of abandoned land in Bogor Regency	2020	LPPM IPB, BAPPEDALITBANG (delayed)	0	0	1 (delayed)
			Total	0	9	2
			Percentage	**0%**	**82%**	**18%**

(*) Notes: a) Scholarly Publication; b) Practical Actions; c) Political actions
Source: Processed primary data (2020)

In explaining why new knowledge can be adopted or not, the analytical method developed by IDS (2006) is used in Table 3.

Table 3. Identification of Knowledge Product (Institute Development Study (IDS), 2006)

No.	Actions	Discourse	Interest	Network	Policy space	Types of policy space
1	Practical actions	In line with a policy-holders	In line with policy-holders	1. PT. Aneka Tambang 2. Medco Foundation 3. BAPPEDALITBANG 4. DISNAKAN 5. DISTANHORBUN 6. Jami'atul Hidayah Islamic boarding school 7. Land-owners, 8. Cultivators	large	*Practical spaces*
2	Political actions	In line with policy-holders	In line with policy-holders	1. BAPPEDALITBANG 2. LPPM IPB	low	*Birocration space*

No.	Actions	Discourse	Interest	Network	Policy space	Types of policy space
3	Scholarly publication	In line with policy-holders	Not in line with policy-holders		low	*Conceptual spaces; Popular spaces*

Source: Processed primary data (2020)

Based on the IDS (2006) approach, three factors determine whether or not policy-makers can adopt a new knowledge: the knowledge or discourse factor, the availability of actors or networks, and the existence of similar interests or politics. If these three factors are met, the new knowledge generated will have a significant policy space, so the possibility for adoption is also substantial. It is known that adoption in practical actions has a similar discourse with local governments. KSKP and local governments believe that land indicated as abandoned needs to be managed to provide optimal economic, social, and environmental benefits.

Based on the interest factor, the local government has considerable interest because, based on data (BPS Province of West Java, 2013), 81.39% of Farmer Households (RTP) in Bogor Regency are small farmers or have land less than 0.5 ha. Therefore, indicated abandoned land has enormous potential to increase the availability of agricultural land that farmers can access. Furthermore, the network factor is also reasonably available because apart from the support from the Bupati, two SKPDs have become "champions of change," namely BAPPEDALITBANG and DISNAKAN. This condition explains why the adoption in practical action can be done.

A regency regulation regarding the use of abandoned land has been formulated, considering the interests and networks of different actors. The adoption process could not run because of the budget allocated for the Covid-19 pandemic. Even though all elements have been met, funding as an enabling factor is still needed. According to Green et al. (1980), enabling factors facilitate behavior or action. Thus, all actors can act according to their functions and roles.

Adoption in scientific publications conducted by the Regional Government of Bogor Regency has not been found. Local governments, in general, rarely conduct scientific research. According to Kartodihardjo (2017), scientific information is a factor that is less considered in making decisions, such as information or advocacy from the media or interest groups.

3.2 Power Relations Between Actors in the Integration of Science Into Policy

3.2.1 Direct Impacts

Power relations between actors are discussed using Participatory Prospective Analysis. Based on Table 4, the actors with the most robust variables and direct influence are the Regency Head and KSKP IPB. They are categorized as the driving actors with strong influence and low land-use dependence.

The Regency Head is the driving variable for direct influence because he has the authority to make land-use policies abandoned by private and company ownership without depending on other actors, so he has a low level of dependence. An example of the authority possessed by a Regency Head is to make a Regency Head Regulation (Perbub) or a program to use land indicated to be abandoned by private companies.

KSKP IPB facilitates using abandoned land owned by the Bogor Regency Government. The university communicates with Bogor Regency SKPDs about using abandoned land belonging to local governments such as BAPPEDALITBANG, DISNAKAN, and the Regional Financial and Asset Management Agency (BPKAD). On the other hand, no driving variable is found in the land owned by pesantren because each

actor is interdependent and drives the other.

3.2.2 Indirect Impacts

Indirect influence analysis is carried out to determine variables or stakeholders that have an essential role in the future or long term. Based on the research, KSKP is the actor that acts as a driving force for both the abandoned land use program indicated by private companies, Islamic boarding schools, and land owned by the local government. KSKP has a strategic role in the program's sustainability because it has access to information technology, technical mastery in the field, and the ability to influence other stakeholders and the market. However, based on the analysis, it is also known that the strategic role of KSKP still needs to be supported by actors who have the authority to make policies and actors who have access to funding so that policy adoption can be carried out.

Table 4 indicates the most influential actors in the long-term sustainability of policy adoption (Driving Variables-Indirect Effect) are KSKP IPB, PT Antam, Regency Head (Private owned land), Coordinating Ministry for the Economy, KSKP IPB, Mediator (for the Islamic Boarding School's land), KSKP IPB, PT Antam, Regency Head (for the company's land), KSKP IPB, BAPPEDALITBANG, DISNAKAN (for the Regency government's land). These actors have a central role because they have access to technology and marketing information, the authority to make policies, or access funding.

3.2.3 Network Analysis

Based on the network analysis (Table 5), KSKP is the most prominent stakeholder in establishing communication. The highest scores in outdegree indicate this condition, and indegree in three types of land ownership meant as abandoned, namely privately owned land, company land, and the Islamic boarding school land. Regarding the land owned by the Bogor Regency Government, BAPPEDALITBANG is the most prominent actor in building the network as the facilitator of various meetings between SKPD, KSKP IPB, and other actors in encouraging the adoption of new product knowledge regarding the use of abandoned lands in Bogor Regency.

KSKP IPB is also the actor with the most prominent role in controlling information and acts as a facilitator in disseminating information related to the program of using abandoned land indicated to be left by private property and Islamic boarding schools. On the land owned by the company, the cultivator is the actor. He has the most significant role because the cultivator is a community leader in building communication with all actors involved. Cultivators are communication facilitators between KSKP IPB, land guards, and village heads. The actor that has the most significant role in disseminating information on the land owned by the Regency Governments is the village head. He knows the Regency Government's land's location and boundaries in the field and bridges communication with land cultivators.

Table 4. Power relations in four types of land ownership

Power relation	Private owned land		Islamic Boarding School's land		Company's land		Regency government's land	
	Direct effect	Indirect effect	Direct effect	Indirect effect	Direct effect	Indirect effect	Direct effect	Indirect effect
Driving variables	Regency Head	KSKP IPB, PT Antam, Regency Head	-	Coordinating Ministry for the Economy, KSKP IPB, Mediator	Regency Head	KSKP IPB, PT Antam, Regency Head	KSKP IPB	KSKP IPB, BAPPEDA-LITBANG, DISNAKAN
Leverage variables	Land-owners, village chiefs,	Land-owner	Medco Foundation, Islamic boarding school	Medco Foundation	KSKP IPB, Cultivators	-	BAPPEDA-LITBANG, DISNAKAN	Asset Service
Output variable	Cooperativ es	LSM Qiara, Cooperatives, Mediator, DISNAKAN	LSM Qiara	Islamic Boarding Schools, LSM Qiara	Councilors, Village chiefs	cultivators, village chiefs, land-keepers, Mediators	-	Village chiefs
Marginal variables	PT Antam, LSM Qiara, Mediator, BKP5K, DISNA-KAN	BKP5K	Coordinating Ministry Mediator, BAPPEDALITBANG, village chiefs, DISNAKAN	BAPPEDA-LITBANG	PT Antam, Mediator, land-keepers	Councilors	cultivators	cultivators
Bunch Variables					Land-owner		Village chiefs Asset Service	

Source: Processed primary data (2020)

Network analysis also measures closeness centrality, which is a way to measure how close one stakeholder is to other stakeholders based on the average length of one stakeholder to all stakeholders in the network. KSKP IPB is the most powerful stakeholder in distributing information on the type of land owned by individuals, companies, and Islamic boarding schools because it has the most outstanding closeness centrality value (Table 5). This condition shows that KSKP can build closeness and effective communication with almost all stakeholders. In the case of land owned by the Regency Governments, the actor with the most remarkable closeness centrality is the cultivators because they are the actors who control the land at the site level so that all related actors will automatically establish communication with the cultivators. The network analysis on privately owned land can be seen in Figure 2 (a, b, c). Based on the three analyses, KSKP IPB has a potential role in a successful science-policy interface process, aligning with research (Kusumadewi 2018).

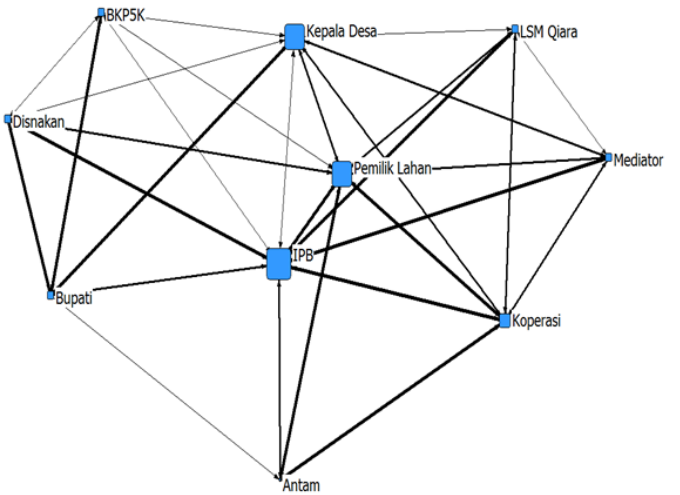

Figure 2a. Network Analysis – Degree of Centrality

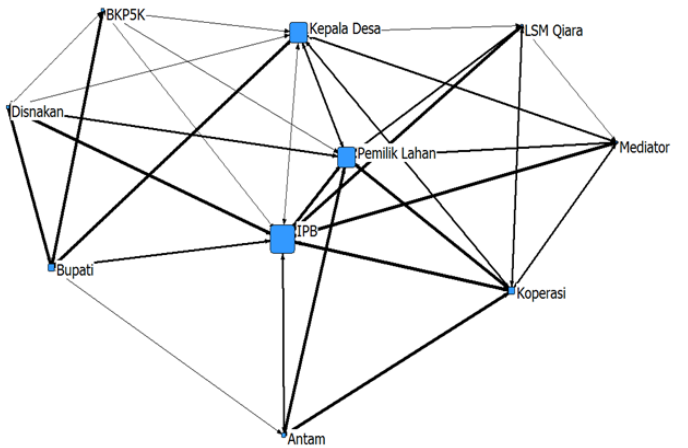

Figure 2b. Network Analysis - Betweenness Centrality

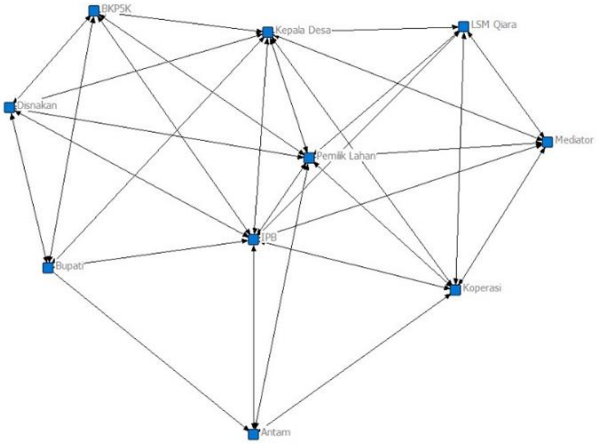

Figure 2c. Network Analysis - Closeness Centrality

Table 5. Network analysis of four types of land ownership

	Private owned land	Islamic boarding school's land	Company's land	Regency government's land
Degree Centrality	KSKP IPB: Outd degree: 21,000 Indegree: 11,000 Normality Outdegree: 0,778	DITMAWAPK IPB: Outdegree: 16,000 Indegree : 11,000 Normality Outdegree: 66,67	KSKP IPB: Outdegree: 13,000 Indegree: 7,000 Normality Outdegree: 54,167	BAPPEDALLITBANG: Outdegree: 8,000 Indegree: 7,000 Normality Outdegree: 53,333
Betweenness Centrality	KSKP IPB: Betweenness: 11,867 Normality Betweenness: 16,481	DITMAWAPK IPB: Betweenness: 13,667 Normality Betweenness: 24,405	cultivators Betweenness: 11,833 Normality Betweenness:21, 131	Village chiefs Betweenness: 8 Normality Betweenness: 40
Closeness Centrality	KSKP IPB: 100%	DITMAWAPK IPB: 100%	KSKP IPB: 43,75%	Cultivators: 45,46%

Sumber: Data primer diolah (2020)

3.3 The Process of Integration of Science into Policy Making Indicated Abandoned Land Use in Bogor Regency

Within the framework of the RAPID analysis, various interrelated factors are described that determine whether policy-makers politically use research-based evidence based on the available communication channels. The three factors are politics, evidence/knowledge, and the link between policy and research. These are conditioned by the fourth dimension, external influences, such as the socio-economic context, donor agencies, or broader national and international policies (Kartodihardjo, 2016).

There are some new kinds of knowledge adopted by stakeholders in Bogor Regency, especially BAPPEDALITBANG and the Livestock and Fisheries Office, i.e., (1) the inventory and mapping of land indicated abandoned, (2) the creation of land-use models indicated abandoned with various agricultural and livestock products, and (3)

land-use coordination meeting indicated abandoned. In addition, the BAPPEDALITBANG has also adopted approaches for the preparation of documents for the development of superior agricultural commodities, preparation of documents for the development of superior agricultural commodities, preparation of planning documents for the development of leading plantation commodities, and making Strategic Development Planning Scope of Food and Agriculture Security.

3.3.1 Politics

The political context in the framework of RAPID analysis includes the degree of political freedom in a country, the level of contestation, personal power and interests, institutional pressures, attitudes and incentives among officials, their freedom to move and be innovative, and power relations. According to Court & Young (2006), science is most likely to influence policy in a democratic, open, transparent, accountable government with solid academic institutions, civil society, free media, and sound information systems. Therefore, based on the degree of political freedom, conditions in Bogor Regency are pretty conducive to the process of science-policy interfaces. Still, it depends on whether researchers are willing and able to become "intrapreneurs" for science (Carden & Neilson, 2004).

In addition to the degree of political freedom, the process of science-policy interfaces is also influenced by political contestation. Court & Young (2006) highlight the importance of political contestation in controlling the impact of policy research. Adopting new scientific knowledge is often unsuccessful because it is caused by system/process failures, lack of consensus, and blocking by particular enthusiasts. No matter how good the scientific findings are, they will not be adopted in a system when they are not oriented to the public interest. The process of science-policy interfaces to the product of land use knowledge is neglected in the face of a bureaucratic system, which sometimes creates complexity, as stated by Ascher (2000). All actors related to land use policies indicated abandonment has different goals or interests and could be a trade-off. According to (Krott, 2005), the interests can be traced because they show benefits for the recipient. However, according to (Krott, 2005), it is difficult to identify with certainty all human interests. For example, the goals of the owners or custodians of the land are more economical or asset security, while the purposes of the bureaucracy are more about achieving economic and political performance and goals.

Other complexities found are related to time, authority, and finance. An inflexible budget system creates difficulties at the bureaucratic level. Even if they intend to adopt a land-use policy, it is indicated that they are neglected and cannot be done if it is not included in the budget line. The complexity of authority also influences the policy adoption process. The SKPD that most supports the policy adoption process is BAPPEDALITBANG, but its jurisdiction is limited to planning and budgeting, while for technical activities, the control lies in other SKPD. Based on the findings in the field, the doctrine complexity also has an effect, where the program and budget doctrine and the regulatory doctrine, in some cases, have quite hindered the adoption of policies. Facing the problems mentioned above, cooperating with the private sector through social programs or CSR can be a solution because the private financial system is relatively flexible. Medco Foundation and Astra are private actors that support adopting land-use policies indicated as abandoned.

Apart from the system, another aspect that hinders policy adoption is the lack of consensus at the local government level. The indicated abandoned land use program in Bogor Regency has not yet become the consensus of all existing SKPDs. As a result, policy adoption tends to be only driven by BAPPEDALITBANG as SKPD, which has the main task of planning programs, and DISNAKAN, with interest in using indicated abandoned land to support livestock programs in Bogor Regency. Other SKPDs are not

interested in carrying out concrete programs in the field. This condition is in line with what was conveyed by Kartodihardjo (2017), where policy-holders will support new knowledge as long as this knowledge can support the achievement of KPI or be politically profitable.

The potential for blocking by particular enthusiasts is also possible, especially for using local government land that has not been managed. One policy adoption that can get resistance is prioritizing land owned by the regional government for various purposes to make acquiring new land more difficult. Power and self-interest play a significant role in this context, as Court & Young (2006) presented. Concerning the privately-owned land, based on research (Purwawangsa et al. 2021), most of the indicated abandoned land is "guitar" land, or the owner lives outside the village or sub-district and entrusts the land to local cultivators. To reduce the risk of resistance and blocking from actors with unique interests, involving managers or cultivators at the site level can be used as one solution.

Researchers must also involve the lower-level or the lowest-level bureaucracy that can make programs and propose budgets in the political context. It is essential because the lower-level bureaucracy is the actor that can offer programs and activities in their respective work units and those who will be directly affected if there is a policy change. Empirical results indicate that even though there is a change in the bureaucracy structure at the top level, the program can still run as long as there is no change in the system at the lower level. Moreover, even if there is a change in the bureaucratic system or even a change in the Work Organizational Structure (SOTK), researchers or other actors can act as "policy intrapreneurs," and integrating knowledge into policy can continue. Therefore, in the context of encouraging the adoption of scientific knowledge, the existence of "champions" or people behind the organization at the bureaucratic level becomes very important and more critical than SOTK.

The method of integrating knowledge into policy can be carried out in stages. According to Lindquist (2001), the types of decisions in the policy process can be categorized into four: routine, incremental, fundamental, or emergency. In the context of integrating new knowledge on the use of abandoned indicated land in Bogor Regency, it can be categorized into incremental and fundamental (Figure 3).

Based on Figure 2. At the initial stage (2015-2019), the Bogor Regency government incorporated new knowledge related to the use of indicated abandoned land into the selected issues to be adopted as programs and activities in several SKPD, such as BAPPEDALITBANG, DISNAKAN, and the Food Crops, Horticulture and Plantation Service. (DISTANHORBUN).

The adoption of new knowledge is making maps, models, and discussions. In the process, new knowledge was adopted but not intensively and systematically through existing formal mechanisms and networks, so it has not provided fundamental policy changes (Lindquist, 2001). The adoption of more substantial policies and formal channels will begin in 2020. The Land Use Program indicated through BAPPEDALITBANG has been included in the Strategic Development Planning for the Food and Agriculture Security Scope. In addition, there is also a discussion of the Regional Regulation for the Use of Indicated Abandoned Land in Bogor Regency, which BAPPEDALITBANG initiated with the implementer of LPPM IPB. Adopting this fundamental nature has not gone well because the land-use policies indicated abandoned at DISTANHORBUN were hampered. The Regency Head Regulation (Peraturan Bupati) discussions were postponed because the budget allocation was shifted for the COVID-19 handling programs.

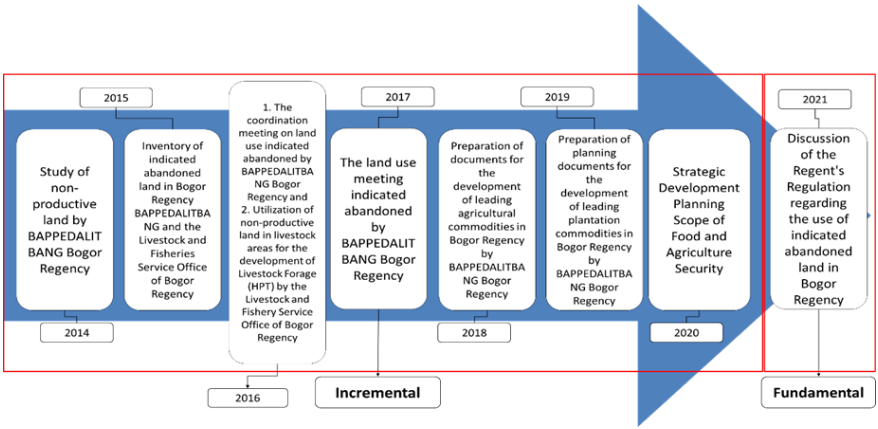

Figure 3. The adoption stage of the use of abandoned land owned privately in Bogor Regency

3.3.2 Evidence

Within the framework of RAPID analysis, evidence/knowledge must be relevant, credible, and on topic. The research presents a feasible solution to the problem, preferably tested or validated to prove its usefulness. Researchers and policy-makers must interact with research messages packaged interestingly and understandably (Court & Young, 2006). The evidence used to convince policy-makers is the reports of studies, models, and publications generated by the Directorate of KSKP IPB and DITMAWAPK IPB. The evidence consists of scientific reports, journals, maps, policy briefs, and demonstration plots on the use of abandoned land that had been built. Internalization is carried out in publications, dissemination, expert discussions, coordination meetings, and action activities such as planting and harvesting at the demonstration plot locations. A descriptive scientific approach, such as modeling, is more effective in convincing policy-makers than just ideology or rhetoric (Kingdon, 1984).

Substantial evidence is insufficient to encourage policy-makers to change or create new policies. According to Simon (1957), uncertainty, ambiguity, and complexity characterize the policy process. Therefore, the narrative developed to encourage policy change based on the new knowledge that has been discovered is essential. According to (Rein & Schön, 1991), the policy narrative is the frame used by policy-makers to select, organize and interpret information. According to Roe (1991), the research will have a more significant impact if it fits within the range of what policy-makers can accept as "good advice". For example, policy-makers prefer the term "non-productive land" to land indicated as abandoned, even though the meaning of "non-productive" land is not appropriate to describe land the owner does not manage.

In the context of knowledge transfer regarding the use of abandoned land in Bogor Regency, the narrative developed is that abandoned land can provide land access to smallholders, create jobs, increase agricultural production, and increase public opinion. Therefore, the report follows the local government and other related actors. However, policy-holders will tend to be resistant if the narrative created is the issue of justice, land inequality, or law violations due to neglecting land.

3.3.3 Connectors

Science cannot influence policy without the mutual trust of actors, and thus, decision-makers do not consider scientific information (Kartodihardjo, 2017). Instead of science,

several factors usually considered in decision-making are instructions from higher authorities, developed narratives, laws and regulations, and social, economic, and political influences (see Ekayani et al., 2016). The challenge in encouraging the adoption of science is how to build a network to enter the circle of factors considered in the decision-making process.

Building mutual trust can start by selecting like-minded actors to work with and then seeking to influence the policy agenda-setting process (Kartodihardjo, 2017). These actors can come from formal or informal networks as long as they have the same ideas. The actor who thinks the same does not have to be those who have the authority to make policies but have "access" to policy-makers, such as pesantren leaders. Networking is the "art" of communicating with many actors (Ibrahim & Karyanti, 2007). The processes of network formation in land use activities indicated as abandoned can be seen in Figure 4.

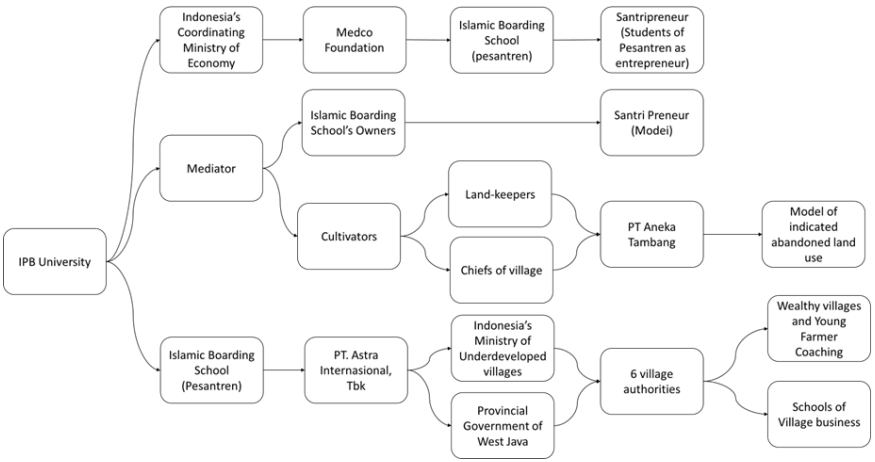

Figure 4. The processes of network formation in land-use activities are indicated as abandoned

Figure 4 shows that the process of integrating land-use policies indicated to be abandoned in Bogor Regency. In addition to the same idea, effective connectors in the policy adoption process often have other "powers," such as having access and influence to policy-makers or funders, access to critical information, or solid socio-political power. The connector could be a government officer or mediator who can connect with other actors and solve abandoned lands.

According to Neilson (2001), another factor encouraging policy adoption is "think tanks." In the context of this study, the identified "think tank" is BAPPEDALITBANG. It is in line with Court & Young (2006), who explained that the media has a crucial role in building relationships with policy-makers. Mass media is also effective for building public support; appropriate science acknowledged by the community usually has more power in the policy-making process. Therefore, intensive communication is carried out formally and informally, borrowing the terms Court & Young (2006) to communicate honestly.

4. CONCLUSION

The "product of knowledge" that has the most significant policy space is adopting policies in the form of practical actions. In terms of discourse, interests and networks are met, and supported by an enabling factor, namely funding. The analysis `of power relations between actors in integrating knowledge in policies regarding abandoned

land shows that KSKP IPB is the most influential actor in building, bridging, and distributing information among the stakeholders involved. Still, adopting new policies can only work if the actors who know the resources, including funding, and actors who have the authority to make policies have the same interests in working together.

RAPID analysis shows that the policy-makers will adopt science if they follow their organization's criteria and performance indicators (KPI) or get political or economic benefits. The role of the lower bureaucracy is crucial in policy adoption because their main tasks are creating and implementing the programs. In addition, trust between actors and connectors becomes very important by adopting new knowledge into the policy. Connectors can come from various parties as long as they have access to policy-makers, such as pesantren leaders.

The role of people "behind the organization" and policy intrapreneurs is very important to increase research access to policy-makers. The objective evidence in the field, such as modeling, is relatively more effective in convincing policy-makers than just studies. Science will become good advice and have a more significant impact as long as in line with the public or policy-makers' interests. Science is difficult to integrate into policy without the mutual trust of different actors from formal and informal networks who have access to policy-makers.

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