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RESEARCH ARTICLE

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Identification of Forest City Multi-Policy Using the MULTIPOL: A Study In The New Indonesian Capital, East Kalimantan

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ABSTRACT

The policy-planned development in the new Indonesia Capital City (IKN) area must be accompanied by good planning to ensure the continued availability of forestry ecosystem services, especially forestry areas. These ecosystem services are strongly influenced by their ecological functions. Humans depend on essential ecosystem services to satisfy their inherent needs and enhance or preserve their quality of life. Natural resources are being overused to satisfy these demands, endangering biodiversity and putting more strain on ecosystems. Therefore, a multi-policy approach describes and visualizes the relationships between multi-aspect policies that provide and benefit from forestry ecosystem services. The method used in compiling this paper is multi-policy, part of the prospective analysis method. This method will map and create a model, the best policy scenario that can be applied to achieve the goal of a forest city in the new nation's capital. The results show that the presidential regulation implementation scenario is the best policy choice for the forest city model in the new state capital.

Introduction

Law Number 3/2022 concerning State Capital was passed with consideration for the need, among other things, to enhance the governance of the state capital region in addition to serving as a vehicle for addressing the needs of the Indonesian people and all of Indonesia's tragedies, improving well-being for the public, educating the populace, and taking part in the implementation of an orderly global order founded on social justice, freedom, and lasting peace. This law also emphasizes that Indonesia does not yet have a law specifically regulating State Capital. The law that existed before the issuance of Law Number 3/2022 was Law Number 29/2007, concerning the Provincial Government of the Special Capital Region of Jakarta as the Unitary State Capital (*Ibu Kota Negara*/IKN) of the Republic of Indonesia, which only regulates the determination of the Special Capital Region Province of Jakarta as the Capital of the Unitary State Republic of Indonesia. The IKN relocation plan is expected to boost the national economy to +0.1%, reduce the gap between income groups at both the regional and national levels, and encourage trade and investment in the new IKN and its surroundings [1]. It is anticipated that the relocation of IKN will also enable it better to embody the essence and goals of national development governance, ease tensions in the previously uneven development process, and accommodate future developments, keeping in mind the rapidly expanding dynamics of multidimensional global development, so that Indonesia will be able to keep up with these developments with the help of the new IKN area [2].

The development of a new capital city is important for several reasons. The first is economic opportunities [3]. A new capital city can expand economic opportunities for disadvantaged Americans by creating a new center of economic growth and upward mobility. New capital cities can facilitate infrastructure renewal and

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rural development. Second, they are sustainable and walkable [4]. A new capital city can be designed as a smart city focusing on walkability, sustainability, and economic growth. Third, economic diversity [5]. The new capital city should have housing for all economic backgrounds to promote class harmony and upward mobility. Fourth, climatic and environmental considerations [6]. A new capital city can be designed based on climate and environmental considerations, such as being in a sparsely populated area with access to natural resources. The Fifth category is Urban Planning and Architecture [7]. A new capital city can serve as a model for urban planning and architecture by incorporating the latest design and architectural practices to create a unique and functional city. Finally, it has political and economic stability [8]. A new capital city can help alleviate population and urban stress in existing capital cities, thereby promoting political and economic stability.

The construction of the National Capital is still ongoing at the time of this writing, so research on this topic is still relatively new. Research related to developing a new national capital in Indonesia should be conducted from various perspectives. This study's novelty is that the Multiple Perspectives and Multiple Criteria (MULTIPOL) program has never been used to analyze the needs of actors in Indonesia's new national capital.

Materials and Methods

Study Area

The IKN area, as defined by Presidential Regulation Number 63/2022 of the Archipelago Capital City Master Plan, will be the site of this research project. The research Locations were mapped according to Figure 1 The planned development in the IKN area must certainly be accompanied by good planning to ensure the availability of ecosystem services. These ecosystem services are greatly influenced by their ecological functions. Humans need some ecosystem services to meet their basic needs and improve or maintain their quality of life. To meet these needs, natural resources are exploited, threatening biodiversity and increasing pressure on ecosystems [9]. Therefore, a structural spatial approach is used to explain and visualize the spatial relationships and relationships between areas that provide and benefit from ecosystem services.

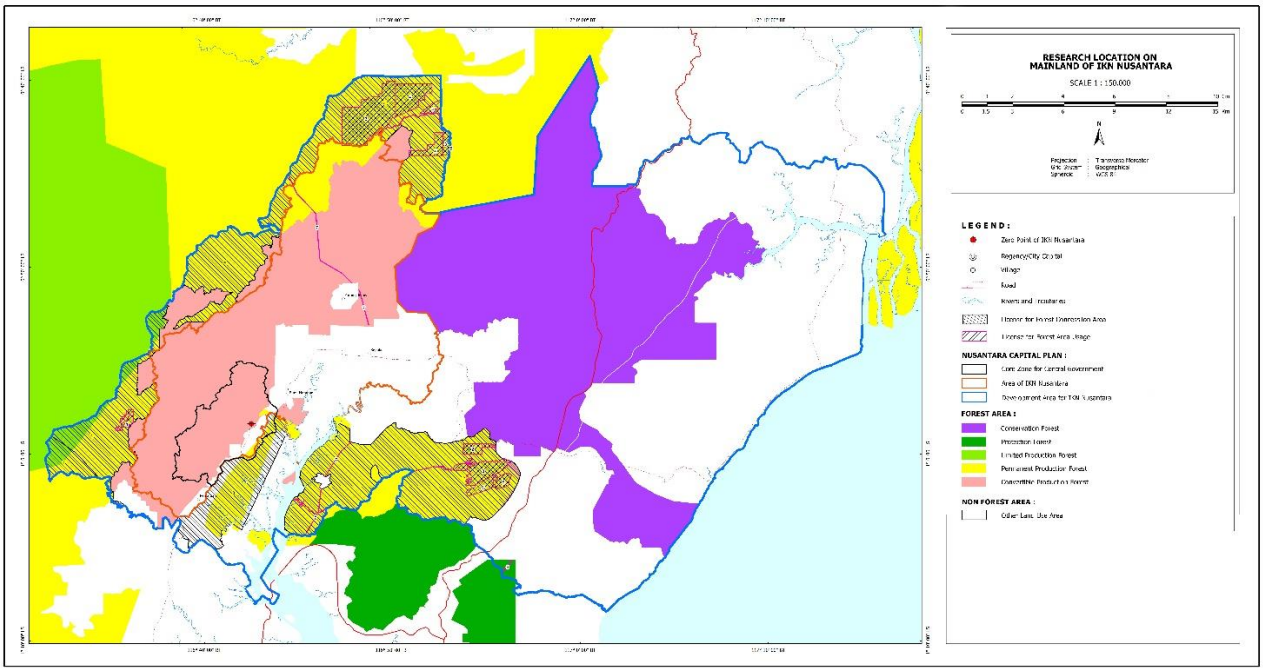

Figure 1. New Indonesian Capital City Map (research area).

Development in the IKN area must be ensured to run in accordance with the principles of sustainable development, so the development must first be carried out a strategic environmental study (KLHS/*Kajian Lingkungan Hidup Strategis*). The IKN KLHS was prepared twice, namely the KLHS for the Relocation of the State Capital prepared by the Ministry of Environment and Forestry (KLHK/*Kementerian Lingkungan Hidup dan Kehutanan*) and the KLHS for the National Capital Masterplan by the Ministry of National Development

Planning (Bappenas/*Badan Perencanaan Pembangunan Nasional*). The KLHS for the relocation of the capital is a study that is rapid assessment and produces safeguards recommendations for the use of space. The KLHS was then deepened by the IKN master plan drafting team and the results were in the form of recommendations for the master plan so that it could accommodate the vision of the IKN to become a sustainable green city.

Methodology

From October 2022 to February 2023, this study was carried out in the East of Borneo, namely, at the Indonesian New Capital and associated organizations (Figure 1). A prospective analysis approach was used to process the primary data received and data obtained by the Focus Group Discussion (FGD). A prospective analysis is a technique for future policy reviews. In this study, prospective analysis referred to Bustos et al. [10], using Multiple Perspective and Multiple Criteria (MULTIPOL) tools. The MULTIPOL Method of prospective analysis is used to identify and evaluate various possible future alternatives [11]. This method models different views and criteria to describe various possible futures [12]. The MULTIPOL Method allows different stakeholders to contribute to the analysis process by providing their perspectives [13]. This allows for more comprehensive thinking and involves various relevant aspects, such as economic, social, political, technological, environmental, and other factors. In the MULTIPOL Method [14], several steps are typically performed, including:

a) Identification and description of possible futures: The team of analysts maps various possible future scenarios and alternatives based on an understanding of current trends and events.
b) Stakeholder identification: The analysis team identifies stakeholders related to the studied situation or problem. This can include individuals, groups, organizations, or other entities affected by various future alternatives.
c) Development of a stakeholder perspective: Each stakeholder provides their own input and perspective regarding the identified alternative future. This can be achieved through interviews, group discussions, or other methods of obtaining diverse views.
d) Assessment of criteria and weights: Relevant criteria for evaluating future alternatives were identified, and a weight was assigned to each criterion based on its importance in the analysis context.
e) Evaluation and modeling of future alternatives: Future alternatives are evaluated based on predefined criteria and weights. This can involve modeling using quantitative or qualitative methods such as SWOT, impact, and risk analyses.
f) Decision-making: The results of the analysis help in making better decisions and understanding the consequences and implications of various future alternatives.

The MULTIPOL prospective analysis method combines different perspectives and criteria to produce a more comprehensive and in-depth understanding of the future [10,12,14–16]. In this instance, it was applied to map the degree of correlation between the variables to create a cluster typology of possible development areas for the upcoming capital city of Indonesia. The validity of the research findings and their strength in determining the maximum count that must be involved in the successful development of the new Indonesia Capital City have been demonstrated by the application of the MULTIPOL method in the decision-making process, which takes into account the position and intensity of criteria, action, policy, and scenario based on the influence and the roles, positions, and attitudes of interest on a policy to be chosen. The location map of the study displayed Borneo's east. The preliminary FGD results were used to select the respondents. MULTIPOL was applied for some actions in the regulated policy, especially in Europe.

The Seelig method, developed by Purba et al. [17], was used to conduct the FGD. The variables for the development of the new Capital were analyzed by dealing with eight criteria, eight actions, five policy scenarios, and eight stakeholder scenarios [18–20]. This study uses the prospective structural paradigm method to explore the structure, dynamics, and interrelationship network between the most important variables in developing the new Indonesian Capital City. Data were collected using the FGD method to determine the influential and decisive stakeholders in the development of the area and workshops in filling out the software used in data analysis. The discussion will be implemented using the world café method to encourage participant interaction, knowledge sharing, and experience transfer. The FGD participants totaled 11 people, representing the stakeholders. People come from a variety of stakeholders. It comes from the KLHK, Ministry of Public Works and Human Settlements (PUPR/*Pekerjaan Umum dan Perumahan Rakyat*), New Capital City Authority Bureau (Bureau New Capital), East Kalimantan Provincial Government (Provincial

Government), Public, Indonesian Republic Police (POLRI/*Kepolisian Republik Indonesia*), Attorney, and the State Intelligence Agency (BIN/*Badan Intelejen Negara*).

Results and Discussion

The accuracy of the sources used to identify the scenarios, policies, and actions that are believed to impact the development of future Indonesian Capital City will significantly determine the study's outcomes. To accomplish this, experts provided orientation to participants during the first round of the FGD regarding the notion of sustainable development and the significance of the government system. A list of factors was created based on participants' comprehension, expertise, and knowledge. The debate outcomes revealed eight policies, eight stakeholders, and five actions that were thought to impact the development scenario of new capital. The actions, policies, and scenarios are listed in Tables 1, 2, and 3. Stakeholders are variables involved in development activities [21,22].

Additionally, MULTIPOL software was used to conduct a prospective study, and the results show how actions connected to policies in the creation of new capital city areas are interdependent. When building a MULTIPOL model, the four major parts must be filled with important variables. The four main sections are 1) criteria, 2) action, 3) policies, and 4) scenarios. Criteria contain a list of objectives or achievement conditions the scenario maker desires. Action contains the steps and actions to achieve the criteria referred to in the first part. Policies contain a series of deemed necessary policies related to criteria, actions, and scenarios. Stakeholders or interested parties can fill in these scenarios.

For the case of New State Capital, the following is a list of criteria, actions, policies, and scenarios. There are eight criteria in this study: forest land cover, built-up area increase (built-up area), reduced forest erosion (erosion), cultural sites survive (cultural sites), forest ecotourism is increasing (forest ecotourism), availability of clean water increases (clean water), flood control (flood), and forest use is reduced (forest use). The process by the MULTIPOL algorithm using the matrix data yielded the results. There are eight action lists in this study, namely tree planting (tree planting), developing a city with the concept of a forest city (Forest City), development based on the RKL-RPL/*Rencana Pengelolaan Lingkungan-Rencana Pemantauan Lingkungan* (Dev RKLRPL-Short Term), development of the Dayak Cultural Center (Development of Cultural Center), increasing forest tourism destinations (forest tourism), building a water reservoir (water reservoir), building a pond (pond), and a moratorium on permits in the new capital city area (Moratorium). Five policies are listed in this study: forest and land rehabilitation, tourism development, the Bappenas New Capital City Masterplan, Presidential Decree No. 64/2022 Spatial Planning, and the New Capital City Integrated EIA. There are eight scenario lists in this study, namely the KLHK, PUPR, Bureau New Capital, East Kalimantan Provincial Government, Public, POLRI, Attorney, and BIN.

In the next step, the matrix must be filled. The three matrices were then filled. The first matrix is an action evaluation matrix related to the criteria (Table 1), the second matrix is a policy evaluation matrix related to the criteria (Table 2), and the third matrix is a scenario evaluation matrix related to the criteria (Table 3). After filling in the three matrices, the results were interpreted as follows. There were two broad sets of results. These two major sections evaluate actions concerning the policies and subsequent evaluation policies concerning the scenario.

Table 1. Action evaluation matrix related to criteria.

Items	Forest land cover increased	Built-up area increased	Reduced forest erosion	Cultural sites survive	Forest ecotourism is increasing	Availability of clean water increases	Flood control	Forest use is reduced
Tree planting	20	2	20	5	20	20	20	20
Developing a city with the concept of a forest city	20	20	18	15	18	15	15	17
Development based on RKL-RPL	20	20	20	16	16	18	19	15
Development of Dayak Cultural Center	10	10	10	20	18	10	10	10
Increasing forest tourism destinations	18	15	17	15	20	12	12	0
Build water reservoir	0	20	18	0	18	20	20	0
Build a pond	0	20	18	0	18	20	20	0
Moratorium on permits in the new capital city area	20	15	18	10	15	18	18	10

Table 2. Policies evaluation matrix related to criteria.

Items	Sum	Forest land cover increased	Built-up area increased	Reduced forest erosion	Cultural sites survive	Forest ecotourism is increasing	Availability of clean water increases	Flood control	Florest use is reduced
Forest and land rehabilitation	100	30	18	15	1	1	20	15	0
Tourism development	100	10	10	12	7.5	7.5	13	0	40
Bappenas new capital city masterplan	100	30	10	15	0	0	20	15	10
Presidential Decree no 64 2022 Spatial Planning	100	30	0	20	5	5	10	10	20
New capital city integrated EIA	100	35	28	10	1	1	15	10	0

Table 3. Scenario evaluation matrix related to criteria.

Items	Sum	Forest land cover increased	Built-up area increased	Reduced forest erosion	Cultural sites survive	Forest ecotourism is increasing	Availability of clean water increases	Flood control	Florest use is reduced
Ministry of Environment and Forestry	100	30	0	10	5	15	15	15	10
Minister For Public Works and Human Settlements	100	10	30	10	10	0	20	20	0
New Capital City Authority Bureau	100	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5
East Kalimantan Provincial Government	100	20	0	20	30	5	5	10	10
Public	100	0	5	10	25	10	20	5	25
Indonesian Republic Police	100	30	8	15	1	1	12.5	12.5	20
Attorney	100	30	8	15	1	1	12.5	12.5	20
State Intelligence Agency	100	30	8	15	1	1	12.5	12.5	20

Evaluation Action Concerning The Policies

MULTIPOL provided the outcomes of the evaluation action about the policies in Table 4. The scores of actions about the policies are stored in the matrix. Otherwise, they are determined by multiplying the collection of weights from the policy-related action assessment matrix by the policy-related action matrix. This matrix also contains additional data, such as the mean, standard deviations, and order of action by policies. This table result can be displayed in graphical form in Table 5 (this graph shows the scores of policies related to scenarios. It corresponds to the evaluation matrix of policies concerning scénarios).

The Table 4 and Figure 2 can be explained as follows: Based on the largest number, namely grade 8, it is obtained in aggregate that developing an RKL-RPL is the main choice. Every actor in the development of IKN needs to pay attention to planning related to the environment [23,24]. This was followed by the development of the forest city model (number grade 7), tree planting (number grade 6), moratorium (number grade 5), forest tourism (number grade 4), water reservoirs and ponds (number grade 2), and the last development of the cultural center (number grade 1, the smallest). This means that the first step or the most important goal in developing a new national capital based on forests and environmental sustainability must prioritize the Environmental Management Plan and Environmental Monitoring Plan [25]. Management plans related to the environment become important because cities will grow and evolve [26]. Forests, which are the main topic of this study, are a vital need for the Indonesia New Capital because they will contribute to sustainable cities [27]. Therefore, urban forests are one of the strategies for building healthy cities [28,29] because they can reduce carbon emissions [30,31] and affect economic and social valuation in cities [32,33]. In some cities worldwide, the Indonesia New Capital may also need the term smart urban forest [34]. Other criteria and

actions drive the Environmental Management Plan and Environmental Monitoring Plan. The manifestation of this table is shown in Figure 2.

Table 4. Action concerning the policies matrix result.

Items	Forest and land rehabilitation	Tourism	Bappenas Masterplan	Presidential Decree No. 64	E IA integrated	Moy.	Ec. Ty	Number
Tree planting	16.6	17.1	18.2	19.2	14.8	17.5	1.7	6
Forest city	17.9	17.4	17.6	17.6	18.5	17.9	0.3	7
Dev RKL-RPL	19.4	17.1	19	18.3	19.5	18.8	0.6	8
Development of the cultural center	10.2	11.4	10	10.9	10.2	10.4	0.4	1
Forest Tourism	15.2	9.5	13.6	12.9	15.6	13.9	1.5	4
Water reservoir	13.5	8.1	11.7	8.5	12.6	11	2	2
Pond	13.5	8.1	11.7	8.5	12.6	11	2	2
Moratorium	18	13.9	17.5	16.5	17.8	17.1	1	5

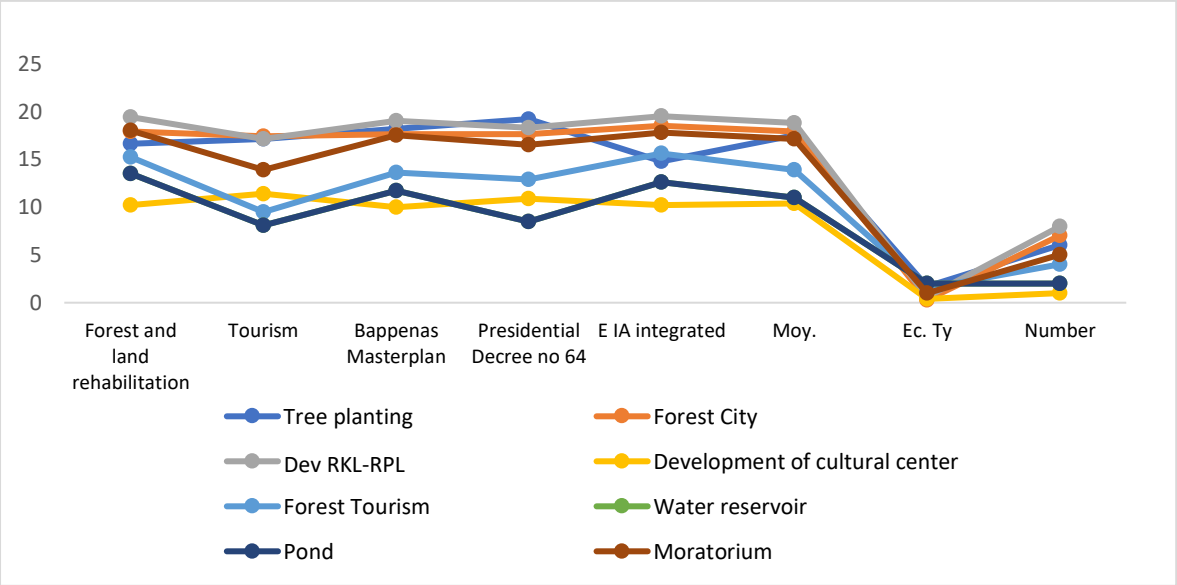

Figure 2. Action concerning the policies graph result.

Evaluation Policies Concerning The Scenario

Based on the FGD results outlined in several MULTIPOL matrices, it was concluded that developing a new National Capital City must prioritize action to form an RKL-RPL (Environmental Management Plan and Environmental Monitoring Plan). In policy, choices should always adhere to Presidential Decree No. 64 as the basis. Policy laws to build a new nation's capital. Later development will pay attention to the weight of forming an environmentally friendly forest city by integrating environmental variables, involving local customs and wisdom, and opening up opportunities for tourists who want to see the form of a city based on environmentally friendly forests.

From Table 5 and Figure 3 showed that based on the largest number, namely grade 5, it was obtained in aggregate that Presidential Decree No. 64 was the main choice. This was followed by the Bappenas Master Plan (number grade 4), Forest and Land rehabilitation (number grade 3), EIA integration (number grade 2), forest tourism (number grade 4), water reservoirs and ponds (number grade 2), and the last development of tourism (number grade 1, the smallest). This means that the first step or the most important goal in

developing a new national capital based on forests and environmental sustainability must prioritize Presidential Decree policies. The manifestation of this table is shown in a graph. The MULTIPOL algorithm process and provided the results of that scenario. Each scenario represents a stakeholder's objective. All eight stakeholders agreed and must follow this rule to develop a new Indonesian Capital City in East Kalimantan.

Table 5. Evaluation policies concerning the scenario matrix.

Items	KLHK	PUPR	Bureau New Capital	Provincial Government	Public	POLRI	Attorney	BIN	Moy.	Ec. Ty	Number
Forest and land rehabilitation	15.9	17	12.5	11.9	7.5	17.1	17.1	17.1	14.5	3.3	3
Tourism	11.6	8.6	12.5	11.7	16.9	15.4	15.4	15.4	13.4	2.6	1
Bappenas Masterplan	16.8	14.5	12.5	12.5	9.2	18.4	18.4	18.4	15.1	3.2	4
Presidential Decree No. 64	17	9.5	12.5	15.2	11.2	18.6	18.6	18.6	15.2	3.4	5
EIA integrated	15.4	18	12.5	11.1	6.2	17.4	17.4	17.4	14.4	3.9	2

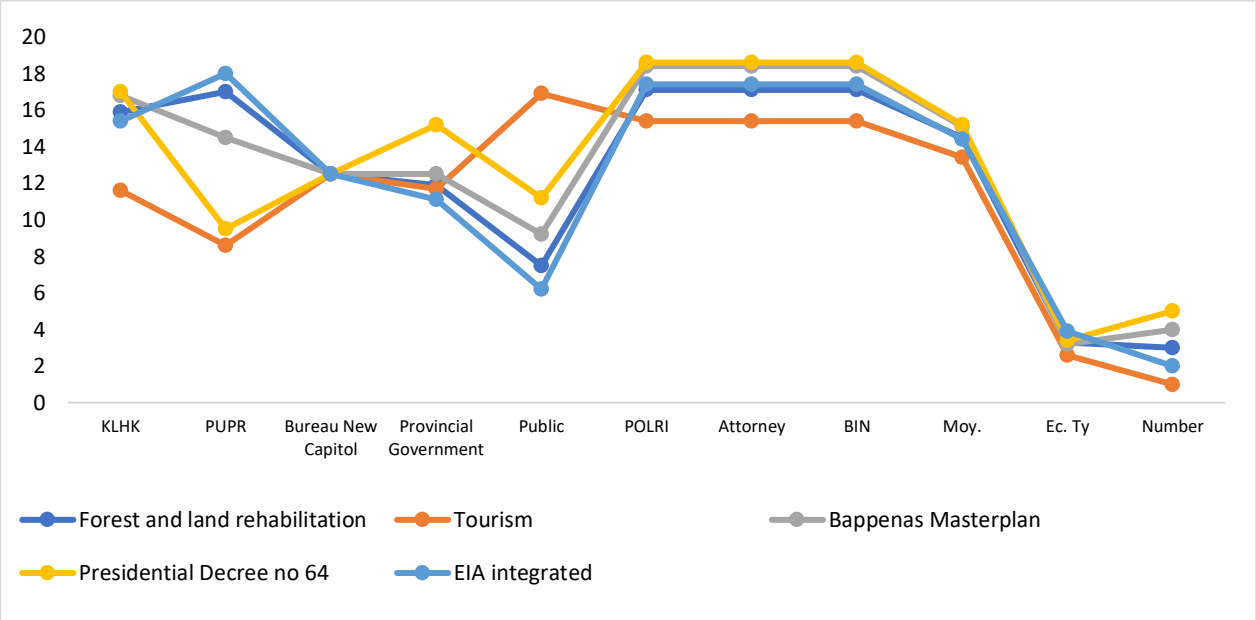

Figure 3. Evaluation policies concerning the scenario graph.

Conclusions

The preparation of the Environmental Management Plan and Environmental Monitoring Plan (RKL-RPL) is the main choice, which is followed by the development of a model forest city (class 7 number), tree planting (grade 6 number), moratorium (grade 5 number), forest tourism (class 4 number), water reservoirs and ponds (class 2 number), and the development of a cultural center (class 1 number, smallest). The first step or the most important goal in developing a new national capital city based on forests and environmental sustainability must be to propose an Environmental Management Plan and an Environmental Monitoring Plan. The policy evaluation with respect to the scenario shows that the first step or the most important goal in building a new national capital city based on forests and environmental sustainability must prioritize the Presidential Regulation policy.

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