Policy adoption process on climate change adaptation

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Abstract. This study aims to explore the process of policy adoption related to climate change adaptation. Specifically, this paper is based on the literature review process of scientific articles to map the definition of adaptation to climate change that is developing, then the forms of the policy adoption process that have been carried out. This study is exploratory in nature with the knowledge and determination of research topics that are still open. The researcher chose 2 keywords as emphasis, such as “climate change adaptation”. AND “policy adoption”. Sources of research use secondary data from tracing and collecting scientific articles indexed by Scopus. 35 of 659 articles were filtered and analyzed. Researchers use the Scholarly website, connected paper and VOSviewer to help analyze data. The study found that there is a knowledge gap between mitigation and adaptation. Adaptation is different than mitigation. From the results of mapping scientific articles, it can be concluded that discourse related to the adoption of climate change adaptation policies, the discourses that are often discussed at the academic level most of the 2006-2019 studies are mostly street level organizations, strategies, vulnerability indicators, tourism sector, mitigation, policy environment, barriers, maladaptation, policy context, society.

1. Introduction
The discourse that emerges from the study of climate change is explained by the Kyoto Protocol, uncertainty, risk, decision makers. Many countries are struggling to adapt to climate change. Droughts, erratic rainfall, heat waves and other climatic events have affected the region resulting in disasters with strong social, economic, and environmental impacts. Climate change is increasingly visible from extreme weather events that occur more frequently.

Several studies suggest that adaptation to climate change is needed to minimize its impact Burton et al. [1]. Sperling [2] states that adaptation is the ability of people to minimize risk, although adaptation will not eliminate the risk of climate change. To determine the appropriate policy action to be taken, it is necessary to map out the existing studies related to climate change adaptation. This is important to equip us with insight in recommending the adoption of appropriate policies based on the substance of the issues often discussed by world academics who are concerned about climate change.

The population of countries that depend on natural resource wealth is the most affected by climate change. The study of Adger et al. [3], Thomas and Twyman [4] mentions that it is developing countries whose populations will be affected by extreme weather changes. Therefore, UNDP [5] once mentioned
that adaptation should be integrated with everything so that society becomes more resilient. UNDP [5] also states that the adaptability of a population determines the economic empowerment of the population. The policy-making process in each country will respond differently to this phenomenon. This is interesting to identify.

In several discussions, it appears that climate change is a global issue, but in the specific local context of Indonesia, it seems minimal in responding and visualizing policies related to this. 25 years since the ratification of UNFCCC membership in 1994 until now, there has been no clear integration of development and policy directions regarding mainstreaming climate change. It is difficult to identify whether climate change policies are successful or not. Because the Newman and Head [6] states that failure is a general description in policy science, because the measure of failure is not necessarily clear in what way, duration of time and how much complexity of actors involved. Howlett et al. [7] mentions at least to justify the observable failure of factors both inside and outside the policy, governance capacity, and the level of uncertainty in policy knowledge and practice.

In terms of practice, the development of climate change issues in Indonesia has not attracted serious attention from policy makers. Reflecting on the second round of the 2019 presidential debate on the infrastructure, energy, food, natural resources and environment sectors, the issue of climate change was not mentioned at all by the two candidates in the development plan for the next five years. Even though several studies mention the political, economic, and environmental impacts of climate change, it seems to be felt [8]. The implication is that there is no major development plan in the natural/environmental sector that is aligned with the potential for environmental change and policies that must be prepared so that these sectors are maintained.

This study reviews the emerging issues related to climate change policy. researchers try to explore discourses and definitions related to climate change which have implications for finding and developing new ideas and insights. This study aims to map the development of public policy studies to reach efforts to control climate change. Early mapped research explores how climate change adaptation is then carried out, how others learn and follow, what differences enable policy change Wood et al. [9] However, no one has specifically searched the literature to see what discourses arise related to climate change adaptation. As mapped in the following Table 1:

Table 1. Research questions.

| Authors, name of article | Research Question |
|--------------------------|------------------|
| Ryan [10]                | What are the main problems of climate adaptation in six countries in the region: Argentina, Brazil, Chile, Costa Rica, Paraguay, and Uruguay? |
| Granberg and Glover [11] | How is Australia's national policy to adapt to the impacts of climate change? |
| Wellstead and Stedman [12]| How does policy work empirically: do analysts pay more attention to long-term complex issues or are they preoccupied with "firefighting" immediate issues of the day? |
| Olazabal et al. [13]     | How was the concept of credibility as a critical issue in climate adaptation policy developed with the Adaptation Policy Credibility (APC) framework? |
| Biesbroek et al. [14]    | How National Adaptation Strategies were officially adopted or are being developed in countries in the EU at the end of 2008? |
| Amundsen et al. [15]     | The survey seeks answers to two questions: what is being done at the municipal level in these areas in policy adaptation and how in Norway? |
| Klint et al. [16]        | Examine the policy environment for its conducive to climate change adaptation to develop an adaptation framework for the tourism sector. |
| Burton et al. [17]       | To what extent can adaptation reduce the impact of climate change? |
| Hinkel [18]              | What are vulnerability indicators and what arguments are available to build on them? |
| Tennekes et al. [19]     | How does the context of the distribution of responsibilities among social actors influence the assessment of adaptation options as legitimate or illegitimate? |
| Lesnikowski et al. [20]  | Analyzed eight hypotheses driving the choice of local adaptation policy instruments using fractional regression analysis and multi-level modeling. 125 local governments in Canada, France, Germany, the Netherlands and the UK. |

This paper differs from previous studies and contributes to the literature, especially mapping the adoption of climate change adaptation policies by analyzing what we know so far.
2. Methods
This paper begins with a search for scientific articles related to climate change adaptation obtained through Scopus.id access. The keys entered in the search were “climate change adaptation” and “policy adoption”. An initial search found as many as 659 articles. With a limit of 2006-2019. Consideration of the year chosen for the reasons of field research productivity before the pandemic. Then the articles were filtered based on the provisions: open access and suitability of the title and content of the manuscript, so it was decided that as many as 35 articles were mapped using the VOS Viewer application to see emerging discourses related to climate change adaptation. This determines the discussion related to the issue. A total of 7 articles were analyzed with the help of the Scholarly website to facilitate the analysis to answer the adoption of climate change adaptation policies that have been carried out by Indonesia.

3. Results and discussion

3.1. Mapping terms
Based on the results of mapping scientific articles related to the adoption of climate change adaptation policies, the discourses that are often discussed at the academic level most of the 2006-2019 studies are mostly street level organization, strategy, vulnerability indicator, tourism sector, mitigation, policy environment, barrier, maladaptation, policy context, society, showed in Table 2.

| No | Term                      | Occurrences | Relevances |
|----|---------------------------|-------------|------------|
| 1  | Street level organization | 5           | 8.8        |
| 2  | Strategy                  | 9           | 3.04       |
| 3  | Vulnerability indicator   | 6           | 2.97       |
| 4  | Tourism sector            | 6           | 1.55       |
| 5  | Mitigation                | 10          | 1.08       |
| 6  | Policy environment        | 7           | 1.03       |
| 7  | Barrier                   | 11          | 0.96       |
| 8  | Maladaptation             | 4           | 0.64       |
| 9  | Policy context            | 4           | 0.51       |
| 10 | Society                   | 4           | 0.38       |

By analogy with matters relating to the process of adopting climate change adaptation policies, the success of their implementation is determined by the street level of the organization. This is because they are at the forefront of implementing policies. Discussing adaptation is always associated with the level of vulnerability. Policy adoption studies are usually associated with decision-making theory, political entrepreneurship or are based on policy objectives Krause [21]. Krause [21] study also found that adoption of government programs did not specifically lead to climate change interventions. The government usually at the regional level prefers green city programs over climate-oriented programs such as waste management or restrictions on the use of plastic. The thing that becomes an obstacle when internalizing the mainstream of climate control to be internalized into government institutions requires a large amount of fiscal capacity and resources [22]. Several later studies that appeared between 2006-2016 mapped that adaptation is different from mitigation.

From the collection of studies analyzed related to the climate adaptation process, it usually discusses related to comparisons on climate adaptation or risk management and compared to climate mitigation or protection from the impacts that occur from risks [23]. Gerber [24] states that mitigation can be done to intervene in the causes of climate change, such as reducing emissions and relying on renewable energy, while adaptation is an adjustment step by planning for emergency preparedness. Hultquist et al. [25] stated that mitigation is basically a global problem while adaptation is carried out in a local context in response to hazards. Adaptation is easier to prepare without having to identify the cause. So that adaptation is more appropriate than mitigation in terms of the implementation of the policy.
formulation process. Because the adaptation process is adapted to each locality according to oneself. Therefore, it is not surprising that then adaptation refers to the focus of certain sectors according to those faced by the environment such as climate adaptation in coastal locations, weather adaptation [9].

3.2. Correlation between terms

Based on the results of mapping the VoS Viewer application from 35 articles for 10 years from 2006 to 2019 it shows: the relationship terms resulting from the review of the title and abstract of the article produce a relationship of 5 clusters. Based on the results of equalization through terms, occurrence and relevance, 512 terms appear the most when talking about climate change adaptation policy as shown in the following Figure 1:

Figure 1. Correlation of terms.

- The first cluster (light green) consists of 6 related items, the six most frequently appearing keywords are climate change adaptation, climate change policy, local government, policy environment, resilience, tourism sector. The distribution of this research term appears in research in 2014. It means that the impact that is most felt on climate change is the tourism sector, especially those related to nature. Therefore the success of climate change is determined by the policy environment.
- The second cluster (blue color) consists of 5 related items, which consist of adaptation policy, maladaptation, mitigation, policy context, UNFCCC. Research range from 2008-2010. This means that global climate change mitigation and adaptation efforts are included in the UNFCCC agenda which has been internalized to each ratifying member country.
- The third cluster (yellow color) consists of 4 items, which consist of barrier, climate adaptation, climate adaptation policy, narrative. The research was conducted in the range of 2014-2016. This means that the climate change adaptation policy narrative determines the success and obstacles of climate adaptation.
- The fourth cluster (Green Tosca) consists of 3 items, namely policy work, strategy, street level organization. Research range from 2010-2012. This means that policy performance is determined by the strategy carried out by the street level organization.
- The fifth cluster (green color) (purple color) consists of 3 items, namely community, vulnerability, vulnerability indicator. Distribution research 2010-2012s. This means that the party most affected by this vulnerability is the community. Vulnerability indicators determine the level of risk or impact of climate change on the community. More specifically, the network of related terms discussed include: When talking about climate adaptation policy, this issue is related to probability, problem, community, vulnerability, adaptation, strategy, barrier and partnership (Figure 2).
The interesting thing is that when we talk about mitigation, adaptation is related to it, but when we talk about adaptation, mitigation is not involved. 60% of the 71 words is relevant. The top 42 words that are relevant and often appear, but after filtering based on the meaning of the concept there are only 15 terms that can be defined. Discussions: Policy adoption is an action taken by the government to respond to a public problem. The policy process that arises from innovation and policy diffusion efforts. The concept emerged discussed around 1960 in the US. The study of policy adoption began to grow in the context of education policy in the US but later it was studied from various sectors. Two factors drive policy adoption: internal and external. That is, countries adopt policies that they do partly because of the influence of their internal socio-demographic, economic, organizational, and political characteristics, and externally is the influence of other countries on each other's policy behavior [26].

4. Conclusion
Based on the results of the mapping of scientific articles, it can be concluded that discourses related to the adoption of climate change adaptation policies, the discourses that are often discussed at the academic level most of the 2006-2019 studies are mostly street level organizations, strategies, vulnerability indicators, tourism sector, mitigation, policy environment, barriers, maladaptation, policy context, society. This has implications for a country's adoption process of climate change policies, which must consider the discourse.
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