A Systematic Protocol for Mapping Forest Governance Research in Indonesia

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ABSTRACT

Indonesia possesses a vast amount of forest resources. However, this condition has degraded and has triggered ecological and social problems. Many researches, especially forest governance researches, have been conducted in Indonesia and these have covered wide aspects of forest governance. Research findings are suspected to be neither adopted nor implemented in the policy process because there is no summary of the research findings in a simple and an easy-to-understand form. A systematic review method enables a more comprehensive search and presentation of these research findings. This paper presents a protocol map in conducting researches related to forest governance. A data extraction template with 13 keywords was used to assess articles included in the study. Based on the findings, determining keyword/s is a crucial step in conducting a systematic review.

Keywords: systematic review, forest governance, research protocol, Indonesia
JEL Classification: Q23

INTRODUCTION

Indonesian tropical rain forest covers more than 120 million hectares (ha) and it is around 63 percent of the country's terrestrial area. The forest provides forest products, including timber and non-timber, as well as ecological services. Besides these, customary groups and communities living in the area depend on the forest to fulfill their basic needs.

Since the Indonesian forest area is the largest in the Association of Southeast Asian Nations (ASEAN) (Morales-Hidalgo, Oswalt, and Somanathan 2015), it plays an important role in the region. Problems related to Indonesian forests (such as illegal logging and illegal log/wood trading, forest fire, emission from deforestation, and others) and benefits from it (e.g., supply of wood and other non-wood products, including environmental services) will significantly contribute to the region. Most of the Indonesian forest policies could affect the politics and economics of the region.

Furthermore, the Indonesian forest area also ranks as the eighth biggest in the world (Morales-Hidalgo, Oswalt, and Somanathan 2015). In 2009, Indonesia voluntarily pledged to reduce emissions by 26 percent on its own effort and up to 41 percent with international support by 2020. This condition placed Indonesia as one of the important nations to reduce emissions, even though it is not part of the Annex I countries (i.e., Organization for Economic Co-operation and Development-member countries in 1992, the Russian Federation, the Baltic States, and several Central and Eastern European States) (UNFCCC 2014). Indonesian policy on forestry attracts global attention. As a Non-Annex I country, Indonesia can contribute in carbon sequestration through forest conservation, sustainable forest management, and enhancement of forest carbon stocks to earn carbon credits that can be traded in the international carbon market.

In the last decades, however, Indonesian forests suffered from serious problems that caused degradation of its condition. In the Asian region, Keenan et al. (2015) ranked Indonesia at the highest position on net tropical forest loss for period 2010–2015 at 684,000 ha per year. On the same period, Morales-Hidalgo, Oswalt, and Somanathan (2015) claimed that Indonesia lost primary forest of around 3.4 million ha, and it was the fourth most degraded forest globally after Papua New Guinea, Brazil, and Gabon.

Problems related to Indonesian forest management are increasing and need integrative solutions based on field research findings. Scientists from research as well as forestry higher education institutions have conducted researches related to Indonesian forest management. These researches cover a wide range of themes on forest management such as deforestation, threat of biodiversity, forest fire, illegal logging, forest tenure, and forest governance, among others.

Even though numerous researches have been conducted in many sites in Indonesia, degraded forest condition and poor forest governance remain. Research findings are neither adopted nor implemented in policy processes since there is no summary of previous researches presented in a simple and an easy to understand form. Systematic review is one of the methods to solve this problem.

This research aimed to: (1) identify achievements of forest governance research conducted in Indonesia; and (2) map forest governance researches that have been conducted related to issues to be resolved, study area, affiliated researchers, as well as research trend. This research would be useful to provide information and feedback relevant to forest policy in Indonesia. The summary of forest governance researches in Indonesia derived from this standard protocol also aimed to enrich the field of forest governance, thereby providing important inputs to the Ministry

of Environment and Forestry (MoEF), Republic of Indonesia Strategic Plan 2015-2019. This summary would later be presented in several categories such as major issues of forest governance in Indonesia and trend of research, among others.

SYSTEMATIC REVIEW

Systematic review applies the scientific method in a literature review process to restrict systematic errors (bias) by identifying, assessing, and synthesizing all relevant researches to answer a specific question or set of questions (Petticrew and Roberts 2006). Systematic review combines large amounts of information that can be digested easily and produces more reliable findings to help decision making, inform guidelines and policies, and inform research findings directly. It can compare and contrast scientific articles and provide a detailed assessment of the content of specific topics (Bath-Hextall 2014; Lowry et al. 2013). In addition, systematic review overcomes uncertainty when discord between the primary research, reviews, and editorials occurs (Bath-Hextall 2014).

Systematic review is a method to map uncertainty and identify if there are few or even no relevant researches conducted, and if there is a need for a new study for a research theme or research location. There are thousands of research papers published each year, making it impossible for policymakers and researchers to stay abreast of the recent research findings, except for a specific area of interest, but sometimes it becomes very narrow in scope (Petticrew and Roberts 2006). For policymakers, a systematic review presents a summary of sharp and reliable evidence since this analysis provides background for a potential policy.

Systematic review applies search criteria stated clearly and explicitly to comprehensively identify the relationship of the research to specific questions. In a systematic review, there is a need to develop a protocol with well-defined questions, search criteria, and an outline of procedures in conducting a thorough search. Through a clear protocol, the review process provides better results that could be evaluated, investigated, and updated. The process can also be repeated as well as updated by other researchers in the future. Therefore, this method offers many advantages over other methods of literature review for the field of ecology, evolution, and conservation biology (Lowry et al. 2013; Petticrew and Roberts 2006).

Lowry et al. (2013) further explained that one of the biggest challenges in every review, including systematic reviews, is that not all scientific articles can be obtained (i.e., missing paper). Although the methodology is transparent, there are many factors that may make it not completely repeatable, such as changes in search engine algorithms in the database, including addition of journals in the future, and lag between scientific articles and database entry. In addition, there is subjectivity in deciding whether a scientific article will be included or not in the analysis based on content and themes that have been determined.

Although there is an argument of the importance to include gray literature in a systematic review process to get a more complete picture of the research findings (Hopewell et al. 2007; Mc Auley et al. 2000), this is difficult to do. Gray literature refers to sources of neither published nor widely distributed scientific information (Schembri 2007). As a consequence, this kind of literature is hard to obtain. Included in gray literature are theses and dissertations, technical reports with limited distribution, a journal published by special interest groups with limited distribution, abstracts, conference papers,

and conference proceedings that are only available for participants in the conference, environmental impact statements, some types of government documents, and some types of online documents.

At various themes of research, especially in the social sciences, most of the relevant research findings may not be issued in the form of scientific journals and are categorized as gray literature that cannot be indexed in electronic databases (Petticrew and Roberts 2006). An electronic search will not show relevant information in large quantities. Thus, gray literature has not been included in the review process because of the difficulty to obtain and search information from these resources.

METHOD

This study adopted the systematic reviews method used by Lowry et al. (2013), who are working in the field of ecology and do not fully follow all methodologies developed and widely used in medicine and social sciences. Ideally in systematic reviews, at least two readers must evaluate all research findings. However, Lowry et al. (2013) argued that it should not be fully carried out and for practical reasons (in this case, the study is a thesis research that required independent work).

In addition, this study used a single, peer-reviewed, and regularly updated database providing abstracts and citation literature in various disciplines, i.e., Scopus (Lange 2014; Leisher et al. 2016). This focus is based on the assumption that scientific articles in international scientific journals give broader impacts than other forms of scientific articles. Scientists, researchers, and practitioners normally refer to high quality research or studies with local or national scope with which to compare their own findings. Moreover, they require (a) literature database(s) to simplify searching of papers. International scientific journals meet these requirements. An advantage of referring to international scientific journals is that they reference relevant websites, project reports, and other gray literature.

To complement international scientific journals, this paper also included national scientific journals accredited by the Ministry of Research, Technology and Higher Education and the Indonesian Institute of Science (*Lembaga Ilmu Pengetahuan Indonesia* (LIPI)). In this study, an accredited national journal is a journal that has an accreditation certificate from LIPI, valid at the time of this study (May–June 2016).

The basic requirement in performing systematic reviews is to develop a standard protocol containing a strategy to conduct a literature search, scientific article criteria to be included, as well as the data extraction strategy (Randall 2007).

Literature Search Strategy

Article search is not intended to take an entire article from the database, but only take relevant articles and leave the irrelevant (Petticrew and Roberts 2006). The search for articles aims to get a complete list of scientific articles that may be suitable to answer research questions (Bettany-Saltikov 2010). The article search is an important part of the review since validity of review results is directly related to the accuracy of the searching process and the ability of researchers to identify relevant scientific articles. Bettany-Saltikov (2010) further explained the need for the establishment of inclusion criteria to determine the focus and limit of the review. This stage involves screening titles and abstracts of each article found in the article search, reading full text of any article, which may be included in the analysis.

This systematic review focused on scientific

articles related to forestry problems that would be solved through MoEF policy. These problems were adopted from MoEF targets as stated in the Strategic Plan for Years 2015–2019, especially forest management issues related to forest governance, including efforts undertaken to improve forest governance and issues that may arise due to inappropriate forest governance policies, namely:

1. Forest governance: (a) open access area management; (b) implementation principles of sustainable forest management-SFM; (c) community partnerships in forest management through People Plantation Forest (*Hutan Tanaman Rakyat*-HTR), Community Forest (*Hutan Kemasyarakatan*-HKm), Village Forest (*Hutan Desa*-HD), Customary Forest (*Hutan Adat*), and private smallholder tree plantations (*Hutan Rakyat*); (d) forest fire management; and (e) combatting illegal logging.
2. Addressing climate change, both in mitigation activities to reduce greenhouse gas emissions and adaptation activities to increase community resilience to climate change impacts.

These forestry problems were further explained through operational definitions, and keywords were derived from these. Finally, article search applied these keywords. This research limited inclusion criteria to the defined keywords and research sites located in Indonesia. A data extraction template with 13 keywords was used to assess included articles: Forest Governance, Forest Policy, Forest Stakeholder, Land Tenure, Sustainable Forest Management, Forest Certification, Forest Partnership, Social Forestry, Community Forestry, Forest Fire, Illegal Logging, Decentralization, and Climate Change. Definitions and keywords used are shown in Table 1.

The article search applied the following strategies:

1. Scopus database was used for article search using determined keywords and Boolean logic combined with "Indonesia", namely: Keywords: (forest governance OR forest policy OR forest stakeholder OR land tenure OR sustainable forest management OR forest certification OR forest partnership OR social forestry OR community forestry OR forest fire OR illegal logging OR decentralization OR climate change) AND (Indonesia).
2. In contrast, local articles were searched in accredited journals' websites and keywords used had been set. This is because there was no special database that embodied the national journals.
3. The first phase of screening results was further refined according to document type: article, review, and conference paper. Only articles in the English language were included. Inappropriate documents were excluded in the next screening phases.
4. Retrieved appropriate scientific articles to be analyzed for compliance with forest problems was the next phase for this systematic review.

Workflow for article search in international journals is seen in Figure 1 and those for accredited national journals in Figure 2.

Article Criteria for the Review Process

The database used in the article search process was based on inclusion criteria (De Araujo Barbosa, Atkinson, and Dearing 2015): (1) article should be in accordance with intended keywords; (2) keywords specified must exist in whole or at least one in title, author keywords, or abstract; and (3) an article must be published in scientific journals through a peer-review process, which can help correct errors,

Table 1. Definition and keywords of forest management issues (adopted from MoEF targets as stated in Strategic Plan for Years 2015–2019)

Forest Issue	Definition	Keyword/s
Forest governance	Forest governance comprises: (1) all formal and informal, public, and private regulatory structures, i.e., institutions consisting of rules, norms, principles, decision procedures, concerning forests, their utilization, and their conservation; (2) the interactions between public and private actors therein; and (3) the effects of either on forests (Giessen and Buttoud 2014). Governance refers to who makes decisions and how decisions are made, from national to local scale, including formal and informal institutions and rules, power relations, and practices of decision making. It also refers to the kinds of decisions that are made and whether they are clear, consistent, and comprehensive. Hence, good forest governance means decisions are fair, transparent, and just, rights are respected, laws and rules are enforced equitably, decision makers are accountable, and decisions are made based on the analysis of what is good for people and forests in general and not based on personal interest (Larson and Petkova 2011). Forest policy is a set of orientations and principles of actions adopted by public authorities in harmony with national socioeconomic and environmental policies in a given country to guide future decisions in relation to the management, use, and conservation of forest and tree resources for the benefit of society (Global Forest Resources Assessment Programme 2012). Decentralization is the process of reorganizing or dispersing functions, powers, and human and financial resources away from the central bureaucracy or state authority and distributing them to lower levels (Sahide et al. 2016).	forest governance, forest policy, forest stakeholder, decentralization
Open access area management	Land tenure is the relationship, whether legally or customarily defined, among people, as individuals or groups, with respect to land. (For convenience, “land” is used here to include other natural resources such as water and trees.) Land tenure is an institution, i.e., rules invented by societies to regulate behavior. Rules of tenure define how property rights to land are to be allocated within societies. They define how access is granted to rights to use, control, and transfer land, as well as associated responsibilities and restraints. In simple terms, land tenure systems determine who can use what resources for how long, and under what conditions (FAO Rural Development Division 2002).	land tenure

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Table 1. Continuation

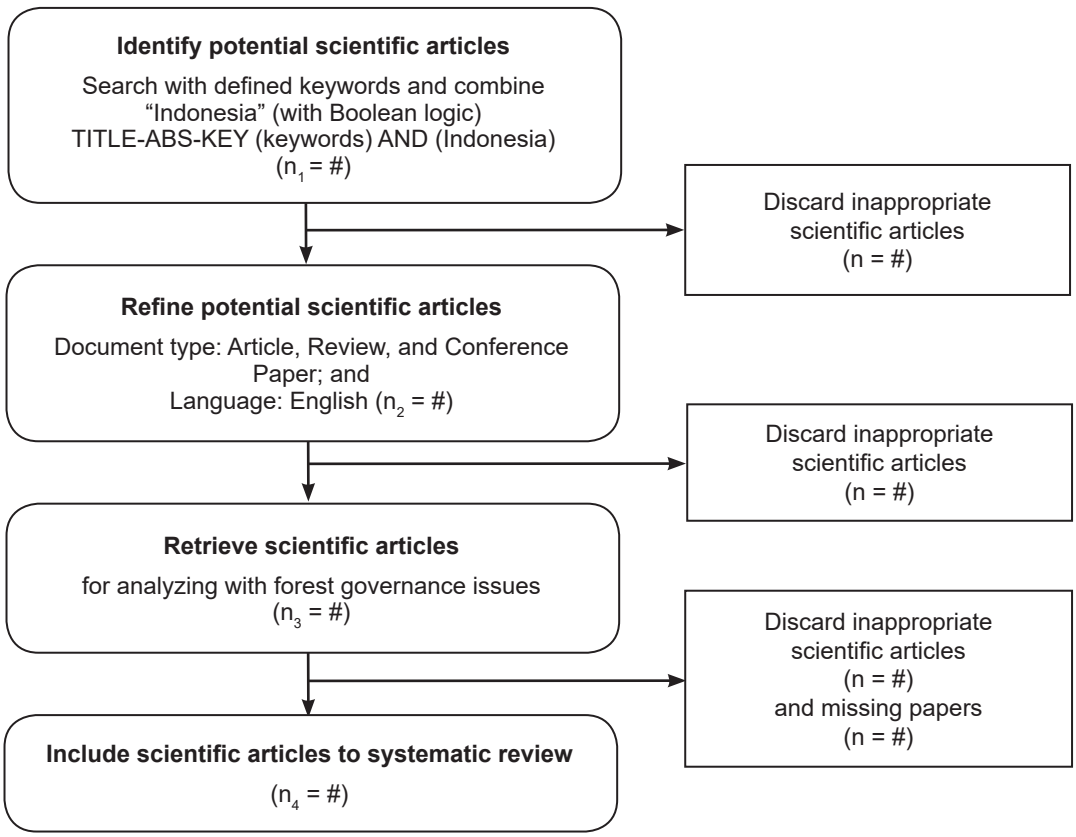
Forest Issue	Definition	Keyword/s
Implementation principles of sustainable forest management (SFM)	Sustainable forest management (SFM) refers to how to manage forests' regenerative capacity to draw present benefits without compromising future benefits and options (MacDicken et al. 2015). SFM fulfills any of the following conditions (Global Forest Resources Assessment Programme 2012): • have been independently certified or in which progress towards certification is being made; • have fully developed, long-term (10 years or more) forest management plans with firm information that these plans are being implemented effectively; • considered as model forest units in their country and information is available on the quality of management; • community-based forest management units with secure tenure for which the quality of management is known to be of high standard; and • protected areas with secure boundaries and a management plan that is generally considered in the country and by other observers to be well managed and that are not under significant threat from destructive agents.	forest stakeholder, decentralization
Community partnerships in forest management through People Forest Plantation *(Hutan Tanaman Rakyat–HTR)*, Community Forest *(Hutan Kemasyarakatan–HKm),* Village Forest *(Hutan Desa–HD),* Customary Forest *(Hutan Adat),* and private smallholder tree plantations *(Hutan Rakyat)*	Partnerships refer to the range of relationships established by companies and communities on the expectation of benefit. Partnerships may be formal or informal arrangements and may involve third parties in a variety of roles (Mayers 2000).	forest partnership, social forestry, community forestry
Forest fire management	A forest fire involves combustion of organic material (fuel) that releases a large quantity of energy transferred from the burning fuel to unburned fuels ahead of the fire front. This phenomenon ensures the fire spread. The fire start depends on the flammability of the vegetation. The fire spread depends on a number of variables, including fuel characteristics (size, moisture content, and arrangement), weather, and topography (*Département Gestion des territoires* 2009).	forest fire

Continued on next page

Table 1. Continuation

Forest Issue	Definition	Keyword/s
Combat illegal logging	Illegal logging takes place when timber is harvested, transported, bought, or sold in violation of national laws (Brack and Hayman 2001 in Rosenbaum 2003). Unlawful actions that might be included in the term of illegal logging: • Harvest and transport: theft or vandalism of trees or other forest resources; violation of harvest or management regulations; civil wrongs such as breach of contract; illegal transport; • Sales or processing: fraud (including deceptions about grade, species, volume, origin, or certification status); violation of sales regulations; violation of processing regulations; sham transactions to hide profits, avoid liabilities and taxes, etc.; • Export and import: smuggling and other violations of export controls; violation of import controls, including tariffs and phytosanitary laws; • Associated crimes (which may happen anytime from harvest to export): crimes linked to earlier crimes, such as receiving stolen property or being part of a criminal conspiracy; evading taxes, tariffs, or fees due to the government; bribery and extortion; and • Abuse of governmental authority: criminal abuse (e.g., soliciting bribes, exercising favoritism, diverting government income for personal use); abuse of discretion (e.g., failing to follow required standards and procedures in administering government forests).	illegal logging
Addressing climate change, both in mitigation activities to reduce greenhouse gas emissions and adaptation activities to increase community resilience to climate change impacts	Climate change means a change of climate, which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and, which is in addition to natural climate variability, observed over comparable time periods (UNFCC 2011).	climate change

Figure 1. Workflow for scientific article screening phases

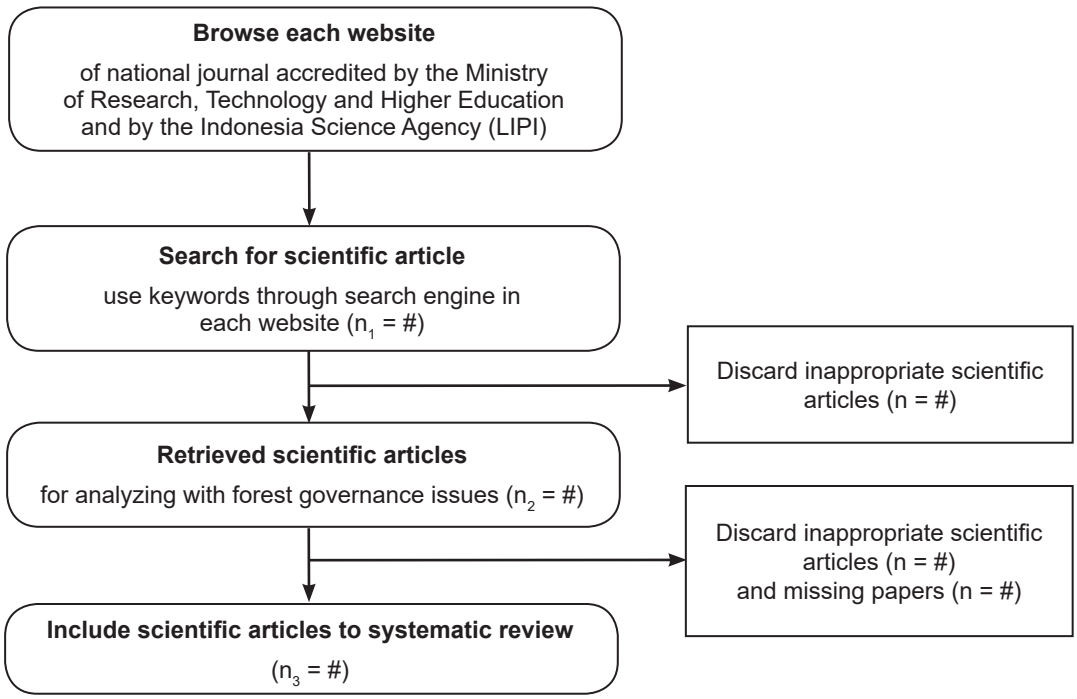


refine the analysis, assist in interpretation of data, and encourage authors to make his/her work accessible to others; and (4) article must be written in English.

For the review process, this research used three types of documents, namely: article, review, and conference paper (Schembri 2007; Swoger 2016):

1. An article is a primary literature published in peer-reviewed journals. This is usually a research report, which contains a title, abstract, keywords, introduction, materials and research methods, results, discussion, acknowledgments, and references.
2. A review is a secondary literature published in journals with peer review, with the aim to synthesize and provide an overview of themes/specific issues relevant to an author's expertise. It is not a report on the results of new research and often do not contain "materials and methods," which describes the methodology of how a study is done.
3. A conference paper is a paper containing research findings presented at an international, regional, or national conference, workshop, or symposium. It is considered as a primary literature if it passes the peer review process and is published, either as a book or part of a conference's proceedings as a special issue of a scientific journal, including an extended abstract. However, abstracts of papers presented at a conference that do not pass peer review process are not considered as primary literature, even though these may be published in book form.

Figure 2. Workflow for scientific article screening phases of accredited national journal by the Ministry of Research, Technology and Higher Education and by the Indonesia Science Agency (LIPI)



Strategy of Data Extraction

Appropriate scientific articles were selected, summarized, and then presented in tabular form.

Data Synthesis

Data extracted were presented in descriptive intended categories, namely: research location cluster, authorship/writer composition, trends of research, as well as forest governance issues.

GENERAL SCREENING RESULT

Based on the early phase of the screening process, 12,317 scientific articles were found in the Scopus database. Upon further screening, a total of 541 scientific articles were included in the analysis. Screening phases based on 13 keywords provided the following results for scientific articles (Figure 2): the most number of articles came from "forest fire" keyword with 160 (26.10%) articles; keyword "forest policy" covered 86 (14.03%) articles; "climate change" keyword gave 74 (12.07%) articles; "forest governance" keyword had as many as 62 (10.11%) articles; and keyword "decentralization" reached 38 (6.20%) articles. In addition, results of screening eight other keywords, namely, sustainable forest management, forest stakeholder, land tenure, illegal logging, community forestry, forest certification, social forestry, and forest partnership provided 193 (31.48%) scientific articles.

The results of the screening process depended on keyword-sensitive definition—if the keyword or combination of keywords are interchanged, even for a single word, the result

would be different. Based on Figures 3 and 4, application of different keyword combinations in Phase 1 (n1) of the screening process such as forest governance OR forest policy OR forest stakeholder AND Indonesia generated significant result differences with the application of keyword combinations forest governance OR forest policy OR forest stakeholder as well as keyword combinations such as governance OR policy OR stakeholder AND Indonesia.

Based on the findings, determining keyword/s is a crucial step in conducting a systematic review.

POTENTIAL OBSTACLES

There were many missing articles that could have been included in the study. In accordance with the research protocol, a screening process based on predetermined keywords was adopted. These keywords should be there in their entirety or at least one word must be found in the title, author keywords, or abstract. Therefore, the selection of keywords by the authors influenced the screening results with Boolean logic. Selection of incompatible keywords, such as very specific or unfamiliar words, will potentially exclude materials searched for from the initial screening process and in the analysis. Missing data is the biggest challenge in systematic review (Petticrew and Roberts 2006).

Research findings in majority of working papers are not published in scientific databases and not indexed by Scopus and, as a consequence, were not included in this study. For example, in the Center for International Forestry Research website (www.cifor.org), there were at least 207 working paper documents and only one scientific article (i.e., McCarthy 2002). The scientific paper was originally a working paper that was later published in the form of a scientific article. Research findings in working paper form are usually published only in the website of the institution conducting the research. This is less

Figure 3. Scientific article results of screening phases

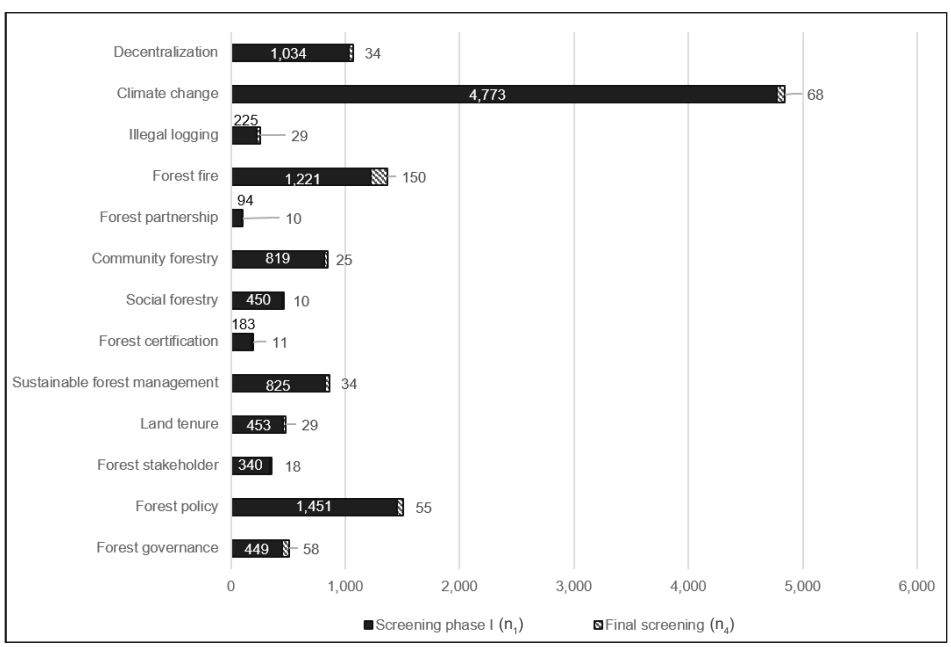
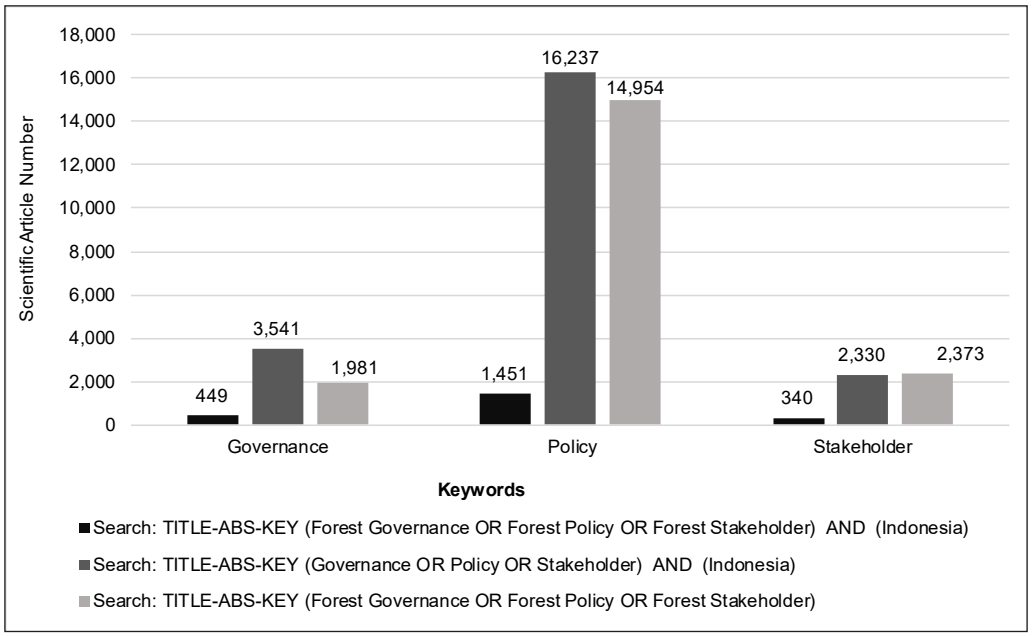


Figure 4. Combination of keywords in the screening process



useful for readers who prefer to search literature in databases without necessarily searching on Google, Google Scholar, and a special website related to the management of forest resources. However, working papers provide information to a broader audience who may be less familiar with databases of scientific articles.

The availability of a scientific article is determined by some keywords specified in the protocol; however, author's keywords different from those in this systematic review may create a conflict in the classification of an article. To resolve this issue, a scientific article is classified based on its focus/main discussion.

CONCLUSION

This systematic protocol in conducting research related to forest governance in Indonesia would be useful in providing a simple research form that would inform forest policy in Indonesia. The process is transparent and can thus be repeated and updated by other researchers in the future. However, the result would not be completely similar to the previous version because of changes that would be applied in several portions of the protocol. Regardless of the limitation in generating a completely identical result, the process could be adapted for other fields of research or studies, and conducted independently by scholars and scientists.

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