



Environmental Politics: The State and Technology of Environmental Innovations

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Abstract — This paper aims to explain state actors in the context of environmental politics while also describing technologies of environmental innovation that can be used by the state in solving environmental crises. Common interests in the context of the environment, which are articulated and enforced by the state, can be seen in the existing environmental crisis. The method used in this paper is a qualitative method with an integrated literature review (ILR) approach. The results show that the state often damages the environment in the name of development. On the other hand, the state has also become a key actor involved in finding solutions to environmental problems. Then in developing countries, the pressure to make changes in development processes and practices is also increasing. This pressure arises from grassroots actor politics, especially in relation to the demands of nongovernmental actors for new policy packages. In conclusion, environmental politics see contestation between actors in managing natural resources and the environment. As one of the actors, the state is the party that is considered the most entitled to regulate the management of natural resources and their impacts. Furthermore, the state is the party capable of making regulations for progress related to the development and diffusion of technology of environmental innovation.

Keywords — politics, environmental, state, innovation

I. INTRODUCTION

State power derives largely from the unique authority of actors acting in the 'national interest'. However, if society needs institutions such as the state, the practical dilemma facing all developing countries to integrate environmental conservation and economic development concerns is very difficult. This section also considers some of the contradictions in the dual role of the state as both environmental user and protector, and how these contradictions are reflected in inter-state conflicts and intra-state relations. Also, explains the proliferation of actors who may diminish the roles of the state.

Furthermore, in Hobbes's [1] view, the state has absolute power and the right to determine the fate of its people to maintain order and peace. The absolute status is owned by the state because the state is not a partner of the agreement, but the result of an agreement between citizens. That is, in the agreement to form the state, each citizen has given up all their rights to the state. However, the state does not have any obligations to its citizens, including the obligation to be accountable to the people. The state is above all citizens and

has absolute power. It also has the right to demand absolute obedience of citizens to its laws and to provide punishment for violators, including the death penalty. Thus, citizens will suppress their desires and instincts to behave destructively. Furthermore, citizens will choose to obey the law because they have a fear of being punished by death. The loss of freedom of citizens against the state is the price to pay if everyone wants to live in peace, order, and tranquility.

In an environmental context, the case of common property enforced and articulated by the state could be found in Hardin's [2] essay 'Tragedy of the Commons'. He describes the situation where herders graze livestock on a common pasture. Each herder seeks to increase the number of livestock on his pasture until the 'environmental carrying capacity' of the land is exceeded. However, instead of limiting the use of each, pastoralists continue to add livestock to the pasture, leading inevitably to the tragedy of land degradation and the eventual destruction of pastoralists' livelihoods. Importantly, the neo-Malthusian has also been described in the literature as neo-Hobbesian as an acknowledgment of the central statement about the importance of the global Leviathan. According to Shahar [3], the complexity of existing social problems and ecological crises necessitating authoritarian state action seems inevitable.

In Indonesia's context, the incidence of disasters from year to year also does not show a decrease. The total number of victims almost tripled from 2017 to 2018, from 3.49 million people in 2017 to 9.88 million people affected. The environmental quality indicators also show no difference from global conditions. According to a 2018 IPBES report, Indonesia is losing 680,000 hectares of forest each year - the highest in the Southeast Asia region. Data from the Ministry of Environment and Forestry in 2016 stated that out of 105 rivers monitored in Indonesia, 101 rivers were in moderate and severe pollution. Meanwhile, on the island of Java, which has a population of 56.9%, the availability of clean water only covers 4.2% [4].

Another example, forest degradation caused by deforestation in Indonesia is high. This is due not only to government policies through transmigration and the granting of Forest Tenure Rights (*Hak Penguasaan Hutan*) but also to the activities of communities, both individuals and groups, which tend to be exploitative [5]. Furthermore, in a global study conducted by Geyer et al. [6], Indonesia becomes the second-largest country in the world contributing plastic waste to the ocean. In Government Regulation Number 59/2017 on

the implementation of the global Sustainable Development Goals (SDGs), waste is related to global targets 6.6 on handling urban waste and 7.3 on improving integrated waste management. In 2019, from the total amount of waste generation of 67 million tons, the average composition of national plastic waste is 17.14% or around 11.4 million tons in a year [7]. In reality, natural resources do contribute greatly to development. On the other hand, the sustainability of the availability of natural resources is ignored [8].

It should also be noted that environmental scholars agree that the environmental crisis is a moral problem [9]. Therefore, it can only be solved by adopting a non-anthropocentric environmental ethic, which is an environmental ethic that extends moral consideration to the environment. Eckersley [10] argues that an eco-centric approach is more consistent with ecological realities and more likely to bring humans to psychological maturity and allow the diversity of all (most) beings (humans and nature) to be maintained.

However, the current environmental agenda does not seem to be oriented toward this ethic. For instance, The Intergovernmental Panel on Climate Change (IPCC) of the United Nations attended by representatives of 195 countries in Incheon, South Korea (2018) warned that the destruction of the world is imminent if state leaders do not immediately make radical, rapid and widespread changes to stem the rate of global warming. The world's scientists who are members of The IPCC stated that there are only 12 years left for preventing global temperatures from rising above 1.5 C°. Various scientific evidence has explained the environmental damage caused by the production of gasoline-fueled vehicles, greenhouse gas emissions, and deforestation. However, it is the profitability of these industries that sets the agenda for the environment [9].

Nevertheless, control related to the environment must still be integrated with management which refers to the principles and noble values that develop in society. However, what happens in Indonesia is that the incidence of disasters is directly proportional to the environmental destruction and deprivation of the community's living space facilitated by state administrators. Data collected by WALHI shows that there are 173 million hectares of concessions for the private sector and state-owned enterprises. These concessions have caused conflicts and environmental disasters that contribute to disasters and structural impoverishment [11].

There are several aspects of state theoretical critiques that concentrate on. *Firstly*, state actors as obstacles in solving environmental problems on a global scale. The argument is that the goal of countries in the world is to create economic development, regardless of environmental considerations. [12]. *Secondly*, associated with the inability of the state to effectively overcome environmental issues at multiple scales. The argument is that the state is 'too small' to overcome environmental problems at global and regional levels. Also, the state is 'too big' to overcome environmental problems at the local level [13]. In this case, the state tends to inhibit the environmental initiatives of actors at the local level and various efforts in developing a comprehensive global approach to overcome environmental problems globally.

II. THE FACE OF THE STATE

The state is understood as if it is the most powerful party and has the right to regulate the life of the nation and state. In Indonesia's context, the 1945 Constitution, concerning natural resource management, explains that the state controls the water, earth, and natural resources contained therein. This is in line with what Scott [14] describes: the state seems to be incarnated as the only force with the right to regulate, homogenize and control, and as if what is done by the state is good things that can bring society to a prosperous direction. The state also regulates community life through "civil registration". The state still has an interest in regulating its citizens to become citizens [15]. This process is what became known as civilization. Even deeper, Aretxaga [16] explains that in establishing its power, the state is justified to use coercion and violence in exercising its power.

As if the state is a "final form" (static) of the process of becoming a state. In fact, according to Migdal [17], the Weber-style state (as imagined above) as a steady and harmony will not be realized, because in it there are social dynamics and contestation in the social life of its people. in the process of statehood, according to Nugent & Joseph [18] in daily formation, the state experiences contestation between various actors in it, so do not imagine the state as a thing (state is not a thing). The state is constantly changing and moving. In understanding the state, we need to see how relations and contestations occur within it, even when connected to globalization [19].

Scholars have attributed the growth of modern state power to the development of global capitalism, e.g. Wallerstein [20] argues primarily actors such as the state are necessary for providing public goods; ensuring public safety - meeting financial needs for physical (education, roads, health, etc.) and social infrastructure. In the capitalist system, without such intervention, there will be no prosperity because it is the capitalist system that will be able to capitalize (the main activities in the capitalist system).

Johnston [21] argues that capitalism will fail if the state does not do "certain" things. Thus, in a capitalist system, the state becomes an institutional necessity (the absence of the state in Hobbesian anarchy is an obstacle to capital accumulation). From this perspective, the presence of the state needs to be understood as the institution being 'in the right place at the right time'.

Nevertheless, the modern state is strongly linked to the development of capitalization does not mean that the state has no vested interest in sources of power. Indeed, states often have strategic interests stemming from their unique socio-spatial standing and political economy path in inter-state systems and domestic political processes [22]. This means that in practice, state and capitalist interests do not always coexist. An example is the state's selective promotion of environmental conservation facing business barriers. Often the conflict is not over whether environmental resources are commercially exploited, but rather over the conditions under which such exploitation occurs, namely for logging restrictions to ensure long-term production.

In Indonesia, environmental protection and restoration efforts that have long-term impacts tend to be sidelined

compared to short-term economic interests. For instance, the Minister of Environment and Forestry Regulation Number 24/MENLHK/SETJEN/KUM.1/10/2020 on the Provision of Forest Areas for Food Estate Development will strengthen corporate and investment dominance over Indonesia's forest environment. The regulation adds variants of new licenses in forest areas. So an increase in the rate of logging of natural forests is a consequence [23].

The state entity in the environmental context has generated a lot of pessimism among scholars. For instance, Johnston [21] argues that the state's role as a facilitator in the capitalist system's actor chain for environmental issues is a co-product of the 'system'. Also, being an important factor in overcoming environmental problems, although it is largely inhibited in its activities because it is more tied to capitalist interests. In addition, the state is also responsible to manage the physical and biological resources, effectively unavoidable, but never fully accepted within the capitalist system.

The state often degrades the environment in the name of development. That the state has been so destructive of the environment must be recognized as a paradox in the functioning of the state. There is an innate risk of conflict between the state's role in using, and the state's role in protecting the environment, which is ultimately decisive [12]. The state also contributes to maximizing the extraction of natural resources. It is highly dependent on the production processes and the primary product's export. In developing countries, the state has emphasized the extraction of natural resources for export mainly to developed countries, such as timber, minerals, agriculture, and fisheries. At the same time, this process also affects the economy and accelerates the political marginalization of developing countries.

Furthermore, state-funded industrial development is also associated with water, land, and air pollution due to the manufacturing processes. Developing countries have made considerable efforts to attract investment from transnational corporations and build up their local industries. Therefore, it is not surprising that most countries have shown little tendency to control the process of industrialization and emissions management within their territories. This has led to the development of increasingly severe pollution issues in developing countries' cities. Yet cities have a major role to play as a refuge from pollution. Therefore, Leonard [24] promotes a special policy on urban growth that economic development should prioritize environmental conservation.

Therefore, Leonard [24] promotes a specific policy on urban growth that economic development should prioritize environmental preservation. Indonesia has implemented various policies in addressing various environmental issues while creating sustainable development. For instance, the Economy Blue, Sustainable Development Goals (SDGs) in villages, and Indonesian Sustainable Palm Oil (ISPO) policies [25]–[27]. Another example, Independent Rural Community Empowerment (*Program Nasional Pemberdayaan Masyarakat Mandiri Pedesaan*) has been successful in improving road access and connectivity, rehabilitating drainage, sewage, and sanitation [28]

Furthermore, the Berau Forest Carbon Program (*Program Karbon Hutan Berau*) implemented at the district

level is a carbon finance mechanism for development that bridges the gap between small, isolated emission reduction projects and the potential of the national REDD+ program. It has the potential to provide important lessons for achieving large-scale green growth. Forests in Berau District, East Kalimantan are threatened by oil palm expansion and coal mining. This program seeks to create a REDD+ program with incentives that is effective in reducing emissions. Implemented through four stages: scoping, development, pilot projects, and full implementation phases [29].

III. ECOLOGICAL CONSCIOUSNESS IN DEVELOPING COUNTRIES

In developing countries, there has also been growing pressure for change in development processes and practices. This pressure has emerged from the politics of actors which in this case is particularly visible and associated with, for example, the demands of peasant movements and indigenous community organizations for new policies oriented to local empowerment, social justice, and the creation of a sustainable environment [30]. These actors have received support from domestic and foreign NGOs and professionals who also can lobby the state directly to change its traditional policies and practices [31].

In the environmental context, the crisis that occurs is a shared responsibility, including the state, the private sector, and all elements of society [32]. Thus, Participatory environmental enforcement through integrating community values in protecting the environment is an ideal strategy for sustainable development processes [33]. The state needs to facilitate this.

Although natural resources could not supply a huge population, more than 90% of the world's population growth occurred in developing countries, where growth averaged 2.3% [34]. Africa, for example, has a population growth rate of 3.0%/year. As a consequence, most of the world's approximately 20-25% population lives in "absolute poverty" - where per capita income was less than 370 dollars/year in developing countries [35], [36].

The reluctance of developing countries for implementing environmental conservation could be linked to bureaucratic resistance which has the advantage of the 'status quo'. Bureaucratic conflict in environmental contexts is perceived to reside in lower institutions, although, often the most powerful institutions are those that have been relegated from institutional control because they are environmentally destructive, such as coal-fired energy generation or hydropower sources (reservoirs), mining or massive deforestation, and intensive crop production [37]. In contrast, environmental organizations usually have limited substantive power, are relatively new, and have to deal with the policies of powerful institutions.

Similarly, countries claim green mandates to expand areas incorporated in nature reserves or national parks as one of the ecotourism promotion strategies. In general, tourism has become one of the central businesses in developing countries, and ecotourism become one of the fastest-growing sectors [38]. Developing countries that capitalize on tourism,

extensively utilize tropical forests with a diversity of wildlife considered exotic through conservation initiatives under the guise of protecting wildlife and forests for tourist 'consumption'.

More importantly, most developing countries now realize that green policies can provide financial benefits. Activities such as ecotourism or reforestation can be green businesses, although there is still debate about 'greenness'. Importantly, the general idea behind the 'greening' cooperation process is that if the recipient country is committed to implementing policies related to creating a sustainable environment, the donor country will support, among other things, through financial assistance. Thus, developing countries have a strong intention to develop 'green' policies.

Currently, developing countries are focusing on overcoming ecological issues through various means. For instance, Pakistan is developing green technology strategies for the sustainable of solar power projects through the adoption of green technology [39]. Green technology becomes strategic to implement because it can improve environmental quality, city-region resilience, economic growth, and social welfare [40].

States could also promote environmental conservation for the purpose of social control or security. Thus, conservation initiatives are a means for the state to assert its power's position over other actors. For example, the development of eucalyptus plantations or national parks almost always engages systematic state intervention [41].

Furthermore, the relationship between a country's state policies and international environmental change is dynamically linked [42]. For instance, environmental degradation results from the actions of state actors in the form of development policies and practices in the region, and these development policies and practices produce environmental impacts that extend beyond the region. The disconnect between environmental influence and political responsibility could apply to all countries in the world.

The interesting here is the industrialization that has been chosen in Developing countries, including the state policies that trigger development and solve the environmental problems of an increasing number of countries. Thus, for example, the emergence of polluted areas in developing countries could be caused by an increase in air and water pollution problems, which indirectly increases environmental problems on the global scale [43].

Moreover, environmental degradation at the global level is also related to the practice of development policies initiated by state actors who act beyond national boundaries (into the international commons) [42].

IV. TECHNOLOGY OF ENVIRONMENTAL INNOVATIONS

Innovation plays a key role in driving technological improvements. It helps countries to find strategic solutions to various environmental problems. Technological advancement can essentially contribute to environmental resilience. Thus, innovation in environmental sustainability needs to be

accompanied by technological advances, which are also sustainable, as a preventive measure when innovations that are being implemented are unable to solve environmental problems [44]. In this context, many empirical studies have documented technological innovation efficiency in improving environmental sustainability [45].

The technology of environmental innovation becomes very important in the creation of a sustainable environment, given that various environmental problems (ex. limited natural resources, climate change, etc.) become a big challenge in the creation of a sustainable environment and economic progress. In this context, the technology of environmental innovation needs to at least represent an element of reconciliation between environmental sustainability and economic growth [46]. More specifically, environmental technological innovation principally facilitates new methods in the process of environmental resource management [47], this innovation becomes a tool for creating environmental change to become more sustainable, as well as an opportunity to increase economic growth through 'wise' resource utilization [48]. This statement is in line with the opinion of [49] which states that technology of environmental innovation is proven to produce sustainable economic growth.

For instance, converting waste into appropriate products through cycles designed to restore the value of the waste requires the technology of environmental innovation to be optimized [49]. Another example, is environmental technology innovations in the context of clean and green energy help protect against environmental pollution while reducing dependence on fossil fuel energy [50]. technology of environmental innovation also plays a role in achieving energy conservation. In this context, the technology of environmental innovation not only emphasizes the efficient use of traditional energy sources but also renewable energy sources (the capacity could be developed by technological innovation through increasing the renewable energy force in meeting energy demand in the long term) [51]. In addition, the technology of environmental innovation is also one of the components that support environmental sustainability by providing a statistically negative impact on CO² emissions [45].

Huber [52] discusses how a country becomes a pioneer in contributing to global diffusion and the development of environmental technology innovation. An important component of this goal is the strengthening of regulations for market institutions or firms. Looking from the perspective of ecological modernization theory, Huber explains six theses that form the basis of ecological modernization. *Firstly*, technological innovation. Modernization is a multifunctional process that includes integrated cultural change (encompassing science, religion, education, politics, nation-building, art, and even more instrumental functions e.g. policy formulation and development of industry, technology, markets, and finance). The modernization of today's society also requires ecological modernization; the re-adaptation of industrial society on a global scale through modern approaches (technology, scientific knowledge, etc.) that essentially aim for sustainable development.

Secondly, strict regulation. The emergence of new technologies needs to be facilitated by laws and regulations.

Strict regulatory innovation will become a 'facilitator' in the technology of environmental innovation. Empirically, the research results of Esty and Porter [53] reveal that the firmness of law enforcement, the sophistication of the regulatory structure, and the strictness of environmental standards are important factors in determining the country's performance towards environmental conservation.

Thirdly, environmental innovations take place in the market with the state as the main pioneer. Environmental innovations tend to be complex, hence they require reorganization of the production chain or the creation of a new chain from scratch (as in the case of biofuel feedstocks for fuel). Because of its complexity, most industries risk shying away from production chain ties. That is why they need a trusted legal context that minimizes economic risks, also ensures fair competition, and enables effective planning.

Fourthly, despite globalization, Technological innovation and environmental policies depend on each country. This trend of globalization has led to the assumption of a less role for the state [54], [55], or even that national sovereignty has become obsolete. And the effective governance of a nation ultimately relies on state prerogatives (such as tax collection, the use of force, and law-making). In this context, global governance only helps to coordinate. Global governing bodies usually do not have supranational authority.

Fifthly, one of the centers of global ecological innovation development is essentially 'active' international companies. In this context, companies play a major role in environmental governance processes (seeing the fact that they are directly part of the value chain). Thus, companies need to make decisions on how to produce, develop and use the technology of environmental innovation. *Sixthly*, environmental innovations do not easily trickle down in the hierarchy of the world system. An innovation transfer is possible though very rare. The main barriers to technology transfer to developing countries are often limited and incompatible due to uneven development [56]. Recently, ecological innovations can be easily adopted by countries in the core innovator group, and they are now in many cases currently being adopted by developing countries, but in many cases, by underdeveloped countries still ignoring them. Therefore, it is the demand of developing countries to introduce ecological innovations by adopting the technology of environmental innovation, as well as contribute to the progress of their countries in the future.

Environment innovation technology can improve the quality of life, prevent massive environmental degradation, and is an urgent need in efforts to increase industrial productivity. [57], [58]. This statement is supported by the findings of data from 28 OECD countries, it was found that technological innovation affects the development of industrial structure by affecting the income elasticity of demand [59]. It is important to note that the application of innovation at the local level, in this context of environmental technology, needs to pay attention to local wisdom and be based on the local community to find the equivalent and identity of the community [60].

Marking the efforts to create technology of environmental innovation in Indonesia, Soetrisno [61] found

that the creation of sustainable and equitable Citarum watershed environmental resources for the welfare of the community requires the development of environmentally friendly technology as a driving factor, which accelerates the improvement of competitive capabilities in achieving a sustainable environment [62]. Another example, in the context of waste management, in 2017 Bali developed environmental innovation through Waste Management and Waste to Energy to develop technology or methods of processing waste to be used as an alternative fuel. The Waste to Energy program has produced a product in the form of Solid Recovered Fuel (SRF) which can then be processed into pellets that can be used as fuel for various purposes [63].

Furthermore, Suprobo & Mutfianti [64] found that the main factors determining environmental innovation carried out by urban villagers in Surabaya are ultimately green products, green processes, and even green impacts for the village itself. Green product is a dimension of environmental innovation that can be described as a result, including Waste Bank savings, compost for fertilizer, waste-treated water, craft products from waste, processed plant and herbal products, tourism activities, and community gardens. In further development, it was also found that green processes can also be an indicator of environmental innovation, one of which is Wastewater Treatment Equipment (*Alat Pengolah Air Limbah*) technology, composting technology, and technology in waste management.

Thus, it can be said that if the technology of environmental innovation considered to have a significant impact on various fields of human life is not properly considered, then efforts to solve environmental problems seem to only be a 'mirage' [65], seeing the fact that the creation of environmental innovation technologies is at the core of competitive opportunities, in this context Indonesia as a developing country. Successful innovation requires policy stability and regulatory flexibility [66]. Therefore, efforts to implement regulations, policies, and action plans also need to be carried out sustainably [48].

V. CONCLUSION

Environmental politics examines the contestation between actors in the management of natural resources and the environment. As one of the actors, the state in the context of natural resource management is the party that is considered the most entitled to regulate natural resource management. The state is allowed (considered reasonable) to discipline its citizens by using violence. But in its development, there are criticisms that the state is not a harmonious or stable organization, because in it there are actors who contest each other in the daily formation of the state. Not to mention when associated with the context of globalization, where relations between developed countries, donor agencies, and multilateral also influence policies in developing countries.

In the practice of natural resource management, there is a dualism of the state's role, on the one hand, the state is a protector for other actors in utilizing natural resources so as not to happen what Hardin fears as a 'Tragedy of The Commons', and at the same time also as an environmental destroyer. The state is positioned as a protector by making

policies on resource management, as well as on policies to support development (developmentalism) which are considered as destroyers (for instance, the conversion of forest areas into mining, natural resource conflicts due to land conversion from forests to plantations, etc.).

While in technology environmental innovation, the state is the institution most likely to cause real progress in developing and innovating environmental innovation technologies. The state is the main actor in environmental innovation, even in the global scope, nation-state governments are pioneers in national industries rather than global bodies such as UN agencies. Developing countries must build production with the latest environmentally friendly technologies while conducting research within their capacity. Sustainable development must be carried out in a planned manner, and with international standards in each developing country. Last but not least, the most important thing is that technological innovation within each country should continue until it is achieved on a global scale.

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