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Crowdsourcing and Public Participation to Advance Global Environmental Protection

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Abstract

The principles of international environmental law provide a robust framework for analyzing the legal dynamics of environmental hazards. Central to this framework is the principle of participation, which is pivotal in enhancing environmental protection and mitigating the progression of environmental hazards. By leveraging methods like crowdsourcing, this principle can foster a more engaged public involvement in safeguarding the biosphere. This research explores participatory democracy, access to information, public decision-making, and environmental litigation as fundamental approaches to achieving the objectives of international environmental legislation. It aims to illuminate the two-way interaction between these elements and assess the feasibility of actualizing the participation principle through crowdsourcing. The research examines the effectiveness of crowdsourcing as a tool for implementing this principle in supporting and protecting the environment. By reviewing and analyzing relevant sources, the article posits that increasing stakeholder participation, including civil groups and individuals, can enhance the effectiveness of environmental legislation and advance social and environmental justice. It advocates for the creation of platforms that facilitate information



A. Introduction

The complexity and global nature of today's environmental issues makes them unmanageable by just a few individuals or organizations. Addressing these challenges necessitates diverse scientific insights and comprehensive knowledge, considering these problems not only span across borders but also impact the entire planet and even the outer atmosphere. The root of these environmental issues lies in the collective behavior of institutions, governments, and society at large, and their resolution requires a concerted global effort.

Central to the concept of environmental protection is the principle of participation, a cornerstone of international environmental law, underscored in numerous international legal documents. This principle encompasses three fundamental rights: the right to access environmental information, the right to public participation in decision-making, and the right to access administrative and judicial remedies concerning environmental matters. These components are essential for advancing the right to a healthy environment.¹ However, the international community's effectiveness in actualizing this principle has been limited, primarily due to insufficient attention to its practical implementation. Fulfilling this principle requires deep social research, robust institutional frameworks, and effective models of engagement between international institutions and global citizens.

The research methodology of this research is descriptive-analytical, grounded in library research and consultation of reliable sources. It emphasizes the critical role of citizen engagement in exchanging ideas, decision-making, and policy implementation processes. This approach aligns with public diplomacy and a new political interpretation of participation as a two-way interaction within a crowdsourcing framework.

Relevant research in this area includes the World Meteorological Organization's 2024², publication, "HI Weather Crowdsourcing Guidance Note: Harnessing the Power of the Crowd," which highlights the role of citizens and crowdsourcing in climate and weather-related contexts.³ Additionally, Helen K. Liu's 2021 study⁴, "Crowdsourcing: Citizens as Coproducers of Public Services," published in the Wiley Online Library Policy Internet Journal, affirms the significance of crowdsourcing in participatory policy-making and citizen involvement in democratic governance. Moreover, Joshua Chad Geller's 2015 paper, "Crowdsourcing Sustainable Development Goals from Global Civil Society: A Content Analysis,"⁵ published in the SSRN Electronic Journal, illustrates how crowdsourcing has strengthened civil partnerships

¹ Bozhinova, K. Environmental Governance and Public Participation. (2014).

² WNO, HI Weather Crowdsourcing Guidance Note: Harnessing the Power of the Crowd. (2024).

³ *Ibid.*

⁴ *Ibid.*

⁵ Gellers, J, C. Crowdsourcing Sustainable Development Goals from Global Civil Society: A Content Analysis. (2015).

in global environmental protection. These studies collectively underscore the importance of crowdsourcing and participation in addressing environmental challenges globally.

B. Discussion

1. The Importance and Impact of the Participation Principle in International Environmental Law

Principle 10 of the Rio Declaration (1992) underscores the importance of inclusive participation in addressing environmental challenges. It advocates for the provision of accessible environmental information to citizens at the national level, including details on hazardous materials and local activities, while also ensuring opportunities for involvement in decision-making processes. States are urged to promote transparency by freely disseminating information and facilitating public engagement. Moreover, the principle emphasizes the availability of judicial and administrative avenues for recourse, including options for compensation and redress.

Principle 10 of the Rio Declaration (1992) establishes that effective management of environmental issues requires the involvement of all relevant citizens at the appropriate level. At the national level, each individual must have access to environmental information held by public authorities, including details on hazardous materials and activities in their communities. This principle also advocates for public participation in decision-making processes and ensures that states provide the necessary information freely to encourage public involvement. Moreover, it supports public access to judicial and administrative recourse, including compensation and redress, facilitating a comprehensive approach to environmental governance. These concepts form the three pillars of environmental democracy: the right to access environmental information, the right to participate in decision-making processes, and the right to judicial recourse. These rights were further encapsulated in the Aarhus Convention, specifically in Articles 4-5 (access to information), 6-8 (participation in decision-making), and 9 (access to justice).⁶ Public participation extends beyond government action to include various actors in civil society such as industrial enterprises, international organizations, trade unions, and non-governmental organizations, requiring these groups to be active, transparent, and accountable.⁷ Regulating these entities' involvement in international environmental law is crucial for effective environmental management and decision-making. Non-governmental organizations, such as the International Association for Environmental Law⁸, play pivotal roles by providing specialized knowledge that aids in developing environmental policies and conducting impact assessments. Their participation in judicial processes is also critical, often acting as key defenders of the environment in various stages of litigation, whether directly or indirectly involved.

Participation manifests in various forms, including involvement in environmental protection, standardization, and regulation, decision-making, technological development, knowledge transfer, compensation for environmental damage, and the development and implementation of treaties and human rights strategies at the international level. Such diverse

⁶Gkoutziamani, A. Public Participation, a way to be at the heart of environmental democratic governance, (2019). <https://yeenet.eu/public-participation-a-way-to-be-at-the-heart-of-environmental-democratic-governance-legal-seeds/.p4>.

⁷ *Ibid.*

⁸ ISOEL.

participation is crucial due to the variety of environmental issues, the necessity for scientific research, and the foundation it provides for drafting environmental regulations. Both individuals and organizations have access to participate in the creation, modification, or evaluation of environmental plans or programs.⁹ Recognized as a preventive tool, public participation aids in overseeing democratic decision-making in environmental matters. It also ensures the proper execution of environmental decisions and enhances the democratic legitimacy of these actions.

Principle 10 of the 1992 Rio Declaration¹⁰, reinforced by the 1998 Aarhus Convention, acknowledges public participation as a core principle of international environmental law. The Aarhus Convention specifies that decision-making, project approval, and legal processes must involve public participation. According to the convention, national institutions and authorities are required to consider public input in their decisions and must inform the public about opportunities to engage in project procedures.¹¹

To better grasp the current status and progression of the participation principle in international environmental law, we will review relevant sections of international documents and conventions. This will help us understand what has been accomplished by the international community in fostering this principle.

1. Treaty-Based Approach to the Principle of Participation

The principle of participation has been explored through various international instruments and conventions, reflecting a spectrum from soft to hard law.

a. Soft Law

The principle of public participation is central to various international environmental agreements and declarations, recognizing the critical role that public involvement plays in environmental governance. The Rio Declaration on Environment and Development (1992)¹² in Rio de Janeiro solidifies this notion, particularly through Principle 10, which asserts that the most effective way to manage environmental issues is by engaging citizens at the appropriate level. This includes providing access to environmental information, offering opportunities for public involvement in decision-making and problem-solving, and ensuring access to judicial and administrative remedies, which may include corrective and compensatory measures for the environment. Further supporting this, Principle 13 calls for states to cooperate and play an active role in the development of international law to facilitate compensation for damages and adverse impacts of environmental pollution.

The Declaration also highlights the vital contributions of specific groups. Principle 20 recognizes the critical role of women, acknowledging their significant contributions to development and environmental stewardship. Similarly, Principle 22 underscores the

⁹ Fung, A. (2006). Varieties of participation in complex governance. *Public Administration Review*, 66(Supp.).

¹⁰ Declaration, Rio. (1992) "Rio declaration on environment and development."

¹¹ Glucker A. N., Driessen, P.J., Kolhoff, A., Runhaar, H. A.C. (2013). Public participation in environmental impact assessment: why, who and how? *Environmental Impact Assessment Review*, Volume 43, (2013), pp111-114.

¹² Declaration, Rio. "Rio declaration on environment and development.", (1992) https://culturalrights.net/descargas/drets_culturals411.pdf.

importance of involving indigenous peoples and local communities in the development and protection of the environment.

Agenda 21¹³, a comprehensive plan of action adopted at the same Earth Summit in 1992, builds on these principles by emphasizing the necessity of access to information and broad participation in decision-making as prerequisites for sustainable development. It particularly focuses on the role of "human-centered social and civil groups" in environmental protection across its chapters 23–32 and 36. Agenda 21 also stresses the importance of including marginalized groups like indigenous peoples and women in these processes.

Moreover, the Johannesburg Declaration on Sustainable Development (2002) echoes these themes, advocating for inclusive, broad, and long-term participation in policy-making, decision-making, and implementation at all levels to achieve sustainable development. This declaration further calls on both small and large companies to participate responsibly in community development and to maintain accountability in a stable and transparent environment. It also requires states to prepare and submit national reports on the implementation of Agenda 21, aiming to enhance public awareness and engagement.

Additionally, the Governing Council of the United Nations Environment Programme¹⁴ (UNEP), through its resolution 17/22, requested the UNEP Executive Director to support capacity-building programs. These programs are designed to enhance the development, implementation, and enforcement of environmental laws at the national and local levels, ensuring that the public has access to environmental justice, can participate in decision-making, and has the right to access environmental information.

These documents and initiatives underscore a global commitment to enhancing public participation in environmental decision-making, reflecting a broad recognition of its importance in achieving sustainable environmental governance.

b. Hard Law

Several international agreements emphasize the significance of public participation in environmental governance, integrating provisions to ensure transparency and cooperative engagement across civil society and governmental bodies. The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (1989) under Article 10 calls for states parties to collaborate and assist in the environmentally sound management and disposal of hazardous wastes. This includes ensuring access to information, monitoring environmental effects, developing laws and regulations, creating technical guidelines, and cooperating with relevant international organizations. Similarly, the United Nations Framework Convention on Climate Change (UNFCCC) mandates in Article 4.1(i) that parties promote public awareness and participation, including the engagement of non-governmental organizations. The Convention also requires, in Article 6, the development and implementation of education programs and public awareness initiatives on climate change at national and regional levels.

¹³Agenda 21, the Rio Declaration on Environment and Development, <https://sustainabledevelopment.un.org/outcomedocuments/agenda21>.

¹⁴ <https://digitallibrary.un.org/record/143874?ln=en>.

Additionally, the 1994 Convention to Combat Desertification (UNCCD) highlights the necessity of civil society participation alongside governmental involvement in Article 3(a)(c), emphasizing the inclusion of diverse stakeholders in environmental management. The North American Agreement on Environmental Cooperation (NAAEC), associated with the North American Free Trade Agreement (NAFTA), allows citizens to file complaints against member states that fail to enforce environmental laws, through the "Commission for Environmental Cooperation." This mechanism has been instrumental in establishing an open environmental regime that fosters public participation. NAAEC also requires member states to publicly disclose their environmental laws, regulations, procedures, and administrative practices, facilitating public access to information and enabling citizens to seek judicial and quasi-judicial remedies to uphold environmental standards.

The Aarhus Convention stands as a pivotal regional agreement among European states, reinforcing the principles of transparent governance by ensuring public access to information, active participation in decision-making, and equitable access to justice in environmental matters. Recognized as one of the most advanced treaties in this realm, the Aarhus Convention systematically secures these rights, underscoring the interconnectedness of environmental sustainability and democratic practices.

Following the structure and spirit of the Aarhus Convention, the Escazú Agreement serves Latin America and the Caribbean, under the administration of the Economic Commission for Latin America and the Caribbean (ECLAC). While it mirrors the Aarhus model in its framework, the Escazú Agreement extends further by explicitly linking the obligations of the parties to the fundamental public rights of information access, decision-making participation, and judicial access. It introduces broader principles like intergenerational equity, prevention, and non-regression to ensure these rights do not diminish over time. Significantly, the agreement places a higher emphasis on the rights of indigenous peoples and vulnerable communities, mandating that parties not only provide access to relevant environmental information proactively but also facilitate public involvement in significant environmental decision-making processes, such as land use and permitting for environmentally impactful projects. Access to justice in the Escazú Agreement is comprehensive, covering denials of environmental information requests, participation rights, and any decisions or omissions that could harm the environment or breach environmental laws.

In North America, where the Escazú Agreement does not apply, the North American Agreement on Environmental Cooperation (NAAEC) governs public participation in environmental matters. Compared to the Aarhus Convention and the Escazú Agreement, NAAEC sets more modest minimum standards for public participation in decision-making and access to information. However, NAAEC's provisions for accessing justice are notably more comprehensive. The agreement mandates that states implement effective judicial and administrative measures to enforce domestic environmental laws and ensure that individuals and groups can access justice when these laws are violated.¹⁵

¹⁵ Goldschmidt, M. The role of transparency and public participation in international environmental agreements: The North American Agreement on Environmental Cooperation, *Boston College Environmental Affairs Law Review* | Vol. 29(2), (2002). pp346-351.

The Convention on Biological Diversity (CBD) underscores the importance of public education and the exchange of information in environmental conservation efforts. Article 13 of the CBD promotes the use of mass media and educational programs to enhance public awareness of the significance of conserving biodiversity. Meanwhile, Article 17 obliges member states to facilitate the exchange of critical information for the conservation and sustainable use of biological diversity, including research findings and details on educational and training initiatives. Furthermore, the CBD has instituted a Clearing-House Mechanism, detailed in Article 18, to ensure all member states can access essential information and technologies. This mechanism is pivotal in fostering scientific and technical collaboration among member states and other stakeholders, thus aiding the effective implementation of the convention's objectives.

The Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade emphasizes the critical role of obtaining Prior Informed Consent (PIC) from participating countries before trading specific hazardous chemicals. This PIC mechanism, also integral to other agreements like the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), is based on the principle of prior informed consent and helps regulate the import of controlled chemicals and the access to genetic resources.

The Vienna Convention for the Protection of the Ozone Layer and its subsequent Montreal Protocol primarily engage the United Nations Environment Program (UNEP) to keep member countries informed about substances that deplete the ozone layer. To assist in this effort, UNEP has established the Technical and Economic Assessment Panel (TEAP), which provides these nations with information on technological alternatives to ozone-depleting substances.

Article 10 of the Stockholm Convention on Persistent Organic Pollutants underscores the importance of enhancing public awareness and education on persistent organic pollutants. It obligates state parties to disseminate information about these pollutants to both public officials and the general public, aiming to increase awareness and facilitate informed actions.

The United Nations Convention to Combat Desertification¹⁶ places a unique emphasis on participatory approaches at all levels of society, acknowledging that desertification is a complex issue linked with economic, social, cultural, and environmental factors. Given its extensive impact, effectively addressing desertification requires broad involvement from various sectors of society.

The preamble of the United Nations Convention to Combat Desertification highlights the critical importance of international cooperation and broad-based participation in tackling desertification. The convention elaborates on various aspects of this participation, emphasizing the need to increase public awareness and involve local communities. It particularly focuses on the active involvement of women and youth, supported by non-governmental organizations (NGOs) that strive to alleviate the effects of desertification and drought. Member states are encouraged to create national action plans through ongoing participatory processes that include

¹⁶United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa (Paris, 14, October, 1994).

NGOs, local communities, and both genders, with particular attention to resource users such as farmers and herders. The convention advocates for the development of frameworks that guarantee the effective engagement of all pertinent stakeholders at every phase of these plans, including planning, decision-making, implementation, and evaluation. Moreover, the convention supports involvement in continuous scientific research on desertification. It calls for the collection, analysis, and sharing of information to tackle specific challenges and promotes strengthening ties among national, sub-regional, regional, and international research entities, spanning both the private and public sectors. The goal of these efforts is to foster the development of sustainable, affordable, and accessible technologies that enable effective local participation.

The United Nations Convention to Combat Desertification emphasizes the importance of capacity building and technical training, aiming to enhance research capabilities and expand support services through training programs that involve community members and local agents in conservation and sustainable resource use. Additionally, it encourages the creation of educational and public awareness programs in both affected and unaffected countries, promoting continuous access to relevant information and educational activities to raise awareness. The convention also highlights the need for a participatory approach in attracting funding, planning programs, and deploying financial resources at the national level, involving NGOs, local groups, and the private sector. Advocating for a decentralized policy approach, it empowers local authorities, communities, and structures with management and decision-making responsibilities to enhance local participation and governance in combating desertification. Through these initiatives, the convention establishes a robust framework that underscores the necessity for broad-based participation and international cooperation.

The Cartagena Protocol on Biosafety, a supplement to the Convention on Biological Diversity, emphasizes the importance of broad participation in biosafety matters, including the exchange of information, technology, and expertise, as well as in the processes of evaluation and reporting. Similarly, the Kyoto Protocol of 1998 promotes the voluntary participation of both governmental and non-governmental entities in developing the Clean Development Mechanism, highlighting a commitment to participatory engagement in environmental governance. This approach is reflected in several other international agreements, including the Mediterranean Protocol, the Asia Protocol, and the 1998 Convention on Prior Informed Consent for Certain Hazardous Chemicals and Pesticides in International Trade (Rotterdam), which all advocate for collaborative and inclusive processes in addressing critical environmental challenges.

2. From Prediction to Implementation of The Principle of Participation in International Environmental Law

The principle of participation, crucial for addressing environmental challenges, is often highlighted in international protocols and conventions, yet the methods of realizing this principle typically receive less attention beyond mentions of education, NGO involvement, stakeholder engagement, and public participation.¹⁷ These methods, while fundamental, lack

¹⁷Glucker A. N., Driessen, P.J., Kolhoff, A., Runhaar, H. A.C, Public participation in environmental impact assessment: why, who and how? *Environmental Impact Assessment Review*, Volume 43. (2013).

robust mechanisms needed to foster truly global participation in environmental problem-solving. Given the vast scale of international environmental issues, comprehensive and effective participation is paramount. Crowdsourcing offers a transformative approach by leveraging the collective intelligence of a diverse crowd across various knowledge bases, experiences, and perspectives, significantly enhanced by new technologies, social media, and the internet. This model not only facilitates widespread involvement, regardless of individual circumstances, but also assumes that under optimal conditions¹⁸, groups can outperform individual experts, thereby aligning with the principles of participation found in international agreements¹⁹ and enhancing the implementation of environmental protection goals through inclusive and collaborative problem-solving.²⁰

The principle of participation in international law aims to secure comprehensive, efficient, and accurate outcomes while fostering appropriate processes for resolving, monitoring, and managing global issues. Central to this principle is the belief that the best results are achieved through the collective involvement of states, institutions, and individuals within the international community. Participation primarily concerns the identification of areas and needs within the international arena that require collective action. On the other hand, crowdsourcing focuses on the methods of engagement, as well as the principles and guidelines that govern how collective input is harnessed to forge the best decisions, solutions, and advancements. This differentiation underscores how crowdsourcing can enhance the principle of participation, steering it towards more strategic and structured engagement within the international community.

Exploring the potential of integrating crowdsourcing with the principle of participation, especially in environmental management, reveals significant benefits. Applications of crowdsourcing could include facilitating public access to and sharing of environmental information, collecting diverse environmental data, creating platforms for in-depth research into the impacts of new technologies and phenomena on the environment, establishing forums for idea exchange and decision-making processes, and engaging the public and experts in forecasting environmental trends and in selecting potential strategies for future scenarios. Although this discussion does not delve into the specifics of how crowdsourcing can be operationalized in these contexts, it is evident that a detailed examination could significantly advance our understanding and implementation of effective environmental governance. Future research should thus focus on providing a comprehensive blueprint for the practical application of crowdsourcing within the principle of participation.²¹

Crowdsourcing in policy-making is driven by a robust sense of civic responsibility and a commitment to safeguarding the rights of individuals, groups, and broader concerns such as environmental protection. This form of crowdsourcing is distinct from other types that might focus on lighter pursuits such as fostering creativity, sparking thought, or developing personal

¹⁸ Crowdsourcing week, What is Crowdsourcing? (2022). <https://crowdsourcingweek.com>.

¹⁹ Surowiecki, J. *The wisdom of crowds*. Anchor. (2005).

²⁰ Howe, Jeff "The Rise of Crowdsourcing". *Wired*. (2006).

²¹ Ghasemi, S., Tayebi, S. Governance and Environmental Regulation in Light of Crowdsourcing, *CIFIL Journal of International Law*, Volume 3, Issue 6, October, (2022). pp 117-125. <https://doi.org/10.30489/cifj.2022.354107.1057>,

skills. In policy-related crowdsourcing, the stakes are inherently higher, and the focus is on substantive outcomes that can impact society and the environment.

A notable example of this can be seen in the interaction between non-state actors and the European Union Parliament. Often, these interactions take place through the establishment of interparty groups that operate outside the formal structure of the parliament. Such groups have proven to be effective channels for influencing environmental policy decisions within the European Parliament. Through these platforms, non-governmental actors gain an indirect yet impactful role in the legislative process, providing valuable insights and data to the parliament's secretariat. This, in turn, helps to inform and sway the opinions of parliamentarians during sessions. The inclusion of diverse perspectives ensures that environmental policies are more comprehensive, balanced, and ultimately more effective.²² By engaging with non-governmental actors, parliamentarians can tap into a wider pool of expertise and viewpoints, enhancing their capacity to address complex environmental challenges in a manner that benefits both the ecosystem and society at large.

3. The Use of Participatory Democracy and Crowdsourcing to Achieve Social Change in the Path of Sustainable Environmental Protection

Efforts to enhance participatory and direct democracy have led to innovative steps designed to foster more inclusive participation. A key focus has been on increasing political-social productivity, which examines effective ways for citizens to engage meaningfully in the lawmaking process. This approach not only seeks to determine how best to involve individuals collectively in policy formulation but also aims to harness this collective intelligence to drive broader social change.²³

In order to use collective intelligence to address environmental risks, based on the history of its use in policy-making, we can identify three stages for its use in the field of environment:

1. Citizens are asked to share their concerns, experiences, and problems regarding the environmental risk and its regulatory framework.
2. The ideas of the general public on how to solve the problems are collected.
3. A specialized population-based group is asked to evaluate the generated ideas and draw conclusions.

In addition, the use of crowdsourcing in participation²⁴ to address environmental issues can have similar results to its use in policy-making, some of which we will discuss below:

1) People's Constructive Participation

People are often driven to engage in social activities that have a clear impact and purpose. When provided with meaningful opportunities to participate, they are likely to contribute ideas and propose potential solutions, an action that not only validates their input but also underscores

²² Alizadeh, M, Zarneshan, S, Dolatabadi, Z. Access to Environmental Justice in EU for Non-governmental Actors, *Public Law Research Journal*, Volume 20, Issue 60, (2019). <https://doi.org/10.22054/qjpl.2019.18537.1446>, pp. 237-259

²³ *Ibid.*

²⁴ Sanne Akerboom and Robin Kundis Craig How law structures public participation in environmental decision making: A comparative law approach, *Environmental Policy and Governance Journal WILEY*, (2022) pp1-15, [wileyonlinelibrary.com/journal/eet](https://onlinelibrary.wiley.com/journal/eet).

their value within the process. Participation serves as a civil movement that advocates for the collective good and acts as a foundation for enhancing rights and responsibilities. This participatory approach not only fosters respect and inclusivity but also leads to the discovery of more effective and constructive solutions to societal issues.

2) The Impact of Policy-Making Participation

One concern with participatory approaches to policy-making is that they may not always be seen as desirable and can be perceived as risky. This stems from the potential to instill in participants unreasonable expectations, maintaining the illusion that they have a direct impact on laws. This is a legitimate concern; however, participants' ideas are typically refined and discussed, not directly enacted. The danger lies in participants becoming discouraged if they feel their suggestions are ineffective, which can deter them from future involvement. Participants are generally knowledgeable and realistic about their contributions' influence. Clear communication about how their input will be used and the actual impact it will have can help manage expectations and maintain engagement in these democratic processes.

3) Crowdsourcing for Legal Learning and Knowledge Acquisition

Through the exchange of information and arguments, participants learn how to crowdsource and understand each other's situations. As a result, volunteers are subjected to more research. The path of participation realizes the process of ideation, not the capacity of decision-making, which is a sovereign act.

4) Intellect and Credibility

Participants in policy-making processes demonstrate their social intelligence through active engagement and ideation, with their intellectual growth thriving on the realization of the concept of participation and access to information. This vital engagement contributes significantly to fulfilling the right to information principle, ensuring all are informed and empowered. In crowdsourcing, every idea is reviewed, ensuring all participant voices are heard, thereby strengthening the impact of collective opinions and ideas. While this inclusive approach enriches the decision-making process, it ultimately falls to politicians to determine the most appropriate policies.²⁵

4. The Realization of The Principle of Participation in the Light of Crowdsourcing

a. The Realization of Access to Environmental Information Through

International participation is crucial for ensuring universal access to environmental information, a principle increasingly recognized within international environmental law. Documents in this field highlight the importance of public access to a diverse range of environmental information, including biodiversity, regional environmental issues, cutting-edge environmental protection technologies, and scientific data crucial for tackling and solving environmental challenges. Crowdsourcing and information technology significantly enhance

²⁵ Aitamurto, Tanja. "Crowdsourcing for democracy: A new era in policy-making." *Crowdsourcing for Democracy: A New Era in Policy-Making*. Publications of the Committee for the Future, Parliament of Finland, (2012). pp 1-4.

the sharing of environmental information by improving factors such as cost, speed, quality, flexibility, scalability, and diversity.²⁶

Developing platforms for broad access to environmental information involves multiple strategies. One effective approach is to establish a platform categorized by different types of information, making it accessible to various stakeholders including the general public, international bodies, NGOs, scientists, and policymakers. Such a platform would facilitate the sharing and utilization of environmental data for multiple purposes. The structure and layout of this platform, along with its various sections, can be designed using diverse methods, including international conventions and contributions from relevant international documents, NGOs, and experts in the field. Methods such as Crowd Voting can be employed to finalize and approve any proposed categories or structures, thereby fostering greater involvement in creating the platform's initial structure. This could include features like mobile crowdsourcing for mapping environmental, social, and other concerns.²⁷

Additionally, widespread access to information through such platforms supports another critical goal of international environmental law: facilitating the exchange of information, technology, and knowledge. This enables the conduct of scientific assessments and the preparation and submission of scientific, performance, and other reports. Furthermore, it aids in the discovery of technical and technological methods that enhance environmental protection and support.

b. Crowdsourcing for Public Participation in Design and Decision-Making

Environmental issues are notoriously complex and have far-reaching consequences akin to a butterfly effect. Addressing them requires a multifaceted approach that encompasses the exchange of information, comprehensive data collection, extensive and varied scientific research, and insights from independent experts worldwide. It also involves identifying a range of potential solutions, proposing diverse approaches, and consolidating all information, assessments, and achievements into a unified platform to facilitate informed decision-making.

Crowdsourcing has emerged as a powerful tool in this context, drawing on practical experience to enable effective participation and collaboration. It allows for the integration of diverse perspectives and the pooling of knowledge and resources, which are essential for tackling complex environmental challenges. This method of engagement not only accelerates the gathering of necessary data but also enriches the decision-making process by introducing varied viewpoints and innovative solutions.

The design and implementation of environmental protection platforms using crowdsourcing must be meticulously planned to address the complexities involved. Effective crowdsourcing initiatives can foster cooperation between international organizations, the public, and civil societies, enhancing the participation of diverse groups, including politically disadvantaged communities such as indigenous populations and women. This approach also supports the development of infrastructures that amplify the influence of unions, organizations,

²⁶ Berry, L.H, Koski, J., Verkuijl, C., Strambo, C. and Piggot, G. Making space: how public participation shapes environmental decision-making. Discussion brief. Stockholm Environment Institute. (2019).

²⁷ D, Powell "A new tool for crowdsourcing". МИР (Модернизация. Инновации. Развитие). 6 (2-2 (22)). (2015). ISSN 2079-4665.

and local groups, facilitating their involvement in decision-making and standardization processes related to emerging environmental technologies and phenomena.

To ensure the success of crowdsourcing in environmental decision-making, it is imperative to align with the principles of international environmental law. These principles guide the application of crowdsourcing and ensure that its use not only complements but also enhances the legal frameworks aimed at protecting the environment. Among these guiding principles, some of the most critical include:

- 1) Groups can only make wise decisions when they are composed of a diversity of perspectives and expertise. The irrational biases that arise in any group can only be mitigated when all members are able to think critically and independently. In groups where no one thinks critically or independently, people's opinions are more likely to be influenced by groupthink, which can lead to poor decision-making. Conflict and disagreement are often ignored or interpreted in a way that is favorable to the majority opinion. This can lead to groupthink, a phenomenon in which group members become quite focused on reaching consensus that they fail to adequately consider alternative viewpoints.
- 2) The smartest groups have decentralized structures but gather their information in a central location. (Large groups are more effective when they have a decentralized structure) meaning that everyone can organize themselves and work in smaller subgroups without being under the direction of a central leader. The more time a group's members invest in a problem and the more independently they work on it, the more likely it is that they will develop effective solutions.
- 3) A group with a decentralized structure, however, will only be successful if its activities, outcomes, and data are gathered and examined in a central location where individuals can have a comprehensive understanding of the bigger picture. Therefore, if the ideal conditions for group behavior are met, groups of people can not only make intelligent choices, but also produce outcomes that are superior to those of an expert group or its smartest members.²⁸

The utilization of web platforms is a key strategy recommended by crowdsourcing for facilitating information exchange, participation, and decision-making. The inherent anonymity and absence of physical presence in web-based projects can foster a safe and supportive environment, encouraging increased involvement from individuals who might be deterred by the dynamics of traditional settings. Such platforms offer ease of use and promote broader, more diverse collaboration, breaking down barriers that often exist in other participatory platforms.²⁹

In the realm of environmental management, the power of crowdsourcing can be leveraged through innovative tools that enhance monitoring and compliance. Under international environmental law, states are obliged to enact and enforce robust environmental regulations. Individuals can engage collectively in demanding compliance from governments, organizations, or private enterprises, as well as in monitoring and reporting legal violations.

²⁸ Surowiecki, J. *The wisdom of crowds*. Anchor. (2005).

²⁹ DeVun, Leah (19 November 2009). "Looking at how crowds produce and present art". *Wired News*. Archived from the original on 24 October 2012. Retrieved 26 February 2012.

The influence of collective action through media is well-documented and, while it has the potential for misuse, such as dissemination based on inaccurate information, it also holds considerable promise for fostering positive changes.

Ensuring the reliability of initial data through verification and analysis by a collective of experts is crucial. Developing and implementing monitoring and enforcement strategies based on this vetted information can empower the collective to hold various stakeholders accountable more effectively. Furthermore, the advancement of communication technologies and the emergence of a participatory culture enable traditional institutions to enhance transparency and accessibility using digital participatory methods.³⁰

c. Access to and Recourse to Administrative and Judicial Bodies in the Field of the Environment Through Crowdsourcing

Claiming and litigation are crucial tools that enable citizens to exercise their rights to participate in environmental decision-making processes, not just limited to governmental and international organizations but extending to private individuals as well. Crowdsourcing provides a platform that recognizes and facilitates citizen participation in environmental protection, allowing them to contribute to strategy development and to assert their rights through administrative and judicial bodies. It is essential to foster interactions between citizens and organizations responsible for environmental conservation, particularly in exploiting informational data. Additionally, the general public,³¹ alongside non-governmental organizations and groups, should have the ability to influence and assert rights against judicial bodies, introducing diverse ideas into the judicial process, ensuring robust enforcement and public disclosure, and creating accountability and transparency among violators.

These interactions can profoundly influence environmental litigation and the overall environmental destiny by empowering individuals to advocate for "the right to a healthy environment," compelling governments to enact necessary environmental protections. The use of modern web-based tools can accelerate these processes, making participation more accessible and effective. Despite challenges, public participation has become an essential component of environmental decision-making as governments tackle climate change and other crises. Crowdsourcing helps establish the fundamental requirements for public participation and develops specific frameworks for its application, enhancing the role of citizens and NGOs in environmental governance and compelling governments to include individuals in decision-making, thus promoting a more democratic and environmentally responsible society.³²

C. Conclusion

The pressing environmental challenges facing the world today necessitate a transformation in international environmental policies toward a more inclusive and participatory framework, where the active involvement of individuals, groups, organizations, and governments is crucial. Traditional governmental approaches to environmental management have proven inadequate,

³⁰ Aitamurto, Tanja. "Crowdsourcing for democracy: A new era in policy-making." *Crowdsourcing for Democracy: A New Era in Policy-Making*. Publications of the Committee for the Future, Parliament of Finland. (2012).

³¹ Kusworo, D. L, Fauzi, M. N. K "Implementation of Litigation Mediation in Resolving Medical Negligence Disputes Between Patients and Health Workers", *Administrative and Environmental law review Journal*, Vol. 4(1), (2023). pp. 21-35.

³² *Ibid*.

underscoring the need for a more organized and comprehensive structure capable of effectively addressing global environmental issues. This structure must transcend borders and governmental jurisdictions, offering a unified and impartial approach to environmental governance. To keep pace with environmental changes and effectively manage them, this structure must account for all the broad, diverse, and ever-evolving dimensions and factors impacting the environment. Developing such a structure is immensely challenging and requires a multidimensional strategy that can encompass its various aspects, opportunities, and unique circumstances comprehensively.

In pursuit of the most accurate and wide-ranging solutions for environmental management, it is essential to involve experts, scientists, and the public in the creation of large-scale participatory networks. These networks should enable participants to freely and objectively share their findings and opinions. The approach suggested in this article integrates crowdsourcing with the theoretical principle of participation, offering a practical solution to enhance engagement across the specified dimensions and characteristics. Crowdsourcing can empower groups to make informed decisions and achieve results potentially superior to those of individual experts or the most intelligent members within a group, provided the conditions for optimal group behavior are met. The article concludes with a general recommendation for deploying crowdsourcing to actualize the principle of participation through the development of a comprehensive platform. This platform would systematically incorporate all discussed principles, enhancing access to information, involvement in decision-making, and recourse to judicial and administrative authorities, thereby facilitating true participatory engagement. While implementing such a platform is undoubtedly complex and challenging, the significant benefits it promises justify the effort, research, and serious measures required.

D. Suggestion

By synthesizing the key findings and conclusions, suggestions were proposed as a means of effective dissemination of the value of this research and its potential implications for future studies or practical applications as follows.

- a. Public participation and crowdsourcing are both valuable tools for engaging with a wide range of stakeholders and harnessing collective intelligence. Public participation involves actively involving individuals or groups in decision-making processes, allowing them to contribute their perspectives, expertise, and feedback. Together, public participation and crowdsourcing can enhance the quality of decision-making processes by incorporating multiple viewpoints, fostering collaboration, and generating innovative solutions.
- b. By harnessing the collective wisdom and resources of a global community, international environmental law can be more effectively implemented and enforced. This collaborative approach not only enhances transparency and accountability but also fosters innovation and creativity in finding sustainable solutions to complex environmental challenges.
- c. Crowdsourcing can provide a platform for citizens to actively participate in monitoring and reporting on government actions related to treaty compliance. By harnessing the collective knowledge and resources of the crowd, governments can be held accountable for their commitments and obligations under international treaties. This increased

transparency and scrutiny can help ensure that governments are meeting their treaty obligations and taking necessary steps to address any shortcomings. Ultimately, crowdsourcing has the potential to strengthen the implementation and enforcement of international agreements, leading to more effective governance and greater accountability.

- d. By working together, citizens and governments can create a powerful force for positive change and ensure that crowdsourcing efforts to protect the environment are successful.

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