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The environmental law and legislation are key instruments protecting humans as well as ecosystems having mosaic of biological organisms interacting with edaphic, hydrological and atmospheric components. Environmental law or policy is not a new discipline. For over half a century, various publications on this highly demanded subject have enlightened the scholars, scientists, jurists, policy makers and activists. In the United States, Europe, Oceania and other continents, number of journals and periodicals emerged on environmental law and policy. Majority of these publications operate in territorial contexts and serve the audiences of their respective regions. Truly international perspective of a journal on environmental law or policy was observed missing.

Taking off from identified gaps, a collaborative forum constituting The Grassroots Institute, Yaroslav Mudryi National Law University of Ukraine and the Northern Institute of Minority and Environmental Law propelled the idea of publishing and disseminating a triannual Journal of Environmental Law and Policy having an inclusive character. Fortunately, a team of editors came up to anchor the publication and to line up not only the institutional modalities but also an active advisory board and hyper-active editorial board. Within a period of few months, a handsome team of renowned academicians, scholars, scientists, experts, practitioners and jurists took shape, along with decent website for the upcoming journal. Nevertheless, several competent authors made this inaugural issue possible followed by the excellent contribution by the members of the editorial board who reviewed the papers effectively in fast mode. This pace and temperament of the work would always be solicited.

Obviously, this journal would not have become a reality without the support and contribution by members of advisory board and editorial board and the officiating editors – editor-in-chief, deputy editors-in-chief and executive editor. Editorial assistants too have contributed to the management of the manuscripts and to the final publishing etc. Last but not least, the collaborative forum of partnering institutions calls for legal and policy scientists, academicians, scholars and senior jurists to join hands and make the Journal of Environmental Law and Policy a successful venture.



Professor Dr. Anatoly Getman, PhD, Dr.Sc.(Law)

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ENVIRONMENTAL JUSTICE AND INCLUSIONS

Inaugural Editorial

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The environmental agenda encompasses a relatively large number of issues having multiple actors involved in and around them. Environmental problems are diverse and complex, both in local as well as in international settings. The complexity of environmental problems often involves exploring various solution approaches. The regulatory process is one of them; and the policy process complements regulatory developments. They guide human behaviour. Given that human interactions with nature and ecological processes are central to environmental problems, law and policy regulations suggest changing human behaviour in order to be in harmony with nature and to better cope with natural processes. Coping with natural processes does not mean seeking the adoption of preventive measures only. Rather, positive and proactive measures are necessary to recover from environmental harm, as we have already caused significant damage to our environment. We must recover from the injury caused to our planet in order for it to exist in its unique condition and to continue with life support systems that are sustainable. Law and policies are some of the tools we employ to recover from the damages caused to our environment. Since the 1972 Stockholm Conference on the Human Environment, the environmental agenda has predominantly captured our attention on all decision-shaping and decision-making levels, including political, economic, scientific, and cultural spheres both in academic and non-academic contexts. The actors' joint efforts have provided us with a mutual understanding of environmental problems, a set of agreed-upon norms and principles, and procedural practices to respond to such problems.

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Environmental Justice and Inclusions

However, in the international context, the state-centric legal framework adopts a consent-based approach. The legal norms and rules are binding for states only when these norms and rules are emanating from states' free will, as expressed either in treaties and conventions or by usages generally accepted as part of the customary international norms. States tend to balance their free will with their national interests while committing to environmental regulations. Therefore, even though there is a shared understanding of environmental problems, their solutions are not always likely to be achieved through strict legal mechanisms—nor is it an ideal approach to solve environmental problems by stringent regulatory tools only. Environmental problems are interconnected and dynamic; they constantly transform due to both natural processes and the human interactions with such processes. Environmental problems know no borders. Hence, the environmental impacts transcend the territories where the problems originated. The impacts are also dynamic; they affect different regions differently. They demand differentiated responses following differentiated impacts. Environmental problems are not merely inter-state matters; they are often global problems – calling for an alternative to the traditional governance approach with just state actors – and, thus, require bringing all relevant actors, such as non-state actors, local sub-national actors, and all sorts of stakeholders, together. Such a governance approach calls for a meeting point within top-down and bottom-up structures, making environmental law and policy more representative, democratic, and legitimate.

We strive to adopt such a unique, global approach to environmental governance in order to deal with climate change, biodiversity conservation, natural resource management, etc. Sharing responsibilities in our performances, which are guided by the norms and principles developed to date, is the core of environmental management. Such a process requires us to take actions toward ensuring overall environmental justice and the promotion of inclusions. Both environmental justice and inclusions are mutually reinforcing – environmental justice demands broader inclusions in the governance approach, and, at the same time, inclusions promote environmental justice.

The phrase “environmental justice” must not be understood merely in the climate change context concerning the divides between the global south and the global north. Indeed, territoriality is an essential component, for example, for measuring the emission range of greenhouse gases, identifying the nations that have the highest emissions, and recognizing the nations that suffer from the adverse consequences despite their innocence. Territoriality is crucial to sharing the responsibilities and burdens associated with climate change mitigation processes among different nations. Climate change is often considered to be a threat multiplier because of its widespread consequences in all aspects of life, including the environmental, socio-economic, political, and cultural contexts. These widespread consequences deepen the challenges to both the environment and society at large, leading

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to a threat to human security and development and resulting in an exacerbation of inequality and social injustice.

The understanding of environmental justice goes beyond territoriality regimes and involves people and communities within the specific territorial regime, but also across territories. For example, local and Indigenous communities are vulnerable to the effects of global climate change. Often, these groups rely on having a pristine natural environment for their traditional livelihoods and subsistence, which, particularly for Indigenous peoples, are nature-based activities in most cases. Such practices offer them a unique cultural and ethnic identity as distinct groups of people. While these groups live in harmony with nature and do not cause harm to the natural environment themselves, they, however, share the burden arising out of environmental changes caused by actors from within and beyond their territories. In most cases, Indigenous peoples and other local communities face a disproportionate amount of the environmental degradation to which they do not contribute themselves. Quite contrarily, they serve the stewardship role in the environmental conservation process, via environmental management and development through their unique knowledge. Principle 22 of the Rio Declaration on Environment and Development of 1992 recognized their knowledge and the vital role it plays in environmental management. Today, international regulatory tools increasingly stipulate provisions acknowledging their role in environmental governance. The Convention on Biological Diversity (CBD) of 1992, and its subsequent Protocols, the Convention on Wetlands of International Importance or the Ramsar Convention of 1971, and the most recent Paris Agreement of 2015 within the framework of climate change regime, are some of the environmental treaties that explicitly refer to Indigenous peoples and local communities and their importance for inclusions in environmental law-making processes.

The process of inclusion of Indigenous and local communities within the climate change regime shows a unique example. The Indigenous peoples' representation is carried out by the International Indigenous Peoples' Forum on Climate Change (IIPFCC), established in 2008 as the Caucus for Indigenous Peoples. During the adoption of the Paris Agreement, the IIPFCC presented proposals for their inclusion in the process, which resulted in the recognition of Indigenous peoples and local communities. The Preamble and Article 7 of the Paris Agreement referred to Indigenous and local communities and noted the importance of their traditional knowledge and local knowledge systems on the adaptation to integrate them into the relevant socio-economic and environmental policies and actions, where appropriate. The Local Communities and Indigenous Peoples Platform (LCIP Platform) was established as a non-party stakeholder to enhance their participatory role. The implementation of enhanced inclusion has been discussed in the subsequent Conferences of the Parties (the CoPs). For example, in 2018, CoP 24 (held in Katowice) adopted a decision (2/CP.24) to establish the LCIP Platform Facilitative Working Group (FWG) to further

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operationalize the LCIP Platform and facilitate the implementation of its functions. The most important aspect in this decision was choosing and appointing local and Indigenous peoples as representatives by themselves and on equal terms along with the state party representatives.

Additionally, the inclusion of Indigenous peoples in environmental matters is also reflected in processes undertaken within the United Nations' structure, such as the United Nations Environmental Program (UNEP). In 2004, the UNEP established the Focal Point on Indigenous Issues, who is a liaison officer that communicates with Indigenous representatives and ensures their participation in the UNEP processes in environmental governance. The UNEP accredits Indigenous organisations for participating in, for example, the United Nations Environmental Assembly (UNEA) – the United Nations' highest-level decision-making body on environmental issues. The UNEA was established in the Rio+20 conference in 2012 and calls for global action to address the critical environmental challenges facing the world.

Today, human rights norms link environmental justice both as a substantive right and a procedural right. Although the mainstream human rights treaties, such as the International Covenant on Civil and Political Rights (ICCPR) and the International Covenant on Economic, Social and Cultural Rights (ICESCR), have not explicitly referred to a right to the environment, today, a human rights-based approach to environmental governance has become the norm. In 1993, the World Conference on Human Rights held in Vienna adopted the Vienna Declaration and Programme of Action (VDPA), which articulated a right to development based on equitable grounds by meeting environmental needs for both present and future generations. Simultaneously, the VDPA reconfirmed the protection of minorities and Indigenous peoples to profess and practice their own culture, which necessitates a harmonious environmental governance approach, as stated previously. The famous Inuit Petition of 2004 was the first step that showed a concrete case on the relationship between Indigenous peoples' human rights and climate change. The Inuit leaders from the Inuit Circumpolar Council (ICC) filed a petition to the Inter-American Commission on Human Rights (IACHR) complaining that the absence of the United States (US) in mitigating the climate change process caused human rights violations for the Inuit inhabiting the Arctic regions of the US and Canada. As the Inuit culture is heavily dependent on the presence of ice, which they use to help them hunt, gather food, communicate, etc., the loss of ice resulting from global warming heavily impacts their way of life and their cultural survival. Despite its failure to be cognized by the IACHR due to insufficient information for determining the consequence, the petition offers normative guidance establishing a link between climate change and human rights. Climate change, as one of the main driving forces for environmental change, results in land degradation, coastal erosion, loss of ice, and an increase in natural disasters, among other things, which bring about significant adverse consequences to enjoying many basic human

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rights. For example, climate change has caused both an internal and external displacement of populations, making individuals become environmental refugees, and leading to political and social problems, both in national and international contexts, which has resulted in diverse forms of inequality and injustice. Broadly, therefore, a lack of the right to a sound environment causes a violation of substantial human rights components, such as the right to life. The United Nations Human Rights Council, in its most recent session (the 46th Session) held on 22 February–19 March 2021, adopted a resolution on human rights and the environment that explicitly confirms that the enjoyment of human rights is integrally linked to a healthy environment.

The points stated herein are only a very small fraction of the environmental challenges that exist today. There have been significant efforts undertaken to meet these challenges and promote inclusion and justice within our environmental governance approaches. Yet, there are significant demands ahead of us to promote knowledge and to better understand both global and local environmental problems and their solutions. This newly established journal, the Journal of Environmental Law & Policy, joins the effort for knowledge promotion by debating various environmental governance approaches and utilizing an interdisciplinary perspective with a broad focus. This journal intends to join the global movement for attaining the sustainable development goals set by the United Nations in the exchange of knowledge and information on both legal and policy perspectives, from both national and international environmental law and policy contexts.

CHARTING THE COURSE FOR A BLUE ECONOMY IN NIGERIA: A LEGAL AGENDA

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ABSTRACT

Ocean and coast based economic activities are increasingly being recognized as key drivers for supporting global economies. This move towards a “blue economy” is becoming widespread in view of the paucity of land resources being experienced globally by promoting sustainable and inclusive economic growth using oceanic resources. The sustainability of these ocean-based activities must however be intricately linked with the existence of a comprehensive and cohesive legal framework to align marine conservation with the extractive and exploitative endeavors. This paper analyses the potential for a blue economy in Nigeria and examines the adequacy of the existing legal regimes on marine environmental protection meant to reduce the risks of intensified ocean-based activities resulting into unsustainable environmental impacts. The paper submits that deriving sustainable wealth from ocean-based activities in Nigeria is achievable given the existing legal framework for marine environmental protection in the country. It however recommends the need to further tighten the noose around the implementation protocols of these laws to better integrate the health of the ocean ecosystem into the development of the country’s ocean resources.

Keywords: Blue economy; Sustainability; Environmental protection; Legal framework; Nigeria

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Charting the Course for a Blue Economy in Nigeria: A Legal Agenda

1. INTRODUCTION

The ocean and its resources are increasingly accepted widely as a viable alternative resource to meet the needs of the rising global population amidst Earth's dwindling land resources.¹ It is projected that with a substantial expansion of many of the current ocean-based economic activities, food, jobs, energy and raw materials to cater for the needs of the projected population level of 9-10 billion people would become readily available by the year 2030.² At the heart of these activities must however remain the health of the ocean ecosystem by preventing its over-exploitation, pollution, biodiversity loss and the negative effects of climate change associated with the expansion. Dealing with these problems, therefore, it is essential to develop of innovative strategies to address the changes that would unfold with the broadening of the ocean waterscape. One of such innovative strategies was the concept of a 'blue economy'. The concept was developed to underscore the importance of the health of the ocean ecosystem considered as pivotal to the sustainability of any economic policy initiative centred on the use of ocean resources.³ It consists of strategies designed to ensure the sustainable use of ocean resources for economic growth, improved livelihoods, and job creation whilst preserving the health of the ocean ecosystem.

Using Nigeria as a case study, the abundant water resources⁴ provided by nature contribute to economic growth through supporting various economic activities that depend on or derive from ocean resources.⁵ However, with the growing recognition of the importance of the ocean and its resources to global economic growth, there is the need to shift attention to other emerging opportunities derivable by a substantial expansion of the scope to which ocean resources are put to use in Nigeria. Realizing the full potentials of these resources demands sustainable action on numerous fronts to achieve a durable balance between ocean use and marine ecosystem conservation. One of such is the existence of a comprehensive and cohesive

¹ Ralph Rayner, Claire Jolly and Carl Gouldman, 'Ocean Observing and The Blue Economy' (2019) 6 *Frontiers in Marine Science*.
<<https://www.frontiersin.org/articles/10.3389/fmars.2019.00330/full>> accessed 16 April 2021.

² European Commission, 'The EU Blue Economy Report 2020' (Publications Office of the European Union 2020)
<https://blueindicators.ec.europa.eu/sites/default/files/2020_06_BlueEconomy-2020-LD_FINAL-corrected-web-acrobat-pro.pdf> accessed 19 April 2021.

³ S. Smith-Godfrey, 'Defining the Blue Economy' (2016) 12 *Maritime Affairs: Journal of the National Maritime Foundation of India*
<<https://www.tandfonline.com/doi/full/10.1080/09733159.2016.1175131>> accessed 16 April 2021.

⁴ J. O. Ayoade, 'Water resources and their development in Nigeria' *Les Ressources En Eau Et Leur Exploitation En Nigérie* (1975) 20 *Hydrological Sciences Bulletin*.

⁵ Ozigbo Emmanuel and others, 'Review of Aquaculture Production and Management in Nigeria' (2014) 4 *American Journal of Experimental Agriculture*
<<http://www.sciencedomain.org/abstract/4508>> accessed 19 April 2021.

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range of regulatory guidelines to ensure that the exploration of these ocean-based resources is done within sustainable limits. Given this premise, the present paper examines the governance regime for a blue economy in Nigeria given its importance in creating and regulating a sustainable balance between the utilization of marine resources and the protection of the marine ecosystems.

To put this in proper perspective, the paper explores the concept of a blue economy as well as its potentials for sustainable economic development in Nigeria. The existing laws on ocean based economic activities would be considered to highlight its adequacy, or otherwise, in fulfilling the objective of sustainable development in Nigeria's blue economy. The paper finds the existing ocean governance framework in Nigeria sufficient to provide a solid foundation for the smooth realization of the goals of a blue economy in the country. It however recommends the need to address the weaknesses in the enforcement of these laws geared to reduce the risks of undermining the very foundation on which the ocean economy stands.

2. BLUE ECONOMY: AN EMERGING TREND IN INTERNATIONAL ENVIRONMENTAL DISCOURSE

The term 'blue economy' was first used by Professor Gunter Pauli in his book 'The Blue Economy: 10 Years, 100 Innovations, 100 Million Jobs' to describe a wealth creation strategy using nature-inspired derivatives on the basis of environmental correctness.⁶ According to Pauli, the 'blue economy' broadly encompasses activities geared towards achieving economic growth and development based on ocean activities whilst also considering the social and environmental outcomes of these activities. The term gained international recognition through the advocacy of the Small Island Developing States (SIDS) at the Rio +20 Conference of 2012.⁷ At the conference, these States advocated for the sustainable use of their ocean resources against the backdrop of their peculiar challenges of limited land resources, environmental/ecological vulnerabilities as well geographic remoteness and isolation which does not offer them much economic footprint as mainland nations.⁸ Their argument was based on the relevance and applicability of the concept of "Green Economy".⁹ They called for the

⁶ Gunter A Pauli, *The Blue Economy: 10 Years, 100 Innovations, 100 Million Jobs* (Paradigm Publications 2010).

⁷ Jennifer J. Silver and others, 'Blue Economy and Competing Discourses in International Oceans Governance' (2015) 24 *The Journal of Environment & Development*.

⁸ Julian Roberts and Ahmed Ali, *The Blue Economy and Small States* (1st edn, Commonwealth Secretariat 2016) <https://bluecharter.thecommonwealth.org/wp-content/uploads/2018/09/BlueeconomyandSmallStates_UPDF.pdf> accessed 20 April 2021.

⁹ Lucien Georgeson, Mark Maslin and Martyn Poessinouw, 'The Global Green Economy: A Review of Concepts, Definitions, Measurement Methodologies and Their Interactions' (2017) 4 *Geo: Geography and Environment*.

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incorporation of the principles of the green economy into the management of coastal water bodies and related resources in a sustainable manner.¹⁰

The term which has grown to a purely ocean-based and ocean-related concept now goes beyond viewing the ocean solely as a mechanism for economic growth.¹¹ It comprises a range of economic activities and related policies that together determine whether the use of oceanic resources is sustainable.¹² In its report 'The Ocean Economy in 2030', the Organization for Economic Co-operation and Development (OECD) refers to the blue economy as all the activities aimed at realizing the full potentials of seas and oceans using responsible and sustainable approaches to their economic development.¹³ According to the report the blue economy concept seeks to develop strategies to maintain a durable balance between increasing ocean uses and marine ecosystems integrity. This according to the report will require actions on multiple fronts with new thinking and fresh approaches contributing possible solutions to the long-term sustainability related challenges of a growth in the ocean economy.

Abdullahel defines the concept of blue economy (also known as oceans economy) as economic and trade activities that integrate the conservation and sustainable use and management of oceans biodiversity, including maritime ecosystems and genetic sources.¹⁴ It extends beyond the exploitation of maritime and marine resources to include the consideration of the effect of these activities on the future health and productivity of these same resources. Visbeck also defines the blue economy model as one that not only focusses on the economic derivatives from the exploitation of ocean resources but also emphasizes the improvement of human well-being and social equity by ensuring the inclusion and participation of all affected social groups and sectors.¹⁵ At the core of the ocean economy as Kakonge explained whilst discussing the blue economy potentials of Kenya is the efficient and optimal use of natural marine resources within ecological limits.¹⁶ The concept ranges from sourcing and use of raw materials from the ocean where

¹⁰ Jay S. Golden and others, 'Making Sure the Blue Economy is Green' (2017) 1 *Nature Ecology & Evolution* <<https://doi.org/10.1038/s41559-016-0017>> accessed 19 April 2021.

¹¹ Michelle Voyer and others, 'Shades of Blue: What Do Competing Interpretations of the Blue Economy Mean for Oceans Governance?' (2018) 20 *Journal of Environmental Policy & Planning*.

¹² Ki-Hoon Lee, Junsung Noh and Jong Seong Khim, 'The Blue Economy and the United Nations' Sustainable Development Goals: Challenges and Opportunities' (2020) 137 *Environment International* <<https://doi.org/10.1016/j.envint.2020.105528>> accessed 20 April 2021.

¹³ OECD, 'The Ocean Economy In 2030' (OECD Publishing 2021) <<https://doi.org/10.1787/9789264251724-en>> accessed 20 April 2021.

¹⁴ Abdullahel Bari, 'Our Oceans and the Blue Economy: Opportunities and Challenges' (2017) 194 *Procedia Engineering*.

¹⁵ Martin Visbeck, 'Ocean Science Research Is Key for A Sustainable Future' (2018) 9 *Nature Communications*.

¹⁶ Amb. John O. Kakonge, 'Kenya and the Blue Economy: The Way Ahead' (2019) 8 *International Journal of Innovative Research and Development*.

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feasible to include activities that are not natural resource intensive and support sustainable patterns of consumption.¹⁷

In summary, the concept seeks to promote economic growth, social inclusion, and the preservation or improvement of livelihoods while at the same time ensuring environmental sustainability of the oceans and coastal areas.¹⁸ Its objective of sustainability fits perfectly into the framework of the United Nations Sustainable Development Goals (SDGs) which interlinks the socio economic aspects of development and environmental sustainability.¹⁹ Goal 14²⁰ of the SGDs focusses on the conservation and sustainable use of oceans, seas and marine resources for sustainable development with a view to increasing the benefits derivable from use of these resources by 2030. The targets of this goal which are sine qua non with the objectives of a blue economy will ensure that ocean resources contribute to a sustainable and inclusive development for countries. It will be able to strike a balance between the need to exploit these resources for economic development and the sustainable use of it.

3. A BLUE ECONOMY FOR NIGERIA: POTENTIAL AND OPPORTUNITIES

Although a universally accepted concept, the adoption of the blue economy concept by individual countries will depend on perceived potentials and benefits that nations can derive from subscribing to it.²¹ In Nigeria, the country's ocean resources can contribute significantly to the nation's overall development through a wide range of economically beneficial activities that derive from and are supported by these vast resources. Available statistics show that 267.3 billion m³ of surface water and 52 billion m³ of ground water are available for use in Nigeria annually and less than 10% of these enormous amounts of water resources are being

¹⁷ Michaela Garland and others, 'The Blue Economy: Identifying Geographic Concepts and Sensitivities' [2019] *Geography Compass*; Joseph O. Rasowo and others, 'Harnessing Kenya's Blue Economy: Prospects and Challenges' (2020) 16 *Journal of the Indian Ocean Region*.

¹⁸ Erika Techera, 'Achieving Blue Economy Goals: The Need for Improved Legal Frameworks across the Indian Ocean' (2019) 1 *Seychelles Research Journal* <<https://seychellesresearchjournalcom.files.wordpress.com/2019/08/achieving-blue-economy-goals-erika-techera.pdf>> accessed 20 April 2021.

¹⁹ Laura Recuero Virto, 'A Preliminary Assessment of the Indicators for Sustainable Development Goal (SDG) 14 "Conserve and Sustainably Use the Oceans, Seas and Marine Resources for Sustainable Development"' (2018) 98 *Marine Policy*.

²⁰ The focus of Goal 14 is to conserve and sustainably use the oceans, seas and marine resources for sustainable development.

²¹ UN Economic Commission for Africa, 'Unlocking the Full Potential of The Blue Economy: Are African Small Island Developing States Ready to Embrace the Opportunities?' (Economic Commission for Africa 2014) <https://www.researchgate.net/publication/305502123_Unlocking_the_full_potential_of_the_blue_economy_Are_African_Small_Island_Developing_States_ready_to_embrace_the_opportunities> accessed 20 April 2021.

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currently exploited.²² This section will focus on some of the trade and economy related opportunities in the ambit of blue economy that can be expanded or explored in Nigeria to create opportunities for economic growth, economy diversification and new investments.

3.1 Sustainable Fishing and Aquaculture

Fish and fish products are considered as an important sector of global trade.²³ The global seafood market is projected to reach approximately 155.32 billion dollars in value by the year 2023.²⁴ Most of these exports are driven by the demand in developed countries, which account for more than 75 per cent of global fish imports.²⁵ Nigeria is said to be the largest inland aquaculture producer in Sub-Saharan Africa with about 157 recorded species of fish belonging to 71 families in the Nigerian inshore waters alone.²⁶ According to a survey carried out by Rabo et al.,²⁷ of the total fish caught by African fishers totalling about 6.30 million tons during the period under survey, 3.80 million metric tons were from marine waters with Nigeria as the highest contributor in terms of total fish caught. Optimizing the natural and human resource potentials of Nigeria as a leading aquaculture country opens up the potential for increased income generation for the country and improving the livelihoods of many of its coastal communities.²⁸ Expanding the fishery and aquaculture sector in Nigeria has the potentials to prevent food insecurity, reduce unemployment in the country through job creation, generate income for individuals and ultimately for the country by attracting foreign exchange that contributes to the economic transformation of the country.²⁹

²² Federal Ministry of Information and Communications, 'Nigeria Handbook 14th Edition' (2009).

²³ Jessica A Gephart and Michael L Pace, 'Structure and Evolution of the Global Seafood Trade Network' (2015) 10 Environmental Research Letters.

²⁴ Andrew Pershing and others, 'Chapter 9: Oceans and Marine Resources. Impacts, Risks, And Adaptation in the United States: The Fourth National Climate Assessment, Volume II' <<https://nca2018.globalchange.gov/chapter/9/>> accessed 20 April 2021.

²⁵ AA Kigbu, TD Imgbian and MM Yakubu, 'Unconventional Cultivable Freshwater Fish Species: A Potential Tool for Increased Aquaculture Production in Nigeria' (2014) 2 Global Science Research Journals
<<https://www.globalscienceresearchjournals.org/articles/unconventional-cultivable-freshwater-fish-species-a-potential-tool-for-increased-aquaculture-production-in-nigeria.pdf>> accessed 20 April 2021.

²⁶ P.A Ekunwe and C.O Emokaro, 'Technical Efficiency of Catfish Farmers in Kaduna, Nigeria' (2009) 5 Journal of Applied Sciences Research.

²⁷ P.D. Rabo and others, 'The Role of Fisheries Resources in National Development: A Review' (2014) 18 International Letters of Natural Sciences.

²⁸ W.O Ashaye and others, 'Overcoming Food Importation: A Panacea to Food Insecurity, Poverty Reduction and Job Creation Among Rural Farming Populations in Nigeria' (2019) 7 GSJ.

²⁹ Otekenari David Elisha, 'the Nigeria Blue Economy: Prospects for Economic Growth and Challenges' (2019) 12 International Journal of Scientific Research in Education.

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3.2 Shipping and Maritime Transport

Shipping is generally considered as the most cost effective mode of transporting goods and commodities across global channels.³⁰ About half of the world's population, most of its largest cities and industries along with critical value chains tend to be concentrated in coastal areas to ensure access to transport routes and continuous flows of resources and products.³¹ Apart from providing transportation, the shipping industry creates employment opportunities as well as generating revenue through its export and trading facilities.³² Although Nigeria occupies a meagre 853 km of the 47,000 km of Africa's coastline, her strategic location makes maritime transport very important in terms of its socio-economic prospects and the ability to connect to the rest of the world and access international markets.³³ As a major ocean-based activity and an important component of the blue economy the potentials for unlimited opportunities abound if the needed attention is paid to maritime transportation by the Nigerian government.³⁴ Job creation, development of cottage and allied industries, export promotion, increased foreign exchange earnings, economy diversification, expansion of opportunities to trade and compete favorably in overseas markets are just some of the few benefits of a well-developed shipping industry.³⁵

3.3 Renewable Marine Energy

Global demand for renewable energy is expected to increase two and a half times by 2035.³⁶ The generation of renewable energy from tides and waves, wind turbines located in offshore areas, submarine geothermal resources and marine biomass is set to become a viable alternative for contributing to energy needs and climate change mitigation objectives. For Nigeria, such renewable energy sources would help diversify her energy portfolios and secure higher levels of energy security given the country's huge reliance on fossil fuels as its main energy source. Although many of these technologies are still at the early development stages, global investment in them is already on the rise and it is believed that renewable

³⁰ Simone Caschili and Francescs Romana Meda, 'A Review of the Maritime Container Shipping Industry as a Complex Adaptive System' (2012) 10 *Interdisciplinary Description of Complex Systems*.

³¹ B Damachi and Yang Zhaosheng, 'The Nigerian Shipping Industry and Indigenous Shipping Companies' (2005) 32 *Maritime Policy & Management*.

³² Marie-Noëlle Albert, Nadia Lazzari Dodeler and Emmanuel Guy, 'From A Seafarer's Career Management to the Management of Interwoven Sea- And Shore-Based Careers' (2016) 6 *SAGE Open*.

³³ Victor Olowe, 'Africa 2100: How to Feed Nigeria in 2100 With 800 Million Inhabitants' [2020] *Organic Agriculture*.

³⁴ Imoh Ekpo, 'Impact of Shipping on Nigerian Economy: Implications for Sustainable Development' (2012) 2 *Journal of Educational and Social Research*.

³⁵ O.B Ndikom, 'The Concept of Shipping Routing' (2013) 5 *American Journal of Industrial and Business Management*.

³⁶ Jeffrey R. Bartels, Michael B. Pate and Norman K. Olson, 'An Economic Survey of Hydrogen Production from Conventional and Alternative Energy Sources' (2010) 35 *International Journal of Hydrogen Energy*.

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ocean energy is set to become the world's major source of clean energy. As one of the industrial giants of Africa, taking the central position in the development of this cutting-edge technology given Nigeria's vast water resources would help meet her increasing energy demands while reducing long term carbon emissions.

3.4 Marine Biotechnology

Oceans and seas are the source of a huge variety of life forms including macro and micro-organisms. Living marine resources have huge potential for developing new food, biochemical, pharmaceutical, cosmetics and bio-energy applications.³⁷ According to Suttle, the growing commercial interest in marine bio-prospecting to discover new plants and animal species from which medicinal drugs and other commercially valuable compounds can be derived is expected to increase with developments in science, technology and innovation since the first drugs from marine organisms were commercialized over a decade ago.³⁸ The Nigerian marine environment is rich in biodiversity with a wide range of novel species of microorganisms.³⁹ This rich biodiversity if harnessed and commercialized through the application of scientific and engineering principles has the potential to become a potent revenue source.⁴⁰ Devoting resources to the development of technology to aid bio-prospecting in Nigeria has the potentials for poverty eradication and national development through marine sustainable aquaculture and fisheries, providing sustainable alternative sources of energy, pharmaceutical discoveries that would improve human health amongst others.⁴¹

3.5 Ecotourism

Apart from growing to become one of the largest global business ventures, tourism is also a great employer of labor as it is said to employ 1

³⁷ About 18,000 natural products have been developed to date from about 4,800 marine organisms, and the number of natural products from marine species is growing at a rate of 4 per cent per year. See further Narsinh L. Thakur and Werner E.G. Müller, 'Biotechnological Potential of Marine Sponges' (2004) 86 *Current Science*; Narsinh L. Thakur and Archana N. Thakur, 'Marine Biotechnology: An Overview' (2006) 5 *Indian Journal of Biotechnology*.

³⁸ Curtis A. Suttle, 'Viruses: Unlocking the Greatest Biodiversity on Earth' (2013) 56 *Genome*.

³⁹ Olumide Adedokun Odeyemi, 'Exploring Potentials of Marine Microbiology and Biotechnology in Developing Countries' (2017) 3 *International Journal of Scientific and Research Publications*.

⁴⁰ Helen Ngozi Ebeh, 'Exploring the Potentials of Marine Biotechnology for Poverty Eradication and National Development' (2017) 37 *Knowledge Review* <<https://www.globalacademicgroup.com/journals/knowledge%20review/Helen%20Ebeh17.pdf>> accessed 20 April 2021.

⁴¹ Ward Appeltans and others, 'The Magnitude of Global Marine Species Diversity' (2012) 22 *Current Biology*.

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out of every 11 persons globally.⁴² Globally, there is a growing popularity for shore-based coastal tourism. The recreational uses of the marine environment as a whole include fishing, shell collection, bird watching, sunbathing, wind surfing, scuba diving and boating among others.⁴³ The rich cultural and ecological resources which are in abundance have the potential of making Nigeria a major tourist destination spot in Africa.⁴⁴ Identifying, developing and ensuring the sustainable use of coastal and marine resources for tourism therefore has the potential of providing a number of socio-economic benefits to Nigeria.⁴⁵ Apart from the job creation, development of coastal and marine tourism can potentially be a game changer in the quest to diversify the economy from a predominantly crude oil-based economy to a multi-product economy. Other benefits include foreign exchange earnings, infrastructure development, stimulation of recreational and educational values, display and exchange of sociocultural values, preservation of cultural heritage, and natural resource conservation.

3.6 Seabed Exploration

With dwindling reserves in land-based mines coupled with the extensive environmental and social consequences of mining on land, significant investments are already being made in some countries in terms of exploration for deep seabed resources.⁴⁶ Physical, chemical and biological interactions over the years have seen the deep seabed become a repertoire of a vast number of mineral resources.⁴⁷ Although oil and gas are widely regarded as the most valuable, sea-floor massive sulphides, cobalt-rich ferro manganese crusts, and polymetallic (manganese) nodules, which are all rich in sulphur, nickel, cobalt, iron and manganese are just some of the minerals

⁴² Ademuyiwa Hafiz Oladele and Oghenetjiri Digun-Aweto, 'Strengths Weakness Opportunities and Threats Analysis of Aquatic Tourism in Nigeria' (2017) 8 *Journal of Environmental Management and Tourism* <<https://journals.aserspublishing.eu/jemt/article/view/1655>> accessed 20 April 2021.

⁴³ Nnezi Uduma-Olugu and Henry N. Onukwube, 'Exploring the Coastal Tourism Potentials Of Lagos' (2012) 5 *Journal of Sustainable Development* <http://www.ccsenet.org/journal/index.php/jsd/article/view/14777> accessed 18 April 2021.

⁴⁴ Ademuyiwa H. Oladele, Oghenetjiri Digun-Aweto and Petrus Van Der Merwe, 'Potentials of Coastal and Marine Tourism in Nigeria' (2018) 13 *Tourism in Marine Environments*.

⁴⁵ Mohammed Manzuma-Ndaaba Ndanusa, Yoshifumi Harada and Md. Aminul Islam, 'Challenges to Growth in Tourism Industry of A Developing Country: The Case Of Nigeria' (2014) 10 (19) *Asian Social Science* 282 <<http://www.ccsenet.org/journal/index.php/ass/article/view/40850>> accessed 18 April 2021.

⁴⁶ A. Marvasti, 'Resource Characteristics, Extraction Costs, And Optimal Exploitation of Mineral Resources' (2000) 17 *Environmental and Resource Economics*.

⁴⁷ Kathryn Miller, Kirsten Thompson, Paul Johnston, David Santillo, 'An Overview of Seabed Mining Including the Current State of Development, Environmental Impacts and Knowledge Gaps', (2018) 4 *Frontiers in Marine Science* 418. <[doi://10.3389/fmars.2017.00418](https://doi.org/10.3389/fmars.2017.00418)> Accessed 1 July 2020.

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that have been extracted from the sea bed over the last 20 years.⁴⁸ Although the extent of the resources available within the seabed of the Nigerian maritime jurisdiction still remains unknown till date, efforts are already in place to explore the possibilities of discovering in commercial quantities other mineral resources apart from oil and gas. Former Director General of the Nigerian Maritime Administration and Safety Agency (NIMASA) while speaking at the opening ceremony of the 23rd assembly of the International Seabed Authority (ISBA) held in Kingston Jamaica⁴⁹ reiterated that the Nigerian Navy Hydro-graphic Office has begun undertaking a hydro-graphic survey and charting of the country's maritime area to establish a data base of seabed minerals available for the benefit of the country. When successfully completed, it may present the country with a unique opportunity for an alternative source of revenue.

It can be deduced from the above discussion that as a beneficiary of nature's largesse, expanding the current scope in the utilization of ocean resources in Nigeria is indeed viable and economically beneficial. There is, therefore, no doubt that a 'blue economy' is one of the ways to augment the current economic development initiatives of the Nigerian government if the requisite investments in the science, technology and innovation needed to boost the sector are made. This would go a long way in addressing many of the key challenges currently facing the country ranging from food insecurity, poverty, and economic backwardness.

4. LEGAL FRAMEWORK FOR ACHIEVING BLUE ECONOMY IN NIGERIA

As stated earlier, a blue economy offers many financial, development and socio-cultural benefits but the environmental risks associated with these benefits cannot be overlooked. A 'blue economy' plan for Nigeria therefore needs not only to identify and develop those sectors that have a high potential for sustainable yield and growth but must also include an environmental protection plan suitable for coping with present and future challenges associated with increased ocean activities.⁵⁰ Having highlighted the potentials and opportunities in the previous section, an analysis of the existing legal framework on marine protection would be undertaken in this section. The aim is to appraise its adequacy in ensuring the sustainable conservation and preservation of the health of the ocean ecosystem whilst the economic goals of the blue economy are being pursued in Nigeria.

⁴⁸ UNEP, 'From wealth in the oceans: Deep sea mining, on the horizon?' (2014) <www.unep.org/geas> Accessed 25 August 2020.

⁴⁹ Guardian, 'Nigeria to Benefit from Deep Sea Mining - Peterside. (NAN).' (2017). Punch 11, August 2017. <<https://guardian.ng/business-services/nigeria-to-benefit-from-deep-sea-mining-peterside>> Accessed 26 August 2020.

⁵⁰ Abubakar Hassan Hamisu, 'A Study of Nigeria's Blue Economy Potential with Particular Reference to the Oil and Gas Sector', [2019] World Maritime University Dissertations 1234. <https://commons.wmu.se/all_dissertations/1234> Accessed 1 September 2020.

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At the fountainhead of all laws relating to the protection of the marine environment in Nigeria is Section 20 of the Constitution of the Federal Republic of Nigeria 1999. The section provides that ‘the State shall protect and improve the environment and safeguard the *water*, air and land, forest and wildlife of Nigeria’.⁵¹ This provision from which all other environmental protection laws in Nigeria derive validity makes it the core responsibility of the federal government to protect and improve the environment. More specifically on the marine environment, the section states that the State shall ‘safeguard’ the waters of Nigeria. The use of the word ‘safeguard’ according to the Learned Justices of the Supreme Court in *Attorney General Lagos State vs Attorney General of the Federation and 35 others*,⁵² indicates the intention of the government to channel resources towards protecting of the waters of Nigeria from any form of harm. Although the provision fails to spell out in clear terms how this function is to be performed, it serves as a rallying point for all governmental policies and regulations on environmental protection. The provision ensures that any policy initiative on the blue economy in Nigeria must necessarily include action points on the protection and improvement of the waters of Nigeria to ensure its sustainability.

Similarly, by vesting in the Federal Government the right to use and control all surface and ground water in Nigeria,⁵³ the provisions of the Water Resources Act allow the government to make holistic plans to develop and manage sustainably the usage of the country’ blue economy resources. The Act in section 5(a) (ii) empowers the minister to make proper provisions for the adequate supplies of suitable water for the generation of hydro-electric energy for navigation, fisheries and recreation. Section 6 of the Act imposes a duty on the Minister charged with the responsibility for matters relating to water resources to draw up from time to time, an up-to-date comprehensive master plan for the development, use, control, protection, management and administration of all water resources and to periodically review in the light of prevailing economic, financial or technological conditions, activities, plans and proposals of public authorities exercising powers relating to water resources. The flexible nature of this provision allows the government to regularly update its strategy for the protection and management of water resources in Nigeria to cope with the environmental impacts of intensified ocean activities owing to the expansion of the ocean-based economy in Nigeria. The minister is also expected to make provisions to ensure that the possible consequences of particular developmental proposals on the marine environment are properly investigated and considered before each proposal is approved.⁵⁴ This is to have a detailed and well-coordinated plan for the investigation, use, control, protection, management and administration of water resources in Nigeria.⁵⁵ Comparably, the Environmental Impact

⁵¹ Emphasis by the author

⁵² (2003) 12 NWLR (pt. 833) SC

⁵³ The National Water Resources Act Cap N83 LFN 2004, S1

⁵⁴ The National Water Resources Act S 5(f).

⁵⁵ The National Water Resources Act S 5 (g) (i).

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Assessment Act⁵⁶ also requires a mandatory environmental impact assessment be done for all new projects and activities having an impact on the environment.⁵⁷ Section 2 restricts the commencement of any public or private project without considerations for its environmental impact. As such an expansion of the existing use to which ocean resources are put to will require an impact assessment to make certain that such planned investment or developmental activities conforms to the sustainability goal of the blue economy.

One key environmental risk that can undermine the achievement of the goals of the blue economy is the pollution generated by maritime transport especially ship-source oil pollution. This challenge is magnified by the strong interdependence between the key economic sectors that make up the blue economy as such any negative environmental impact in any of the sectors could ultimately lead to the collapse of the other. It therefore goes without saying that achieving sustainability and resilience in the maritime transport sector is of paramount importance to the survival of the blue economy as a whole. In order to militate against this challenge, protect the living components of the ocean ecosystem and preserve the health of the ocean, The Oil in Navigable Waters Act prohibits the discharge of oils into the navigable waters of Nigeria.⁵⁸ Sections 1, 3 and 5 of the Act make the discharge of any oil or mixture containing oil into the navigable waters of Nigeria a crime punishable by payment of a fine.⁵⁹ It provides further in section 5 that for the purpose of preventing or reducing discharges of oil and mixtures containing oil into the sea, all Nigerian ships are required to be fitted with such equipment necessary to prevent oil pollution. The Act also restricts the transfer of oil at night without requisite notice⁶⁰ and imposes a duty to report any discharge of oil into waters of harbors on the owner or master of the vessel in Section 10. Failure to make such reports in the prescribed format would make such person guilty of an offence under the Act and shall be liable on summary conviction to a fine.⁶¹ The Oil Pipelines Act⁶² equally prevents the pollution of the marine environment by regulating the grant of licenses for the establishment and maintenance of oil pipelines. In standardizing the processes, the Act seeks to prevent the pollution of lands and *waters* by oil pipelines.⁶³ Section 14 of the Act imposes a duty of care on the holder of such license or permit for the purpose of laying an oil pipeline either on land or water to take all reasonable steps to avoid any unnecessary damage to the environment in pursuance of the permit. This is to prevent the exploration activities for oil and gas and the subsequent laying

⁵⁶ Environmental Impact Assessment Act CAP E12 LFN 2004

⁵⁷ Environmental Impact Assessment Act S 1

⁵⁸ Oil in Navigable Waters Act Cap 06 LFN 2004

⁵⁹ Oil in Navigable Waters Act S6

⁶⁰ Oil in Navigable Waters Act S9

⁶¹ Oil in Navigable Waters Act S10(2)

⁶² Oil Pipeline Act Cap 07 LFN 2004

⁶³ See Preamble to the Act

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of pipelines for transportation from interfering with other aspects of the blue economy, such as fishing, thus preserving sustainably the ocean ecosystem as a whole.⁶⁴ In the same manner, The Petroleum Act⁶⁵ regulates the activities in the Nigerian petroleum industry to prevent the pollution of water courses and the atmosphere. This is to see to it that all exploitative activities carried out upon the grant of a license or lease under the Act are carried out in such a manner as to prevent the pollution of water ways in the Nigeria thereby preserving the ocean ecosystem.⁶⁶ Furthermore, The Oil Terminal Dues Act⁶⁷ also prohibits the discharge of oil into any part of the sea from a pipeline, vessel or as a result of any operation for the evacuation of oil.⁶⁸ Notwithstanding these provisions of the law, where the discharge or spill of oil or mixtures containing oil inadvertently occur, the National Oil Spill Detection and Response Agency (NOSDRA) established by The National Oil Spill Detection and Response Agency (Establishment) Act⁶⁹ is empowered to provide timely and effective response to such incidents through the implementation of the National Oil Spill Contingency Plan.⁷⁰

In order to reduce overfishing and restore marine ecosystems through sustainable fishing and aquaculture, the Sea Fisheries Act⁷¹ regulates fishing practices within the territorial waters of Nigeria. The Act prohibits fishing methods such as use of explosive substances or poisonous or noxious matter capable of introducing toxic substances into the marine environment.⁷² It provides that anyone caught fishing with such prohibited substances shall be liable upon conviction to a term of two years imprisonment or to a fine of N50, 000.⁷³ It further provides that such fishing boats or apparatus used in the perpetration of such unlawful act as well as the fish derived from the process shall be forfeited.⁷⁴

For the purpose of ensuring compliance with environmental laws and regulations in Nigeria particularly as it relates to safeguarding the health of the ocean ecosystem, The National Environmental Standards and Regulations and Enforcement Agency (NESREA) Act⁷⁵ provides for the establishment of The National Environmental Standards and Regulations

⁶⁴ A G Eze, T C Eze, 'A Survey of the Legal Framework for the Control of Oil and Gas Pollution from Some Selected Countries', (2014) 31 *Journal of Law, Policy and Globalization* 1.

⁶⁵ Petroleum Act CAP P10 LFN 2004

⁶⁶ Petroleum Act CAP P10 LFN 2004 S 9(1)(a)(iii)

⁶⁷ Oil Terminal Dues Act CAP 08 LFN 2004

⁶⁸ Oil Terminal Dues Act S 6

⁶⁹ National Oil Spill Detection and Response Agency (Establishment) Act (NOSDRA) 2006

⁷⁰ National Oil Spill Detection and Response Agency (Establishment) Act See Ss 1 and 5

⁷¹ Sea Fisheries Act CAP S4 LFN 2004

⁷² Sea Fisheries Act S 10(1)

⁷³ Sea Fisheries Act S 10(2)

⁷⁴ Sea Fisheries Act S 13

⁷⁵ National Environmental Standards and Regulations and Enforcement Agency (NESREA) Act 2007

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and Enforcement Agency (NESREA).⁷⁶ Section 7(h) specifically provides that the agency is saddled with the responsibility of enforcing through compliance all environmental regulations and standards on noise, air, land, seas, ocean and other water bodies in Nigeria. As the highest and most potent institution for environment enforcement in Nigeria,⁷⁷ the Agency through the powers granted by the Act ensures the enforcement of all laws relating to the discharge of hazardous substances into the air or upon the land and water of Nigeria or at the adjoining shorelines except where such discharge is permitted or authorized under any law in force in Nigeria.⁷⁸ Additionally, the Act also empowers the agency to make regulations on water quality standards for the purpose of protecting public health and welfare in Nigeria.⁷⁹

Having examined the extant legal framework on water management and protection in Nigeria, this paper submits that the existing laws are adequate and sufficient for the successful take off and sustainability of the blue economy project in Nigeria. Whilst this article does not suggest that there will not be challenges, it has shown from the analysis of the existing legal framework that there is a sufficient basis to believe that with proper enforcement of these laws, the sustainability of the blue economy is guaranteed.

5. CONCLUSION AND RECOMMENDATIONS

From the sectorial analysis of the potential and opportunities of the blue economy and on the strength of the existing legal framework to support its sustainability, it is prudent to conclude that a blue economy is achievable in Nigeria. Although Nigeria may not qualify as one of the Small Island Developing States (SIDS), the abundance of coastal areas in the country particularly in the Niger Delta and areas in the southern part of the country suggest that pursuing the blue economy through the sustainable use of these water resources can contribute to the economic development of Nigeria and herald the much talked about economic diversification.

As a means of achieving the specified end of the goals of the blue economy, the following are recommended. Firstly, given the multiplicity of alternatives there is a need to weigh the relative importance of each sector of the blue economy to determine the value of its contribution to the economy. This will enable the right policy decisions to be made with regards to developing the most productive in terms of economic returns. Secondly, the

⁷⁶ National Environmental Standards and Regulations and Enforcement Agency (NESREA) Act S 1

⁷⁷ National Environmental Standards and Regulations and Enforcement Agency (NESREA) Act S31

⁷⁸ National Environmental Standards and Regulations and Enforcement Agency (NESREA) Act S27

⁷⁹ National Environmental Standards and Regulations and Enforcement Agency (NESREA) Act S7(c),7(d),20, 23(2) and 24 (3)

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interrelated nature of all the segments of the blue economy calls for a system of checks and balances which can best be facilitated through the proper enforcement of the letters of the law. The Nigerian environmental governance landscape is characterized by an array of legislation but fraught with the challenge of enforcement of the laws. The laws and procedures guiding ocean protection and conservation have been found to be comprehensive and robust, thus, making the problem not to be with the written legislation but with its enforcement. The punitive sanctions that would encourage better environmental behavior in these laws have been found to be ineffective with individuals and corporate bodies finding the economic rewards of violation more compelling than the likelihood of sanctions for infractions. For instance, failure to comply with sections 1, 3 and 5 of the Oil in Navigable Waters Act which prohibits the discharge of oil into Nigerian waters is punishable by a mere fine of two thousand naira (equivalent to USD 4.89). This meagre amount to be paid as fine is deemed inconsequential compared to the environmental impact of the intentional or accidental discharge of oil into the ocean ecosystem. Thirdly, realizing the full potential of the blue economy requires the efforts of all and sundry. Although the government may be required to provide the enabling environment to facilitate the diversification of resources into the development of the blue economy, the private sector also has a pivotal role to play in its success. There is the need for strategic local and private lump-sum investments in the development of the sectors of the blue economy particularly in the maritime and fishing sub-sectors in order to improve their contributions to the economy.

There is also the need to raise awareness to better educate stakeholders on what the blue economy is and why it matters. To achieve this, there is the need to remove all informational barriers that are often created by educating public, private, and civil society, and youth in sectors that forecasts suggest will provide the next generation of new jobs. It is further recommended that for the blue economy to be sustainable, the country needs to develop and/or strengthen national policies to better integrate blue economy considerations into national and sub-national policy and governance frameworks. These policies should be informed by the measures suggested earlier, with clear targets set for the blue economy in Nigeria.

In a nutshell, a coordinated policy planning process for sustainable development of the country's ocean economy will require active participation and decisions by a wide range of public agencies, linked by common objectives and actively sharing information. Nigeria can borrow a leaf from Bangladesh⁸⁰ where, at least five different ministries namely the ministries of Environment and Forestry, Fisheries and Livestock, Power, Energy and Mineral Resources, Shipping and the Ministry of Civil Aviation and Tourism are currently reviewing or designing policies that would affect

⁸⁰ Mohammed Kaisarul Islam, M Rahaman, Zobayer Ahmed, 'Blue Economy of Bangladesh: Opportunities and Challenges or Sustainable Development', (2018) 5(8) *Advances in Social Sciences Research Journal* 168.

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one or more of the sectors of the ocean economy in Bangladesh.⁸¹ Each of these ministries, as well as other public agencies, has a mandate to deliver on various actions and programs in the current five year plan to move the country's ocean economy toward a blue economy. At the end, these collaborative efforts are a blueprint that would maintain existing maritime industries and develop new ones, develop a strong human resource base for domestic utilization and export to foreign job markets; give special priority to anticipated climate change impacts in all relevant matters.

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⁸¹ Pandurang Ganapatil Patil, John Virdin, Charles S Colgan, Gulan Hussain, Pierre Failler, Tibor Vegh, *Toward a Blue Economy: A Pathway for Sustainable Growth in Bangladesh* (Washington, DC: The World Bank Group 2018)

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ANALYSIS OF INDIAN AND CANADIAN LAWS REGULATING THE BIOPESTICIDES: A COMPARISON

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ABSTRACT

An excessive use of toxic plant protection chemicals has irreversibly damaged the soil biology of agroecosystems, resulting in a substantial decline of productivity. Biocontrol agents, especially microbial biopesticides, are seen as one of the key solutions to overcome toxicity and pest resistance issues. Biopesticides are defined as mass-produced agents manufactured from living microorganisms or natural products used for the control of pests. Laws to regulate biopesticides both in India and Canada need to be analysed from the perspectives of trade facilitation, ease of business, proliferation of green technologies and products, and the sustainability and revitalization of soil biology. Registration of new biopesticides for its manufacturing, trade, import, storage, transport, disposal and safety is discussed from the point of view of the legal barriers imposed on the production process and trade. Having compared laws of both countries, authors offer recommendations for legal reform.

Keywords: Biopesticides; Microbial Products; Agrarian Laws; Legal Analysis; Legal Reform.

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Analysis of Indian and Canadian Laws Regulating the Biopesticides: A Comparison

1. INTRODUCTION

An excessive application of toxic plant protection chemicals has steadily degraded the soil biology of agroecosystems, causing irreversible toxicity. Over the last half century, agricultural systems have tended to shift to more sustainable ways of growing food without irreversibly damaging the soil's ability to support crops. Green microbial products, such as biopesticides, have the potential to reduce the use of toxic pesticides or insecticides and increase farmers' current agricultural productivity, while at the same time contributing to the soil's ability to produce more in the future. Biopesticides are defined as mass-produced agents manufactured from living microorganisms or natural products used for the control of pests.¹ The OECD guidance for microbial biopesticides² states that, "the microorganism and its metabolites pose no concerns of pathogenicity or toxicity to mammals and other non-target organisms which will likely be exposed to the microbial product; the microorganism does not produce a known genotoxin". While plenty of literature exists on the microbiological and biotechnological aspects of biopesticide production, there has been no critical analysis of the laws and regulations governing the manufacture, trade, use and transport of biopesticides, especially in India.

The challenges for most countries pertain to inadequate legislation, inadequate capacity and weak implementation of policies related to biopesticides.³ Recently, a number of countries have changed their legal frameworks and policies to minimize the use of chemical pesticides and promote the use of biopesticides; however, biopesticides are still mainly regulated by the system originally designed for managing chemical pesticides. As a result, market entry barriers hinder the full development of biopesticides and impose burdensome costs on the biopesticide industry.⁴ Immature policy apparatus, limited resources and capabilities, and lack of trust between regulators and producers are some of the serious issues observed. Multiple challenges exist in India and Canada for manufacturers and importers of biopesticides, especially at the registration and import stages. At the time of registration of a new biopesticide, the manufacturer/trader/importer must generate data that, while easily attainable for chemical-based products, are not easy to obtain for biopesticides. The organic, non-toxic and ecologically benign biopesticides

¹ Organization for Economic Co-operation and Development, 'Report of Workshop on the Regulation of Biopesticides: Registration And Communication Issues.' (OECD 2009) <[https://www.oecd.org/env/ehs/pesticides-biocides/ENV-JM-MONO\(2009\)19-ENG.pdf](https://www.oecd.org/env/ehs/pesticides-biocides/ENV-JM-MONO(2009)19-ENG.pdf)> accessed 30 April 2021.

² *ibid.*

³ Aruna Urs, 'The Sorry Tale of Biopesticides' (*Business-standard.com*, 2015) <https://www.business-standard.com/article/punditry/the-sorry-tale-of-biopesticides-115092100014_1.html> accessed 30 April 2021.

⁴ Suresh Kumar and Archana Singh, 'Biopesticides For Integrated Crop Management: Environmental and Regulatory Aspects' (2014) 05 *Journal of Biofertilizers & Biopesticides*.

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are required to pass a series of tests that were originally designed for conventional chemical pesticides, both in India and Canada. Another important issue concerns the technical or administrative personnel who deal with the registration, testing, monitoring, surveillance, inspection, and authorization tasks. Their understanding, capacities, and orientation limited to toxic chemical products, and they have little or no experience with microbial products. This creates many difficulties and grey areas in the compliance and implementation of the regulations both in India and Canada.

This article analyses the legal frameworks regulating biopesticides in India and Canada, and its comparative characteristics in relation to statutory effectiveness.

2. CONTEXT AND METHODOLOGY

This article is derived from a previous study⁵ conducted between 2017 and 2020 at the Faculté de droit, Université de Montréal in partnership with Earth Alive Clean Technologies, in order to understand the various legal provisions in Indian and Canadian laws regulating biopesticides and biofertilizers. It aims not only to identify the policy and legal gaps existing in the Indian and Canadian legal frameworks governing biopesticides, but also to suggest ways forward in order to avoid bottlenecks impeding the entry and free trade of green products that can contribute to the achievement of the sustainable development goals (SDGs). The present study consists of an analysis of the pertinent clauses and sections of laws regulating pesticides and biopesticides in India and Canada with references to European Union regulations. Research methods included dialectical, qualitative and comparative legal research,⁶ as well as gap analysis. The premise of this research is the belief that unless the practical impact of the laws or rules is known, there is little chance of reforming the legal framework in India and Canada.

3. INDIA'S LAW ON PESTICIDES

Before discussing legal aspects of biopesticides, it is important to understand the scientific overview of biopesticides. There are three broad categories of biopesticides: (1) microbial biopesticides, (2) botanical biopesticides, and (3) semiochemicals. The scope of this article is restricted to microbial biopesticides and biocontrol agents. Microbial biopesticides are derived from fungi, bacteria, algae, viruses, nematodes and protozoa, and

⁵ Study of Indian and Ukrainian Legal Frameworks Regulating Biofertilizers and Biocontrol Agents in Reference to Canadian Microbial Products

⁶ Dialectical research or dialectical inquiry or dialectical investigation is a form of qualitative research which utilizes the method of dialectic, aiming to discover fact through examining and interrogating competing ideas, perspectives or arguments. Dialectical research may also be thought of as the opposite of empirical research, in that the researcher is working with arguments and ideas, rather than data (Bertell Ollman, *Dialectical Investigations* (Routledge 1993)).

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other compounds produced directly from these microbes such as metabolites.⁷ The names of some microbial biopesticides are shown in Appendix 1. More than 3,000 types of microbes that cause diseases in insects have been recorded. Amongst these microbial biopesticides, over 100 bacteria have been identified as insect pathogens.⁸ In addition to bacteria, more than 1000 viruses that act as insect pathogens have been isolated. Various nuclear polyhedrosis viruses (NPVs) have been found infesting 525 insect species worldwide.⁹ Over 800 species of entomopathogenic fungi and 1,000 species of protozoa pathogens have also been described and identified, along with two major groups of entomopathogenic nematodes – *Steinernema* (55 species) and *Heterorhabditis* (12 species).¹⁰

When considering legislation governing biopesticides, two crucial concerns should be taken into account. First, regulations must be formulated to ensure human and environmental safety and to consistently and reliably characterize the quality of biopesticide products. Second, registration and regulatory agencies require a biopesticide data portfolio, a concept originating from the framework governing chemical pesticides. Such data includes information about the mode of action, toxicological and eco-toxicological evaluations, and host range testing.¹¹ Generating this scientific data is quite expensive for companies and can, therefore, deter companies from commercializing biopesticides. Taking these two crucial concerns regarding biopesticide governance into consideration, the Indian government and regulatory agencies need to strike a balance between seeking data and allowing commercialization of biopesticides. There is also a need to critically analyze the existing Indian legal framework to understand the gaps and weaknesses hindering the overall trade, manufacture and use of biopesticides in the country.

3.1 Inappropriate Treatment to Biopesticides

In India, biopesticides and biocontrol agents are still largely regulated by legal frameworks originally designed for chemical insecticides and pesticides. The *Insecticides Act, 1968* and *Insecticides Rules, 1971* regulate the import, registration, manufacture, sale, transport, distribution and use of insecticides (pesticides) with a view to prevent risk to human beings and animals, as well as all connected matters. The basic problem is the intent of

⁷ Joop C. van Lenteren, 'The State of Commercial Augmentative Biological Control: Plenty of Natural Enemies, But A Frustrating Lack of Uptake' (2011) 57 *BioControl*.

⁸ Muhammad Nawaz, Juma Ibrahim Mabubu and Hongxia Hua, 'Current Status and Advancement of Biopesticides: Microbial and Botanical Pesticides.' (2016) 4 *Journal of Entomology and Zoology Studies*.

⁹ Opende Koul, 'Microbial Biopesticides: Opportunities and Challenges.' (2011) 6 *CAB Reviews: Perspectives in Agriculture, Veterinary Science, Nutrition and Natural Resources*.

¹⁰ *ibid.*

¹¹ David Chandler and others, 'The Development, Regulation and Use Of Biopesticides for Integrated Pest Management' (2011) 366 *Philosophical Transactions of the Royal Society B: Biological Sciences*.

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the law. Because they were designed to address chemical pesticides, the fundamental principles underlying the *Act* and the *Rules* treat biologicals (products of biological origin) on par with chemicals. This treatment is grossly inappropriate; the science relating to the origin, production, application, physiology, and functions of biopesticides is completely different from that of chemical pesticides. However, via a few circulars from 1994, 1996, 1999, 2000, 2001, 2007, 2008, 2009 and 2011, a policy framework under the *Insecticides Rules, 1971* has been developed governing the manufacture, sale, storage, distribution and transportation of a range of microbial biopesticides (based on baculoviruses: NPV and granulosis virus, antagonistic fungi, entomopathogenic fungi, antagonistic bacteria, and entomotoxic bacteria), botanical biopesticides (neem products, herbal plant growth regulators, pyrethrum extract, cymbopogon plant extract, rotenone of pisciculture, and eucalyptus extract), and semiochemicals (insect pheromones). To correct the course, it is necessary that biologically-produced microbial, botanical and pheromonic biopesticides be treated separately through a dedicated law or policy. On the other hand, biofertilizers, which are similar in origin to microbial technology, have received relatively better treatment under Indian law. The *Fertilizer (Control) Order, 1985* has been modified to accommodate biofertilizers with amendments in 2006 and 2009, including special provisions addressing biofertilizers.¹² In the absence of a separate law on biopesticides, the *Insecticides Act, 1968* and the *Insecticide Rules, 1971* require similar amendments. Indeed, the failure to introduce such amendments has caused the trade in biopesticides to suffer, unfairly inflating the price. And while chemical pesticides may be cheaper, farmers and consumers are bound to pay a hefty price for the consumption of toxic chemicals residues.

3.2 The *Insecticides Act, 1968* – Scope of the Law

The *Insecticides Act, 1968* (the *Act*) is “an act to regulate the import manufacture, sale, transport, distribution and use of pesticides with a view to prevent risk to human beings or animals, and for matters connected herewith”. It was brought into effect on the recommendation of the inquiry commission as a measure to check food poisoning. The 1968 *Act* was amended in 1972, 1977 and 2000. Section 3 of the *Act* deals with definitions, section 4 with the Central Insecticides Board, section 9 with registration of insecticides, section 16 with the Central Insecticides Laboratory, section 19 with insecticide analysis, and sections 20-22 with the inspectors. Provisions of this *Act* are in addition to and not in derogation of any other law for the time being in force. The other relevant enactments are: (1) Prevention of *Food*

¹² Hasrat Arjjumend, Konstantia Koutouki and Anatolii Getman, 'Ukrainian Legislation For Safeguarding The Agroecosystems And Environmental Health: The Challenges Ahead', *Kharkiv International Legal Forum: Law and Problems of Sustainable Development in Globalized World*, (Pravo Publishing House 2017)
<http://dspace.nlu.edu.ua/bitstream/123456789/15286/1/Arjjumend_Koiutouki_Getman_3-17.pdf> accessed 30 April 2021.

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Adulteration Act, 1954, (2) Drugs (Control) Act, 1950, (3) Drugs and Cosmetics Act, 1940, (4) Dangerous Drugs Act, 1930, (5) Poisons Act, 1919, and the (6) Destructive Insects and Pests Act, 1914. The Insecticides Act, 1968 has registered 739 chemical pesticides in India and banned/denotified a number of toxic pesticides. Noticeably, 970 companies have registered biopesticides as of 9 April 2021.¹³ Through its Gazette Notification no. 147 dated 26 March 1999, the Government of India included the following categories of biopesticides:

Antagonistic Fungi and Bacteria

- (a) *Bacillus subtilis*
- (b) *Gliocladium* species
- (c) *Pseudomonas* species
- (d) *Trichoderma* species

Entomogenous Fungi

- (a) *Beauveria bassiana*
- (b) *Metarrhizium anisopliae*
- (c) *Nomurea rileyi*
- (d) *Verticillium lecanii*

Grannulosis Viruses (GV)

Nuclear Polyhedrosis Viruses (NPV)

Further, the *Bacillus* species was also added in the schedule with the variants:

Bacillus thuringiensis var. *israelensis*,
Bacillus thuringiensis var. *kurstaki*,
Bacillus thuringiensis var. *galleriae*, and
Bacillus sphaericus.

Recently, the following 25 genera, species, or strains have also been added into the Schedule:

1. *Nomurea rileyi*
2. *Hirsutella* spp.
3. *Verticillium chlamydosporium*
4. *Streptomyces griseoviridis*
5. *Streptomyces lydicus*
6. *Ampelomyces quisqualis*
7. *Candida oleophila*
8. *Fusarium oxysporum* (non-pathogenic)
9. *Burkholderia cepacia*
10. *Coniocytrium minitans*
11. *Agrobacterium radiobacter* strain 84
12. *Agrobacterium tumefaciens*
13. *Pythium oligandrum*
14. *Erwinia amylovora* (hairpin protein)

¹³ 'Bio-Pesticide Registrant | Directorate of Plant Protection, Quarantine & Storage | GOI' (*Ppqs.gov.in*, 2021) <<http://ppqs.gov.in/divisions/cib-rc/bio-pesticide-registrant>> accessed 30 April 2021.

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15. *Phlebia gigantean*
16. *Paecilomyces lilacinus*
17. *Penicillium islanidicum* (for groundnut)
18. *Alcaligenes* spp.
19. *Chaetomium globosum*
20. *Aspergillus niger* strain AN27
21. VAM (fungus)
22. *Myrothecium verrucaria*
23. *Photorhabdus luminescences akhurstii* strain K-1
24. *Serratia marcescens* GPS 5
25. *Piriformospora indica*

In addition to above microbial biopesticides, the following 'plant origin biopesticides' are also the part of Schedule:

1. Pyrethrins (Pyrethrum)
2. Neem products
3. Karanjin
4. Extracts of *Cymbopogon* spp.
5. Oxymatrine
6. Reduced Azadirachtin(s)
7. Triptericium of *wilfordii* Hook GTW (Plant extract)
8. Bitterbarkomycin
9. Squamocin
10. Eucalyptus leaf extract

3.3 Central Insecticides Board and Registration Committee (CIBRC)

Constituted under sections 4 and 5, the Central Insecticides Board and Registration Committee (CIBRC) regulates pesticides in India along with the Food Safety and Standards Authority of India (FSSAI). CIBRC is responsible for advising central and state governments on technical issues related to the manufacture, use and safety of pesticides.¹⁴ The functions of CIBRC are twofold, as specified in the *Act*: (a) advising on the risk to human beings or animals involved in the use of insecticides and the safety measures to prevent such risks (section 2(2a)); and (b) advising on the manufacture, sale, storage, transport and distribution of insecticides with a view to ensure safety to human beings or animals (section 2(2b)). These functions of CIB are further expanded under rule 3 of the *Insecticide Rules, 1971*, and include:

- (a) advising the Central Government on the manufacture of insecticides under the *Industries (Development and Regulation) Act, 1951*;
- (b) specifying the uses of each class of insecticides based on their toxicity and whether or not they are suitable for aerial application;
- (c) advising tolerance limits for insecticide residues and establishing minimum intervals between the application of insecticides and harvest in respect of various commodities;

¹⁴ Rohid Bhide, 'Regulatory Perspective of Agrochemicals In India' (*Grainews*, 2013) <<http://news.agropages.com/News/NewsDetail---10045.htm>> accessed 30 April 2021.

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- (d) specifying the shelf-life of insecticides;
- (e) suggesting colorization, including colouring matter which may be mixed with concentrates of insecticides, particularly those of highly toxic nature;
- (f) carrying out such other functions as are supplemental, incidental or consequential to any of the functions conferred by the *Act* or these rules.

The Department of Biotechnology within the Indian Ministry of Science and Technology is the technical agency that evaluates effectiveness, quality and safety issues during the approval process. Before authorization and registration, it must be determined that the microorganism and its metabolites pose no concerns relating to pathogenicity or toxicity to mammals and other non-target organisms that will likely be exposed to the microbial product; that the microorganism does not produce a known genotoxin; and that all additives in the microbial manufacturing product and in the end-use formulations are of low toxicity and have little potential to harm human health or the environment.

Section 5a(i) of the *Insecticides Act, 1968* speaks about the constitution of the Registration Committee which is given the tasks of registering insecticides and pesticides (including biopesticides) after scrutinizing their formula and verifying claims made by the importer or the manufacturer regarding their efficacy and safety to human beings and animals. The Registration Committee, under rule 4 of the *Insecticide Rules, 1971*, has been given the following tasks: (a) specify the precautions to be taken against poisoning through the use or handling of insecticides; (b) carry out such other incidental or consequential matters necessary for carrying out the functions assigned to it under the *Act* or *Rules*. While the Registration Committee is expected to emphasize toxicological and ecosystem safety issues, the majority of these concerns apply to toxic organo-chemicals. Yet most biocontrol agents are ecologically safe and non-toxic. Thus, as far as biosafety is concerned, a separate legal framework is required to provide regulatory guidance for different categories of biopesticides in a systematic and comprehensive manner. Treating all categories of pesticides under one regulatory framework harms the economic viability of biocontrol agents (affecting manufacture, trade, supply, etc.).

3.4 Registration Process

Applications for registering the manufacture and import of a new pesticide or biopesticide can be made in prescribed Form I (rule 6) to the Secretary, Registration Committee, Directorate of Plant Protection, Quarantine & Storage, Ministry of Agriculture, NH-IV, Faridabad - 121001 Haryana. The application process requires a tremendous amount of data. Form I does not contain elaborate guidelines specifying the information that is required at the time of application submission. Several relevant parameters on which data are required for registration of biopesticides are mentioned in Appendix 2. The requisite tests and analysis of each

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biopesticide to be registered are relatively exhaustive and specific. In addition, recently, highly technical tests such as DNA barcoding and fingerprinting are made mandatory for new registrations of microbial biopesticides.¹⁵ Under section 16 of the *Act*, the Central Insecticide Laboratories are notified from time to time. Under rule 5 of the *Insecticide Rules, 1971*, the functions of the laboratory are described.

Under Section 9(3) of the *Insecticides Act, 1968*, the period for registration of an imported or manufactured biopesticide is 12 months from the date of application. This period may be further extended by 6 months if the Registration Committee is unable to arrive at a decision within said period on the basis of the materials before it. This lengthy registration period is impractical from a business perspective. It is also unsuitable for biopesticides, as the shelf life of biocontrol agents is very short. Often, laboratory tests take such a long time that the effective shelf life of the particular strain contained in the biopesticide expires before registration is granted. Due to delay in testing and short shelf life, the sampled strain does not fit the standards set for that particular category of the biopesticide. Therefore, the length of time required for the registration of biopesticide must be shortened in accordance with the shelf life of the various biopesticide strains.

Section 9(3) of the *Insecticides Act, 1968* also requires the Registration Committee to investigate claimed safety precautions for humans and animals, including wildlife. In cases where the precautions claimed are insufficient or, notwithstanding the observance of such precautions, the use of the insecticides involves serious risk to human beings or animals, the Committee may refuse the registration. Similarly, according to Sections 9(3B) and 9(3C), the Registration Committee must take precautionary measures when the insecticide is being introduced and registered for the first time in India. Such provisions are also applicable to biopesticides. However, unless there is a serious biosafety issue involved, biopesticides should be treated different from chemical pesticides, with due care to the ecological and public health effects of biopesticides.

As per the provisions of section 9 of the *Act*, applications for licenses to manufacture registered pesticides (also under Rule 9) and to obtain licenses for sale, etc., of registered pesticides (Rule 12) are lodged. Sections 9 (application) and section 13 (license granting) of the *Insecticides Act, 1968* are somewhat inconsistent with each other. The registration of biopesticides is carried out at a federal level, whereas the license is granted by state governments after the registration is done by the central government, the state government issues a license for a particular biopesticide. Contrary to actual practice, there is no mention in Sections 9 and 13 that licenses would be issued for insecticides (or biopesticides for that matter) only after their registration by the central government.

¹⁵ 'India CIBRC Issued New Regulation Decisions on Biopesticides' (*Grainews*, 2015)
<<http://news.agropages.com/News/NewsDetail---15797-e.htm>> accessed 30 April 2021.

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3.5 Packing and Labelling

Under rules 16 to 20 of the *Insecticides Rules, 1971*, the importance, manners, procedures and prohibitive actions are described for packing, packaging and labelling of pesticides or biopesticides. Without the prescribed proper packing and labelling, no pesticide or biopesticide is allowed to be exhibited or sold. According to rule 17(1), “every package containing the insecticide shall be of a type approved by the Registration Committee.” Rule 17(2) makes it more explicit by stating, “before putting any insecticide into the primary package, every batch thereof shall be analyzed as per the relevant specifications of the manufacture thereof, in accordance with the approved methods of analysis and the result of such an analysis shall be recorded in the register maintained for the purpose...”. Each package needs to contain a leaflet having necessary information about the pesticide or biopesticide. Important disclosure is to be made about the particulars regarding chemicals harmful to human beings, animals and wildlife. Warning and cautionary statements must be included regarding the symptoms of poisoning, suitable and adequate safety measures and emergency first aid treatment, and decontamination or safe disposal of used containers. Under Rule 19, the procedure of labelling is elaborately explained. Toxicity caused by the pesticide in case of leakage, spillage, usage or accidental contamination is addressed in all these instructions. However, there is no word mentioned about biopesticides in any section of the *Act* or any rule, despite the fact that various notifications and amendments are adopted both in the *Act* as well as *Rules*.

3.6 Inspection, Sampling and Analysis of Biopesticides

Under section 21 of the *Act*, inspectors are given powers to inspect and collect samples of pesticides. Their duties are also fixed under section 22 of the *Act*. However, the training of these inspectors relates only to toxic chemicals; they lack the proper training and knowledge to handle biopesticides. This lack of training may have grave implications for the trade and free use of biopesticides. In the *Insecticides Act, 1968*, there is no specific instruction given to inspectors on how to sample or handle the biopesticides. Unlike the Fertilizer Control Order, the *Insecticides Act, 1968* has not prescribed any sampling method. Under section 21(1)(e) of the *Act* and Rule 24(2) of the *Insecticides Rules, 1971*, the procedure prescribed for the analysis of insecticides (or for biopesticides) is the same as that prescribed by the Indian Standards Institution¹⁶ (ISI). Analysis of samples is conducted only by the Central Insecticides Laboratory constituted under the provisions of section 16 of the *Act*. In accordance with the Rule 21 of the *Insecticide Rules, 1971*, an analyst should be qualified in Agriculture, Science or Chemistry apart from training in analysing insecticides.

¹⁶ *Deputy Director of Agriculture vs M/s Sandoz Ltd* [1991] Andhra High Court, CriLJ 1830 (Andhra High Court).

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3.7 Disposal of Pesticides

Rule 44 of the *Insecticide Rules, 1971* emphasizes environmental and safety aspects. The manufacturers, formulators and operators must dispose of packages or surplus materials and employ safe washing methods in order to avoid environmental or water pollution. The packages must also be broken and buried away from human habitation.

4. CANADA REGULATION ON BIOPESTICIDES AND ITS COMPARISON WITH THE INDIAN FRAMEWORK

The Indian legal framework dealing with pesticides (and biopesticides) can be compared with Canadian law on pest control products, i.e., pesticides. By incorporating the word “organisms,” the Canadian approach broadens the scope of the law on pesticides to include biological products. By comparison, India’s law on pesticides has accommodated microbial biopesticides and plant-origin biopesticides through amendments and notifications.

4.1 Background of Canadian Regulation

In Canada, the *Constitution Act, 1867* addresses legislative control over the availability, use and disposal of pesticides at federal and provincial levels. Initially, pesticide control came under provincial control between the 1920s and 1930s. Currently, there are two prominent laws regulating pesticides and biopesticides: the *Pest Control Products Act*, from 1939 and the *Foods and Drugs Act* enacted in 1970. The *Pest Control Products Act* was consolidated in 2002 and enacted as the *Pest Control Products Act, 2002* (last amended 12 July 2019). This law is “an Act to protect human health and safety and the environment by regulating products used for the control of pests”. Compared to the Canadian laws, India’s *Insecticides Act, 1968* has exhibited scarce references to environmental protection and public health and safety.

4.2 Scope of the Laws

The *Pest Control Products Act, 2002* of Canada describes pest control products under section 2 as: “a product, an organism or a substance, including a product, an organism or a substance derived through biotechnology, that consists of its active ingredient, formulants and contaminants, and that is manufactured, represented, distributed or used as a means for directly or indirectly controlling, destroying, attracting or repelling a pest or for mitigating or preventing its injurious, noxious or troublesome effects”. The word ‘an organism’ here implies microorganisms like fungi, bacteria or viruses that are used to produce biopesticides (microbial products) through using biotechnology. The scope of the Canadian law is very broad in this sense; however, it is only the Indian law (i.e., *Insecticides Act, 1968*) that provides a comprehensive list of what is included and subject to registration under the law. Nearly 35 items of microbial biopesticides and 10 plant-origin biopesticides are included under the Indian law.

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4.3 Registration of Pesticides or Biopesticides

Section 7 of the *Pest Control Products Act, 2002* provides for the registration of pest control products. If required, authorities may conduct evaluations of the product for health or environmental risks as per the powers under section 7(3a). Further, a scientific approach will be applied while evaluating the health and environmental risks (section 7(7b)). Certain technical aspects under evaluation include aggregate exposure to the pest control product, namely, dietary exposure and exposure from other non-occupational sources, including drinking water and use in and around homes and schools, and cumulative effects of the pest control product and other pest control products that have a common mechanism of toxicity. Additional data required include different sensitivities to pest control products of major identifiable subgroups, e.g., pregnant women, infants, children, women and seniors. Section 6(2) clarifies that no person shall manufacture, import, export or distribute a registered pest control product under section 53.3 or 54 of the *Pest Control Products Act, 2002*, unless it conforms to the conditions of registration respecting its composition and the person complies with the other conditions of registration. Accordingly, Canadian legislation is particularly concerned about human and environmental safety. Microbial biopesticides are not given any distinct treatment given their biological origin or as green products. In India, too, the registration process of pesticides and biopesticides is very exhaustive and intensive. For microbial biopesticides, complex analyses like DNA barcoding and fingerprinting are made mandatory.

4.4 Packaging and Labelling

Norms for the packing, packaging and labelling are equally stringent in Canadian and Indian legislation. These norms have equal force as they do not allow products to be sold, transferred, transported, distributed or stored without compliance of the given instructions of packing and labelling. Section 6(3) of Canada's *Pest Control Products Act, 2002* instructs that under section 53, 53.3 or 54, no person shall store, import, export or distribute a pest control product that is not packaged and labelled in accordance with the regulations and, if it is registered, the conditions of registration. Biopesticides are treated in the same manner as other pesticides.

4.5 Inspection, Analysis and Disposal of Biopesticides

Like India's *Insecticide Act, 1968* and *Rules 1971*, sections 45 and 46 of the *Pest Control Products Act, 2002* in Canada has laid down an appointment procedure for inspectors. Section 48 deals with the powers of inspectors, whereas subsequent sections (49 to 57) address procedures of inspecting, sampling, testing and seizing the pest control products. Section 58 talks about the disposal of pest control products. In continuation, section 59 empowers the inspectors to advise owners or possessors of the pest control products to dispose appropriately of the material if it is discovered to pose serious risks to human health or the environment. Under section 59(3), an

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inspector can issue a notice in this regard to the holder of a toxic or hazardous pest control product for adequate disposal. In case of offence, an inspector can, under section 59(4), punish in the following manner:

- (a) on summary conviction, to a fine of not more than \$200,000 or to imprisonment for a term of not more than six months, or to both; or
- (b) on conviction on indictment, to a fine of not more than \$500,000 or to imprisonment for a term of not more than three years, or to both.

Indian legislation does not give strict advice to the holders of pesticides or biopesticides for their disposal, although public and environmental health and safety are emphasized.

5. CONCLUSION AND RECOMMENDATIONS

Around 67,000 different crop pest species – including plant pathogens, weeds, invertebrates and some vertebrate species – are responsible for an estimated 40% reduction in the world’s crop yield.¹⁷ One way to increase food availability is to improve the management of pests. Yet, the unsustainable application of chemical fertilizers and plant protection chemicals has caused a steady decline in soil and crop productivity the world over. Agricultural practices must evolve to sustainably meet growing local and global demand for food without irreversibly damaging the world’s agroecosystems and natural resources (especially soil). Critically, this must occur while also maintaining food security, even in the context of climatic change. Simply put, rising food yields must be decoupled from the unsustainable use of water, energy, fertilizers, chemicals, and land. Investing in sustainable agriculture is one of the most effective ways to simultaneously achieve the sustainable development goals (SDGs) on poverty and hunger, nutrition and health, education, economic and social growth, peace and security, and environmental preservation.

5.1 Indian Law Regulating the Biopesticides

All three broad categories of biopesticides – microbial biopesticides, botanical biopesticides, and semiochemicals – are adopted by India’s *Insecticides Act, 1968* through amendments and notifications. Through its Gazette Notification no. 147 dated 26 March 1999, the Government of India included the following categories of biopesticides: Antagonistic Fungi and Bacteria (4 species), Entomogenous Fungi (4 species), Grannulosis Viruses (GV), Nuclear Polyhedrosis Viruses (NPV), 3 variants of *Bacillus thuringiensis*, and *Bacillus sphaericus*. Later, 25 additional genus, species, or strains were added into the Schedule. In addition to the above microbial biopesticides, 10 “plant origin biopesticides” also became the part of Schedule.

¹⁷ E.C. Oerke and others, *Crop Production and Crop Protection* (Elsevier Science 2014).

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The *Insecticides Act, 1968* and the *Insecticides Rules, 1971* regulate the import, registration process, manufacture, sale, transport, distribution and use of insecticides (pesticides) with a view to prevent risk to human beings or animals and for all connected matters. The Central Insecticides Board and Registration Committee (CIBRC) is responsible for advising central and state governments on technical issues related to manufacture, use and safety issues of pesticides. The Department of Biotechnology of the Ministry of Science & Technology is the technical agency that evaluates effectiveness, quality and safety issues during the approval process. Apart from these regulations, the organic food producers in India are supposed to comply with the National Program for Organic Production (NPOP) standards with mandatory organic certification by authorized certification agencies. Before the authorization and registration of a biopesticide, it is ensured that the microorganism and its metabolites pose no concerns of pathogenicity or toxicity to mammals and other non-target organisms which will likely be exposed to the microbial product; that the microorganism does not produce a known genotoxin; that all additives in the microbial manufacturing product and in end-use formulations are of low toxicity, and that they pose little threat to human health or the environmental.

An analysis of Indian law on pesticides reveals multiple challenges facing the manufacturers, importers, traders and users of biopesticides. Existing Indian laws and regulations were conceived to regulate conventional chemical pesticides but are currently being applied to biopesticides without accounting for the key differences between the two. At the time of registration of a new product, the manufacturer/trader/importer must generate data that are easily obtained for chemical products, but which may be difficult to obtain for biopesticides. Furthermore, there are questions as to the utility of some of this data when applied to biopesticides. Under the current laws and rules, organic non-toxic and ecologically benign products such as biopesticides are required to pass the same tests as conventional chemicals. Another major issue concerns the technical or administrative personnel who deal with the registration, testing, monitoring, surveillance, inspection and authorization of substances. Their level of knowledge and experience with biopesticides is limited, resulting in shortcomings concerning implementation and compliance with the regulations.

One of the major obstacles in promoting biopesticides as an alternative to chemical pesticides is the lack of appropriate recognition of biopesticides, reflecting the weakness of the underlying policy framework in India.¹⁸ The relative immaturity of the policy framework, limited resources and capabilities, and a lack of trust between regulators and producers are also serious problems. Investment risks involved in opting for biopesticides on farmers' fields, and farmers' confidence in the quality and performance of

¹⁸ Suresh Kumar and Archana Singh, 'Biopesticides: Present Status and the Future Prospects' (2015) 06 Journal of Biofertilizers & Biopesticides.

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the products, continue to be debated in India.¹⁹ The Government of India introduced a Pesticides Management Bill (pending in parliament for many years), which is intended to replace the existing *Insecticides Act, 1968*. However, this bill still fails to differentiate biopesticides from conventional chemical pesticides. The analysis of Indian legislation points to the need to create a separate and distinct legal framework for biopesticides. The regulatory options governing biopesticides should also be in line with novel microbial technologies. These changes would ultimately contribute to achieving the SDGs and would support the flow of goods and services for organic agriculture and horticulture in India.

5.2 Recommendation for India's Law on Biopesticides

In India, biopesticides and biocontrol agents are still largely regulated by legal frameworks originally designed for chemical insecticides and pesticides. The *Insecticides Act, 1968* and *Insecticides Rules, 1971* regulate the import, registration, manufacture, sale, transport, distribution and use of insecticides (pesticides) with a view to prevent risk to human beings and animals, as well as all connected matters. The basic problem is the intent of the law. First, regulations must be formulated to ensure human and environmental safety and to consistently and reliably characterize the quality of biopesticide products. Second, registration and regulatory agencies require a biopesticide data portfolio – a concept originating from the framework governing chemical pesticides. Such data includes information about the mode of action, toxicological and eco-toxicological evaluations, and host range testing.²⁰ Generating this scientific data is quite expensive for companies and can therefore deter companies from commercializing biopesticides. Taking these two crucial concerns regarding biopesticide governance into consideration, the Indian government and regulatory agencies need to strike a balance between seeking data and allowing commercialization of biopesticides.

Because India's regulations were designed to address chemical pesticides, the fundamental principles underlying the *Act* and the *Rules* treat biologicals on par with chemicals. This treatment is grossly inappropriate; the science relating to the origin, production, application, physiology and functions of biopesticides is completely different from that of chemical pesticides. To correct the course, biologically-produced microbial, botanical and pheromonic biopesticides must be treated differently. In the absence of a separate law on biopesticides, the *Insecticides Act, 1968* and the *Insecticide Rules, 1971* require appropriate amendments. Indeed, the failure to introduce such amendments has caused the trade in biopesticides to suffer. Farmers and consumers are bound to pay hefty prices for chemical pesticides – and end up consuming chemical residues.

¹⁹ Rohid Bhide, 'Regulatory Perspective of Agrochemicals in India' (*Grainews*, 2013) <<http://news.agropages.com/News/NewsDetail---10045.htm>> accessed 30 April 2021.

²⁰ Chandler and others (n 13)

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5.3 Canadian Law Regulating Biopesticides

The *Pest Control Products Act, 2002* is the Canadian law regulating biopesticides in the country. This law is “an Act to protect human health and safety and the environment by regulating products used for the control of pests”. The law is progressive in the context of protecting the environment and human health. Additionally, section 2 of the *Act* includes in the definition the word “an organism,” which implies microorganisms like fungi, bacteria or viruses that are used to produce biopesticides through using biotechnology. Before granting registrations to the companies, government authorities conduct evaluations of the proposed product. Notably, human health concerns, environmental risks, and threats to animal health are the central aspects of the pre-registration scientific assessments. Thus, the Canadian legislation is particularly concerned about human and environmental safety. Yet, microbial biopesticides are not given any distinct treatment due to their biological origin and non-toxic properties. Given the potential negative effects of pesticides on human and environmental health and safety, the Canadian law contains very strict penal provisions for non-compliance of the norms set for the disposal of toxic or hazardous pest control products. This is in contrast to the Indian legislation which does not give strict advice to the holders of pesticides or biopesticides for its disposal.

5.4 Recommendation for Canadian Law on Biopesticides

The Canadian law provides for strict regulation of pesticides and biopesticides to ensure environmental and human safety. In addition, the inclusion of microbial products right in the definition gives adequate space for biopesticides in the regulation process. However, like India, a separate regulation dealing with biopesticides and biocontrol agents should be promulgated in order to differentiate biological products from toxic chemical pesticides and pest control products.

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APPENDIX.1

List of some important microbial biopesticides²¹

Common name	Target insects
Entomopathogenic viruses	
Corn earworm NPV (HezeSNPV)	<i>Helicoverpa zea</i> : corn earworm, tomato fruitworm, tobacco budworm, <i>Helioth virescens</i>
Cotton bollworm NPV (HearNPV)	<i>Helicoverpa armigera</i> , cotton bollworm, pod borer
Diamond back moth GV	<i>Plutella xylostella</i>
Velvetbean caterpillar, NPV (AngeMNPV)	<i>Anticarsia gemmatalis</i>
Alfalfa looper NPV (AucaMNPV)	Noctuidae
Tea moth (Buzu NPV)	<i>Buzura suppressaria</i>
Entomopathogenic bacteria	
<i>Bacillus thuringiensis</i> subspecies <i>kurstakia</i>	Lepidoptera
<i>B. thuringiensis</i> sub-species <i>aizawaia</i>	Lepidoptera
<i>B. thuringiensis</i> sub-species <i>japonensis</i>	Coleoptera: Scarabaeidae
<i>Paenibacillus popilliae</i>	Coleoptera: Scarabaeidae, <i>Popillia japonica</i>
Entomopathogenic fungi	
<i>Aschersonia aleyrodis</i>	Hemiptera
<i>Beauveria brongniartii</i>	Coleoptera (Scarabaeidae)
<i>Conidiobolus thromboides</i> Acari	Hemiptera, Thysanoptera
<i>Lecanicillium longisporum</i>	Hemiptera
<i>Metarhizium anisopliae sensu lato</i>	Coleoptera, Diptera, Hemiptera, Isoptera
<i>Nomuraea rileyi</i>	Lepidoptera

APPENDIX.2

Technical data required for registering a biopesticide in India

<ul style="list-style-type: none"> ▪ Strain specifications <ul style="list-style-type: none"> ○ Genus and species ○ Rhizosphere competence ○ Biological control capability ○ Growth promotion capability
--

²¹ Hasrat Arjjumend and Konstantia Koutouki, 'Science of Biopesticides and Critical Analysis of Indian Legal Frameworks Regulating Biocontrol Agents' (2018) 11 International Journal of Agriculture, Environment and Biotechnology
 <<http://ndpublisher.in/countpdfdownload.php?id=3051&pdf=IJAEBv11n3t.pdf>> accessed 30 April 2021.

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- Wide range of growth parameters like pH and temperature
- CFU count
 - The data required for claiming 1 year shelf-life of the product is for 15 months for talc-based formulation, i.e., the microbe should remain viable for 15 months with a colony forming units (CFU) count not less than 2×10^6 spores/ml or g on selective media (SM).
 - Pathogenic contaminants such as *Salmonella*, *Shigella* and *Vibrio* should not be present. Other microbial contaminants not to exceed 1×10^4 counts per ml or g.
- Target fungi
- Moisture content
 - Maximum moisture content of the product should not exceed more than 8 per cent for dry formulation of fungi and 12 per cent for bacteria.
- Chemistry
 - Systematic name: Genus and species
 - Common name, if any
 - Natural occurrence: morphological description
 - Manufacturing process: solid or liquid state fermentation
 - Qualitative analysis
 - CFU on selective medium
 - Absence of Gram- bacterial contaminants (*Salmonella*, *Shigella* and *Vibrio*)
 - Moisture content
 - Shelf-life claim: two different locations along with meteorological data
- Technical bulletin/Product profile
 - Bioefficiency*
 - Lab bioefficacy test: The product should be tested against target pathogen/pest at one of the laboratories of ICAR/SAUs/CSIR/ICMR system
 - Field bioefficacy test: The intended product should be tested for field bioefficacy under Indian conditions.
 - Field bioefficacy guidelines have been recently revised/enhanced w.e.f. 01.01.2011
 - Field Bioefficiency*
 - 9 (3B): Provisional Registration
 - One crop: 2 seasons (rabi and kharif)/year, 2 agro-climatic conditions (4 bioefficacy trial reports)
 - 9 (3): Permanent Registration
 - One crop: 2 seasons (rabi and kharif)/year, 3 agro-climatic conditions (6 bioefficacy trial reports)
 - Safety data on non-target organisms
 - Toxicity*

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- Toxicological studies may be conducted by recognized institutes viz. IITR Lucknow, IIBAT Chennai, JR Foundation Vapi, INTOX, Pune
 - a) (For formulated products to be directly manufactured)
 - Single dose oral- Rat (21 days)
(Toxicity/Infectivity/Pathogenicity)
 - Single dose oral- Mouse (21 days)
(Toxicity/Infectivity/Pathogenicity)
 - Single dose Pulmonary- Rat (14 days)
(Toxicity/Infectivity/Pathogenicity)
 - Single dose Dermal- Rabbit (21 days)
(Toxicity/Infectivity/Pathogenicity)
 - Single dose Dermal- Intraperitoneal (21 days)
(Toxicity/Infectivity/Pathogenicity)
 - Primary skin irritation
 - Eye irritation
 - b) Human Safety Records
- Environmental Toxicological Studies (For formulation only)
On Non-Target Vertebrates
 - Toxicity to chicken, pigeon, freshwater fish
- Dossier preparation for 9(3b) & 9(3) registration

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Authors' Declarations and Essential Ethical Compliances

Authors' Contributions (in accordance with ICMJE criteria for authorship)

Contribution	Author 1	Author 2
Conceived and designed the research or analysis	Yes	Yes
Collected the data	Yes	No
Contributed to data analysis & interpretation	Yes	Yes
Wrote the article/paper	Yes	Yes
Critical revision of the article/paper	No	Yes
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Research involving human bodies (Helsinki Declaration)

Has this research used human subjects for experimentation? No

Research involving animals (ARRIVE Checklist)

Has this research involved animal subjects for experimentation? No

Research involving Plants

During the research, the authors followed the principles of the Convention on Biological Diversity and the Convention on the Trade in Endangered Species of Wild Fauna and Flora.

Research on Indigenous Peoples and/or Traditional Knowledge

Has this research involved Indigenous Peoples as participants or respondents? No

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FORMATION AND DEVELOPMENT OF THE ECOSYSTEM APPROACH IN INTERNATIONAL ENVIRONMENTAL LAW BEFORE THE CONVENTION ON BIOLOGICAL DIVERSITY

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ABSTRACT

The article analyses general aspects of the formation and development of the ecosystem approach in international environmental law before the adoption and entry into force of the Convention on Biological Diversity. On the grounds of thorough and complex research encompassing the main international environmental agreements and scientists' views, it is concluded that the issues of protection and conservation of natural ecosystems and implementation of the ecosystem approach had already received wide support at the international level by that time, whereas adopted agreements created the necessary base for the further formation and development of the ecosystem approach as a holistic concept under the Convention on Biological Diversity.

Keywords: Environmental law; International agreements; Sustainable development; Biological diversity; Ecosystem; Ecosystem approach

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Formation and Development of the Ecosystem Approach in International Environmental Law before the Convention on Biological Diversity

1. INTRODUCTION

From a historical perspective, the whole process of formation and development of the ecosystem approach in international environmental law can be divided into three interdependent and complementary periods: pre-Convention, Convention and post-Convention, which are consistent with the adoption on 5 June 1992 of the Convention on Biological Diversity¹ (CBD) at the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro (Brazil, 3–14 June 1992).

Conforming to the CBD, its objectives are the conservation of biodiversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources.² The CBD contains a definition of an 'ecosystem', which is a dynamic complex of plant, animal and microorganism communities and their non-living environment interacting as a functional unit,³ and the obligations for the conservation of ecosystems: to promote its protection; to rehabilitate and restore degraded ecosystems; to prevent the introduction of, control or eradicate those alien species which threaten ecosystems, etc.⁴

The CBD does not specify an ecosystem approach, but its main provisions are contained in a number of decisions of the meetings of its governing body – the Conference of the Parties (COP). At the First meeting of the COP (Nassau, Bahamas, 1994) the Contracting Parties confirmed that the planet's essential goods, ecological functions and services depend on the variety and variability of ecosystems, and if humanity is to have a future on this earth, biological diversity must be conserved, because its depletion causes threats to ecosystems that are vital for the sustenance of human societies in all countries.⁵ And, at the Second meeting of the COP (Jakarta, Indonesia, 1995) the ecosystem approach was recognized as the primary framework of action to be taken under the CBD.⁶

But the most productive with regard to the ecosystem approach was the Fifth meeting of the COP (Nairobi, Kenya 2000), because it adopted

¹ Convention on Biological Diversity (adopted 5 June 1992, entered into force 29 December 1993) 1760 UNTS 69 (CBD).

² *ibid* art 1.

³ *ibid* art 2.

⁴ *ibid* paras 'd', 'f', 'h' of art 8.

⁵ Decision adopted by the Conference of the Parties to the Convention on Biological Diversity at its First Meeting (Nassau, 28 November – 9 December 1994). Decision I/8: Preparation of the participation of the Convention on Biological Diversity in the third session of the Commission on Sustainable Development, UNEP/CBD/COP/DEC/I/8.

⁶ Decisions adopted by the Second Meeting of the Conference of the Parties to the Convention on Biological Diversity (Jakarta, 6–17 November 1995). Decision II/8: Preliminary consideration of components of biological diversity particularly under threat and action which could be taken under the Convention, UNEP/CBD/COP/2/19.

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Decision V/6⁷ which contains a description of the ecosystem approach, a list of its 12 interrelated and complementary principles and 5 operational guidance for their application (sections 'A', 'B' and 'C' of the Annex). According to section 'A', the ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. This approach is based on the application of appropriate scientific methodologies focused on levels of biological organization, which encompass the essential structure, processes, functions and interactions among organisms and their environment, and recognizes that humans, with their cultural diversity, are an integral component of many ecosystems.

It should be noted that there is no consensus in academic circles on the concept and nature of the ecosystem approach and its relationship to other similar approaches, but for clarity we will use R.A. Perelet's formulation that the ecosystem approach is a means of examining the relationships within ecosystems with other systems and people for whom ecosystems are habitats and livelihoods, and aims to ensure the long-term sustainability of biodiversity and the significant development of current understanding of sustainable nature.⁸

Precisely in the context, introduced by the CBD, the ecosystem approach is considered by many experts in international environmental management and law.⁹ However, despite the fact that, indeed, the ecosystem approach as a holistic concept began to be developed under the CBD, numerous references to it can also be found in international environmental agreements adopted much earlier.

2. THE AIM OF THE ARTICLE

A certain contribution to the coverage of the formation and development process of the ecosystem approach in international environmental law, in particular, in covering its pre-Convention period, was made by both domestic and foreign scientists including M.O. Medvedieva

⁷ Decisions adopted by the Conference of the Parties to the Convention on Biological Diversity at its Fifth Meeting (Nairobi, 15–26 May 2000). Decision V/6: Ecosystem Approach, UNEP/CBD/COP/5/23.

⁸ RA Perelet, 'Ekosistemnyy podhod k upravleniyu prirodopolzovaniem i prirodoohrannoy deyatel'nostyu' (2006) 1 Mechanism of Economic Regulation 39.

⁹ G Henne, 'The Ecosystem Approach under the Convention on Biological Diversity: A workshop which was held in Lilongwe, Malawi, during 26-28 January 1998' (1998) 25(3) *Environmental Conservation* 273–275; RD Smith and E Maltby, *Using the Ecosystem Approach to Implement the Convention on Biological Diversity: Key Issues and Case Studies* (Gland: IUCN 2003) 118; E Morgera, *The Ecosystem Approach under the Convention on Biological Diversity: A Legal Research Agenda* (2015). E Morgera, 'Ecosystem and Precautionary Approaches' in J Razzaque and E Morgera (eds) *Encyclopedia of Environmental Law: Biodiversity and Nature Protection Law* (EE, 2016), Forthcoming, Scottish Centre for International Law Working Paper Series No. 7, Edinburgh School of Law Research Paper No. 2015/17, etc.

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(who compiled a list of international legal acts, which, in her opinion, contain references to elements or principles of the ecosystem approach),¹⁰ F.M. Platjouw (who not only listed such acts, but, using ten-year periodization, categorized them into those that were adopted in the 1970s, 1980s and 1990s, though almost without references to scientists' comments),¹¹ V. De Lucia (who in his fundamental research touched on a brief historical account aimed at showing the early history of the 'ecosystem approach' concept so as to highlight its genealogical character),¹² and others.

In some scientific papers on the ecosystem approach, if its historical aspect is studied, then either it is considered only in relation to narrow areas and sectors, such as watercourses and water resources, living marine resources, fisheries management, forestry policy, etc.,¹³ or exclusively within the framework of individual international conventions.¹⁴

Based on the foregoing background, it becomes obvious that the historical foundations of the ecosystem approach require additional and complex analysis, taking into account a more thorough and comprehensive

¹⁰ M Medvedieva, 'Ekosystemnyi pidkhid u mizhnarodnomu pravi navkolyshnoho seredovyshcha: problemy rozuminnia ta zastosuvannia' (2010) 2 *Pravo Ukrainy* 184–189.

¹¹ FM Platjouw, *Environmental Law and the Ecosystem Approach: Maintaining Ecological Integrity through Consistency in Law* (London: Routledge 2016) 232.

¹² V De Lucia, *The 'Ecosystem Approach' in International Environmental Law: Genealogy and Biopolitics* (Routledge 2019) 311.

¹³ O McIntyre, 'The Emergence of an 'Ecosystem Approach' to the Protection of International Watercourses under International Law' (2004) 13(1):1 *Review of European Community and International Environmental Law* 1–14; M Erdem, 'Ecosystem Approach to Environmental Protection in the Law of International Watercourses' (2013) (Special issue) *Dokuz Eylul University Law Journal* 1359–1391; DEJ Currie, *Ecosystem-Based Management in Multilateral Environmental Agreements: Progress towards Adopting the Ecosystem Approach in the International Management of Living Marine Resources* (Rome: WWF International, Global Species Programme 2007) 53; SR Enright and B Boteler, 'The Ecosystem Approach in International Marine Environmental Law and Governance' (2020) in: O'Higgins T., Lago M., DeWitt T. (eds) *Ecosystem-Based Management, Ecosystem Services and Aquatic Biodiversity*. Springer, Cham 333–352; WR Turrell, *The Policy Basis of the 'Ecosystem Approach' to Fisheries Management* (Norrköping: EuroGOOS 2004) 28; ML Wilkie, P Holmgren and F Castañeda, *Sustainable forest management and the ecosystem approach: two concepts, one goal* (Forest Resources Division FAO, Rome 2003) 31, etc.

¹⁴ MN Kopylov and AM Solncev, 'Ramsarskaja konvencija 1971 g. i jekosistemnyj podhod k razumnomu ispol'zovaniju i ustojchivomu razvitiju vodno-bolotnyh ugodij' (2012) <<https://wiselawyer.ru/poleznoe/60725-ramsarskaya-konvenciya-1971-ehkosistemnyj-podkhod-razumnomu-ispolzovaniju>> accessed 15 April 2021; C Redgwell, 'Protection of Ecosystems under International Law: Lessons from Antarctica' in A Boyle and D Freestone (eds), *International Law and Sustainable Development* (OUP 1999) 224; KT Nguen, 'Konvencija ASEAN 1985 g. kak hronologicheskij vtoroj primer jekosistemnogo upravlenija' (2011) 1–2 (45–46) *Mezhdunarodnoe pravo* 108–112; OV Rudenko, 'Alpiiska konventsija – zrazok ekosistemnoi paradyhmy pryrodookhoronnoho zakonodavstva' (2011) 559 *Naukovyi visnyk Chernivetskoho universytetu. Jurisprudence* 62–65, etc.

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research of the main international environmental agreements and different views of scientists. Given this, but without pretending to be an exhaustive study, this article has covered well-known and unknown (to a wide range of readers) facts and opinions concerning general aspects of formation and development of the ecosystem approach in international environmental law before the adoption and entry into force of the CBD.

3. AWARENESS OF THE IMPORTANCE OF CONSERVING ECOSYSTEMS

The term 'ecosystem', which is central to the ecosystem approach, was coined by A.G. Tansley, who wrote that when we are trying to think fundamentally, we cannot separate organisms from their special environment, with which they form one physical system. The formed, in this way, systems are the basic units of nature. These ecosystems, as we may call them, are of various kinds and sizes, and form one category of the multitudinous physical systems of the universe, which range from the universe as a whole down to the atom.¹⁵

In subsequent years, numerous definitions of the ecosystem were developed in scientific literature (R.L. Lindeman, F.C. Evans, F.R. Fosberg¹⁶ and many others), but perhaps the greatest contribution to the development of the ecosystem concept was made by E.P. Odum, who described an ecosystem as any entity or natural unit that includes living and non-living parts interacting to produce a stable system in which the exchange of materials between the living and non-living parts follows circular paths¹⁷, and he claimed that it is the main functional unit in ecology, as includes both organisms and inanimate environment - components that mutually affect each other's properties and are necessary to maintain life in its form that exists on Earth.¹⁸

Besides, thanks to the E.P. Odum's research that the understanding of importance of the stable functioning of ecosystems was emerged in the public consciousness, as ignorance in maintaining balance in ecosystems becomes a threat to human existence.¹⁹ According to the scientist, the idea of an ecosystem and the realization that humanity is part of complex biogeochemical cycles are the basic concepts of ecology, which are designed to play a crucial role in the life of mankind; they should be the basis for the

¹⁵ AG Tansley, 'The Use and Abuse of Vegetational Concepts and Terms' (1935) 16(3) Ecology 299.

¹⁶ RL Lindeman, 'The Trophic-Dynamic Aspect of Ecology' (1942) 23(4) Ecology 399–417; FC Evans, 'Ecosystem as the Basic Unit in Ecology' (1956) 123(3208) *Science* 1127–1128; FR Fosberg, 'The island ecosystem', in FR Fosberg (ed.), *Man's Place in the Island Ecosystem: a Symposium* (Bishop Museum Press: Honolulu 1963) 1–6.

¹⁷ EP Odum, *Fundamentals of ecology* (Philadelphia: W.B. Saunders Company 1953) 9.

¹⁸ Ju Odum, *Jekologija* (Moscow: Mir 1986), 24. Translated from: EP Odum, *Basic Ecology* (New York: CBS College Publishing 1983).

¹⁹ *ibid* 77.

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conservation of natural resources. That is why approaches to the study of the ecosystem must be combined and translated into a program of action if humans want to survive the current environmental crisis they have created.²⁰

Modern ecologists are no less eloquent on this issue, claiming that the point of global environmental changes that have occurred over the past 50–100 years is the destruction of ecosystems on vast land areas, in the waters of semi-enclosed seas and the coastal oceanic zone, which threatens the biosphere with the most catastrophic consequences. Destruction and deformation of natural ecosystems (forest, tropical, steppe, forest-tundra, etc.) as a result of human economic activity are, without a doubt, the most important and essential aspect of the global environmental crisis.²¹

Taking into account the functions of ecosystems in nature and their importance for maintaining its favourable state, the need to preserve and restore ecosystems as the main structural units of the biosphere has become extremely urgent. From these considerations, the ecosystem approach as a new strategy for natural resource management was developed in international environmental law.

The pre-Convention period of the ecosystem approach dates back to the 1960–1970s, when the general public learned about the threat looming over the biosphere. It is at this time that international organizations and non-governmental organizations were created to deal with different environmental issues, numerous literary and scientific works were published touching upon various environmental problems, intergovernmental scientific programs were developed, and international environmental congresses and conferences were convened.

The first attempt to involve the world community and governments in the practical solution of global environmental problems was the United Nations Conference on the Human Environment in Stockholm (Sweden) on 5–16 June 1972 (UNCHE, also known as the Stockholm Conference). In the process, a number of interrelated and complementary documents were adopted, the leading one being the Declaration of the United Nations Conference on the Human Environment²² (Stockholm Declaration) divided into two parts. The first part contained seven theses proclaiming and explaining the responsibility of man to nature, awareness of the special mission of mankind and the necessity of solving accumulated problems. The second part contained 26 principles guiding in solving environmental issues and problems. Principle 1 establishes the link between the duty to protect the environment and the realization of fundamental human rights and

²⁰ Ju Odum, *Osnovy jekologii* (Moscow: Mir 1975) 50, 51. Translated from: EP Odum, *Fundamentals of ecology. Third edition* (Philadelphia–London–Toronto: W.B. Saunders Company 1971).

²¹ VI Danilov-Danil'jan, KS Losev and IE Rejf, *Pered glavnym vyzovom civilizacii: Vzgljad iz Rossii* (Moscow: INFRA-M 2005).

²² Report of the United Nations Conference on the Human Environment (UN, New York 1973) A/CONF.48/14/Rev.1.

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freedoms. Principles 2–7 are devoted to the problems of using the planet’s natural resources and the conservation of species diversity on Earth. Principles 8–25 cover measures to protect and improve environmental conditions. The last principle (26) deals with the consequences of the use of nuclear weapons and weapons of mass destruction.²³

Analyzing the Stockholm Declaration, it can be argued that despite its lack of binding legal force and its anthropocentricity (the need to protect nature is motivated by human interests), it was crucial not only for the development of international environmental law, but also for the development of an ecosystem approach. Some of its principles explicitly mention the need to conserve ecosystems and states that ‘the natural resources of the Earth, including the air, water, land, flora and fauna and especially representative samples of natural ecosystems, must be safeguarded for the benefit of present and future generations through careful planning or management’, and that any negative impact on the environment ‘must be halted in order to ensure that serious or irreversible damage is not inflicted upon ecosystems’.²⁴

In several principles of the Stockholm Declaration, ecosystem conservation is noted indirectly by recognizing the need to support the ecosystem functions of natural objects. For example, the Declaration states that ‘the capacity of the Earth to produce vital renewable resources must be maintained and, wherever practicable, restored or improved’.²⁵ There are also principles where the requirements for the equitable use of natural resources are enshrined in order ‘to ensure that benefits from such employment are shared by all mankind’,²⁶ as well as principles that emphasize the adaptation of integrated and coordinated approach to States’ development planning ‘so as to ensure that development is compatible with the need to protect and improve environment for the benefit of their population’, and which stress the importance of rational planning as a means of ‘reconciling any conflict between the needs of development and the need to protect and improve the environment’.²⁷ In general, according to experts in public international law, in particular G. Handl, a strong undercurrent in this Declaration is sustainable development, even though the World Commission on Environment and Development (WCED) was not to coin the concept until several years after Stockholm.²⁸

²³ IA Cverianashvili, ‘Stokgol’mskaja konferencija 1972 g. i ejo rol’ v stanovlenii mezhdunarodnogo jekologicheskogo sotrudnichestva’ (2016) 1 Vestnik Nizhegorodskogo universiteta imeni N.I. Lobachevskogo 91.

²⁴ Stockholm Declaration principles 2, 6.

²⁵ *ibid* principle 3.

²⁶ *ibid* principle 5.

²⁷ *ibid* principles 13, 14.

²⁸ G Handl, ‘Declaration of the United Nations Conference on the Human Environment (Stockholm Declaration), 1972 and the Rio Declaration on Environment and Development, 1992’ (2013) United Nations Audiovisual Library of International Law 5.

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So, the Stockholm Declaration, approved at the Stockholm Conference in 1972, has become a reference point for awareness of the importance of conserving natural ecosystems on a global scale. Not without reason, one year after this Conference, its Secretary-General M.F. Strong wrote in his article 'One Year after Stockholm: An Ecological Approach to Management':

"For the first time we began to see that all mankind literally is in the same boat – that the world community is faced with its first truly global problem. It was the truth that ecologists and poets before them had been trying to tell us: in nature everything is tied together."²⁹

The ecosystem trend introduced by the Stockholm Declaration can be clearly seen in the World Conservation Strategy³⁰ (WCS) prepared by the International Union for Conservation of Nature and Natural Resources (IUCN) and published on 5 March 1980. The WCS notes that human beings, in their quest for economic development and enjoyment of the riches of nature, must come to terms with the reality of resource limitation and the carrying capacities of ecosystems, and must take account of future generations' needs. This is the message of conservation, for if the objective of development is social and economic welfare, the motif of conservation is to ensure Earth's capacity to sustain development and to support all life.³¹

One of the main objectives of living resource conservation the WCS recognizes is the maintenance of essential ecological processes (those processes that are governed, supported or strongly moderated by ecosystems and are essential for food production, health and other aspects of human survival and sustainable development) and 'life-support systems', for example, watershed forests or coastal wetlands. The maintenance of such processes and systems is vital for all societies regardless of their stage of development.

The leading place in the WCS is occupied by the preservation of genetic diversity and the sustainable utilization of species and ecosystems. It is noted that unique ecosystems should be protected as a matter of priority, and for this reason only those uses compatible with their preservation should only be permitted. At the same time, a complete range of ecosystems in each country should be protected so that the range of diversity in nature is preserved. In addition, species and ecosystems should not be so heavily exploited that they decline to levels or thresholds from which they cannot easily recover.

It is obvious that in contrast to the Stockholm Declaration the WCS had a clearer ecosystem focus. As I.V. Krjzh points out, the WCS builds on the

²⁹ MF Strong, 'One Year after Stockholm: An Ecological Approach to Management' (1973) 51(4) *Foreign Affairs* 691.

³⁰ World Conservation Strategy: Living Resource Conservation for Sustainable Development. IUCN–UNEP–WWF, 1980.

³¹ *ibid* foreword.

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Earth's limited resources and the carrying capacity of ecosystems as realities with which humanity must align its pursuit of economic development and the enjoyment of natural wealth. Therefore, on the one hand, it supports the development path set by the Stockholm Conference and, on the other hand, it introduces the notion of sustainable development that takes into account the limits of acceptable impacts on ecosystems.³²

By the way, the second edition of the WCS which is called as 'Caring for the Earth: A Strategy for Sustainable Living'³³ was published in October 1991. Its aim is to help improve the condition of the world's people, by defining two requirements. One is to secure a widespread and deeply held commitment to a new ethics, the ethic for sustainable living, and to translate its principles into practice. The other is to integrate conservation and development: conservation to keep our actions within the Earth's capacity, and development to enable people everywhere to enjoy long, healthy and fulfilling lives. The Strategy also defines the basic concepts of sustainable living, in particular 'sustainable development', which is interpreted as 'improving the quality of human life while living within the carrying capacity of supporting ecosystems'.

In the context of the protection and sustainable use of ecosystems the World Charter for Nature³⁴ (WCN), an international declarative document approved and proclaimed by United Nations General Assembly resolution 37/7 of 28 October 1982, deserves special attention. The WCN proclaims that: 'mankind is a part of nature and life depends on the uninterrupted functioning of natural systems which ensure the supply of energy and nutrients'; 'every form of life is unique, warranting respect regardless of its worth to man'; 'man can alter nature and exhaust natural resources by his action or its consequences and, therefore, must fully recognize the urgency of maintaining the stability and quality of nature and of conserving natural resources', because 'lasting benefits from nature depend upon the maintenance of essential ecological processes and life support systems' while 'the degradation of natural systems owing to excessive consumption and misuse of natural resources... leads to the breakdown of the economic, social and political framework of civilization'; and therefore 'man must acquire the knowledge to maintain and enhance his ability to use natural resources in a manner which ensures the preservation of the species and ecosystems for the benefit of present and future generations'.³⁵

Evaluating the above provisions, we can see that the WCN, although formally supporting the anthropocentric trends, as it also confirms the

³² IV Krjzh, Psihologija global'nyh jekologicheskikh izmenenij (Har'kov: HNU imeni V.N. Karazina 2012) 94.

³³ Caring for the Earth: A Strategy for Sustainable Living. Published in partnership by IUCN, UNEP, WWF (1991) <<https://portals.iucn.org/library/efiles/documents/cfe-003.pdf>> accessed 15 April 2021.

³⁴ World Charter for Nature (adopted and entered into force 28 October 1982) A/RES/37/7 (WCN).

³⁵ *ibid* preamble.

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importance of preservation of the species and ecosystems 'for the benefit of present and future generations', but in its essence, as M.O. Medvedieva noted, it is a clear example of the introduction of the concept of ecocentrism in the mechanism of international legal regulation because it is based on the recognition of the need to respect nature and ensure its reproduction (not because a human needs it).³⁶

To this end, the WCN enshrined five general principles conforming to which all human activities concerning nature should be directed and evaluated: 1) nature shall be respected and its essential processes shall not be impaired; 2) the genetic viability on the earth shall not be compromised; the population levels of all life forms must be at least sufficient for their survival, and to this end necessary habitat shall be safeguarded; 3) all areas of the Earth, both land and sea, shall be subject to these principles of conservation; special protection shall be given to unique areas, to representative samples of all the different types of ecosystems and to the habitat of rare or endangered species; 4) ecosystems and organisms, as well as the land, marine and atmospheric resources that are utilized by man, shall be managed to achieve and maintain optimum sustainable productivity, but not in such a way as to endanger the integrity of those other ecosystems or species with which they coexist; 5) nature shall be secured against degradation caused by warfare or other hostile activities. It should be noted that studying the principles of international law that apply to environmental relations, and referring to the 4th principle of the WCN, E.V. Vasilenko argues that it includes a definition of the concept of the ecosystem approach.³⁷

Thus, the analyzed documents were highly significant for the formation and development of the ecosystem approach in international environmental law. As D.K. Bekjashev notes referring to A.N. Vylegzhanin, 'these documents do not define the term 'ecosystem' and do not disclose the content of ecosystem management', but it was in the Stockholm Declaration and the WCN wherein the conceptual and legal framework of the ecosystem approach was first established.³⁸ A similar view is supported by O.M. Spektor, who, turning to D. Freestone, writes that the conceptual and legal framework for the ecosystem approach has been laid down in the texts of the Stockholm Declaration, the WCS and the WCN, although these terms do not apply.³⁹ D. Freestone himself speaks about it this way:

³⁶ MO Medvedieva, 'Pryntsypy ekolohichnoi etyky v mizhnarodnii dohovirni ta sudovii praktytsi' (2015) 124 (part I) Aktualni problemy mizhnarodnykh vidnosyn 69.

³⁷ EV Vasilenko, Formirovanie mezhdunarodnogo prirodoresursnogo prava, Candidate's thesis (Rostov-na-Donu 2016) 52.

³⁸ DK Bekjashev, 'Mezhdunarodno-pravovoj princip jekosistemnogo podhoda v upravlenii rybolovstvom' (2016) 8(69) Aktual'nye problemy rossijskogo prava 183.

³⁹ OM Spektor, 'Klasyfikatsiia mizhnarodno-pravovykh rezhymiv pryrodnykh resursiv za predmetom yikh rehuliuвання' (2016) 41(3) Naukovyi visnyk Uzhhorodskoho natsionalnoho universytetu. Series: Jurisprudence 160.

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“The recognition of the importance of management of ecosystems themselves, rather than simply those of their components which may be of immediate significance to mankind, is a relatively recent phenomenon. Crucial steps in this development were the 1972 Stockholm Declaration and the 1980 IUCN World Conservation Strategy which formed the basis for the 1982 UN General Assembly World Charter for Nature, and which popularized the concept of, as well as the term, ‘life support systems’ and which stressed the interrelationship of these with other ecological processes and genetic diversity.”⁴⁰

4. PRIMACY IN THE REFLECTION OF THE ECOSYSTEM APPROACH

Since the early 1970s, agreements have begun to be concluded at the international level to protect not only separated species of flora and fauna (such as the so-called ‘fish’ conventions, conventions on the protection of birds and plants) or all species of flora and fauna and unique landscapes in a particular region (on the African continent, in the Western Hemisphere, etc.), but also the habitats of such species around the world.

A striking example of international environmental agreements of this type was adopted on 2 February 1971 in Ramsar (Iran) the Convention on Wetlands of International Importance Especially Waterfowl Habitat⁴¹ (Ramsar Convention) for *inter alia* stemming the progressive encroachment on wetlands and its conservation by combining far-sighted national policies with coordinated international action.⁴² Under this Convention, the List of Wetlands of International Importance has been created, where wetlands are designated for their international significance in terms of ecology, botany, zoology, limnology or hydrology. In the first instance, wetlands of international importance to waterfowl at any season should be included.⁴³

Exploring the history of the Ramsar Convention, M.N. Kopylov and A.M. Solncev indicate that in its development phase it was aimed specifically at the protection of waterfowl through the establishment of a network of protected areas, but as the text of the Convention improved, the protection of wetland habitats (rather than species) became a priority. In scientists’ opinion, the unique feature of this Convention is that it is based on an ecosystem approach, as it not only aims to conserve waterfowl, but also recognizes wetlands as ecosystems that are critical to biodiversity

⁴⁰ D Freestone, ‘The Conservation of Marine Ecosystems under International Law’. International Law and the Conservation of Biological Diversity. International Environmental Law and Policy Series. M. Bowman and C. Redgwell (eds). (London; Boston: Kluwer Law International 1996) 100.

⁴¹ Convention on Wetlands of International Importance Especially as Waterfowl Habitat (adopted 2 February 1971, entered into force 21 December 1975) 996 UNTS 245 (Ramsar Convention).

⁴² *ibid* preamble.

⁴³ *ibid* parts 1, 2 of art 2.

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conservation and human well-being.⁴⁴ In another publication M.N. Kopylov, S.M. Kopylov and S.A. Mohammad also claim that this Convention was the first international environmental treaty to set standards for the conservation of a specific type of ecosystem.⁴⁵ This position is shared by O.M. Spektor noting that the Ramsar Convention is one of the first treaty sources of international law in the doctrine to provide for the protection of ecosystems.⁴⁶ Indeed, despite the fact that the Ramsar Convention text does not mention not only the ecosystem approach but also the term 'ecosystem' itself, it is obvious that it is an international legal instrument of an ecosystem essence, which is dedicated to the protection of living organisms (primarily waterfowl) in their inextricable link with their habitats (wetlands).

Some authors, among whom O. McIntyre⁴⁷ and M. Erdem,⁴⁸ researching the emergence of the ecosystem approach in the law of international watercourses, insist that one of the first agreements to reflect the concept of ecosystem integrity was the Great Lakes Water Quality Agreement⁴⁹ (GLWQA) signed at Ottawa (Canada) on 22 November 1978 between the United States of America and Canada to 'restore and maintain the chemical, physical, and biological integrity of the waters of the Great Lakes Basin Ecosystem'.⁵⁰ It seems that this statement is true, since the GLWQA already broadly uses the term 'ecosystem' and defines it appropriately, indicating that 'Great Lakes Basin Ecosystem' means the interacting components of air, land, water and living organisms, including man, within the drainage basin.⁵¹

However, while many scientists rightly give the Ramsar Convention and the GLWQA primacy in the reflection of the ecosystem approach, the literature provides information on the existence of earlier examples of its recognition. One of them is Declaration on the Maritime Zone⁵² (Santiago Declaration) signed on 18 August 1952 by the governments of Chile, Ecuador and Peru. This Declaration constituted an unequivocal expression of rights

⁴⁴ Kopylov/Solncev (n. 14).

⁴⁵ MN Kopylov, SM Kopylov and SA Mohammad, 'Kak formirovalas' funkciya upravlenija OON v oblasti ohrany okruzhajushhej sredey' (2013) 4 Vestnik RUDN. Serija Juridicheskie nauki 304.

⁴⁶ O Spektor, 'Mizhnarodne upravlinnia povodzhennia z zhyvymy pryrodnymy resursamy' (2018) 9 Pidpriemnytstvo, gospodarstvo i pravo 277.

⁴⁷ McIntyre (n. 13) 3.

⁴⁸ Erdem (n. 13) 1364.

⁴⁹ Agreement on Great Lakes Water Quality (adopted and entered into force 22 November 1978) 1153 UNTS 187 (GLWQA).

⁵⁰ Ibid art 2.

⁵¹ Ibid art 1.

⁵² Declaration on the maritime zone (adopted and entered into force 18 August 1952) 1006 UNTS 326 (Santiago Declaration).

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of sovereignty over a 200 mile maritime zone and, additionally, has become a cornerstone of the new law of the sea.⁵³

Thus, as 'a norm of their international maritime policy', these governments declared that each of them possesses 'exclusive sovereignty and jurisdiction' over the sea along the coasts of their respective countries to a minimum distance of 200 nautical miles from these coasts, including the seabed and the subsoil thereof. This was the first attempt to give 'international' character to unilateral actions aimed at reviewing existing law. The actions taken by those countries explained the duty of governments to preserve and ensure for their peoples the natural resources of the maritime zones adjacent to their coasts.⁵⁴

Giving the rationale for the Santiago Declaration, A.V. Ovlashhenko and I.F. Pokrovskij note that Latin American ecologists and lawyers have suggested that the biome of the Central Peru, the warm water biome of the Ecuador and the cold-water biome of the North Chile region are located in the Peruvian Current zone within the ecosystem. Their western borders are more distant from the Chilean coast than from Ecuador, but on average they are 200 miles wide. This is, in a nutshell, the concept of biological unity that Chile, Peru and Ecuador have justified in favour of the coastal state. Under this concept, people living on the coast also form part of the biological chain that begins at sea. By biological complex, the biome in Peru was first understood as a very prosaic thing, which is difficult to imagine as the basis for the subsequent 'global' ecosystem approach, namely the biological chain 'anchovy - cormorants - guano'. The decline in anchovy stocks as a result of overfishing led to a reduction in bird stocks and, consequently, in the number of guanos collected in large quantities on Peru's coastal islands. Later, Chile, Ecuador and Peru expanded the concept of biome to include a range of living organisms in selected areas.⁵⁵

Scientists continue that the ecosystem model proposed in the Declaration, which justified the claims of States to extend sovereignty to areas of the high seas, was not initially widely supported. As international law of the sea expert A.A. Volkov wrote on this occasion in 1966: 'Understanding the precariousness... of the rationale for any violation of the international legal principle of freedom of the high seas, the states that signed the Santiago Declaration of 1952 have also put forward scientific arguments to defend their position. The concept of an ecosystem was used

⁵³ A Espaliat Larson, *The maritime boundary Chile-Peru* (Corporación de Estudios Internacionales, 2012) 9 <<http://repositorio.uchile.cl/handle/2250/123727?show=full>> accessed 15 April 2021.

⁵⁴ Slovar' mezhdunarodnogo morskogo prava. Ju.G. Barsegov (ed.). (Moscow: Mezhdunarodnye otnoshenija 1985) 51.

⁵⁵ AV Ovlashhenko and IF Pokrovskij, 'Ispol'zovanie jekosistemnogo podhoda v morskoy dejatel'nosti: pravovye voprosy i ih diskussionnye momenty' (2010) <<https://wiselawyer.ru/poleznoe/42278-ispolzovanie-ehkosistemnogo-podkhoda-morskoy-deyatelnosti-pravovye-voprosy>> accessed 15 April 2021.

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for this'.⁵⁶ But, as scientist further pointed out, in the substantiation of the theory of 'biome' prevailed arguments, which are mainly of economic nature and have nothing to do with the peculiarities of biology of living marine organisms living off the western coast of South America. At that time, the application of the ecosystem concept in practice would have divided many areas of the high seas between different states. For this reason, the concept of the ecosystem could not find support from the vast majority of States at the International Technical Conference on the Conservation of the Living Resources of the Sea (18 April - 10 May 1955, Rome, Italy). It was not recognized outside individual Latin American countries or at a later time. The concept of the ecosystem sparked a strong protest outside South America.⁵⁷ 'The practical implementation of the concept of ecosystem by Latin American countries', as A.A. Volkov pointed in the conclusion of his article, 'is a flagrant violation of universally recognized principles of international law'.⁵⁸

Another prominent international lawyer M.I. Lazarev wrote on this occasion that the struggle for marine ecological balance should be conducted by all States with all certainty and with the help of political, administrative, legal and other measures. However, all these measures do not in any way mean that the ecology of the sea becomes the imperative for international maritime law. And, while issues of the environment and its protection have a very important role to play, neither quantitatively nor qualitatively will rules concerning the protection of the marine environment prevail over rules governing the political relations of States with respect to the use of the seas and oceans. The proposal to make 'the ecology of the sea the basis of the law of the sea' is scientifically untenable. This proposal attempts to replace the political basis of the law with an environmental one, which is totally unrealistic and should be rejected.⁵⁹

Nevertheless, it should be noted that over time the situation will change, and the ecological basis will affect the political one, and the concept of the ecosystem will occupy an important place in the legal regulation of international maritime relations.

5. THE ECOSYSTEM APPROACH TO MARITIME RELATIONS

A fundamental treaty in maritime relations is the United Nations Convention on the Law of the Sea⁶⁰ (UNCLOS), which was opened for

⁵⁶ AA Volkov, 'Konceptija jekosistemy i mezhdunarodnoe morskoe pravo' (1966) 3 Rybnoe hozjajstvo 88 in Ovlashhenko/Pokrovskij (n. 55).

⁵⁷ *ibid.*

⁵⁸ *ibid.*

⁵⁹ MI Lazarev, *Morskaja jekologija i mezhdunarodnoe morskoe pravo (Kritika odnoj burzhuaznoj koncepcii)* (Moscow: IGPAN SSSR 1972) 183-185 in Ovlashhenko/Pokrovskij (n. 55).

⁶⁰ United Nations Convention on the Law of the Sea (adopted 10 December 1982, entered into force 16 November 1994) 1833 UNTS 397 (UNCLOS).

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signature on 10 December 1982. It established the legal regime and boundaries of the maritime spaces that are part of State territory, and the spaces forming zones of functional jurisdiction of States, as well as provided the legal framework for the activities of States in the study and use of the seas and oceans and their resources, including navigation and overflight, mineral exploration and mining, fishing, conservation and protection.

In studying the UNCLOS in the context of practice for an ecosystem approach to the sustainable use of the sea and its resources, A. Luttenberger notes that it provides legal framework for the implementation of an ecosystem approach to all activities conducted in maritime areas. And to confirm this thesis, the scientist refers to the relevant provisions of the UNCLOS. Firstly, he points out to the preamble, which declares that the problems of ocean space are closely interrelated and need to be considered as a whole. Secondly, he cites part 4 of article 61 of the UNCLOS 'Conservation of the living resources', according to which the coastal State shall take into consideration the effects on species associated with or dependent upon harvested species with a view to maintaining or restoring populations of such associated or dependent species above levels at which their reproduction may become seriously threatened. And, thirdly, he focuses on article 119 which contains analogous wording.⁶¹

A similar opinion is expressed by D.K. Bekjashev, who says that the UNCLOS does not contain the concept of an ecosystem approach, but it stresses the need to take action to protect vulnerable ecosystems. It requires States parties to take all necessary measures to conserve and protect the marine environment and to manage its resources through the interdependence of species (articles 61–67, 119). In general, these norms establish the application of an ecosystem approach to fisheries management.⁶²

The authors of the publication 'On the Ecosystem Approach to the World Ocean Development' also emphasize that, despite the absence of the ecosystem approach in the UNCLOS, it highlights the need to take action to protect vulnerable ecosystems. In addition, it provides the legal framework for the implementation of the ecosystem approach to all activities carried out in marine areas. The basic principles for the protection and conservation of the marine environment require States to protect all areas of the oceans from pollution from any source and to take special measures for rare or vulnerable

⁶¹ A Luttenberger, 'Legal challenges of ecosystem approach to sustainable use of the sea'. UNESCO sponsored 4rd Dubrovnik Conference on Sustainable Development of Energy, Water and Environment Systems, Faculty of Mechanical Engineering and Naval Architecture (2007) <https://bib.irb.hr/datoteka/273818.Luttenberger_-_Regulations_on_discharge_of_waste_and_cargo_residues.pdf> accessed 15 April 2021.

⁶² Bekjashev (n. 38) 185.

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ecosystems and habitats of depleted, threatened or endangered fish species and other forms of marine organisms.⁶³

At the same time, it should be noted that there are also opposing views on this issue in the scientific literature. M.Yu. Bezdniezhna, for example, notes that the UNCLOS does not contain clear obligations to protect marine ecosystems and provides for the 'maximum sustainable yield' approach based on the protection of only one species. Although the UNCLOS refers to associated species (article 119), it does not provide a clear mechanism for putting these provisions into practice. Obviously, the researcher continues, it was not the goal of lawmakers to explicitly enshrine ecosystem management in this Convention and, for objective reasons, lack of sufficient knowledge about the subtle ecosystem links between ecosystem components. Since, in theory, such management should take into account all possible relationships between a particular fish resource and predators, other similar species and their own prey; the impact of weather and climate on fish resources; and the complex relationship between fish resources and their natural environment.⁶⁴

P.A. Gudev also notes that the ecosystem approach has never been part of the UNCLOS. Attempts to attribute an 'ecosystem' orientation to the UNCLOS can only be seen as speculative. It has only one article that mentions the term 'ecosystem' itself. This is article 194(5) on measures to prevent, reduce and control pollution of the marine environment, which states: 'The measures taken in accordance with this Part shall include those necessary to protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life'. Among other things, the implementation of the ecosystem approach requires the mandatory application of the same measures for the protection of the marine environment and marine living resources both within and beyond the areas of national jurisdiction of coastal States. However, the realization of the ecosystem approach contradicts the zonal approach, which divides the oceans into different spatial zones and which, in turn, is the basis of the UNCLOS.⁶⁵

Indeed, in the UNCLOS the ecosystem component can only be traced to a formal obligation of States to protect and preserve rare or vulnerable ecosystems. Nonetheless, it should not be forgotten that this Convention was adopted at the Third United Nations Conference on the Law of the Sea (1973–1982), the main impetus to the convening of which was the speech by the Malta's Ambassador to the United Nations A. Pardo in 1967 at the session of

⁶³ Teorija i praktika morskog dejatel'nosti. Serija nauchnyh publikacij pod redakcijem prof. G.K. Vojtolskogo. Issue 18. Mezhdunarodnye uslovija. G.E. Gigolaev, P.A. Gudev (eds). (Moscow: SOPS 2010) 183.

⁶⁴ MYu Bezdniezhna, 'Zastosuvannia ekosystemnoho pidkhotu do rehuliuвання rybnokh resursiv' (2013) 2 Ukrainskyi chasopys mizhnarodnoho prava 97.

⁶⁵ PA Gudev, *Konvencija OON po morskomu pravu: problemy transformacii rezhima* (Moscow: IMJeMO RAN 2014) 148–149, 150.

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the United Nations General Assembly, where he called on countries to open their eyes to the impending conflict that could endanger the very existence of humankind and destroy the oceans. He cited the lack of regulation of relations in the maritime domain as the cause of such conflict. This speech came at a time when many people recognized the need to renew the doctrine of the freedom of the high seas, which did not take into account scientific and technological progress that had changed the way people treated the sea.⁶⁶

Thus, the main purpose of the UNCLOS, as reported by P.A. Gudev himself, was to develop a new spatial and legal hierarchy of the World Ocean,⁶⁷ while the ecosystem component of the Convention has been overshadowed and expressed only in a few provisions. Although, on the other hand, comparing this Convention with the Geneva Conventions on the Law of the Sea⁶⁸ signed on 29 April 1958, which, according to T. Treves, are the expressions of the 'traditional law of the sea' and the importance of them is currently mostly historical,⁶⁹ some progress in that direction can be traced, as the Geneva Conventions do not contain any articles at all on the protection and conservation of marine ecosystems. Furthermore, on 4 August 1995 the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks⁷⁰ was adopted, in which the issues of protection and conservation of marine ecosystems were continued.

Within the framework of the maritime theme also note that in order to develop the strengthening and improvement of the legal regime for the protection of the marine environment, the Convention on the Protection of the Marine Environment of the Baltic Sea Area⁷¹ (Helsinki Convention) was adopted on 9 April 1992 in Helsinki (Finland), and on 21 April 1992 in Bucharest (Romania) the Convention on the Protection of the Black Sea

⁶⁶ EA Grin' and AS Malimonova, 'Iskusstvennye zemel'nye uchastki v mezhdunarodnom prave: Konvencija OON po morskomu pravu' (2017) 132 (08) Nauchnyj zhurnal KubGAU 5.

⁶⁷ Gudev (n. 65) 21.

⁶⁸ Convention on the Territorial Sea and the Contiguous Zone; Convention on the High Seas; Convention on Fishing and Conservation of the Living Resources of the High Seas; Convention on the Continental Shelf.

⁶⁹ T Treves, '1958 Geneva Conventions on the Law of the Sea' (2008) United Nations Audiovisual Library of International Law 3.

⁷⁰ Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (adopted 4 August 1995, entered into force 11 December 2001) 2167 UNTS 3 (United Nations Fish Stocks Agreement).

⁷¹ Convention on the Protection of the Marine Environment of the Baltic Sea Area (adopted 9 April 1992, entered into force 17 January 2000) 1507 UNTS 166 (Helsinki Convention).

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Against Pollution⁷² (Bucharest Convention) was signed. The Helsinki Convention obliges the Contracting Parties to take preventive measures when there is reason to assume that substances or energy introduced into the marine environment may create hazards to human health, and harm the living resources and marine ecosystems,⁷³ and also individually and jointly to take all appropriate measures with respect to the Baltic Sea Area and its coastal ecosystems influenced by the Baltic Sea to conserve natural habitats and biological diversity and to protect ecological processes.⁷⁴ Similar obligations are contained in the Bucharest Convention to prevent, reduce and control pollution, thereof, in order to protect and preserve the marine environment of the Black Sea.⁷⁵

Assessing the Bucharest Convention, V. Velikova, S. Vinogradov and M. Gvilava note that its provisions are general and vague. There is virtually no reference to such popular environmental law principles and concepts as the precautionary principle, sustainable development, ecosystem approach, etc. The document is not relevant, as its focus is on pollution prevention and control, which does not fully reflect today's environmental imperatives, such as integrated marine and coastal area management and biodiversity protection, including the sustainable use of marine living and mineral resources. Some of the obvious gaps and shortcomings of the Bucharest Convention were addressed through the adoption of the Black Sea Biodiversity and Landscape Conservation Protocol in 2002.⁷⁶

This comment should be accepted because the Bucharest Convention hardly reflects an ecosystem approach. However, going beyond the scope of our research, we confirm that ecosystem approach, indeed, is already clearly seen in the Black Sea Biodiversity and Landscape Conservation Protocol to the Bucharest Convention⁷⁷ adopted on 14 June 2002, as its purpose is recognized to maintain the Black Sea ecosystem in the good ecological state.⁷⁸ The Protocol also fixes the obligations to prohibit all actions that may have harmful impacts on the ecosystems,⁷⁹ to implement measures to eradicate or reduce to an possible level species that have already been introduced when it appears that such species cause or are potentially causing damage to

⁷² Convention on the Protection of the Black Sea Against Pollution (adopted 21 April 1992, entered into force 15 January 1994) 1764 UNTS 3 (Bucharest Convention).

⁷³ Helsinki Convention part 2 of art 3.

⁷⁴ *ibid* art 15.

⁷⁵ Bucharest Convention part 2 of art 5.

⁷⁶ Nauchnoe obespechenie sbalansirovannogo planirovaniya hozjajstvennoj dejatel'nosti na unikal'nyh morskikh beregovykh landshaftah i predlozhenija po ego ispol'zovaniju na primere Azovo-Chernomorskogo poberezh'ja. R.D. Kos'jan (ed.), vol. 9. Gelendzhik (2013) 1345–1346 <https://coastdyn.ru/e-lib/tom09_2013.pdf> accessed 15 April 2021.

⁷⁷ Black Sea Biodiversity and Landscape Conservation Protocol to the Convention on the Protection of the Black Sea against Pollution (adopted 14 June 2002, entered into force 20 June 2011) (Black Sea Biodiversity Protocol) <www.blacksea-commission.org/_convention-protocols-biodiversity.asp> accessed 15 April 2021.

⁷⁸ *ibid* part 1 of art 1.

⁷⁹ *ibid* part 1 of art 5.

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ecosystems,⁸⁰ to refrain from action, which endanger the ecosystems or the biological processes contributing to the maintenance of those ecosystems.⁸¹

The last international agreement that we will pay a little bit of attention to as part of the study of the ecosystem approach to maritime relations is the Convention for the Protection of the Marine Environment of the North-East Atlantic⁸² (OSPAR Convention) which was concluded in Paris (France) on 22 September 1992 on the basis of the recognition of the need to manage 'human activities in such a manner that the marine ecosystem will continue to sustain the legitimate uses of the sea and will continue to meet the needs of present and future generations',⁸³ and with purpose to 'take the necessary measures to protect the maritime area against the adverse effects of human activities so as to safeguard human health and to conserve marine ecosystems'.⁸⁴ In 1998, to the OSPAR Convention a new Annex V 'On the Protection and Conservation of the Ecosystems and Biological Diversity of the Maritime Area' was adopted which obligates Contracting Parties to 'take the necessary measures to protect and conserve the ecosystems and the biological diversity of the maritime area, and to restore, where practicable, marine areas which have been adversely affected'.⁸⁵

6. THE ECOSYSTEM APPROACH TO THE ARCTIC AND ANTARCTIC

The Arctic region, which covers much of Earth's northern pole, is a unique and one of the most biologically productive ecosystems in the world with a complex food web made up of organisms adapted to its extreme conditions. It sits at the top of world, covered in sea ice – a seemingly unwelcome place for life. Yet the Arctic is actually teeming with wildlife, from large mammals like walruses and polar bears to birds, fish, small plants, and even tiny ocean organisms called plankton. In addition, this region is vital to the identity, culture, and survival of its Indigenous people.⁸⁶

The importance of the Arctic ecosystem protection is mentioned in Agreement on the Conservation of Polar Bears⁸⁷ signed by the States of the Arctic Region in Oslo (Norway) on 15 November 1973. This Agreement obliges each Contracting Party to take appropriate action to protect the ecosystems of which polar bears are a part, with special attention to habitat

⁸⁰ *ibid* part 2 of art 5.

⁸¹ *ibid* para 'a' of part 1 of art 8.

⁸² The Convention for the Protection of the Marine Environment of the North-East Atlantic (adopted 22 September 1992, entered into force 25 March 1998) 2354 UNTS 67 (OSPAR Convention).

⁸³ *ibid* preamble.

⁸⁴ *ibid* part 1(a) of art 2.

⁸⁵ *ibid* art 2 of Annex V.

⁸⁶ The Arctic. The National Wildlife Federation <www.nwf.org/Educational-Resources/Wildlife-Guide/Wild-Places/Arctic> accessed 15 April 2021.

⁸⁷ Agreement on the Conservation of Polar Bears (adopted 15 November 1973, entered into force 26 May 1976) 2898 UNTS 243 (ACPB).

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components such as denning and feeding sites and migration patterns, and to manage polar bear populations in accordance with sound conservation practices based on the best available scientific data.⁸⁸

In September 1989, officials from the eight Arctic countries met in Rovaniemi (Finland) to discuss cooperative measures to protect the Arctic environment.⁸⁹ As a result of numerous subsequent meetings and discussions, on 14 June 1991 the Arctic Environmental Protection Strategy (AEPS) and the Declaration on the Protection of the Arctic Environment (Rovaniemi Declaration) were formally adopted, and which are fully consistent with the ecosystem approach. According to the AEPS, its first objective is 'to protect the Arctic ecosystem including humans',⁹⁰ while among the principles under which the implementation of the AEPS is envisaged are the following: i) management, planning and development activities shall provide for the conservation, sustainable utilization and protection of Arctic ecosystems for the benefit and enjoyment of present and future generations, including Indigenous peoples; ii) management of natural resources shall be based on an approach which considers the value and interdependent nature of ecosystem components, etc.⁹¹

In support of the AEPS and with the aim of protection and preservation of the Arctic environment on 16 September 1993 the Nuuk Declaration on Environment and Development in the Arctic⁹² (Nuuk Declaration) was adopted in Nuuk (Greenland). It acknowledges that the Arctic environment consists of ecosystems with unique features and resources which are especially slow to recover from the impact of human activities, and therefore there is a need for cooperation for the conservation, protection and restoration of ecosystems. Considering this the Ministers of the Arctic Countries endorsed the Conservation of Arctic Flora and Fauna (CAFF) as a demonstration of international cooperation for conservation and sustainable use of Arctic resources using an ecosystem approach and encouraged CAFF's continuation of the ecosystem approach as a basis for promoting more effective conservation of Arctic resources.

Turning to the Antarctic ecosystem, it worth noting that as a part of the Antarctic Treaty System, based on the Antarctic Treaty (1959),⁹³ on 1 June

⁸⁸ *ibid* art II.

⁸⁹ Arctic Environmental Protection Strategy (adopted 14 June 1991) (AEPS)
<http://library.arcticportal.org/1542/1/artic_environment.pdf> accessed 15 April 2021.

⁹⁰ *ibid* 2.1 'i'.

⁹¹ *ibid* 2.2.

⁹² The Nuuk Declaration on Environment and Development in the Arctic (adopted 16 September 1993) (Nuuk Declaration)
<<https://iea.uoregon.edu/MarineMammals/engine/Documents/1-0279-0287.htm>>
accessed 15 April 2021.

⁹³ The Antarctic Treaty (adopted 1 December 1959, entered into force 23 June 1961) 402 UNTS 71 (Antarctic Treaty).

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1972 the Convention on the Conservation of Antarctic Seals⁹⁴ was adopted in London (Great Britain) for the protection, scientific study and rational use of Antarctic seals, as well as to maintain a satisfactory balance of the ecological system. It contains the obligations of Contracting Parties to report on the basis of the statistical, biological and other evidence available when the harvest of any species of seal in the Convention area is having a significantly harmful effect on the total stocks of such species or on the ecological system in any particular locality.⁹⁵

On 20 May 1980 also within the framework of the Antarctic Treaty System in Canberra (Australia) the Convention on the Conservation of Antarctic Marine Living Resources⁹⁶ (Canberra Convention, or CAMLR Convention) was adopted. From the beginning, this Convention had a clear ecosystem focus, because a key role in its creation was concern that increased catch of krill in the Southern Ocean could seriously affect populations of krill and other marine animals, particularly birds, seals and fish, for which krill are a major source of food.⁹⁷

As reported by I.P. Dudykina, foreign legal scholars correctly consider the Canberra Convention as the 'model' international agreement that provides for an ecosystem approach to the conservation of living natural resources. D. Freestone, for example, qualifies the marine biological resources regime, established by the Convention as a 'model of an environmental (ecological) approach'. Indeed, already in the preamble of the Convention the importance of 'protecting the integrity of the ecosystem of the seas surrounding Antarctica' and increasing 'knowledge of the Antarctic marine ecosystem and its components' are recognized. Unlike the Antarctic Treaty 1959, the area of which lies between the South Pole and the 60° South latitude, the Canberra Convention extends to that area and beyond, attributing to 'Antarctic marine living resources' located in the area between the said parallel and the line of 'Antarctic convergence' (part 1 of article I).⁹⁸

Pursuant to the Canberra Convention 'Antarctic marine ecosystem' means the complex of relationships of Antarctic marine living resources (the populations of fin fish, molluscs, crustaceans and all other species of living organisms, including birds, found south of the Antarctic Convergence) with

⁹⁴ Convention on the Conservation of Antarctic Seals (adopted 1 June 1972, entered into force 11 March 1978) 1080 UNTS 175 (CCAS).

⁹⁵ *ibid* preamble and part 4 of art 5.

⁹⁶ Convention on the Conservation of Antarctic Marine Living Resources (adopted 20 May 1980, entered into force 7 April 1982) 1329 UNTS 47 (Canberra Convention, or CAMLR Convention).

⁹⁷ Antarkticheskij kril'. Istorija sozdaniya ANTKOM. Kratkij obzor (ZAO 'Russkaja pelagicheskaja issledovatel'skaja kompanija') (2011) <<http://ruspelagic.ru/d/290162/d/5142355.pdf>> accessed 15 April 2021.

⁹⁸ IP Dudykina, 'Zarubezhnye analitiki o sovershenstvovanii mezhdunarodno-pravovykh mehanizmov jekosistemnogo upravlenija v Arktike' (2016) 2 Moskovskij zhurnal mezhdunarodnogo prava 97.

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each other and with their physical environment.⁹⁹ As V.V. Golicyn and A.V. Ovlashhenko rightly note, there is perhaps no area on Earth that is more fragile and sensitive to the ecological balance than Antarctica. The Antarctic ecosystem is particularly vulnerable to changes in environmental conditions or the scale of resource exploitation, as it is extremely difficult to remove contaminants or regenerate organisms that have been damaged. For the oceanic waters around the Antarctic continent, scientists continue, a projected increase in sea temperature of just 2–3 °C over the next 100 years would mean the loss of many valuable marine biological resources. It is therefore no coincidence that the Canberra Convention has pioneered an ecosystem approach to conserving living natural resources. The novelty and uniqueness of the Convention lies primarily in its construction based on the so-called ecosystem approach. The Convention was the first international agreement for the conservation and sustainable use of marine living resources based on this approach, which is universally accepted today.¹⁰⁰

The Canberra Convention defines the principles for the conservation of marine living resources under which fisheries and related activities should be carried out: (a) prevention of decrease in the size of any harvested population to levels below those which ensure its stable recruitment; (b) maintenance of the ecological relationships between harvested, dependent and related populations of Antarctic marine living resources and the restoration of depleted populations; and (c) prevention of changes or minimization of the risk of changes in the marine ecosystem which are not potentially reversible over two or three decades, taking into account the state of available knowledge of the direct and indirect impact of harvesting, the effect of the introduction of alien species, the effects of associated activities on the marine ecosystem and of the effects of environmental changes, with the aim of making possible the sustained conservation of Antarctic marine living resources.¹⁰¹ All of the above article and the Canberra Convention as a whole, as noted by N.N. Kuharev, Ju.V. Korzun and N.N. Zhuk, turned out to be focused on the issues of fisheries regulation with the condition of maximum conservation of the Antarctic ecosystem. This is the first time in world fisheries management practice that such a focus has been declared an ecosystem approach to fisheries management.¹⁰²

The essential ecosystem component of the Canberra Convention was also highlighted by V. De Lucia,¹⁰³ and S.R. Enright and B. Boteler, who quoted him, pointing out that this Convention is a good illustration of the

⁹⁹ Canberra Convention art I.

¹⁰⁰ VV Golicyn, AV Ovlashhenko, 'Mezhdunarodno-pravovoj rezhim Antarktiki' in *Mezhdunarodnoe pravo: uchebnik*. N. Vylegzhanin (ed.) (Moscow: Vysshee obrazovanie, Jurajt-Izdat 2009) 221–222.

¹⁰¹ Canberra Convention part 3 of art II.

¹⁰² NN Kuharev, JuV Korzun and NN Zhuk, 'Ob jekosistemnom podhode ANTKOM k upravleniju promyslom Antarkticheskogo krilja (obzor)' (2017) 54 *Trudy JugNIRO* 42.

¹⁰³ V De Lucia, 'Competing narratives and complex genealogies: The ecosystem approach in international environmental law' (2015) 27 *Journal of Environmental Law* 107–108.

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ecosystem approach in action via its incorporation of basic principles of ecosystem ecology, its recognition of the importance of ecosystem interrelationships and its focus on the various components of the marine ecosystem.¹⁰⁴

The Canberra Convention established the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) headquartered in Hobart (Australia) to conserve Antarctic marine ecosystems using an ecosystem approach to their management. This management does not preclude research and commercial fisheries for marine living resources, but it is managed on the condition that fishing is ongoing and takes into account the impact of fishing on other ecosystem components.

Analyzing the Canberra Convention, D.K. Bekjashev writes that it was the first international treaty to establish an ecosystem approach to fisheries management. To confirm this, he cites the words of V.V. Golicyn, who believes that the marine biological resources regime established by this Convention represents a new model for the environmental approach, as well as the views of the authors of the book 'CCAMLR - Approach to Management', who note that unlike other multilateral fisheries agreements, the Convention not only regulates fisheries, but is also responsible for ecosystem conservation. This 'ecosystem approach', which sees the entire Southern Ocean as a set of interconnected ecosystems, distinguishes the Convention from other multilateral fisheries agreements.¹⁰⁵ These same authors note that CCAMLR was one of the first to develop what later became known as the 'ecosystem approach' to fisheries management. This approach does not focus exclusively on the species being targeted, but also sought ways to avoid situations in which fisheries adversely affected 'dependent and associated species', i.e. animals with which humans compete for food resources. CCAMLR's approach is to regulate human activities (i.e. fishing) so that harmful changes to the Antarctic ecosystem can be avoided.¹⁰⁶

Similar wording is contained in another publication 'CCAMLR - Antarctic Management' which notes that, the following two concepts have evolved from the Canberra Convention principles, which are key to the CCAMLR approach to management: (i) management should be based on precautionary approach, and (ii) management follows an ecosystem approach (i.e. all subtle and complex relationships between all organisms and physical processes (such as currents, sea temperature) that make up the Antarctic marine ecosystem must be considered). Given the complexity of the ecosystem approach, it is not surprising that multilateral fisheries conventions and fisheries managers have largely ignored this approach, instead focusing on the management of target species. The CCAMLR's

¹⁰⁴ Enright/Boteler (n. 13) 340.

¹⁰⁵ Bekjashev (n. 38) 184.

¹⁰⁶ ANTKOM – Podhod k upravljeniju. K-G Kok (ed.) (2000) 11, 12
<<http://archive.ccamlr.org/ru/pubs/am/text.pdf>> accessed 15 April 2021.

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ecosystem approach focuses not only on regulating fisheries for individual species, but also to ensure that fisheries do not adversely affect other species that are dependent on or associated with the target species. For example, while there is direct monitoring and management of krill fisheries, CCAMLR also seeks to monitor the possible impact of these fisheries on krill feeders and associated species. In this way, the CCAMLR seeks to maintain a healthy ecosystem by establishing protective limits on krill catches that take into account the needs of the linked species in order to ensure their ecological sustainability. CCAMLR's pioneering work on precautionary and ecosystem approaches provides an example for fisheries organizations around the world.¹⁰⁷

Continuing the theme of protection of the Antarctic ecosystem, it should be mentioned that on 4 October 1991 in Madrid (Spain) the Protocol on Environmental Protection to the Antarctic Treaty¹⁰⁸ (also known as the Antarctic-Environmental Protocol, or the Madrid Protocol) was signed, which entrusted the Parties with the responsibility for comprehensive protection of the Antarctic environment and dependent and associated ecosystems, and also proclaimed Antarctica as a natural reserve, devoted to peace and science.¹⁰⁹

7. THE ECOSYSTEM APPROACH TO CONSERVATION OF WILDLIFE, ATMOSPHERE, MOUNTAINS AND WATERCOURSES

Some ecosystem aspects are provided for in international environmental agreements dedicated to wildlife conservation. Thus, on 3 March 1973 in Washington (D.C., USA) the Convention on International Trade in Endangered Species of Wild Fauna and Flora¹¹⁰ (Washington Convention, or CITES) was signed. The main purpose of this Convention is to combat illegal catch and trade in wild animals and plants, because wild fauna and flora in their many beautiful and varied forms are an irreplaceable part of the natural systems of the Earth, which must be protected for this and the generations to come.¹¹¹

In keeping with the CITES, wild flora and fauna species are classified into three groups (appendixes), which include: species threatened with extinction, and any trade in specimens of these species must be subject to

¹⁰⁷ ANTKOM – upravlenie Antarktikoj (Hobart: ANTKOM) (2001) 7–8
<www.ccamlr.org/ru/system/files/MgmtOfTheAntarctic_ru.pdf> accessed 15 April 2021.

¹⁰⁸ Protocol on Environmental Protection to the Antarctic Treaty (adopted 4 October 1991, entered into force 14 January 1998) 2941 UNTS 3 (Antarctic-Environmental Protocol, or Madrid Protocol).

¹⁰⁹ Antarctic-Environmental Protocol art 2.

¹¹⁰ Convention on International Trade in Endangered Species of Wild Fauna and Flora (adopted 3 March 1973, entered into force 1 July 1975) 993 UNTS 243 (Washington Convention, or CITES).

¹¹¹ *ibid* preamble.

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particularly strict regulation;¹¹² species which although not necessarily now threatened with extinction may become so unless trade in specimens of such species is subject to strict regulation;¹¹³ species which any Party identifies as being subject to regulation for the purpose of preventing or restricting exploitation, and as needing the cooperation in the control of trade.¹¹⁴ As for the protection of ecosystems, the Convention contains some comments on trade in specimens of fauna and flora species listed in Appendix II. It is stated that Scientific Authority of each Party shall monitor both the export permits granted by that State for specimens of species included in Appendix II and the actual exports of such specimens. Whenever a Scientific Authority determines that the export of specimens of any such species should be limited in order to maintain that species throughout its range at a level consistent with its role in the ecosystems in which it occurs, the Scientific Authority shall advise the appropriate Management Authority of suitable measures to be taken to limit the grant of export permits for specimens of that species.¹¹⁵

As M.N. Kopylov and K.A. Merkulova, who analyzed the above provisions of the CITES, claimed, the need to prohibit or strictly control wildlife hunting at a level that enables them to re-establish their populations is one of the generally accepted rules in international environmental law, and in particular as it relates to biota conservation. In modern international environmental law, this rule is embodied in the concept of sustainable development and ecosystem management.¹¹⁶

The next international agreement on the conservation of animal species and their habitats is the Convention on the Conservation of Migratory Species of Wild Animals¹¹⁷ (Bonn Convention, or CMS) adopted on 23 June 1979 in Bonn (Germany), in which the Contracting Parties recognized that wild animals in their innumerable forms are an irreplaceable part of the Earth's natural system that must be conserved for the good of mankind, while among the fundamental principles for achieving this goal is taking appropriate and necessary steps to conserve not only species, but also their habitats. Describing the provisions of the Bonn Convention from the perspective of the ecosystem approach, M.S. Cipris notes that it takes ecosystems into account and thus considers species in their ecosystem context, and also pays special attention on exploring the relationship between the ecosystem approach and the sustainable use and conservation

¹¹² *ibid* Appendix I.

¹¹³ *ibid* Appendix II.

¹¹⁴ *ibid* Appendix III.

¹¹⁵ *ibid* part 3 of art IV.

¹¹⁶ MN Kopylov and KA Merkulova, 'K 40-letiju Vashingtonskoj konvencii o mezhdunarodnoj trgovle vidami dikoj fauny i flory, nahodjashhimisja pod ugroznoj ischeznovenija' (2013) 3 Vestnik RUDN. Serija Juridicheskie nauki 291.

¹¹⁷ Convention on the Conservation of Migratory Species of Wild Animals (adopted 23 June 1979, entered into force 1 November 1983) 1651 UNTS 333 (Bonn Convention, or CMS).

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of migratory species of wild animals, taking into account the approach based on the migratory-areal zoning.¹¹⁸

On 9 July 1985 in Kuala Lumpur (Malaysia) the countries of the Association of Southeast Asian Nations (ASEAN) concluded the first regional international treaty, the Agreement on the Conservation of Nature and Natural Resources¹¹⁹ which provides the obligation of the Contracting Parties to take measures to ensure the sustainability of life support systems, as well as the conservation of genetic diversity and the sustainable use of extractive natural resources under their jurisdiction.¹²⁰ As K.L. Koh¹²¹ and M. Islam¹²² point out, the main (foremost) object of the Agreement is conservation of wild flora, fauna and renewable resources including soil, vegetation, fisheries through the protection of ecosystems, habitats and endangered species, and by ensuring sustainable use of harvested ones.

Exploring this Agreement (some authors call it the Convention), N.A. Nguen and K.T. Nguen note that pursuant to experts, it is 'remarkable' and 'progressive'. The Convention, according to the mentioned researchers, is chronologically the second example of ecosystem management (the first example is obviously the Canberra Convention), as it provides for the obligation of the Contracting Parties to adopt the measures necessary to maintain essential ecological processes and life-support systems, to preserve genetic diversity, and to ensure the sustainable utilization of harvested natural resources under their jurisdiction in accordance with scientific principles and with a view to attaining the goal of sustainable development (article 1). And, although the ecosystem approach is expressed in this Convention in a low-productive general form, researchers highly appreciate its progressiveness and innovativeness, all the more so in the Southeast Asian region, where the developing countries are mainly located. The Convention's concept of ecosystem management, they emphasize, remains relevant today, as the ecosystem approach is the most effective and comprehensive approach to the management and conservation of nature and natural resources. The Convention should enter into force and apply to the

¹¹⁸ MS Cipris, *Sovremennye mezhdunarodnye rezhimy ohrany i sohraneniya migrirujushhih vidov dikih zhivotnyh*. Candidate's thesis (Moscow 2016) 150, 151.

¹¹⁹ ASEAN Agreement on the Conservation of Nature and Natural Resources (opened for signature 9 July 1985, not yet entered into force) (ACNNR) <<http://agreement.asean.org/media/download/20161129035620.pdf>> accessed 15 April 2021.

¹²⁰ MN Kopylov and VA Mishlanova, 'Vklad mezhdunarodnyh organizacij v reshenie jekologicheskikh problem' (2014) 2 *Mezhdunarodnoe pravo i mezhdunarodnye organizacii* 230.

¹²¹ KL Koh, 'ASEAN Agreement on the Conservation of Nature and Natural Resources, 1985: A Study in Environmental Governance', paper given to the World Parks Congress 2003 (Durban, 8–17 September 2003) 3 <<https://studylib.net/doc/7691261/asean-agreement-on-the-conservation>> accessed 15 April 2021.

¹²² M Islam, 'The ASEAN 1985 Agreement on the Protection of Nature and Natural Resources' (2019) 5(6) *International Journal of Legal Developments and Allied Issues* 45–46.

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entire South-East Asian region, which was recognized as a single ecosystem. And it is difficult to imagine sustainable development without an ecosystem approach at the regional level.¹²³

I.P. Dudykina also argues that the ASEAN Convention on the Conservation of Nature and Natural Resources focuses on ecosystem management. It recognizes 'the interdependence of living resources, between them and with other natural resources, within ecosystems of which they are part' (preamble), provides the obligations of the Contracting Parties to adopt 'the measures necessary to maintain essential ecological processes and life-support systems' (article 1), as well as 'appropriate measures to conserve animal and plant species whether terrestrial, marine and freshwater, and more specifically... conserve natural, terrestrial, freshwater and coastal or marine habitats' (article 3).¹²⁴

The next agreement aimed at protecting wildlife in an ecosystem context is the Declaration on Conservation of Flora, Fauna and their Habitats¹²⁵ adopted by the United Nations Economic Commission for Europe (UNECE) at its 43rd session (12–22 April 1988) in connection with the deterioration of wildlife in the European region. The Declaration sets out particular aims, the first of which is to conserve living natural resources, in the interests of present and future generations, by maintaining essential ecological processes and life-support systems, preserving genetic diversity, and ensuring sustainable utilization of species and ecosystems. As V.I. Kurylo, I.V. Hyrenko and V.V. Kurzova write, in this Declaration the principles of the first edition of the WCS 1980 were implemented.¹²⁶

Around this time, particular relevance at the international level acquired the problem of conservation of the atmosphere, especially, protection against depletion of its ozone layer, vital for the survival of the Earth. In order 'to protect human health and the environment against adverse effects resulting or likely to result from human activities which modify or are likely to modify the ozone layer' on 22 March 1985 in Vienna (Austria) was adopted the Vienna Convention for the Protection of the Ozone Layer¹²⁷. Under the Convention, 'adverse effects' means changes in

¹²³ NA Nguen and KT Nguen, 'Cherez obespechenie jekologicheskoy bezopasnosti k ustojchivomu razvitiyu v regione Jugo-Vostochnoj Azii (mezhdunarodno-pravovoj aspekt)' (2011) 12 Zhurnal nauchnyh publikacij aspirantov i doktorantov <www.jurnal.org/articles/2011/uri50.html> accessed 15 April 2021.

¹²⁴ Dudykina (n. 98) 97, 98.

¹²⁵ ECE Declaration on Conservation of Flora, Fauna and their Habitats (adopted by ECE at its 43rd session April 1988) <www.cambridge.org/core/journals/environmental-conservation/article/ece-declaration-on-conservation-of-flora-fauna-and-their-habitats/E7BF1C0AF22F112D2D9E8249AFD81102> accessed 15 April 2021.

¹²⁶ VI Kurilo, IV Girenko and VV Kurzova, 'Pravove zabezpechennja zberezhenja i vikoristannja genetičnih resursiv roslin cherez prizmu globalizacii problemi bio-bezpeki' (2012) 173(3) Naukovij visnik Nacional'nogo universitetu bioresursiv i prirodokoristuvannja Ukraïni. Series 'Law' 101.

¹²⁷ Vienna Convention for the Protection of the Ozone Layer (adopted 22 March 1985, entered into force 22 September 1988) 1513 UNTS 293 (VCPOL).

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the physical environment or biota, including changes in climate, which have significant deleterious effects on human health or on the composition, resilience and productivity of natural and managed ecosystems.¹²⁸

Two years later, on 16 September 1987, the Montreal Protocol on Substances that Deplete the Ozone Layer¹²⁹ was adopted for that Convention, and two more years later, on 11 March 1989, the Hague Declaration on the Environment¹³⁰ was done in Hague (Netherlands), which contains an appeal to all States of the world and the competent international organizations to join in developing the legal instruments to protect the atmosphere and ozone layer and to counter climate change, particularly global warming. The Declaration especially stresses that 'the consequences of these phenomena may well jeopardize ecological systems', while the preservation of these ecosystems is the 'fundamental duty'.

For ensuring the sustainable development of the Alpine region, including through the implementation of a comprehensive policy for the preservation and protection of the Alps, the highest mountain system in Europe, the Convention on the Protection of the Alps¹³¹ (Alpine Convention) was signed on 7 November 1991 in Salzburg (Austria). It obliges the Contracting Parties to protect, conserve and, where necessary, rehabilitate the natural environment and the countryside, so that ecosystems are able to function, and also to preserve, reinforce and restore the role of forests, in particular their protective role, by improving the resistance of forest ecosystems.¹³² Analyzing the Alpine Convention, the team of authors, including V.S. Kravtsiv, P.V. Zhuk and I.A. Kolodiichuk, calls it 'a demonstration of the ecosystem approach to solving environmental macro-regional problems at the inter-State level',¹³³ while O.V. Rudenko entitles it 'an example of an ecosystem-based conservation law paradigm' or 'an example of the practical implementation of an ecosystem-based conservation paradigm', because, the scientist summarizes, this Convention, having an ecosystem character, 'provides an example for future mountain conservation initiatives and provides a lesson in developing legal tools to meet the new challenge of time – the ecosystem approach in international environmental law'.¹³⁴

¹²⁸ *ibid* art 1.

¹²⁹ Montreal Protocol on Substances that Deplete the Ozone Layer (adopted 15 September 1987, entered into force 1 January 1989) 1522 UNTS 3 (Montreal Protocol).

¹³⁰ Hague Declaration on the Environment (adopted 11 March 1989) 28 ILM 1308.

¹³¹ Convention on the Protection of the Alps (adopted 7 November 1991, entered into force 6 March 1995) (Alpine Convention)
<www.alpconv.org/en/home/convention/framework-convention/> accessed 15 April 2021.

¹³² *ibid* paras 'f', 'h' of part 2 of art 2.

¹³³ Naukovi osnovy formuvannia ta shliakhy realizatsii hirs'koi polityky v Ukraini. VS Kravtsiv, PV Zhuk, IA Kolodiichuk et al.; VS Kravtsiv (ed.). (Lviv: DU 'Instytut rehionalnykh doslidzhen imeni MI Dolishnoho NAN Ukrainy' 2018) 25.

¹³⁴ Rudenko (n. 14).

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With the purpose to take national and international measures and cooperation on the protection, rational use, prevention, control and reduction of transboundary water pollution, on 17 March 1992 in Helsinki (Finland) the Convention on the Protection and Use of Transboundary Watercourses and International Lakes¹³⁵ (Water Convention) was adopted, which O. McIntyre cited as an example of ‘a shift in emphasis from a purely territorial and resource-utilization focus, to a more ecosystem-oriented approach’, from the practice of States and international organizations in relation to shared water resources.¹³⁶

The Water Convention promotes a holistic approach, taking into account the complex interrelationships between the hydrological cycle, land, flora and fauna, based on the understanding that water is an integral part of the ecosystem, a natural resource and a social and economic good.¹³⁷ Pursuant to this Convention, in order to prevent, control and reduce any transboundary impact the Parties take appropriate measures to ensure conservation and, where necessary, restoration of ecosystems.¹³⁸ As well as they develop, adopt, implement and render compatible relevant legal, administrative, economic, financial and technical measures to ensure that sustainable water-resources management, including the application of the ecosystems approach, is promoted.¹³⁹ As O.M. Spektor writes, the interpretation of this norm should be carried out taking into account the Guidelines on the Ecosystem Approach in Water Management (1993), issued a year later, which consider a river basin as an integral ecosystem and emphasize that water resources should not be managed in isolation from other ecosystem components (land, air, living resources, etc.).¹⁴⁰

Indeed, the interpretation of the Water Convention under consideration should take into account these Guidelines,¹⁴¹ which are intended to assist in the developing and implementing national policies, action plans, programmes and practices for the practical application of the ecosystem approach to day-to-day water management. The proposed measures, as noted in the Guidelines, would ensure a holistic approach to environmentally sound management of inland water resources and riparian vegetation, wetlands, riverine floodplains and associated wildlife and habitats. This approach entails a new level of national and international

¹³⁵ Convention on the Protection and Use of Transboundary Watercourses and International Lakes (adopted 17 March 1992, entered into force 6 October 1996) 1936 UNTS 269 (Water Convention).

¹³⁶ McIntyre (n. 13) 2.

¹³⁷ Konvencija EJeK OON po ohrane i ispol'zovaniju transgranichnyh vodotokov i mezhdunarodnyh ozer 1992 goda (UN, New York, Geneva 2004) 6.

¹³⁸ Water Convention para ‘d’ of part 2 of art 2.

¹³⁹ *ibid* para ‘I’ of part 1 of art 3.

¹⁴⁰ OM Spektor, *Mizhnarodno-pravove rehuliuвання sfery pryrodoresursnykh vidnosyn*. Doctor’s thesis (Kyiv 2019) 95.

¹⁴¹ Guidelines on the ecosystem approach in water management (1993) <www.unece.org/index.php?id=12847> accessed 15 April 2021.

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awareness and responsibility in solving complex and interrelated problems of the environment.¹⁴²

8. THE ECOSYSTEM APPROACH AND THE CONCEPT OF SUSTAINABLE DEVELOPMENT

In the late 1980s and early 1990s, there was a significant increase in the process of developing the concept of sustainable development at the international level. At the initiative of the United Nations Secretary-General, the World Commission on Environment and Development was established in 1984, chaired by the Prime Minister of Norway G.H. Brundtland (Brundtland Commission). The main objectives of the Commission were: to propose long-term environmental strategies that would enable sustainable development by 2000 and beyond; to consider ways and means by which the world community could effectively address environmental problems. The Commission included about 200 of the world's best experts on environmental issues and development, representing five continents of the planet. The result of its two years of work was the Report 'Our Common Future' submitted to the United Nations General Assembly in 1987.¹⁴³

At the heart of the Report 'Our Common Future'¹⁴⁴ is the concept of sustainable development, that is, development that 'meets the needs of the present without compromising the ability of future generations to meet their own needs'. It is emphasized that 'the concept of sustainable development does imply limits - not absolute limits but limitations imposed by the present state of technology and social organization on environmental resources and by the ability of the biosphere to absorb the effects of human activities'.¹⁴⁵ It is further indicated that 'sustainable global development requires that those who are more affluent adopt lifestyles within the planet's ecological means', and that 'sustainable development can only be pursued if population size and growth are in harmony with the changing productive potential of the ecosystem'.¹⁴⁶

Analyzing the Report 'Our Common Future', V.I. Danilov-Danil'jan, K.S. Losev and I.E. Rejf emphasize that its authors, without using the word 'crisis', actually described the biosphere as a crisis, and the demographic situation on the planet was outlined in the same way. However, recognizing the need for certain restrictions in the exploitation of natural resources, they considered these restrictions not absolute but relative, i.e. due to the level of technological development and existing social relations. And both, in their

¹⁴² *ibid* introduction.

¹⁴³ MM Brinchuk, 'Konceptija ustojchivogo razvitiya: potrebnosti v sovershenstvovanii' (2015) 1(31) *Astrahanskij vestnik jekologicheskogo obrazovanija* 6.

¹⁴⁴ Report of the World Commission on Environment and Development: Our Common Future (1987) <<https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf>> accessed 15 April 2021.

¹⁴⁵ *ibid* para 27.

¹⁴⁶ *ibid* para 29.

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view, 'can be taken under control and improved, which will open the way to a new era of economic growth'. Scientists write that, not to mention the doubtfulness of such a postulate, the process of extinction of natural ecosystems was not properly assessed in the Report, and biota was actually equated to an economic resource, although it has 'ethical, aesthetic and cultural value'.¹⁴⁷ Of course, the above remark is justified, especially since by the time the Report was published, the dependence of human existence on the conservation and restoration of natural ecosystems had been repeatedly confirmed at the international level.

It is fair to say, and mentioned scientists also pay attention to it, that in July 1991 under the editorship of R. Goodland, H. Daly and S. El Serafy the book 'Environmentally Sustainable Economic Development: Building on Brundtland'¹⁴⁸ was published, where it is recognized that the economic subsystem of human is part of the global ecosystem and depends on it. In this book, it was noted that the global ecosystem is the source of all material inputs feeding the economic subsystem, and is the sink for all its waste. The global ecosystem's source and sink functions have limited capacity to support the economic subsystem. The imperative, therefore, is to maintain the size of the global economy to within the capacity of the ecosystem to sustain it. The global ecosystem, which is the source of all the resources needed for the economic subsystem, is finite and has limited regenerative and assimilative capacities. When the economic subsystem was small relative to the global ecosystem, then the sources and sinks were large, and limits were irrelevant. Leading thinkers have shown for years that the world is no longer 'empty', the economic subsystem is large relative to the biosphere, and the capacities of the biosphere's sources and sinks are being stressed.

The concept of sustainable development has undoubtedly influenced the further legal regulation of biodiversity conservation. Taking an opportunity, it should be said that in September 1989 the World Resources Institute, together with IUCN and UNEP, led an unprecedented three-year initiative to develop a program to prevent the destruction of biological diversity. An International Coordinating Group was created and partners from organizations around the world were involved. The result of this work was the publication in 1992 of the 'Global Biodiversity Strategy: Guidelines for Action to Save, Study, and Use Earth's Biotic Wealth Sustainably and Equitably',¹⁴⁹ which contains 85 Actions for the conservation of biodiversity at the national, international and local levels, and which was crucial to the

¹⁴⁷ Danilov-Danil'jan/Losev/Rejf (n. 21).

¹⁴⁸ RJA Goodland, HE Daly and S El Serafy, *Environmentally Sustainable Economic Development: Building on Brundtland* (World Bank, Sector Policy and Research Staff, Environment Department 1991) 85.

¹⁴⁹ *Global Biodiversity Strategy: Guidelines for Action to Save, Study and Use Earth's Biotic Wealth Sustainably and Equitably* (1992)
<http://pdf.wri.org/globalbiodiversitystrategy_bw.pdf> accessed 15 April 2021.

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further development and adoption of the CBD. A significant number of issues in the Strategy relate to the dependence of human life and well-being on the functioning of natural ecosystems and the need to reconcile human actions with the capabilities of nature. It is pointed out that all life on Earth is part of one great, interdependent system. It interacts with, and depends on, the non-living components of the planet: atmosphere, oceans, freshwaters, rocks, and soils. Humanity depends totally on this community of life – this biosphere – of which we are an integral part. Unless we protect the structure, functions, and diversity of the world's natural systems – on which our species and all others depend – development will undermine itself and fail.¹⁵⁰

Thus, both the Report of the Brundtland Commission and the 'Environmentally Sustainable Economic Development: Building on Brundtland' laid on the desk as working documents for the UNCED.¹⁵¹ In addition to the CBD, at the UNCED the Declaration on Environment and Development¹⁵² (Rio Declaration), which contains 27 principles, Agenda 21,¹⁵³ the Forest Principles¹⁵⁴ were adopted, while the United Nations Framework Convention on Climate Change¹⁵⁵ (UNFCCC) was opened for signature.

The Rio Declaration refers to the integrated and integrated nature of the Earth, our home, as well as states that the goal of the Conference is establishing a new and equitable global partnership through the creation of new levels of cooperation among States, key sectors of societies and people.¹⁵⁶ Such cooperation should be in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem.¹⁵⁷ Describing the importance of this Declaration in terms of ecosystem management, scientists argue that in it 'States recognized the ecosystem approach as the basis for ecosystem development'.^{158 159}

Agenda 21 begins with the words that humanity stands at a defining moment in history, confronting with different problems including the continuing deterioration of the ecosystems on which we depend for our well-being. However, integration of environment and development concerns and

¹⁵⁰ *ibid* foreword.

¹⁵¹ Danilov-Danil'jan/Losev/Rejf (n. 21).

¹⁵² Rio Declaration on Environment and Development (1992) UN Doc. A/CONF.151/26 (Vol. I) 31 ILM 874 (Rio Declaration).

¹⁵³ Agenda 21 (1992) UN Doc. A/CONF.151/26 (Vol. I-III).

¹⁵⁴ Non-Legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of All Types of Forests (1992) UN Doc. A/CONF.151/26 (Vol. III).

¹⁵⁵ United Nations Framework Convention on Climate Change (adopted 9 May 1992, entered into force 21 March 1994) 1771 UNTS 107 (UNFCCC).

¹⁵⁶ Rio Declaration (n. 152) preamble.

¹⁵⁷ *ibid* principle 7.

¹⁵⁸ 'Teorija i praktika morskoj dejatel'nosti' (n. 63) 184.

¹⁵⁹ Bekjashev (n. 38) 183.

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greater attention to them will lead to the fulfillment of basic needs, improved living standards for all, better protected and managed ecosystems and a safer, more prosperous future.¹⁶⁰ Agenda 21 consists of 4 interlinked sections, while section II contains chapters (9–22) on the conservation of natural ecosystems. For example, chapter 10 ‘Integrated approach to the planning and management of land resources’ notes the imperfection of the resource approach to understanding land. It is stated that land is normally defined as a physical entity in terms of its topography and spatial nature; a broader integrative view also includes natural resources: the soils, minerals, water and biota that the land comprises. These components are organized in ecosystems which provide a variety of services essential to the maintenance of the integrity of life-support systems and the productive capacity of the environment. If, in the future, human requirements are to be met in sustainable manner, it is now essential to resolve these conflicts and move towards more effective and efficient use of land and its natural resources. Integrated physical and land-use planning and management is an eminently practical way to achieve this.

The ecosystem approach was also endorsed by chapter 18 ‘Protection of the quality and supply of freshwater resources: application of integrated approaches to the development, management and use of water resources’ of section II, according to which the general objective is to make certain that adequate supplies of water of good quality are maintained for the entire population of this planet, while preserving the hydrological, biological and chemical functions of ecosystems, adapting human activities within the capacity limits of nature.

The Forest Principles recognize the vital role of all types of forests in maintaining the ecological processes and balance through, *inter alia*, their role in protecting fragile ecosystems.¹⁶¹ That is why national policy formulation with respect to all types of forests should take account of the pressures and demands imposed on forest ecosystems,¹⁶² and pollutants, particularly air-borne pollutants, including those responsible for acidic deposition, that are harmful to the health of forest ecosystems at the local, national, regional and global levels should be controlled.¹⁶³

Since climate change is a major factor in impacting natural ecosystems, the need to protect them is stipulated in the UNFCCC.¹⁶⁴ It states that human activities have been substantially increasing the atmospheric concentrations of greenhouse gases, that these increases enhance the natural greenhouse effect, and that this will result on average in an additional warming of the Earth’s surface and atmosphere and may adversely affect natural ecosystems

¹⁶⁰ Agenda 21 (n. 153) preamble.

¹⁶¹ Forest Principles (n. 154) principle 4.

¹⁶² *ibid* principle 9.

¹⁶³ *ibid* principle 15.

¹⁶⁴ MM Brinchuk, ‘Estestvennye jekologicheskie sistemy i jekologicheskoe pravo. Chast’ 1’ (2012) 2(20) Astrahanskij vestnik jekologicheskogo obrazovanija 10.

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and humankind.¹⁶⁵ The ultimate objective of this Convention is to achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system, and which should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change.¹⁶⁶

In general, the UNCED was important not only for the establishment of the concept of sustainable development, but also for the formation of the ecosystem approach, because it was at the UNCED that the CBD was adopted, which 'is the first and only international treaty to take a holistic, ecosystem-based approach to biodiversity conservation and sustainable use'.¹⁶⁷

9. CONCLUDING REMARKS

The ecosystem approach, which is a strategy for the integrated management of land, water and living resources that promotes equitable conservation and sustainable use, is most consistently developed today under the CBD, but numerous references to it can be found in international environmental agreements adopted much earlier.

On the grounds of thorough research of such agreements and scientists' views it becomes apparent that before the adoption of the CBD the issues of protection and conservation of natural ecosystems and implementation of the ecosystem approach had already received wide support at the international level. Despite the fact that some of the analyzed agreements were declarative (Stockholm Declaration 1972, WCN 1982, Rio Declaration 1992, etc.) or did not come into force (ASEAN Convention 1985), were focused on the conservation of only individual ecosystems and their components or ecosystems in a particular regions (Convention on the Conservation of Antarctic Seals 1972, CITES 1973, Agreement on the Conservation of Polar Bears 1973, Bonn Convention 1979, Alpine Convention 1991, etc.), were completely built on an ecosystem strategy (Canberra Convention 1980) or related to this area only indirectly (UNCLOS 1982, Helsinki Convention 1992, Bucharest Convention 1992, etc.), they created the necessary base for the further formation and development of the ecosystem approach as a holistic concept in international environmental law under the CBD.

¹⁶⁵ UNFCCC (n. 155) preamble.

¹⁶⁶ *ibid* art 2.

¹⁶⁷ Secretariat of the Convention on Biological Diversity (2004) *The Ecosystem Approach (CBD Guidelines)*. Montreal: Secretariat of the Convention on Biological Diversity 2.

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ASSESSMENT OF ENVIRONMENTAL DAMAGE AND POLICY ACTIONS BY USING CONTINGENT VALUATION METHOD: AN EMPIRICAL ANALYSIS OF SAGO INDUSTRIAL POLLUTION IN TAMIL NADU, INDIA

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ABSTRACT

The objective of the study focusses on water quality, health impact, loss of agriculture production and livestock population. Primary data was collected from 413 households in the study villages of Kaveripuram, Ammampalayam, Kattukkottai and Mallur by adopting the stratified random sampling technique. The information was also gathered on the sago industrial pollution to estimate the households' willingness to pay for improved water quality, and the human health impacts, loss of agriculture production, livestock populations and loss of environmental resources in the study area. The outcome of this study will be helpful to determining the sustainable environmental upgradation and policy reform.

Keywords: Water quality; Health impact; Agriculture production; Sago industry; Willingness to pay; Environmental pollution; Policy

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Assessment of Environmental Damage and Policy Actions by Using Contingent Valuation Method: An Empirical Analysis of Sago Industrial Pollution in Tamil Nadu, India

1. INTRODUCTION

The environmental problems will occur when the market system fails to establish an effective price mechanism in relation to environmental resources, according to economists. These services are free to use and are referred to as public or common goods, despite the fact that their use incurs external costs such as waste, dust, air pollution, noise, water pollution, and other negative environmental consequences.¹ The environment belongs to everyone, but no one owns it, and a common property cannot be valued for its use, so there is competitive overuse. As a result of the market's inability to identify and enforce property rights, environmental destruction has resulted in large part.² The costs of making any product or service are made up of a combination of expensive inputs like labour, capital, and technology, as well as mispriced inputs like natural resources. As a result, retail prices for products and services do not represent the true value of the overall capital used to manufacture them.³ Here as consequence, from the perspective of an environmental economic approach, there is a difference between private and social costs of goods and services. As a result, the private costs of environmental products are usually covered by the retail price of goods and services, but not the external costs.

Because of that, producers and consumers are more likely to use them excessively in comparison to higher-priced alternatives. In addition, underpricing creates inadequate incentives for the development of new technology to combat emissions.⁴ Manufacturers aim to maximize profit in the Growth Economic Model, and consumers are able to fulfil their desires at the lowest possible cost to themselves. Market prices of products and factors do not represent their costs to society due to firms' private cost-cutting behaviour, resulting into economic inefficiency and decreased social welfare if markets are absent. Excessive pollution and environmental degradation are the end results of this process. Better environmental quality can be considered an economic good, whereas environmental degradation caused by other economic activities can be considered a cost item.

¹ Neli Bruce, and Gregory M Ellis, 'Environmental Taxes and Policies for Developing Countries' (Working Paper, Public Economics Division, Policy Research Department, World Bank 1993) <http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/1993/09/01/000009265_3961005091708/Rendered/PDF/multi_page.pdf> accessed 13 May 2021.

² Harun Tanrivermis, 'Willingness to Pay (WTP) and Willingness to Accept (WTA) Measures in Turkey: May WTP and WTA be Indicators to Share the Environmental Damage Burdens: A Case Study' (1998) 19 *Journal of Economic Cooperation Among Islamic Countries* <<https://www.sesric.org/files/article/79.pdf>> accessed 13 May 2021.

³ David Pearce, Anil Markandya and Edward B Barbier, *Blueprint for a Green Economy* (Earthscan 1989).

⁴ Glen P Jenkins and Ranjit Lamech, *Green Taxes and Incentive Policies: An International Perspective* (Institute for Contemporary Studies Press 1994). <https://cri-world.com/publications/qed_dp_114.pdf> accessed 13 May 2021.

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Environmental quality may be lowered as a result of the manufacture and/or use of other commercial products. This has a negative impact on each economic agent's output and/or cost functions. To boost or preserve environmental quality, a range of steps and procedures may be used. These include legal legislation governing goods, procedures, pollutants, and wastes, as well as economic instruments such as taxes, fines, state assistance, tradable pollution permits, and other agreements with polluters. The most appropriate instrument (or instruments) to use in any given situation will be determined by the legal and administrative structure as well as the existence of the pollution problems. For a long time, economists have been arguing that emissions should be taxed. These taxes are intended to eliminate market failures or missing markets. On the other hand, its were unable to find enough political support for this idea.

Traditional command and control instruments, tradable emission permits, and various inspections for pollutant criteria are preferred by decision-makers and public authorities over charges and taxes. Furthermore, a few experimental studies have shown that command and control policy instruments are more costly than market based incentives and unsuccessful in designing environmental policies.⁵ The economic consequences of pollution control and prevention, especially end-of-pipe approaches, result in higher costs due to internalization of the cost of environmental harm, as well as lower productivity and investment in productive assets.⁶ In recent years, there has been a renewed interest in taxation in both developed and developing countries. The main goal of environmental charges or taxes is to internalize the external costs that manufacturers and or customers incur as a result of their output and/or consumption activities.

Some taxation systems, such as emission, product, wastewater, solid waste, and noise charges, as well as tax differentiation and others, are used by governments in the EU and OECD countries. In India, The Environment (Protection) Act, 1986 enforces the "polluter pays principle" and solid waste and wastewater charges have been applied since 1986 at the local level.⁷

Environmental policy prescriptions and environmental, economic assessments are based on the empirical indicators that the Willingness to Pay (WTP) and Willingness to Accept (WTA) of each economic instrument will

⁵ Wallace E Oates, 'Taxing Pollution: An Idea Whose Time Has Come?' *The RFF reader in environmental and resource management* (Resources for the Future 2006). <https://books.google.de/books?id=u2PqUIHZC_IC&pg=PA63&lpg=PA63&dq=Taxing+Pollution:+An+Idea+Whose+Time+Has+Come?&source=bl&ots=6WgU6XASL6&sig=ACfU3U2o_3IsoSwVc1mdw96RddoY56Zmeg&hl=en&sa=X&ved=2ahUKEwj8pIjaqMfwAhWT_rsIHeWfAeEQ6AEwAnoECAQQAaw#v=onepage&q=Taxing%20Pollution%3A%20An%20Idea%20Whose%20Time%20Has%20Come%3F&f=false> accessed 14 May 2021.

⁶ Mostafa K Tolba and others, *The World Environment 1972-1992, Two Decades of Challenges* (Chapman and Hall 1993) <<http://ciesin.columbia.edu/docs/001-009/001-009.html>> accessed 13 May 2021.

⁷ The Environment (Protection) Act, 1986 Chapter III.

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yield equivalent measures of sacrifice.⁸ So, economic instruments of environmental conservation policies may be commenced with the use of individual WTP and WTA measures.

The primary objective of this study is to estimate the individual consumer's Willingness to Pay (WTP) for improving environmental quality and to compare these estimates with the actual amount payment of environmental charges. Furthermore, using the Contingent Valuation Method (CVM) and analysing data obtained via the household questionnaire, the behaviour of economic agents relating to the relationship between charges, payment, and Willingness to Pay (WTP) and Willingness to Accept (WTA) measures have been observed. This study can be used to prepare pollution charges or taxes in order to achieve long-term environmental improvements in the Salem district, as well as developing countries in general.

2. METHODOLOGY AND SAMPLING DESIGN

In order to determine the taxation attitudes of individual consumers, the Salem district was selected as the study area. According to the Salem Starch and Sago Manufacturers Service Industrial Co-operative Society Ltd. (popularly called as SAGOSERVE), the district was chosen due to the large number of sago processing industries in Tamil Nadu.

In terms of human settlement and lifestyle, the district is a model for other districts considering economic and social development indicators. The villages of Salem district were stratified into two strata: control village and experimental villages. Salem is divided into 4 revenue administrative divisions by the local government. Out of four divisions, three revenue divisions were selected. Kaveripuram is a controlled village located in Mattur Revenue Division, and Mallur, Kattukottai and Ammampalayam villages are experimental villages falling in Salem Revenue Division and Attur Revenue Division.

The sampling unit is a household, living in the village. To determine the sample size, a number of households was arrived at from 8304 total households in the study area. Using stratified sampling technique, is a 5 per cent of the total households were selected. Thus, 413 households became the sample size. Of these 413 households, interviewed household were determined using random sampling method.

Between January and October of 2013, data was collected from individual households using a household questionnaire. Individuals aged 34 or older who belonged to selected households completed the household questionnaire. The pilot study used a total of 100 pre-test questionnaires to

⁸ Jack L Knetsch, 'Environmental Policy Implications of Disparities Between Willingness to Pay and Compensation Demanded Measures of Values' (1990) 18 *Journal of Environmental Economics and Management* <[https://doi.org/10.1016/0095-0696\(90\)90003-H](https://doi.org/10.1016/0095-0696(90)90003-H)> accessed 14 May 2021.

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better understand the different socioeconomic conditions and their impacts. The questions in the household survey were divided into two categories: open-ended and close-ended. The survey included questions about a household's monthly income and expenditure, water purifier, refrigerator, type of house, the use of cooking and drinking water nearby sago industry, and so on.

1.1 Contingent Valuation Method: Empirical Specification

Contingent Valuation (CV) was first used by Davis (1963) to estimate the value of big game hunting in Maine. Contingent valuation has become an important analytical method in economic welfare analysis by providing a mean to estimate values when markets do not exist and revealed preference methods are not applicable. Stated preference methodologies aim to provide an economic assessment of environmental impacts using data on hypothetical choices made by individuals responding to a survey and stating their preferences. These methodologies have been used to estimate direct use, indirect use and non-use values. The contingent valuation method (CVM) is a stated preference method that is implemented by means of surveys and aims to assess how individuals would hypothetically react to changes in environmental quality. In particular, it finds out how much respondents would be willing to pay for improved environmental quality or to avoid a hypothetical reduction in environmental quality.⁹

The contingent valuation method (CVM), one of the direct valuation methods, is a survey method used to elicit willingness to pay (WTP) and/or willingness to accept (WTA) values of the individuals by way of creating 'realistic' hypothetical markets. For instance, the individuals/households in the polluted areas were asked to either state their maximum WTP value for avoiding pollution in the future or to state their minimum level of compensation for the loss experienced from pollution damage. Though this method is simple and used widely in the area of water quality, this method needed to be administered very carefully, a failure of which would have led to the generation of invalid and unreliable results. In circumstances such as this, the cross-section data for production from both pollution in affected and the non-affected areas (i.e., with and without) were collected.

Using regression analysis to assess the impact of pollution, along with the influence for other factors, the outputs were estimated. The net change caused by pollution alone on outputs was monetized with the help of the market price, and this amount was treated as damage cost.¹⁰ The main goal

⁹ Craig Meisner, Hua Wang and Benoit Laplante, *Welfare Measurement Bias in Household and on-Site Surveying of Water-Based Recreation: An Application to Lake Sevan, Armenia* (The World Bank 2006).
<<https://openknowledge.worldbank.org/bitstream/handle/10986/8458/wps3932.pdf?sequence=1&isAllowed=y>> accessed 14 May 2021.

¹⁰ L Venkatachalam, 'Damage Assessment and Compensation to Farmers: Lessons from Verdict of Loss of Ecology Authority in Tamil Nadu' (2005) 40 *Economic and Political Weekly* <<https://www.jstor.org/stable/4416473>> accessed 14 May 2021.

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of this analysis is to estimate the willingness to pay (WTP) by incorporating socioeconomic variables into the contingent valuation (CV) model, which assists the researcher in gaining information on the validity and reliability of the CV results and increasing confidence in the implications of this results obtained from the CV empirical analysis suggested.¹¹ Willingness to pay may not necessarily mean the actual price, which an individual (or a society with some special characteristics) will be willing to pay at the current rate of its purchase. It all depends upon the shape of the demand curve (or the preferences). Contingent valuation is well suited for the estimation of a change in the status of the environment. The theoretical basis indicates that an individual seeks to maximize a utility function, or equivalently minimize an expenditure function subject to a utility constraint, which includes a vector of services depending on the environmental status.¹² According to the model specifications suggested from Israel and Levinson (2004)¹³, Benno Torgler et al. (2007)¹⁴, Han et al. (2011)¹⁵, Andrea Kollmann et al. (2012)¹⁶, Salvator Ercolano et al. (2014)¹⁷, Jones et al. (2015)¹⁸ and Cicatiello et al. (2020)¹⁹, the current investigation stresses on how the community is approaching the issues of environmental quality and how is their attitude towards the willingness to pay for tackling the existing constraints.

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- ¹¹ L Venkatachalam, 'The Contingent Valuation Method: a Review' (2004) 24 *Environmental Impact Assessment Review* <[https://doi.org/10.1016/S0195-9255\(03\)00138-0](https://doi.org/10.1016/S0195-9255(03)00138-0)> accessed 14 May 2021.
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3. WILLINGNESS TO PAY BID FUNCTION ANALYSIS

Analysis of bid function underlying the WTP responses was undertaken; and with a range of explanatory variables being investigated linear functional form was tested. The former seemed to perform better in terms of the statistical significance of regression coefficients. Hence, the linear functional form was reported here since this provides ease in the interpretation. Bid function can be written as follows:

$$Y = a + \beta_1 S_{class} + \beta_2 F_{size} + \beta_3 EDU_{head} + \beta_4 TY_{emp} + \beta_5 DIS_{w.collection} + \beta_6 AL_{drinking\ water} + \beta_7 WTP_{HR} + \beta_8 WTP_{agri.loss} + \beta_9 WTP_{livestock\ damage} + \mu$$

$$Y = -594.162 + 2.704 S_{class} + 4.721 F_{size} + 6.199 EDU_{head} + 4.542 TY_{emp} + 8.093 DIS_{w.collection} + 2.343 AL_{drinking\ water} + 142.697 WTP_{HR} + 261.638 WTP_{agri.loss} + 87.596 WTP_{livestock\ damage} + \mu$$

Where,

Y = Dependent Variable

Y is the willingness to pay for the abatement of environmental pollution.

α is Constant.

β_1 - β_9 is coefficients to be estimated.

μ is an error term.

The equation represents the determinants of willing to pay as a function of avoiding environmental risk factors:

S_{class}	=	Social Classification
F_{size}	=	Family Size
EDU_{head}	=	Education of the Family Head
TY_{emp}	=	Type of Employment
$DIS_{w.collection}$	=	Distance for Water Collection
$AL_{drinking\ water}$	=	Alternate Drinking Water
WTP_{HR}	=	Willingness to Pay for Health Risk
$WTP_{agri.loss}$	=	Willingness to Pay for Agricultural Loss
$WTP_{livestock\ damage}$	=	Willingness to Pay for Livestock Damage

4. RESULTS AND DISCUSSIONS

An appropriate environmental tax system may be proposed according to the socioeconomic characteristics of households and firms by using the direct valuation instruments such as willingness to pay related to consumer and producer preferences about the environmental taxes or charges. To determine the suitable approach to share the environmental damages, costs between economic agents in this case, the amount of money that an individual is willing to pay for improving the environmental quality is obtained by the following question: How much would consumers and producers be willing to pay (WTP) as environmental taxes or charges for improving mankind's environmental quality? Or, what would they be willing to accept (WTA) to compensate for the environmental damage in the

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case of sago effluents? The data provided by individual consumers are analysed and the relationship between individuals' fulfilment with currently applied environmental tax payment in selected cases and their willingness to pay is learned. A general WTP and/or WTA function for individual consumers is defined as the following: WTP_i or $WTA_i = f(Q_i, Y_i, T_i, S_i)$, where Q_i is quality or quantity of the attribute, Y_i is the income level, T_i is the index of tastes and S_i is a vector of relevant socioeconomic factors explained by Whitehead (1994).²⁰

In this study, WTP functions of households and firms are estimated. There is no theoretical correct form of these functions (Pearce et al., 1989²¹; Bateman and Turner, 1993²²; Pearce and Turner, 1994²³; Kula, 1994²⁴). In these cases, economic theory does not clearly define a certain mathematical form of economic relationship. One of the main points of criticism raised in this debate refers to the choice of the correct elicitation format. In these circumstances, there are two possibilities: one can ask for people's willingness to pay (WTP) for an improvement of environmental quality, or one can ask for their willingness to accept (WTP) compensation for renouncing this improvement. Critics of the CVM hold that both measures should lead to nearly the same amount of money which can be interpreted as the value. The fact that most practical CVM surveys exhibit a rather substantial divergence between WTP, and WTA is taken as evidence that the CVM is a "flawed measuring instrument", as followed:

²⁰ Alfred N Whitehead, 'Valuation Methods for Environmental Costs and Benefits' in E. Kula (ed), *Economics of natural resources, the environment and policies* (Chapman & Hall 1994).

²¹ David Pearce, Anil Markandya and Edward B Barbier, *Blueprint for a Green Economy* (Earthscan 1989).

²² Ian J Bateman, and Kerry Turner, 'Valuation of Environment, Methods and Techniques: The Contingent Valuation Method' in R Kerry Turner (ed), *Sustainable environmental economics and management: principles and practice* (Belhaven Press 1993).

²³ Kerry Turner, David Pearce and Ian J Bateman, *Environmental Economics an Elementary Introduction* (The Johns Hopkins University Press 1994).

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Table 1
Household Survey

Name of the village		Environmental Pollution		
		No	Yes	Total
Control Village	Kaveripuram	20 (4.8)	62 (15.0)	82 (19.9)
Experimental Villages	Ammampalayam	0 (0.0)	86 (20.8)	86 (20.8)
	Kattukkottai	0 (0.0)	123 (29.8)	123 (29.8)
	Mallur	0 (0.0)	122 (29.5)	122 (29.5)
Total		20 (4.8)	393 (95.2)	413 (100.0)

Note: Figures in parentheses denote the percentage of the column total.

For analysing the willingness to pay of households in both control and experimental villages, a percentage analysis has been worked out. In the experimental villages, 393 (95.2 per cent) of the surveyed households were ready to pay the compensation for the loss in terms of environmental amenities. 20 (4.8 per cent) households were not at all ready to pay the compensation from control villages due to a better environment.

Table 2
Difference in WTP for Abatement of Environmental Pollution between Polluted and Controlled Villages

WTP for Abatement of Environmental Pollution	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Equal variances not assumed	11.598	0.001	-10.965	191.611	0.000	-157.880	14.399

An independent sample "t" test was used to interpret the difference in the level of willingness to pay between the control and experimental villages. A "t" test assuming homogeneity of equal variances was calculated. The results of the test indicated that there is a significant difference in the level of willingness to pay to avoid the environmental pollution in control and experimental villages between two groups $t(191.611) = -10.965$ $p = 0.001$. The

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results suggest that willingness to pay for improving the environment in the control village is lower than the experimental villages. The sig. (2-tailed) value in our example is 0.000. This value is less than 0.05. Hence, we can conclude that there is a statistically significant difference between the willingness to pay between control villages and experimental villages. Since our group statistics box revealed that the mean for the control villages is INR 100.55, it was lower than the mean for the experimental villages i.e., INR 258.43. It is possible to conclude that willingness to pay for the abatement of environmental pollution is high in experimental villages because they are physically and mentally disturbed by sago effluents.

4.1 Determinants of Willingness to Pay

The economic and social costs of environmental damage are usually divided into three broad categories: health cost, productivity cost and the loss of environmental quality. The economic value of these costs can be estimated by using valuation methods. Environmental economics is concerned with the impact of the economy on the environment, the significance of the environment to the economy, and appropriate way of regulating economic activity. Currently, this field is given an attention in most of the countries. For valuing the improvement in environment, different methods are available.

In this study, “stated preferences” contingent valuation method (CVM) is used. Much research was found on CVM in different countries, but only a few studies have been carried out in India applying the CVM.

Table 3
 Regression Result for Willingness to Pay

Sl.No.	Independent Variables	Regression Coefficients	Std. Error	t	Sig.
1	<i>a</i> (Constant)	-594.162	52.948	-11.222	0.000***
2	<i>S_{class}</i>	2.704	3.875	.698	0.486
3	<i>F_{size}</i>	4.721	5.584	.845	0.398
4	<i>EDU_{head}</i>	6.199	3.044	2.037	0.042**
5	<i>TY_{emp}</i>	4.542	6.524	0.696	0.487
6	<i>DIS_{w.collection}</i>	8.093	8.471	0.955	0.340
7	<i>AL_{drinking water}</i>	2.343	11.561	0.203	0.839
8	<i>WTP_{HR}</i>	142.697	16.172	8.824	0.000***
9	<i>WTP_{agri.loss}</i>	261.638	13.430	19.482	0.000***
10	<i>WTP_{livestock damage}</i>	87.596	14.748	5.939	0.000***
N = 413, R ² = 0.664, F = 79.359					

Note: **5 level significant, ***1% level significant.

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The estimated coefficients for the model specification found to have the 'best' fit of the self-explanatory variables with the most statistically significant outcomes. As table dependent variables: WTP, number of observations = 413, $F = 79.359$. The dependent variable used is WTP (per month per family) for the quality of drinking water. All samples were included in the WTP amounts. While the overall model is found to be statistically significant ($F = 79.359$), its explanatory power is low i.e., 66 per cent of the variation in WTP, being explained by the explanatory variables.

The overall model's R^2 value of 0.664 indicates a 66.4 per cent level of variation in the explanatory variables. The coefficient of S_{class} is 2.704, which means that various social groups are more willing to pay for the good environment as compared to both control and experimental areas. The present populations are more educated and knowledgeable about the effects of sago industrial pollution. Compared to educated, uneducated peoples are experiencing more vulnerable effects of sago industrial pollution, and since the water resources are polluted, the people are willing to pay for good quality drinking water. The control village respondents are not ready to compromise their health and environment and they are valuing these resources over the money.

The coefficient of $DIS_{w.collection}$ variable is a + 8.093 at 5 per cent level of significance. This means that distance to the drinking water collection have an increasing ratio of cost. In this situation, people are more willing to pay on the basis of distance of drinking water being collected. The result shows that people are bothered for the distance for quality drinking water. So, it means that if good quality of drinking water is available at far distance from the residence, people are willing to pay.

In general, the operations of the sago industries and its untreated discharged effluents get clogged beneath the land surface and ultimately mixed with the ground water sources. In this way, the quality of the groundwater becomes questionable, and this particular hidden dimension of damage is expressed through the inferences of the study. That is the reason the people are going to collect portable drinking water from faraway places. These are the circumstances that specifically indicate that the operations of the mentioned industries are deteriorating the nearby water sources; therefore, the community has to be dependent on quality water sources from distant means of water for drinking as well as for other purposes.

$AL_{drinking.water}$ variable is + 2.343 with the 10 per cent level of significance. This means that alternative drinking water collections have an increasing cost. The distance has included price, time and income. In these circumstances peoples are unable to pay for that, but many of the households are willing to pay for quality drinking water.

WTP_{HR} , $WTP_{agri.loss}$, $WTP_{livestockdamage}$ variables are +142.697, +261.638, and +87.596 with 1 per cent level of significance. This means that health loss, agricultural loss and livestock damages are very close to our day-to-day life, because these three impacts are more expensive. It is explained that these

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peoples depend on agriculture, agro-industry labourers. Holding livestock is determines social status and economic well-being of the households. The regression results show that if a person or household's income increases by INR 1000, they are willing to pay INR 142 for health risk, INR 261 for agriculture loss, and INR 87 for livestock damage, respectively.

5. CONCLUSION AND POLICY RECOMMENDATIONS

Most economic studies, including environmental assessments and policy prescriptions, are focused on the empirical assumption that willingness to pay and willingness to accept compensation would yield equal measures of sacrifice. Price and benefit signals are used in a market economy to direct capital to high-valued uses. Firms seeking to increase profit and customers seeking material well-being are both allowed to pursue their goals at the lowest possible expense. When commodities and variables are priced to represent their costs to society, such private cost-cutting activity is a social virtue; however, when markets are absent and externalities exist, it results in economic inefficiency and decreased social welfare. It causes unnecessary emissions and environmental destruction.

Environmental quality can be thought of as an economic good, and environmental destruction caused by other economic activities can be thought of as an expense or input into those activities. Environmental content, unlike most consumer products, is bestowed rather than manufactured. However, the production and/or consumption of other commercial goods can degrade environmental quality, so it, like other goods, is in variable supply. For example, manufacturing processes that dump waste products into the atmosphere deplete the supply of clean water and air, which are priced for their own sake. People who want to breath and drink clean and healthy air and water are driving the demand for environmental quality. The desire to pay more for a good decreases as the amount available increases, and increases as the capacity to pay for it (household income) increases. Environmental quality is supplied by polluting activity producers and customers, who have more of it when they minimize the level of polluting activities or buy equipment that decreases the amount of pollution induced at given level of output. The extra costs of pollution abatement equipment or the net value of foregone production (that is, the value of output less the value of the capital released) are the costs of providing better environmental quality. Normally, we will expect the marginal cost of 'supplying' an additional unit of environmental quality to increase as the quantity supplied increases (i.e., as the amount of pollution abatement increases). The 'optimal' level of pollution is achieved when the marginal ability to pay for improved environmental quality is exactly equal to the marginal cost of providing it.

Because of a market 'failure' or a 'missing' market, environmental degradation becomes an economic policy problem. Demanders and

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suppliers have no means of expressing their relative willingness to pay for, or marginal willingness to accept, a decrease in quantity of environmental quality. Firms and consumers who degrade environmental quality by their practices, on the other hand, pay no charge. Polluters consider the degradation of environmental quality to be almost free to them, thus ignoring the costs they place on other. Particularly, sago factories have discharged wastewater near public lands such as streams and ponds. As a result, the Tamil Nadu government imposed a tax and banned some highly polluting industries, as well as providing waste management techniques. In order for companies to install or follow government regulations, they must incur significant costs. Since sago industries do not want to spend so much money in these conditions, the wastewater is eventually drained into their soil. At the same time, the wastes dumped in this manner can mix with the groundwater below the surface, polluting the natural groundwater. Same time, both the government and the public are unable to interfere and exert influence. Such activities result in further abuses of land rights between polluters and consumers. As a result, they escape other costs such as the installation of a Common Effluent Treatment Plant (CEPT).

When an input is free, a cost-cutting manufacturer needs to use as much of it as possible, resulting in unnecessary environmental degradation. However, environmental pollution does not come without a cost to the economy as a whole. Rather, high social costs are levied on the economy in the form of less leisure opportunities, health risks, decreased worker productivity, general unhappiness, and so on. Why isn't there a demand for environmental quality as there is for other goods? The lack of private property rights and the fact that environmental quality is a public (i.e., non-rival) good. It is important to have legal right to regulate the use of something in order for it to be valued by the consumer. Everyone owns the world, but no one owns it. There is economic overuse since a 'common property' cannot be valued for its use.

5.1 Coase and Pigouvian Ideology for Policy Recommendations

Coase (1960)²⁵ pointed out that overuse is not a foregone conclusion. In theory, those who want better environmental quality should be willing to find a way to 'bribe' polluters to reduce emissions to an acceptable level. Since environmental quality is a non-rival or public good, this does not occur. Everyone benefits from clean air bought for himself, but the seller cannot bill for the benefits he offers to others. Furthermore, even if charging a premium were feasible, it would not be ideal since the marginal cost of an additional buyer of environmental

²⁵ Ronald Coase, 'The Problem of Social Cost' (2013) 56 *The Journal of Law and Economics* <<https://www.jstor.org/stable/10.1086/674872>> accessed 13 May 2021.

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quality is zero. As a result, no one has a strong financial incentive to pay polluters to curb emissions. Finally, he suggests that in order to stop free riding, everyone must cooperate. Pollution levels are unsustainable because polluters do not bear the full social cost of their acts, as previously stated. Almost seventy years ago, A.C. Pigou²⁶ suggested that the government impose taxes on activities with external social costs and provide subsidies for activities with external social benefits. The term “external” refers to costs and benefits that are not factored into the market prices that private economic decision-makers face.

Consider the external expense of buying a gallon of fuel. The buyer pays the entire marginal cost of output in the sales price if the gasoline market is well-functioning in other ways. However, when a customer burns fuel in a car engine, another social expense is borne that the consumer is not responsible for. The combustion of gasoline contributes to the degree of air pollution in the region, albeit in a minor way. Wince air pollution is a ‘public’ bad that affects many people in the city, a small increase in air pollution in a region with a large population can have a finite marginal cost. When determining whether or not to buy an additional gallon of fuel, the user of gasoline lacks this aspect of the marginal social cost. The practice claims to be cheaper than it is because the user does not pay the full social expense of burning fuel. The Pigouvian tax concept is to levy a tax on gasoline equal to that portion of the marginal social cost that is not accounted for in the production price – the external marginal cost. The tax-inclusive price that the buyer pays is then proportional to the product’s marginal social cost. The marginal social cost of a gallon of fuel, for example, is US \$1.10 if the manufacturing cost of gasoline is a dollar per gallon and its combustion raises the social cost of emissions by 10 cents. In the absence of government policy, the consumer pays just a dollar per gallon, but with a 10 cent Pigovian levy, the consumer perceives the socially correct price of US \$1.10.

5.2 Role of Government Actions

The above suggestions provide a basis for government action. One option is to make people who benefit from improved environmental quality pay for it. In this situation, a tax is imposed on everybody in the economy, with the proceeds going to polluters to help them reduce the amount of pollution they produce. This is a ‘consumers pay’ policy. Another option is suggested by Coase’s proposal. It makes no difference to Coase whether property rights are granted to polluters or to users of environmental quality. In the above case, consumers have the right to seek compensation from potential polluters. When environmental quality is very good, the amount polluters are willing to pay to degrade

²⁶ Arthur C Pigou, ‘Some Aspects of Welfare Economics’ (1951) 41 *The American Economic Review*.

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the environment by a certain amount is greater than the amount people need to earn (their marginal willingness to accept) to tolerate any degradation. As a result, polluters are willing to pay for environmental destruction, and households are willing to tolerate any amount of it. This is the 'polluters pay' principle.

This result can be reached if the government imposes a pollution tax on polluters. Alternatively, it may impose limits on the quantity of emissions that firms would emit. Both of these measures are based on the principle of 'polluters pay'. Either a 'consumers pay' or a 'consumers pay' policies will achieve the most economically effective level of emissions through lump-sum taxation (environmental quality). But in terms of distributional effect, administrative comfort, and revenue implications for the public sector, the two types of policies differ.

As a result of the partially treated and untreated sago effluent discharges, the operations of the listed industries in and around the study area have been dramatically affected in ground water, human health, loss of agricultural production, and livestock population. Depending on the extent of pollution, the government will collect the money from the polluters and distribute it to the victims. This is an example of a recommendation that can be derived from the study's findings and would undoubtedly benefit the social welfare. Instead of imposing mandatory requirements, the government might consider taxing polluters to pay for both a lump-sum payment to victims and the restoration of the environment of affected villages. Furthermore, the study discovered that sago contamination causes increased health risks, agricultural production losses, livestock health disorders, and increased defensive expenditures for their socioeconomic consequences of land cultivation, mandays loss, and migration to other occupations, as well as increased defensive expenditures by the affected areas. There is a need to concentrate on sago effluent discharge and treatment benchmarks in order to monitor health risks and improve green resources in order to ensure long-term environmental sustainability.

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Authors' Declarations and Essential Ethical Compliances

Authors' Contributions (in accordance with ICMJE criteria for authorship)

Contribution	Author 1	Author 2
Conceived and designed the research or analysis	Yes	Yes
Collected the data	Yes	Yes
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THE LEGAL REGULATION OF CLIMATE CHANGE IN UKRAINE: ISSUES AND PROSPECTS

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ABSTRACT

When the climate change is one of the most urgent, complex and challenging global problems of the present, threatening global economy and international security, it has to be primarily regulated domestically, at the level of a State. The present article aims to examine the current state of legal regulation of the climate change issues in Ukraine. Accordingly, the critical analyses of the national legislation on climate change regulation and whether it corresponds with the State policy's strategic aims are conducted; the provisions of strategic documents on climate change adaptation and mitigation in Ukraine are examined and the evaluation of such regulatory mechanism's efficiency and effectiveness is performed. As a result, the author points out the drawbacks of national policy and law encompassing the climate change and offers a set of suggestions for its improvement.

Keywords: Climate change; State policy; State climate policy; UNFCCC; Association Agreement; European Green Deal

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The Legal Regulation of Climate Change in Ukraine: Issues and Prospects

1. INTRODUCTION

When climate change is one of the most urgent, complex and challenging global problems of the present it has to be primarily regulated locally, at the level of a State. This is due to the fact that climate change poses immediate threat to national security of the country and wellbeing of its citizens, such as increase in natural disasters, threat to food security, water shortage, economic losses, etc., and thus it is the local governance that has to respond promptly. Additionally, Article 16 of the Constitution of Ukraine proclaims that ensuring environmental safety and maintaining ecological balance in the territory of Ukraine is the responsibility of the State.¹

Ukraine has already faced climate-driven changes in various spheres and sectors. Increased incidence of strong floods in the last 20 years has affected nearly one-third of the population, especially in the Carpathian Mountains and its foothills. Droughts now occur on average once every three years, causing a 35-trillion-litre deficit of water for Ukraine. The situation can be considered critical, as for the first time in 120 years, Ukraine may need to restrict its citizens' constitutional water use rights.²

As a result of climate change analysis in some regions of Ukraine it was found that, over the past decade, thermal mode, moisture, wind frequency, etc. have changed significantly, leading to the increased number of wildfire cases. Extreme weather events also inflict significant damage on energy infrastructure, like a severe windstorm in July 2019 damaged power lines in Ukraine and left around 600 towns and settlements temporarily without electricity. The vulnerability of the population, which is largely urban (69.4% in 2020), is magnified by infrastructure deficiencies such as an aging and fragile housing stock and limited potable water supply. In addition, since 2014, economic shocks and the humanitarian crisis in the eastern region have diverted resources from climate adaptation strategy and planning.³

According to the data published by the Ministry of Environmental Protection and Natural Resources of Ukraine⁴, the average annual temperature in Ukraine has increased by more than 2° C since the beginning of the 20th century, including 1.2° C increase over the past 30 years⁵. Additionally, it has been evaluated that over a 20-year time period (up to

¹ Constitution of Ukraine (1996) <<https://zakon.rada.gov.ua/laws/show/254k/96-bp#Text>> accessed 25 March 2021.

² 'The Risk of Water Shortage and Implications for Ukraine's Security' (*Jamestown*, 2021) <<https://jamestown.org/program/the-risk-of-water-shortage-and-implications-for-ukraines-security/>> accessed 1 April 2021.

³ USAID, 'Climate Change Risk Profile Ukraine: Fact Sheet' (2016) <https://www.climatelinks.org/sites/default/files/asset/document/2016_USAID_Climate%20Change%20Risk%20Profile_Ukraine.pdf> accessed 26 March 2021.

⁴ Ministry of Environmental Protection and Natural Resources of Ukraine is a central executive authority which operates in the field of environmental protection.

⁵ MENR, 'Yak Zminyuyet'sya Klimat V Ukrayini' (*Menr.gov.ua*, 2020) <<https://menr.gov.ua/news/35246.html>> accessed 8 April 2021.

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2040), the climatic changes in Ukraine will lead to the mid-rise of the average temperature at the boundaries of 0.8 - 1.1° C, in comparison with the current period. In the future, until the end of the century, only in case of a significant reduction in the anthropogenic impact on the climate system, the temperature regime will remain within the limits of natural variability, i.e., it will stay at the current achieved indicators. In case of moderate and excessive anthropogenic impact, the average annual temperature on the climate system will continue to rise, and by the middle of the century its increase will be 1.5 - 2.0°C, and at the end will be 2.0 - 4.3°C.⁶ This is predicted to lead to the following negative consequences: increase in economic losses and the number of people suffering from extreme weather events (impact on health and productivity, reduced yields and deterioration of air quality, increasing risk of forest fires), significant water shortage due to the reduction of water resources, which is exacerbated by the increase in water use (including for irrigation, energy, industry, housing and communal services), increased number of natural disasters, loss of biodiversity, threat to food security (reduced yields, lack of food or significant rise in price), the need to overcome natural disasters associated with hydrometeorological conditions and fires, forests degradation and loss of ecosystems and biodiversity, and loss of territories due to flooding of coastal areas⁷.

Meanwhile, currently in Ukraine there is no legal framework on climate change, which shall determine the legal and organizational bases for mitigating climate change and adapting to its impacts.

In the light of the stated above considerations, the present article is aimed to examine the current state of legal regulation of climate change issues in Ukraine. Accordingly, the underlying tasks are: to carry out the critical analysis of the national legislation concerning climate change regulation and whether it corresponds with the State policy strategic aims; to analyse the provisions of approved strategic documents on climate change adaptation and mitigation in Ukraine; to evaluate how efficient and effective such regulatory mechanism is; to find and illuminate the current legislative and State policy's gaps; and formulate theoretical and practical suggestions for their further improvement and development.

⁶ S Ivanyuta and others, 'Zmina Klimatu: Naslidky ta Zakhody Adaptatsiyi: Analit. Dopovid' (National Institute for Strategic Studies 2020) <https://niss.gov.ua/sites/default/files/2020-10/dop-climate-final-5_sait.pdf> accessed 8 April 2021.

⁷ Law of Ukraine 'On the Basic Principles (Strategy) of the State Environmental Policy of Ukraine for the period up to 2030' (2019) <<https://zakon.rada.gov.ua/laws/show/2697-19>> accessed 25 March 2021.

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2. LEGAL REGULATION OF CLIMATE CHANGE ISSUES IN UKRAINE

The discussion on the legal protection of climate arose in the middle of the twentieth century, accompanied by research activities of scientists and jurists to study the climate system, its variability, sensitivity, external and internal factors. In the recent decade, there have been theoretical debates on climate law, whether it has already been formed as a new field of law. Dernbach and Kakade stated that 'climate change law is a new and rapidly developing area of law'⁸; Peel defined climate change law as a distinctive body of legal principles and rules.⁹ Meanwhile, other scholars expressed doubts about 'the feasibility of addressing climate law as a new field of law'¹⁰, or that 'it is a discrete body of law with its own sources, methods of law-making, and principles, or that it is a self-contained regime'¹¹. Turning to the legal doctrine of Ukraine, it substantiates the need to develop legal measures to protect the climate within a completely new area of policy and law, while underlining that it requires further scientific and theoretical justification.¹²

Summing up all the aforementioned, it is worth highlighting that the urgency of combating climate change and its impacts was declared by the international community in 2015 with the adoption of the 2030 Agenda for Sustainable Development by all United Nations Member States (the Sustainable Development Goal No. 13).¹³ Thus, from author's point of view, it is obvious that the legal protection of climate has already become the objective reality of the law.

However, currently in Ukraine there is no legal framework on climate change, which shall determine the legal and organizational bases for mitigating climate change and adapting to its impacts. Climate change is mainly considered in the context of international climate change obligations of Ukraine.

⁸ John C Dernbach and Seema Kakade, 'Climate Change Law: An Introduction' (2008) 29 Energy Law Journal <<http://johndernbach.com/wp-content/uploads/2013/08/DernbachKakade-ClimateChangeLawIntro2008.pdf>> accessed 21 April 2021.

⁹ Jacqueline Peel, 'Climate Change Law: The Emergence of a New Legal Discipline' (2008) 32 Melbourne University Law Review 922.

¹⁰ Daniel Bodansky, Jutta Brunnée and Lavanya Rajamani, *International Climate Change Law* (Oxford University Press 2017).

¹¹ J Ruhl and James E Salzman, 'Climate Change Meets the Law of The Horse' [2012] SSRN Electronic Journal <<https://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=3376&context=dlj>> accessed 19 April 2021.

¹² Hanna Anisimova, 'Pravove Zabezpechennya Okhorony Atmosferneho Povitrya, Ozonovoho Sharu ta Klimatu' in AP Getman and others (eds), *Pravova okhorona dovkillia: suchasnyy stan ta perspektyvy rozvytku: monohrafiya* (Pravo 2014).

¹³ UN General Assembly 'Transforming our world: the 2030 Agenda for Sustainable Development' (21 October 2015) A/RES/70/1 <<https://www.refworld.org/docid/57b6e3e44.html>> accessed 26 March 2021.

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Additionally, climate is not defined as an object of legal regulation, neither by environmental law nor any other area of national law. This is a significant legislative drawback that introduces imbalance and ambiguity in defining such concepts as climate change, climate change mitigation, etc., which complements the legislative inability to develop effective measures to address climate-related issues.

It is noteworthy that Ukrainian jurists in the field of environmental law have repeatedly underlined that climate should be determined as an object of legal regulation along with the so-called 'classical objects' of environmental law. According to Malysheva, overcoming anthropocentrism in the regulation of environmental safety should also become an important reserve for the ecological and legal development of Ukraine in the future. New technologies, the latest social phenomena and climate change affect the subject of regulation of environmental law and is designed to ensure its development more widely.¹⁴ Krasnova also notes that a number of environmental objects of environmental law is expanding, in particular, by including (*inter alia*, with ratification of acts of international environmental law) to them such objects as climate, ozone layer, biodiversity, ecological network, etc.¹⁵

In this context, it is important to pay attention to the Climate Programme of Ukraine, which was one of the first legal documents to be developed and approved (back in 1997) in response to recognizing the problem of anthropogenic climate change and as part of the World Climate Programme.¹⁶ The document referred to the climate as one of the main natural resources upon which living conditions, human activities, directions and level of economic development depend. It was also stated that climate is one of the main factors shaping the natural environment, and even minor changes of it, along with overall poor environmental conditions in Ukraine, can cause significant socio-economic damage in case no measures for their prevention are taken. However, no official definition of climate change was introduced neither in the Climate Programme of Ukraine, nor in any other documents that were adopted later.

Moreover, there is no formed and unified approach to understanding the nature and characteristics of climate as an object of environmental protection even in the legal doctrine of Ukraine. In most of the sources, the term "climate" is characterized through the prism of the institution of general (climatic conditions) or special (climatic resources) nature. The climatic

¹⁴ Nataliya Malysheva, 'Novi horizonty ekolohichnoho prava', *Modern tendencies and prospects of development of agrarian, land and environmental law* (Publishing Center of NULES of Ukraine, Kiev, 22–23 May 2015)

¹⁵ Mariia Krasnova, 'Stan ta Perspektyvy Rozvytku Vchennya pro Ob'yekty Ekolohichnoho Prava: Naukovo-Metodolohichni Aspekty' (2013) 2 Bulletin of Taras Shevchenko National University of Kyiv. Legal Studies 8

¹⁶ Resolution of the Verkhovna Rada of Ukraine No 650 'On Climate Programme of Ukraine' (1997) <<https://zakon.rada.gov.ua/laws/show/757-14#Text>> accessed 26 March 2021.

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resource is also referred to the legal category of "intangible natural resources" along with ambient air, airspace, wind energy, solar radiation, radio frequency resource, etc. They are defined as natural resources of a special kind and legal regulations for their protection and / or use are mainly in the process of their formation. Thus, climate is currently considered within the framework of environmental law of Ukraine as a part of legal protection of ambient air and the ozone layer.

Meanwhile, the basis of legal regulation of climate change in Ukraine has been mainly formed as a response to international climate change obligations. Such obligations are posed by the ratification of the following international documents: United Nations Framework Convention on Climate Change, 1992 (hereinafter UNFCCC)¹⁷, the Kyoto Protocol, 1997¹⁸, Paris Agreement, 2015¹⁹ and Association Agreement between the European Union and Ukraine, 2014²⁰. To ensure the implementation of these international treaties, a number of legislative and regulatory documents have been developed and approved.

From one point of view, this is quite logical, as the legal protection of climate as an international universal object is the subject of international cooperation. Ukraine has identified the issues of climate change as the priority of the State's environmental policy. In particular, by signing and ratifying the UNFCCC, Ukraine has committed to protect the climate system for the benefit of the present and future generations, as well as to fulfill individual obligations as a Party to the Convention. Thus, as an Annex I Party²¹, Ukraine has committed to adopt and implement policies and measures aimed at mitigation of climate change by limiting its anthropogenic emissions of greenhouse gas emissions (hereinafter GHG) and protecting and enhancing its greenhouse gas free sinks and reservoirs, taking into consideration the real socio-economic conditions of the country. As Annex B Party to the Kyoto Protocol²², Ukraine had an obligatory target until 2020 to reduce its GHG emissions levels by 20% below 1990 levels.

Furthermore, Ukraine was one of the first European countries to ratify the Paris Agreement²³, a legally binding international treaty on climate

¹⁷ Law of Ukraine 'On Ratification of the UN Framework Convention on Climate Change' (1996) <<https://zakon.rada.gov.ua/laws/show/435/96-бп#Text>> accessed 26 March 2021.

¹⁸ Law of Ukraine 'On the Ratification of the Kyoto Protocol to the United Nations Framework Convention on Climate Change' (2004) <<https://zakon.rada.gov.ua/laws/show/1469-19#Text>> accessed 26 March 2021.

¹⁹ Law of Ukraine 'On the Ratification of the Paris Agreement' (1996) <https://zakon.rada.gov.ua/laws/show/995_801> accessed 26 March 2021.

²⁰ Association Agreement between the European Union and its Member States, of the one part, and Ukraine, of the other part (29 May 2014) OJ L 161.

²¹ United Nations Framework Convention on Climate Change (1992) 1771 UNTS 107, 165.

²² Kyoto Protocol to the United Nations Framework Convention on Climate Change (1998) 37 ILM 22.

²³ Paris Agreement aims to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5

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change, which requires Ukraine (as a Party to the Agreement) to take measures for reducing impact on the climate, e.g., by cutting greenhouse gas (hereinafter GHG) emissions and adapting to the already existing impacts of climate change. Therefore, Ukraine has committed to its obligations under the Paris Agreement with first Intended Nationally Determined Contribution (first NDC), which sets a GHG emission target not to exceed 60% of 1990 GHG levels in 2030.²⁴

However, it is quite questionable that the formation of legal regulation of climate change issues solely through the implementation of international obligations can be effective without adopting a framework legal act of national law. The primary development of strategic documents (mainly aimed at meeting international obligations) within the climate state policy of Ukraine, which is not supported by a framework act of national legislation, is declarative in nature and looks a lot like political promises rather than an effective system of binding legal measures.

This statement is substantiated by the fact that despite all the efforts to reduce overall national GHG emissions through its policies and measures, Ukraine has failed to meet international commitments a number of times. In particular, in 2010 Ukraine failed to establish an initial report demonstrating compliance of its national systems with the procedures under the Kyoto Protocol.²⁵ In 2016, Ukraine failed to establish a true-up period report demonstrating compliance with the Kyoto Protocol, and apart from violating it was found that Ukraine did not retire sufficient units to cover its total GHG emissions as required under the Kyoto Protocol (not in formal compliance with Article of the Kyoto Protocol).²⁶ Additionally, recent poor performance of Ukraine in reaching its commitment under the Paris Agreement, which is rated as 'Critically insufficient' (as from 30 July 2020)²⁷, demonstrates that current policy trends lead to ineffective, inconsistent and not systematic formation of the legal regulation of climate change.

degrees Celsius. Conference of the Parties, Adoption of the Paris Agreement (2015) UN Doc FCCC/CP/2015/L9/Rev/1.

²⁴ NDC Registry, 'Party: Ukraine' (www4.unfccc.int, 2016) <<https://www4.unfccc.int/sites/NDCStaging/pages/Party.aspx?party=UKR>> accessed 11 April 2021.

²⁵ The Compliance Committee of the Kyoto Protocol, 'Non-Compliance Procedure of Ukraine under the Kyoto Protocol - Climate Change Litigation' (*Climate Change Litigation*, 2010) <<http://climatecasechart.com/climate-change-litigation/non-us-case/non-compliance-procedure-of-ukraine-under-the-kyoto-protocol/>> accessed 11 May 2021.

²⁶ The Compliance Committee of the Kyoto Protocol, 'Non-Compliance Procedure of Ukraine under the Kyoto Protocol II - Climate Change Litigation' (*Climate Change Litigation*, 2016) <<http://climatecasechart.com/climate-change-litigation/non-us-case/non-compliance-procedure-of-ukraine-under-the-kyoto-protocol-ii/>> accessed 11 April 2021.

²⁷ Climate Action Tracker 'Ukraine | CAT' ([Climateactiontracker.org](http://climateactiontracker.org), 2020) <<https://climateactiontracker.org/countries/ukraine/>> accessed 12 April 2021.

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To sum up, it is reasonable to mention the statement of K. Prokhorenko that climate is a new, special object of environmental law, which meets the vital, natural environmental rights, interests and needs of the subjects, and, thereby, is subject to comprehensive protection aimed at preventing deterioration of climate balance systems.²⁸

Thus, defining the climate as a special object of law is theoretically and scientifically substantiated. This should be primarily done within environmental law of Ukraine, e.g., by introducing the definition into existing legislative acts. In particular, Article 5 of the Law of Ukraine 'On Environmental Protection'²⁹ should be amended to include the climate into the list of objects of environmental protection. Also, a special article should be developed on the protection of the climate, as well as prevention and mitigation of the negative effects of climate change. Additionally, the provisions of the sectoral Law of Ukraine 'On Air Protection'³⁰ should be complemented with the definition of climate, the content of its protection, and the list of basic measures to protect the environment from adverse effects of climate change. These amendments should be considered as a first stage of formation of a domestic legal framework on climate change. This will create the legal basis for developing and adopting a framework legal act (e.g., climate law) in the sphere of climate change, which shall be aimed at introducing legal measures to achieve net zero greenhouse gas emissions, protect the natural environment and Ukrainian citizens from the adverse impacts of climate change.

Overall, the legal protection of climate as a natural object should involve the development and implementation of a set of measures aimed at mitigating climate change and ensuring adaptation to it, which is reflected in the relevant areas of legal regulation: reduction of anthropogenic greenhouse gas emissions, review of existing scientific and legislative approaches to standardization in this area, rational use, protection and reproduction of the quality of natural absorbers of greenhouse gases, like forests, lands, soils, vegetation, etc., and ensuring the adaptation of ecological systems and humans to the adverse impacts of climate change.

Consequently, the development of fully-fledged environmental legislation to ensure the efficient and effective legal protection of climate is of fundamental importance for Ukraine. The priority tasks are: to identify contradictions and fill gaps in the current environmental legislation, e.g., by defining climate as an object of legal protection; to improve existing national

²⁸ Kateryna Prokhorenko, 'Climate as an Object of Legal Environmental Protection in Ukraine' (PhD thesis, Taras Shevchenko National University of Kyiv 2013).

²⁹ Law of Ukraine 'On Environmental Protection' is a framework domestic law in the field of environmental protection (amended as of 01 January 2021) <<http://zakon0.rada.gov.ua/laws/show/1264-12>> accessed 25 March 2021.

³⁰ Law of Ukraine 'On Air Protection' determines legal and organizational basis and ecological requirements in the field of protection of ambient air (amended as of 20 September 2019) <<https://zakon.rada.gov.ua/laws/show/2707-12#Text>> accessed 25 March 2021.

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legislation on international commitments and obligations of Ukraine under international climate change framework; to develop and adopt a framework legal act (e.g. Climate Law of Ukraine) in the sphere of climate change, which shall be aimed at developing legal measures to achieve net zero greenhouse gas emissions, protect the natural environment and Ukrainian citizens from the adverse impacts of climate change.

3. ADDRESSING CLIMATE CHANGE ISSUES WITHIN STATE POLICY OF UKRAINE

Currently, climate change regulatory provisions in Ukraine are mainly based on the provisions of strategic documents. Noteworthy, following the specifics and scope of issues covered, it is suggested that climate state policy of Ukraine is conditionally divided into two areas: mitigating climate change (e.g., by reducing greenhouse gas emissions) and adapting to climate change impacts.

The fundamental strategic documents are the Strategy of the State Environmental Policy of Ukraine for the period up to 2030³¹ and the Concept on State Climate Policy Implementation till 2030³².

The Strategy of the State Environmental Policy of Ukraine for the period up to 2030 (hereinafter Environmental Strategy), is the fundamental document that defines the national priorities in the field of environmental protection. The Strategy points out that to improve the quality of the atmospheric air and to strengthen its response to the effects of climate change and to achieve the goals of sustainable low-carbon development in all sectors of the economy, Ukraine must ensure that ratified international instruments on climate change and the quality of the atmosphere are fulfilled.³³

In general, the Strategy is aimed at the energy saving and energy efficiency, increasing the production of clean energy, introducing the best available low-carbon, resource-saving production technologies, as well as modern building technologies for heat and energy saving, which will significantly reduce the emissions of greenhouse gases and pollutants into the atmospheric air as well as the discharge of pollutants into water bodies.

It should be noted that the Strategy, as a fundamental policy act on environmental issues, is expected to define the national priorities in the sphere of climate change. Thus, it looks reasonable that it is the Strategy that must be the reference point for further development and legislative support for combating climate change on the national level. However, the Strategy

³¹ Law of Ukraine ‘On the Basic Principles (Strategy) of the State Environmental Policy of Ukraine for the Period up to 2030’ (2019) (Environmental Strategy 2019)
<<https://zakon.rada.gov.ua/laws/show/2697-19>> accessed 25 March 2021.

³² Approved on 7 December 2016 by Resolution of the Cabinet of Ministers of Ukraine ‘On approval of the Concept on State Climate Policy Implementation till 2030’ (2016)
<<https://zakon.rada.gov.ua/laws/show/932-2016-p#Text>> accessed 27 March 2021.

³³ Environmental Strategy 2030.

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does not consider climate change as a separate sphere of environmental policy, addressing it within the framework of legal protection of atmospheric air and mainly in the context of fulfilling international obligations. This is seen as a definite drawback, which results in underestimation of climate change issues on the national level, shifts strategic priorities and inhibits the development and adoption of the framework legislation in the sphere of climate change.

The Concept on State Climate Policy Implementation till 2030 (hereinafter Climate Policy Concept)³⁴ is the first national strategic document aimed at combating climate change by defining the grounds to develop legislation, strategies and action plans for various areas of State policy in this area. Its aim is stated as improving State policy on climate change in order to achieve sustainable development, create legal and institutional preconditions for a gradual transition to low-carbon development in terms of economic, energy and environmental security and improve the welfare of citizens. Its main areas cover the following: strengthening the institutional capacity for development and implementation of State policy on climate change; prevention of climate change by reducing anthropogenic emissions and increasing greenhouse gas absorption to ensure gradual transition to low-carbon development of the country; adapting to climate change, increasing the resilience and reducing the risks linked to climate change.

It is noteworthy that the Climate Policy Concept establishes the basis for the development of draft regulations, strategies and other documents required for the implementation of various components of state policy in the sphere of climate change. Thus, number of planning and strategic instruments have been adopted, e.g., the Action Plan on the Execution of the Concept of Implementation of State Climate Change Policy until 2030 (hereinafter the Action Plan)³⁵, Low Emission Development Strategy (hereinafter LEDES 2050)³⁶, Energy Strategy of Ukraine until 2035 (hereinafter ESU 2035)³⁷, etc.

The Action Plan contains 49 measures aimed at preventing and adapting to climate change. Such measures include taking into account the factor of increasing the frequency and intensity of dangerous and natural hydrometeorological phenomena due to climate change in Ukraine in the process of managing the risks of man-made and natural emergencies,

³⁴ Climate Policy Concept 2016.

³⁵ Approved on 6 December 2017 by Resolution of the Cabinet of Ministers of Ukraine ‘Action Plan on the Execution of the Concept of Implementation of State Climate Change Policy until 2030’ (2017) (Action Plan 2017) <<https://zakon.rada.gov.ua/laws/show/878-2017-p#Text>> accessed 27 March 2021.

³⁶ Approved on 18 July 2018 by Protocol Decision of the Cabinet of Ministers of Ukraine ‘Ukraine 2050 Low Emission Development Strategy’ (2018) (LEDES 2018) <https://mepr.gov.ua/files/docs/Proekt/LEDES_ua_last.pdf> accessed 27 March 2021.

³⁷ Approved on 18 September 2017 by Resolution of the Cabinet of Ministers of Ukraine ‘Energy Strategy of Ukraine until 2035 “Safety, Energy Efficiency, Competitiveness”’ (2017) <<https://zakon.rada.gov.ua/laws/show/605-2017-p#n2>> accessed 27 March 2021.

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developing and approving a plan of measures to adapt to climate change, implementation of pilot projects for the development and implementation of local plans for adaptation to climate change at the regional level, as well as cities, towns and villages.³⁸

A special attention should be given to the LEDS 2050, which was developed and approved by the decision of the Interdepartmental Commission for Enforcement of the UN Framework Convention on Climate Change, according to which Ukraine will make efforts to achieve by 2050 the level of 31-34% of greenhouse gas emissions compared to 1990³⁹. It should be noted that LEDS determines national stakeholders' agreed vision on decoupling further economic and social growth and its social development from the growth in greenhouse gases emissions. Thus, on the one hand, LEDS is based upon the national priorities for sustainable development and current sectoral strategies, while, on the other, it determines a potential pathway for economic development with due account of the goals for the state policy on emission reduction and greenhouse gases absorption⁴⁰. Therefore, it is mainly seen as an instrument for public administration and shaping of climate responsible behavior of businesses and citizens. On 18 July 2018, Government of Ukraine sent the LEDS to the Secretariat of the UNFCCC, which was later posted on the website of the Secretariat. By this, Ukraine demonstrated its commitment to combat global climate change and meet relevant non-mandatory requirements of the Paris Agreement in order to pursue the Climate Action Sustainable Development Goal. However, since then no legislative tool to implement this Strategy has been developed. Thus, LEDS was not enshrined in any of the legislative acts, and, in fact, is of a recommendatory nature only.

Energy Strategy of Ukraine up to 2035 (ESU 2035) and is a policy document, adopted by the Government of Ukraine in 2017, which outlines strategic guidelines for the development of Ukraine's fuel and energy complex for the period up to 2035.⁴¹ It aims at reducing the energy intensity of the economy, as well as diversifying sources and routes of energy supply, and increasing domestic production. This is expected to increase the economic, energy and environmental security, which will lead to optimization of the energy balance and create a solid foundation for the country's sustainable energy future. Remarkably, ESU 2035 envisages the completion of energy sector reform by 2025 to allow its integration with the energy sector of EU. Consequently, strategic objective shall be to create basis

³⁸ Action Plan 2017.

³⁹ Taking into consideration international obligations of Ukraine LEDS 2017 is aimed at supporting a global target on stabilization of greenhouse gases concentration in accordance with the scenario of global average temperature increase confinement to well below 2°C of pre-industrial level.

⁴⁰ FAOLEX 'FAOLEX Database: Ukraine (National Level)' (*Fao.org*, 2017)
<<http://www.fao.org/faolex/results/details/en/c/LEX-FAOC181201/>> accessed 23 April 2021.

⁴¹ ESU 2035.

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for the sustainable development of a competitive economy and an integral part of the European energy sector. However, ESU is currently criticised for its inconsistency and inability to meet the real challenges of the present. In particular, it is considered to be developed not on the basis of market modeling, but on the basis of expert opinions, which does not give accurate forecasts. Additionally, ESU fails to deal with the existing model of State's support for renewable energy sources in Ukraine, according to which the State buys all 'green' electricity, the price of coal and nuclear generation is distorted, and there is no competition on the energy market.⁴²

The development of all the above strategic documents demonstrates a strongly positive trend. However, thorough analysis of their provisions reveals the following drawbacks. Firstly, it is an exclusively declarative nature of all the strategic acts, which tend to be left on paper and never get implemented. The report of Ukrainian Government on yearly progress in the sphere of environmental protection (from autumn 2019 till autumn 2020) showed that it mainly consists of strategies and plans (either already developed or still in process of their development) and few legislative acts entering into force not earlier than 2021.⁴³ Unfortunately, this looks more like the imitation of work that can be reported to international partners rather than the real progress.

Secondly, it is the lack of integration of climate change issues into other sectoral State strategies, as climate policy is strongly interconnected with a number of areas. In this context, it is worth noting that the vast majority of the world economy relies on energy sources or production technologies that release greenhouse gases at almost every stage of production, transportation, storage, supply and disposal. Consequently, this close interaction between climate change and economic viability affects almost all aspects of the national economy. Thus, climate policy issues cover the energy sector and energy efficiency, in particular, environmental protection, utilities, agriculture and food industry, construction and urban planning in the context of adaptation to climate change, health, water, forestry and transport, land issues, waste management, etc. However, climate issues are not taken into account in the agenda of the Ministry of Economy or the Ministry of Finance. The same applies to the agricultural sector, by which the risks should be assessed, and recommendations developed on how to organize its activities in consideration of climate change impact. It is also reasonable to integrate climate issues into the public health sector. This is

⁴² Oksana Rasulova, 'Paperovi Obitsyanky. Yakoyu Ye Klimatychna Polityka Ukrayiny' (*LB.ua*, 2021) <https://rus.lb.ua/society/2021/04/12/482087_paperovi_obitsyanki_yakoyu_ie_klimatichna.html> accessed 15 April 2021.

⁴³ Cabinet of Ministers of Ukraine, 'Kabinet Ministriv Ukrayiny - Yevropeys'ki Kolehy Vidznachyly Prohres Ukrayiny U Sferi Zakhystu Dovkillya Ta Klimatychnij Politytsi' (*Kmu.gov.ua*, 2020) <<https://www.kmu.gov.ua/news/yevropejski-kolegi-vidznachili-progres-ukrayini-u-sferi-zahistu-dovkillya-ta-klimatichnij-politici>> accessed 11 April 2021.

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due to the fact that following questions should be foreseen and regulated: how does climate change affect public health? What diseases can be spread and how the burden on the health system would increase as a result of climate change? All of these must be taken into account in order to reduce future social and economic losses. There is also a big gap in social policy of Ukraine as it does not take into account how the climate crisis is deepening social injustice among vulnerable groups.

This problem was also highlighted by the report of the Ukrainian side of the EU-Ukraine Civil Society Platform, which stated that the crosscutting and integral character of a climate policy is the basis of its successful implementation.⁴⁴ Thus, the report substantiates that the climate policy should be implemented by taking climate change into account in all strategic documents and by coordinating climate change action taken by all central executive agencies.

Thirdly, there are no legislative acts to define State governance in the area of adaptation to climate change in Ukraine. It is worth mentioning that a draft National Plan for Adaptation to Climate Change for the period up to 2020 was developed in 2001, in pursuance of the national action plan for the implementation of the Kyoto Protocol to the UN Framework Conference on Climate Change. However, it was not adopted.

An attempt to develop regulatory act on adaptation to climate change has been repeated recently in pursuance of the updated National Security Strategy from 14 September 2020⁴⁵, which points out that the ability to adapt the economy, livelihoods and civil protection to climate change is currently inefficient. Thus, following the goal of reducing the impact of climate change and increasing the level of environmental safety in Ukraine, the draft Strategy for Environmental Security and Climate Change Adaptation was posted on the official website of the Ministry of Environmental Protection and Natural Resources of Ukraine on 1 March 2021 for further public discussion⁴⁶. According to the draft, the objectives of the Strategy include, *inter alia*, creation of organizational preconditions and scientific and methodological support for the implementation of the State policy of adaptation to climate change. Meanwhile, improving the regulatory and

⁴⁴ Taras Bebeszko and others, 'Climate Change in the Context of Paris Agreement Commitments: Challenges and Cooperation Opportunities for the EU and Ukraine' (UA CSP 2018).

⁴⁵ Ministry of Environmental Protection and Natural Resources of Ukraine, 'Povidomlennya Pro Oprylyudnennya Proyektu Rozporyadzhennya Kabinetu Ministriv Ukrayiny "Pro Skhvalennya Stratehiyi Ekolohichnoyi Bezpeky Ta Adaptatsiyi Do Zminy Klimatu Do 2030 Roku"' (*Mepr.gov.ua*, 2021) <<https://mepr.gov.ua/news/36922.html>> accessed 11 April 2021.

⁴⁶ Ministry of Environmental Protection and Natural Resources of Ukraine, 'Povidomlennya Pro Oprylyudnennya Proyektu Rozporyadzhennya Kabinetu Ministriv Ukrayiny "Pro Skhvalennya Stratehiyi Ekolohichnoyi Bezpeky Ta Adaptatsiyi Do Zminy Klimatu Do 2030 Roku"' (*Mepr.gov.ua*, 2021) <<https://mepr.gov.ua/news/36922.html>> accessed 11 April 2021.

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legislative basis for adaptation activities and fulfillment of relevant international obligations is identified among the priority tasks of the Strategy. However, the draft does not mention the development of a framework legal act in the sphere of climate change mitigation and adaptation, which is already seen as a weak point of the Strategy.

Considering all the above mentioned, it can be concluded that the current climate State policy of Ukraine shows the lack of coordination between the policy and the legislative and other regulatory acts in the climate change sphere. Therefore, Ukraine has no officially adopted legal act that would define the goals, objectives and ways of public policies aimed at reducing emissions and increasing removals of greenhouse gases in Ukraine and adapting the country to climate change. This additionally substantiates the urgency of adopting framework legal act on the prevention of and adaptation to climate change, which was highlighted in the second part of the present article.

4. DEVELOPING CLIMATE CHANGE LEGISLATIVE FRAMEWORK AND POLICY OF UKRAINE IN THE CONTEXT OF IMPLEMENTING EUROPEAN GREEN DEAL

According to the Association Agreement between European Union and its members and Ukraine (hereinafter the Association Agreement), it is assumed that Ukraine develops and strengthens cooperation with European countries, *inter alia*, in the sphere of climate change, thereby, contributing to the long-term goals of sustainable development and the green economy.⁴⁷ Therefore, ensuring the implementation of the provisions of the Association Agreement is identified as one of the main directions of State climate policy of Ukraine.⁴⁸ Climate commitments are set out in the section on economic cooperation (Chapter 6 'Environment'), which provides for institutional reforms in the field of environmental protection. Approximation of Ukrainian legislation to the European one is determined by the regulations and directives of Annex XXX of the Agreement. Two main spheres are identified: reducing greenhouse gas emissions and preventing the destruction of ecosystems. Thus, the areas of cooperation on climate change include the development of an action plan for mitigation of and adaptation to climate change as well as and implementation of long-term measures to reduce greenhouse gases emissions (Annex XXXI to the Agreement). In addition, the Association Agreement includes energy transition and decarbonisation policies, which should allow Ukraine to follow the path towards a low greenhouse gas emissions economy, which is the vital part of

⁴⁷ Article 365 lists 'development and implementation of a policy on climate change, in particular as listed in Annex XXXI to this Agreement'. Association Agreement between the European Union and its Member States, of the one part, and Ukraine, of the other part [2014] OJ L161/5.

⁴⁸ Environmental Strategy 2019.

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climate policy and a vector of legislation development in the sphere of climate change mitigation.

However, European Commission's report on implementation of the Association Agreement from 27 November 2020 identified overall poor performance in environmental and climate spheres and stated that 'reform progress has been slow in relation to climate change'.⁴⁹ Among a set of underlying reasons, this article substantiates that it is the lack of proper legal regulation in the sphere of climate change and the absence of a framework regulatory act of national legislation that is to be considered as a fundamental problem.

Therefore, number of studies and overviews have paid attention to the problems of implementing international obligations that are not further embodied in the national legislation. For instance, the position paper on prospects of updating and amending the Association Agreement regarding environmental and climate change spheres pointed out that implementation of EU climate change law by Ukraine, which is not a member-State of the EU, has had a set of challenges. Among them the fact that national legislation of Ukraine does not have a legal provision enabling a possibility for direct effect of the EU regulations in Ukraine is highlighted. Additionally, it is mentioned that neither the Association Agreement, nor other bilateral or national instruments provide for a mechanism to review transposition into national legislation and implementation of the EU secondary legislation in Ukraine.⁵⁰

In the end of 2019, the European Commission officially declared that climate change is a top priority for the EU by adopting the European Green Deal⁵¹ (hereinafter EGD), that is a roadmap of actions aimed at transforming Europe into the world's first climate-neutral continent by 2050 with the help of building an efficient, sustainable and competitive economy. In the beginning of 2020, the Government of Ukraine announced the intention to join the European Green Deal, taking into account the need to form a State policy in Ukraine that would consider today's environmental and climate challenges.⁵² Ukraine's participation in EGD is likely to become a bilateral process, in which Ukraine should share the ambitious agenda of the EU, and

⁴⁹ High Representative of the Union for Foreign Affairs and Security Policy, 'Association Implementation Report on Ukraine' (European Commission 2020) <https://eeas.europa.eu/sites/default/files/2020_ukraine_association_implementation_report_final.pdf> accessed 28 March 2021.

⁵⁰ Resource & Analysis Center "Society and Environment", *Updating and Amending Annexes XXX and XXXI to the Association Agreement Between the European Union and Ukraine (Environment and Climate Change)* (2019) <<https://www.rac.org.ua/uploads/content/549/files/aaupdate2019eng.pdf>> accessed 9 April 2021.

⁵¹ Commission, 'The European Green Deal' (Communication) COM (2019) 640 final

⁵² Ministry of Environmental Protection and Natural Resources of Ukraine, 'Prezentatsiya "Doluchennya Ukrayiny Do Initsiatyvy "Yevropeys'kyy Zelenyy Kurs"' (Mepr.gov.ua, 2021) <<https://mepr.gov.ua/news/36702.html>> accessed 10 April 2021.

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the EU should take into account the obligations under the Association Agreement in policy-making according to the EGD.

Several policy papers and overviews regarding perspectives and challenges of implementing the EGD by Ukraine have highlighted that the EGD creates a wide space for mutually beneficial synchronization of Ukraine's policy and legislation with relevant EU policies and legislation.⁵³ However, no progress in this sphere has been made yet. In particular, the action plan for implementing EGD (Roadmap for Ukraine within EGD) has not been developed as well as no legal or regulatory acts for EGD's implementation have been drafted.

It is worth mentioning that in 2019 the European Union launched a regional initiative called EU4Climate, aiming to support the six Eastern Partnership countries (including Ukraine) to develop and implement climate-related policies based on the countries' commitments under the Paris Agreement, the Association and Partnership Agreements with the EU, the Eastern Partnership policy initiative '20 Deliverables for 2020' and the UN 2030 Agenda for Sustainable Development.⁵⁵ While the EU4Climate initiative aims to help Ukraine adopt climate change mitigation and adaptation measures to achieve greenhouse gas emission reductions and manage the effects of climate change and should include the technical support for implementing EGD⁵⁶, it is currently on the stage of forming the basis for developing a National Adaptation Strategy for Ukraine, with no legislation to be developed and adopted yet.

It should be highlighted that the Ministry of Environmental Protection and Natural Resources of Ukraine has published a draft of the second National Determined Contributions (NDC) of Ukraine to the Paris Agreement, which aims to reduce greenhouse gas emissions by 65% in 2030 compared to 1990.⁵⁷ By this Ukraine has declared its intention to pursue carbon neutrality as a long-term goal, that is indicated to be achieved

⁵³ Andriy Andrushevych and others, *European Green Deal: Shaping the Eastern Partnership Future. Environmental Policy of The Eastern Partnership Countries Under The EGD. Policy Paper*. (Resource and Analysis Center "Society and Environment" 2020) <<https://www.rac.org.ua/uploads/content/593/files/webeneuropean-green-dealandeapen.pdf>> accessed 10 April 2021.

⁵⁴ Resource and Analysis Center "Society and Environment", *Mapping of Strategic Targets of Ukraine and the EU in the Context of The European Green Deal: Development - Vectors and Flagship Initiatives. Policy Paper* (2021) <<https://www.rac.org.ua/uploads/content/615/files/mappingeuropean-green-deal2021en.pdf>> accessed 10 April 2021.

⁵⁵ 'Home Page - Eu4climate' (*EU4Climate*, 2019) <<https://eu4climate.eu>> accessed 10 April 2021.

⁵⁶ EU4Climate, 'Climate Policy Development and Advancing Cooperation with the EU in Ukraine' (2021) <<https://eu4climate.eu/wp-content/uploads/countries/EU4Climate-UKRAINE.pdf>> accessed 10 May 2021.

⁵⁷ Ministry of Environmental Protection and Natural Resources of Ukraine 'Prezentatsiya "Druhyy Natsional'no Vyznachenyy Vnesok Ukrainy Do Paryz'koyi Uhody (NVV2)'" (Mepr.gov.ua, 2021) <<https://mepr.gov.ua/news/36500.html>> accessed 20 April 2021.

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through aligning climate policy and legislation with the EGD. It is believed that the implementation of the draft act will contribute, in particular, to the decarbonisation of the economy in such key sectors as electricity and heat production, construction, industry, transport, and the achievement of a carbon-neutral economy by 2060. However, the declared NDC has already fallen under the substantiated experts' criticism, *inter alia*, as not ambitious enough. Thus, a more ambitious goal of reducing greenhouse gas emissions to 70% by 2030 compared to 1990 is advised to be set.⁵⁸

In summary, it should be stated that in order to implement the EGD, which provides for the transformation of all sectors of the economy to reduce greenhouse gas emissions, Ukraine must pursue a consistent not only climate but also energy and economic policies, strictly adhere to strategies and take into account the suggestions of legal scholars. The harmonization of domestic legislation and policy with the European Union creates the grounds for ensuring the gradual integration of the environmental component into various spheres of public life, which will contribute to the implementation of effective measures to combat climate change.

5. CONCLUDING REMARKS

The absence of legal definition of climate as an object of law slows down the process of developing and ensuring effective measures for combating climate change in Ukraine. The prevalence of declarative strategic acts and the absence of a framework legal act in this sphere demonstrates that the domestic legislative framework on climate change is underdeveloped and ineffective. This, combined with inconsistent and non-integrated climate change policy, makes it complicated, if not impossible, to ensure effective mechanisms for climate change mitigation and adaptation.

Consequently, the development of fully-fledged environmental legislation on climate is of fundamental importance for Ukraine. The author suggests that such development shall be carried out with the following steps: filling gaps in the current environmental legislation, e.g., by introducing the legal definition of the climate as an object of legal protection; improving current national legislation on international commitments and obligations of Ukraine under international climate change framework and European Green Deal, in particular; developing and adopting a framework legal act (e.g., Climate Law of Ukraine) in the sphere of climate change, which shall be aimed at the developing legal measures to achieve net zero greenhouse gas emissions, protect the natural environment and Ukrainian citizens from the adverse impacts of climate change. These improvements, accompanied by

⁵⁸ Volodymyr Omelchenko, 'Ukraine's Projected 2Nd Nationally Determined Contributions (NDC2): Is it Possible to Achieve More Ambitious Goals at a Lower Cost?' (*Razumkov.org.ua*, 2021) <<https://razumkov.org.ua/en/articles/ukraines-projected-2nd-nationally-determined-contributions-ndc2-is-it-possible-to-achieve-more-ambitious-goals-at-a-lower-cost>> accessed 10 April 2021.

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ensuring integration of climate change issues into all spheres of state policy can create the grounds for Ukraine to become an economically successful and carbon-neutral State.

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ENVIRONMENTAL PROTECTION AND PUBLIC PARTICIPATION IN THE U.S.S.R. DURING THE LATTER 20TH CENTURY

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ABSTRACT

This article considers the evolution of public participation in environmental protection and the “green movement” in the USSR and subsequent legal developments in the later part of 20th century. The article deals with legal history, using the diachronic methods to examine the evolution of public participation in environmental protection under the pressure of the totalitarian regime. The public participation in the USSR is divided into three main historical stages. An overview of the main challenges and achievements of the “green movement” in the USSR during 1950s-1990s is included; as well as causes and consequences of environmental activities in the USSR are highlighted. The three stages of the evolution of public participation in the mid-20th century are as follows: The first stage (up to 1980s) is characterized by the non-politicized activity, usually initiated by students or created by tourist clubs; the second stage (1980s – 1990s) has a special feature that is, liberalization of the political movement; and the third stage (beginning of 1990s) is described by the significant decline of interest in the Nature protection activities, which can be attributed to the unstable political environment at that time.

Keywords: Environmental law; Public participation; USSR; Nature protection; Environmental history

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**Environmental Protection and Public Participation
in the USSR during the Latter 20th Century**

1. INTRODUCTION

Public participation is an integral part of ensuring an optimal environmental policy; consequently, the public participation in democratic countries should be manifested through political parties with a "green" orientation, and through activities of NGOs, public organizations, green movements, citizens' activities, and so on. The critical question here is, who influences governmental decisions in States where public participation does not exist or is forbidden? The answer can be found in the history of the "green movement" and the trajectory of public participation in Nature protection in the totalitarian State – the Union of Soviet Socialist Republics (USSR). With this backdrop, considering significant implications in independent States, such as Ukraine, the Soviet Union during the latter half of the 20th century forms the case study of this research.

2. MATERIALS AND METHODS

Some scholars believe that subdisciplines of historical studies appear to have engaged with 'environmental history' in a systematic way only in the recent past (Freytag, 2016¹). Therefore, it seems essential to investigate the history of environmental public movement in the USSR as a basis for explaining the complexity in the legal history of Nature protection. Unfortunately, the essential principles of environmental value provided by healthy ecosystems and the natural environment were not fully recognized during the Soviet period. Therefore, more than 70 years under the Soviet regime could not pass without leaving an impact on the nature of the republics. The Ukrainian Soviet Socialist Republic was chosen as the geographical location not only to build illustrative examples but also to explain the idea of public participation in the USSR during the latter half of the 20th century. Environmentally, Ukraine was found to be the hotspot for environmental precariousness in the Soviet Union bloc owing to several reasons – the high population, the state of the environment after the Second World War (WWII), better industrial development, the Chernobyl disaster of 26 April 1986, and so on.

The study combined methodologies in legal science and legal history. Historical and legal approach was used to study historiography and source base to disclose the genesis and legal trends of the "green movement" in the USSR in the 20th century. The diachronic² method was used as a historical tool to understand the public participation in its chronological order.

¹ Nils Freytag, 'Analysing the Communication Space and Social Construct of Early Modern Europe from the Perspective of Environmental History' [2016] *Nature and Environment in Early Modern Europe* <<https://brewminate.com/nature-and-environment-in-early-modern-europe/>> accessed 16 April 2021.

² A diachronic approach (literally means across-time) considers the development and evolution of a concrete subject of a study through history.

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3. RESULTS AND DISCUSSION

The concept of “green movement” emerged in the second half of the 20th century as a response to the exacerbation of the ecological problems caused by global economic development. The success of the “green movement” during the 20th century can be seen in its ability to give the equal roles for all constituent movements, without declaring one (that is, “green movement”) more important than the others³ (Galtung, 1986).

The negative environmental impacts in the USSR during the 20th century can be attributed to the engagement in two World Wars, several proxy wars and local conflicts, the industrial activities aimed at rebuilding the post-war economy, the Cold War and arms races, man-made disasters, and so on. In contrast to the developed countries of the world, in the USSR, industrialization had an extremely high level of militarization; therefore, it was carried out not for the satisfaction of consumer needs of the population but for the development of certain types of products aimed at building up the State's military power through weapons and accessories. Thus, a feature of Soviet industrialization was the development of heavy industry and military-industrial complex, which had a crucial impact on the environment. In total, at that time in the USSR, 35 industrial giants were built, one third of which were situated in Ukraine. Some of them were Zaporizhstal, Azovstal, Kryvorizhbud, Dniprobud, Dnipalyuminstroy, and others⁴. All these industrial units affected the biological diversity and environmental sustainability in Ukraine and, moreover, they are the largest environmental pollutants in Ukraine⁵. As a result, in the 1950s, society at large felt the need to protect the environment from the adverse effects of these industrial establishments.

The evolution of the green movement in the USSR can be divided into three stages. The first stage (1950-1980) is characterized by environmental protection at the level of society, which was not politicized in a totalitarian State. The second stage (1980-1990) has a feature of the liberalization of the political movement in toto, and, consequently, emergence and rapid development of the green movement. The third stage (early 1990s) is characterized by a decline of environmental activities both by the people and the government, but more prominent position of political parties with the “green” orientation at the political arena was observed. Each of three stages is described further.

³ Johan Galtung, 'The Green Movement: A Socio-Historical Exploration' (1986) 1 International Sociology <<https://doi.org/10.1177/026858098600100106>> accessed 5 March 2021.

⁴ N. O. Tymochko, *Economic History of Ukraine: Textbook* (KNEU 2005).

⁵ 'Webcite Query Result List of 10 Objects, The Largest Environmental Pollutants at the National Level' (*Webcitation.org*, 2021) <<https://www.webcitation.org/682qwZzP1?url=http://www.menr.gov.ua/content/article/201>> accessed 13 April 2021.

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The first stage (1950s – 1980s). This period is characterized by the non-politicized nature of conservation activities of the groups active against poaching, conducting environmental expeditions, cleaning the forest debris manually, and so on. Such groups were usually initiated by students or created by tourist clubs. In the mid-1950s, an organization “Section for the Protection of Animals”, the first association in the USSR, was created in Moscow city to deal with animal welfare issues. It was headed by O.A. Obrazcov with other enthusiasts K.A. Semenov and E.A Antonov⁶. In December 1960, first group encompassing nature conservation, called ‘*druzhyna*’, engaged people from Moscow. This group was initiated by students of the MSU⁷ Biology Department, and the group built up a stable environmental movement in the country (Damiye, 1991)⁸. The movement constantly expanded, and, by the mid-1980s, it included more than 100 nature conservation groups. As for the Ukrainian SSR, the first animal protection group was the Kiev Society for the Protection of Animals, which was formed in 1960. Subsequently, the group became an independent organization called the Kyiv City Voluntary Animal Protection Society. During 1960s-1970s, every politicized environmental initiative would have to function under the strict control of Soviet power. Despite State scrutiny, environmental initiatives and animal welfare groups in the Soviet republics had still made some progress to mobilize legal protection to fauna. In 1961, because of the work of the Section for the Protection of Animals, the Ministry of Internal Affairs began to convict violators under Article 206 of the Criminal Code of the USSR (classifying the crime as cruelty to animals)⁹. Subsequently, numerous documents were prepared assessing unsatisfactory handling and use of experimental animals. It formed the basis of the first regulation focusing on experimental animals and prohibiting the experiments without using analgesia¹⁰ (Yablonskiy, 2007). With the growing consciousness of animal rights activists, the Ministry of Health approved the first “Rules for Using Experimental Animals”¹¹ in 1977 (Ministry of Health Order No. 7551 of 12.08.1977). Later, the USSR’s State Commission for Academic Degrees and Titles (VAC) ceased to accept dissertations of authors

⁶ Tatyana Pavlova, *Memories of Tatyana Nikolaevna Pavlova about the Origin of the Animal Rights Movement in the USSR and Russia* (Center for the Protection of Animal Rights “Vita” 2008).

⁷ MSU – Moscow State University

⁸ Volodymyr Damiye, ‘The Green Party in the USSR’ (1991) 8 Social - Political Science.

⁹ CCU *Criminal Code of Ukrainian SSR*. 1961 [Code]
<http://search.ligazakon.ua/l_doc2.nsf/link1/KD0006.html> accessed 10 November 2020.

¹⁰ Valentin Yablonskiy and Oksana Yablonska, *Science. Fundamentals of Scientific Research in Animal Husbandry and Veterinary Medicine* (2nd edn, Textbook for the system of master’s, postgraduate and doctoral studies 2008).

¹¹ ‘Rules on Using Experimental Animals, Legal Rules’ (*Base.garant.ru*, 1977)
<<http://base.garant.ru/71623476/>> accessed 18 February 2021.

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who did not use analgesic agents during the scientific experiments conducted on animals.

In summary, the first stage of the development of the green movement in the USSR had amateur, apolitical character. Nevertheless, it resulted into a momentum of public activity and awareness to protect the environment and fauna. As an example, the USSR's Law on the Protection and Use of Fauna, 1980, which mandated to regulate the use of animals in experimental laboratories, came into existence. In the USSR in 1980, the extraction of poison from wild animals was also prohibited to protect the wildlife from cruelty and inhumane treatment¹².

The second stage (mid-1980s to the collapse of the USSR). The Gorbachev's perestroika was the cause and a prerequisite for the emergence and development of several informal groups and organizations. The liberalization of the political movement became the basis for the creation of numerous environmental organizations that operated throughout the USSR. The mass environmental movements were facilitated by a series of legal actions adopted by higher authorities; in particular, in 1986, the Ministry of Culture of the USSR adopted the regulations on amateur associations, clubs, etc.¹³. As this regulation document says, amateur associations were recognized as an organized form of peoples' activity, created on a voluntary basis, creative interests, and individual membership of participants to satisfy a variety of interests of people. Based on this regulation, the legal status of the amateur movement changed - it became a socio-cultural formal movement; and, according to Kozlovskaya et al. (2014), it galvanized development of community initiatives in USSR¹⁴. Subsequently, Mikhail Gorbachev sanctioned a non-political environmental movement normatively as facilitating a course on perestroika¹⁵.

German sociologist Ulrich Beck¹⁶ believes that Chernobyl has become a landmark event in contemporary human history. The first Ukrainian Green World Association was created in 1988 precisely as a public reaction to the horrific environmental disaster which occurred in Chernobyl of Ukraine in 1986¹⁷. Green movement offered Ukrainian society a new form of public space to demonstrate, speech and assert. The Green World Association was

¹² I. F. Pankratov and N. A. Syrodov, *Legislation on The Protection and Use of the Animal World* (Legal literature 1983).

¹³ Regulations on the amateur association, hobby club 1986.

¹⁴ Lyudmila Kozlovskaya, *Technology of Social and Cultural Activity: Study Guide* (BGUKI: Ministry of Culture Resp Belarus, Belarus state University of Culture and Arts 2014).

¹⁵ Tetyana Gardashuk, *Conceptual Parameters of Ecology* (Parapan 2005).

¹⁶ Ulrich Beck, 'The Anthropological Shock: Chernobyl And the Contours of the Risk Society' (1987) 32 *Berkeley Journal of Sociology*
<<http://www.jstor.org/stable/41035363>> accessed 12 January 2021.

¹⁷ Yuriy Samoylenko, 'About the Ukrainian Ecological Association Green World' (*Zelenysvit.org.ua*) <<http://www.zelenysvit.org.ua/?page=about>> accessed 12 January 2021.

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the first organization having advocated for democratic voices in environmental causes and it used the democratic spaces for mobilizing the citizens¹⁸. That time green movement became a subject for scientists of the western and central European countries that is, Papadakis (2014) explains the evolution of ecology, peace and alternative movements in West Germany and the emergence of a Green Party out of them.¹⁹ During this period (1983) in Germany, elections were held in German Bundestag. As a result, the Green Party managed to get 28 seats in the country's supreme legislative body. This fact is worth mentioning to confirm that it was an adjustment not only in the environment sector, but also in social arena. About one-third of all deputies' seats were occupied by women; and, moreover, most of them were entrusted with the leading positions in the government formation²⁰. That fact emphasizes the importance and crucial moment of the 1980s both in environmental and social contexts.

The third stage (early 1990s). This stage, started with the breakdown of the USSR, can be regarded as the hugely politically charged issue. Environmental movements during the contemporary post-Soviet states are the so-called "red to green"²¹ way for exploring the evolution of environmental movement post-1991 (Oldfield, 2011). Modern researchers are focused on the character of environmental movements and related democratic trends following the fall of socialist regimes in 1989-1990 (see Fagan and Jehlicka, 2003)²². It has taken two decades since the end of the state socialism for the mobilization of environmental movements. Carmin and Fagan (2010) mentioned that the green activism played a critical role in the downfall of Soviet-style communism in Eastern Europe at the end of the 1980s²³. Thus, this stage is characterized by the mass entry of the environmental movements into the political arena; however, at the same time, it can be described by the decline of the real environmentalism, becoming more populist. The driving force behind the decline was the fact that the former Soviet republics were more concerned about their own independence and economic well-being, rather than environmental security. That time recession had swept all the world's green movements. For instance, the Green Party in Germany did not get a single seat in the Bundestag in the last election of the 20th century. As a result, the Greens

¹⁸ A Tsymbalyuk, 'Green Movement in Ukraine. Green Party of Ukraine' (2001) 9 Ukrainian Word.

¹⁹ Elim Papadakis, *The Green Movement in West Germany* (RLE: German Politics, Routledge 2014).

²⁰ S Grigoryan, *The Green Party in Germany 93 P.* (INION AN USSR 1986).

²¹ Jonathan Oldfield, 'Russia'S Contemporary Environmental Movement' (2011) 13 International Studies Review.

²² Adam Fagan and Petr Jehlicka, 'Contours of The Czech Environmental Movement: A Comparative Analysis Ofhnuti Duha (Rainbow Movement) Andjihoceske Matky (South Bohemian Mothers)' (2003) 12 Environmental Politics.

²³ JoAnn Carmin and Adam Fagan, 'Environmental Mobilisation and Organisations in Post-Socialist Europe and the Former Soviet Union' (2010) 19 Environmental Politics.

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became less focused on community initiatives and increasingly engaged in lobbying, leading to their separation from the general movement. The environmentalist parties of the 1990s aimed to consolidate their position in the political arena, which became the adverse circumstances for the environmental development. Therefore, in the early 1990s, the formation of political party was a major step forward. For example, in Ukraine, the Green Party was established on September 30, 1990 and it was further registered as a political party on May 24, 1991 with the Ministry of Justice²⁴. Unfortunately, by far the majority of “green” parties of that period declined from environmental slogans, whereas many politicians, making a career, turned away from the green while splitting the "green" parties. These insights of the third stage indicate it as a period of deep crisis for the environmental movement in the post-Soviet states²⁵. Regarding the legal initiatives encompassing international cooperation in the field of environmental protection during latter half of the 20th century, there were very few international environmental initiatives in the USSR at that time. Clearly, totalitarian system was an unfavorable ground for any international environmental activity. For example, environmental organization "Greenpeace" made several attempts to open the national branch in the USSR when it implemented the project²⁶ Children of Chernobyl 1990 in Ukraine.

4. CONCLUSION

In light of the foregoing discussion, the pertinent question would be who influenced the government decisions in the State where public participation was forbidden? The answer was searched by tracing the idea of the public participation and its trajectory as a constituent part of the history of the “green movement” in the USSR. Predicated on various sources, the evolution of the “green movement” in the USSR was divided into three stages, each of which outlined the specific level of participation, legislative recognition, and even a subjective perception of stakeholders. The Soviet Union was created in 1922, but only by the end of 1980s it raised a capacity of the public participation – namely, the ability to create associations, clubs, parties and official groups different from the Communist Party. That became the hallmark of the Gorbachev’s era of glasnost and perestroika, but unfortunately, it was executed for only 5 years ahead of the Soviet Union collapsed. Undeniably, that half of the decade was not adequate to cause a

²⁴ Iryna Kovalenko, 'History of The Development of the "Green Movement" in the USSR and its Influence on the Formation of the Green Party of Ukraine' (2008) 3 Scientific notes of Ternopil National Pedagogical University named after Volodymyr Hnatyuk. Series: History.

²⁵ Volodymyr Lytvyn, 'Green World Association and The Green Party of Ukraine' (1991) 9 Politics and Time.

²⁶ 'Greenpeace- Ukraine: Let Our Common House Be Clean' (*Зеркало недели | Дзеркало тижня | Mirror Weekly*, 1995) <https://zn.ua/ECOLOGY/grinpis-ukraina_da_budet_chistym_nash_obschiy_dom.html> accessed 21 February 2021.

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significant effect on the environmental policy of the USSR. However, on the other hand, this movement caused a fairly strong influence on the subsequent creation of “green” political parties of the independent republics of the former Soviet Union. Currently, after a long absence of international activities in the former USSR, Ukraine has focused on the international cooperation and the adaptation to the EU legislation and best practices.

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Research involving animals (ARRIVE Checklist)

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Research on Indigenous Peoples and/or Traditional Knowledge

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