Regenerating Land, Conserving Water: The Role of Holistic Planned Grazing in Sustainable Energy and Agriculture Law

Nur Afiqah Mardjuki[1], Nurul Syazwani Saiman[2], Khairina Batrisyia Aina Mohd Rizal[3], Arina Kamarudin[4], Norhani Mohd Norasli[5]*, Hanafi Haron[6], Mohd Haris Abdul Rani[7]

[1-5,7]Faculty of Law, University Teknologi MARA, Malaysia

[6]Legal Advisor's Office, Universiti Kebangsaan Malaysia, Malaysia

***Corresponding Author**

DOI: https://doi.org/10.47772/IJRISS.2026.101000047

Received: 05 October 2026; Accepted: 10 October 2026; Published: 28 October 2026

ABSTRACT

Land degradation and water scarcity are two fundamental issues with the environment that have essential legal and policy implications, especially within Malaysia's agricultural and renewable energy industries. The potential of Holistic Planned Grazing (HPG) as a regenerative, natural solution to these issues is studied in this research. Through repairing damaged land, strengthening soil, and increasing water retention through the imitation of natural grazing patterns, HPG is an effective way to avoid desertification and minimizing the need for irrigation. The paper examines HPG in the context of the larger legal arguments concerning virtual water trade, focusing special focus to Malaysia's significant imports of agricultural products that require a lot of water, specifically animal feed, and how it negatively impacts the country's water sustainability. HPG still does not currently have official legal status, although being in line with Malaysia's National Policy on Biological Diversity 2016–2025 and supporting Sustainable Development Goal 15 (SDGs). Being incorporated into national subsidy programs, land use planning, and climate adaptation techniques is made difficult with the absence of it. HPG is required to be included in Malaysia's legislation and regulatory frameworks for the purpose to improve climate resilience, food security and sustainable land management. By connecting concepts from environmental law, renewable energy policy, and agricultural regulation, the research utilizes a holistic approach to suggest a more detailed and environmentally focused legal framework. In the end, this model supports Malaysia's transition to a more sustainable and climate-resilient future by acknowledging the link between land health, virtual water consumption, and sustainable development.

Keywords: Holistic planned grazing (HPG), virtual water, regenerative land management, sustainable agriculture legal reform, water scarcity, water sustainability and land degradation solution.

INTRODUCTION

The global struggle for energy, whether it is derived from renewable or fossil fuels, is often seen as a conflict between clean and dirty sources. However, the truth is more complicated. Even renewable energy sources like solar, wind, and hydro have an impact on climate change and air pollution, regardless of whether fossil fuels are the main cause. Land use pressures, rare earth element mining, water issues, and waste management issues that are all related to these technologies. Furthermore, our current environmental crisis has been described by two interrelated environmental issues which are water scarcity and land degradation.

In advancing the legal recognition of Holistic Planned Grazing (HPG), it is important to draw upon the philosophical principle of posterity the responsibility to manage and preserve natural resources for future generations (Dworkin, 1981 Barry, 1999 Weiss, 1990). Researchers including Ronald Dworkin, Brian Barry, and Edith Brown Weiss have pointed out that sustainable governance must guarantee long-term sustainability. Regenerative systems like HPG specifically align with the requirement in the framework of sustainable energy

and agriculture law. It helps to ensure that future generations acquire an efficient and productive environment as well as giving an opportunity of recovering degraded land and conserving water. Embedding the principle of posterity into legal reforms will therefore strengthen Malaysia's efforts toward a more sustainable, fair, and secure energy and agricultural future.

Land degradation refers to the decline in land productivity resulting from inappropriate land management methods (FAO, 1999). Instead, a water scarcity is defined by either a lack of access to quality water sources or insufficient volumes of water (Fluence News Team, 2025). A lot of countries, including Malaysia, have taken an action regarding to these issues by implementing what scholars call a "virtual water strategy", in which water-scarce countries acquire water-intensive goods (e.g., animal) feed from water-abundant countries so that they can make up for their own water problems (Allan, 2003). Hidden ecological footprints and dependencies are created by this virtual water trade, particularly in nations that are mostly relying on imports to maintain livestock and food production (James Kevin Batchelor, 2018).

There is no exception to Malaysia where it can be seen to import RM 7.85 billion worth of animal feed in 2023 (FMT, 2024). This happens due to the rise of demand for animal feed and limited local production of water-efficient alternatives. Thus shows that not only on economic cost but also silent water cost embedded in the virtual water flow from water-stressed exporters like the U.S and Australia (Water Footprint Network, 2003). This will intersect with the broader issues of land misuse and energy law thus, needing integrated, ecologically-based solutions to regenerate the land, conserve water and reduce our reliance on harmful external inputs. The solution should embody the core principles of energy law such as energy security and reliability, prudent, rational and sustainable use of resources and access to modern energy services.

Holistic Planned Grazing (HPG) provides the solution which mimics the natural movement of wild grazing animal herds by rotating livestock through small paddocks for short periods, followed by long rest intervals to allow for ecological recovery (Savory & Butterfield, 2016). HPG can enhance soil health, increase water retention, reduce erosion and enhance carbon sequestration, all while supporting ecosystems and providing a practical and sustainable approach to agriculture and land use that aligns with energy needs (Gosnell et al., 2019).

From a legal standpoint, HPG remained unnoticed in Malaysia. Despite having links with national and international goals such as the National Policy on Biological Diversity 2016-2025 and SDG 15, HPG still lacks formal legal recognition. This lack of acknowledgment will prohibit it from being effectively incorporated into land use planning, agricultural subsidy schemes, and climate adaptation methods, ultimately limiting its potential to improve agriculture and support ecosystem health.

This article explores the legal and policy implications of integrating HPG within Malaysia's agriculture and energy governance systems. There are four existing statutes that provide the most coherent and immediately relevant legal foundation that may integrate the use of Holistic Planned Grazing into Malaysia's legal system. The Renewable Energy Act 2011 presents the primary legal approach in recognising HPG-linked biomass as a renewable energy source, particularly in promoting sustainable, low-water feedstock alternatives. This is supported by the Sustainable Energy Development Authority Act 2011 (SEDA), which creates the mechanisms for administering sustainable energy promotion. SEDA can serve as the policy node through which regenerative agricultural methods are verified, funded or regulated, thereby extending the scope of sustainable energy law to include nature-based farming systems. Meanwhile, the National Land Code 1965 remains crucial, as land use and tenure are governed by state authorities. Without legal reform to include regenerative practices such as HPG within land administration processes, such methods will remain outside the boundaries of legitimate planning or subsidy eligibility. Lastly, the Environmental Quality Act 1974 supports the environmental benefits of HPG. Also, HPG supports the Act's regulatory focus on pollution control and sustainable land management by lowering erosion, boosting soil carbon, and improving water quality. Together, these four laws offer Malaysia's legal framework for a shift toward regenerative, integrated farming and energy systems.

This article looks into how regenerative approaches, such as HPG, could help to encourage a sustainable land management, lower Malaysia's virtual water footprint, and narrow the gap between food security and conservation of the environment. The fact that agriculture plays a crucial part in the virtual water trade,

implementing regenerative methods like HPG to enhance soil moisture while minimizing reliance on irrigation could contribute to reducing the general virtual water footprint of food production. The research promotes a combined, environmentally focused model of land use law that acknowledges the interrelated nature of soil health, food systems, virtual water, energy security and reliability and sustainable energy production based on the ethical and rational use of resources and equitable access to contemporary energy services through doctrinal legal analysis and a multidisciplinary approach (Heffron et al., 2018).

Holistic Planned Grazing (HPG) is not just a technique of regeneration in the management of land and water, it also perpetuates a conceptual framework within energy and agricultural law as it involves the systemic mind, legal coherence, and sustainability. As emphasized in the conceptual matrix on energy law, HPG manifests itself as an integral part of that functioning law which has to be consistent as an interrelated structure regarding the management of standards over fragmentation and cross-sectoral impacts from policies by virtual water dependency and inefficiency within the energy systems. It provides coherent answers about land degradation problems integrated with inadequate responses due to disconnected policy fields. HPG contextualizes this through the three founding principles of energy law which are: energy security and reliability, prudent and sustainable use of resources, and access to modern energy services. HPG can localize feed production, enhance soil and water resilience, and reduce Malaysia's reliance on imported, water-intensive biomass like alfalfa. This directly contributes to national energy reliability and food sovereignty. Further supported by energy justice theory, HPG reinforces distributional justice by reducing unequal ecological burdens on water-scarce exporting nations, recognition justice by addressing overlooked regenerative farming communities, and procedural justice by advocating inclusive policy reforms that incorporate local agricultural knowledge. Therefore, a holistic legal framework that integrates HPG can enhance environmental governance and ensure equitable, secure, and sustainable outcomes for Malaysia's agriculture-energy nexus.

LITERATURE REVIEW

More than 40 years ago, Zimbabwean biologist Allan Savory introduced holistic grazing as a grazing management technique based on planned rotational grazing that "mimics nature" in order to boost the production of pasture by storing water and carbon (C) in soils (SLU, 2016). Pasture gives a meaning that it is a grass or similar plant suitable for animals such as cows and sheep to eat, or an area of land (Dictionary Cambridge). Similarly, the planning process known as "holistic planned grazing" aims to address the many challenges that livestock managers encounter on a daily basis when combining livestock production with crop, wildlife, and forest production in order to maintain land regeneration, animal health and welfare, and profitability (Savory, 2015).

The three primary aims of grazing management, the first one is to increase the productivity and improve species composition by giving key species some rest, second one is to reduce animal selectivity and lastly ensuring more uniform animal distribution (Briske et al., 2008). Usually, it has different types of grazing management techniques and the distinction can be made between continuous grazing and rotational grazing. In general terms, a rotational grazing system consists of using multiple pastures, one of which is grazed while the others are rested and then re-grazed. One pasture is used for the whole of the grazing season when continuous grazing is practiced. Using rotational grazing has many advantages such as it can improve animal waste distribution and nutrient use, reduce the cost of machinery, fuel, and facilities and also reduce the supplemental feeding and pasture waste (Ray et al., 2011).

Most importantly, there are some principles that need to be taken into consideration in a holistic planning grazing. The first principle is to run as few herds as possible, of which only one herd is considered the best one. Only one herd with a large size is better than having several smaller herds scattered across the land. For each new herd, plants have less growing time, which lowers plant and livestock production. The majority of locations on the grazing unit will only have livestock on them 10% of the time or a smaller number when the animals are concentrated into only one huge herd (Savory, 2015). The second principle is to create one plan for the growing season before main growth starts. In order to prevent overgrazing of plants and to ensure that animals have enough food throughout the year, this plan aims to produce as much pasture as possible during the growing season (Savory, 2015). The last principle is to maximize density for the shortest amount of time. Animals that

stay together in a single herd are better at covering the soil with plant matter and chipping the soil top with their feet, allowing water and air to enter and allowing new plants to sprout. Animals that move around will produce less litter to cover the soil surface since their feet will not have as much of an impact (Savory, 2015).

Building on the ecological role of HPG in conserving water and improving land resilience, it is necessary to examine how this intersects with broader global water challenges. Global freshwater resources are limited and subject to increasing pressure from population growth, economic development and climate change (Vorosmarty et al., 2000; Gleick, 2008; Strzepek and Boehlert, 2010). About 90% of freshwater is used for food production (Shiklomanov, 1997; Oki & Kanae, 2004; Hoekstra & Chapagain, 2008) which is the reason for the research in the use of water in agriculture. Allan in 1993, introduced the concept of virtual water embodied in the production and trade of agricultural commodities. He also argued that countries using virtual water as international trade would receive immense economic benefits because food usually costs less to import than to grow locally. The concept of virtual water has become a neoliberal form of water which treats global water flow into commodity flows and now even natural water systems like watersheds are treated as markets (Whitney et al., 2018). About 80% of freshwater is consumed in agriculture (Rost S et al., 2008). Products containing virtual water are used as a means in international trade by transferring water resources between regions. Food trade from highly productive countries to less productive countries may help to reduce the use of water per amount of crop (Chapagain AK et al., 2006).

This virtual water dependency is highly relevant to the Malaysian context, particularly in the area of livestock feed. As stated in the CAPSA Working Paper No. 79 from UNESCAP, as in 2001, the amount of grain maize imported by Malaysia was 2.4 million tonnes valued at RM 1.03 billion equivalent to US$ 270 million. Malaysia is the biggest buyer of maize among the Southeast Asian countries in which they bought it from the United States, Argentina, China and lately India. This is used extensively for animal feed making up 40 and 50 percent of swine and poultry feed formulations. In the same year, Malaysia also imported about 580,000 tonnes of soybean meal valued at RM 465 million equivalent to US$ 122.3 million which is used in the animal feed industry at between 20 and 25 per cent. Malaysia does not produce maize and soybean locally for feed, all is met by imports (Tunku Mahmud & Sarmin, 2005).

According to the MIDA, Malaysia heavily relies on imported corn, soybean and barley grain in poultry feed. As of 2023, MIDA has approved operations in various animal feed production with a total of RM 3.8 billion investments. Results have shown that maize is the most efficient crop in terms of water consumption and soybean consumed more water per tons of product (Tuninetti et al., 2015; Tozzini et al., 2021).

This heavy reliance on resource-intensive imports draws attention to Malaysia's policy efforts toward sustainable resource management. Malaysia is recognized as one of the 12 countries in the world with mega-biodiversities. Even before the Convention on Biological Diversity (CBD) was ratified on June 5, 1992, Malaysia had put policies in place for the long-term management and sustainable utilization of its rich biological diversity. On June 24, 1994, Malaysia ratified the treaty, and three months later it came into effect. Building on its previous accomplishments and seeing the need to strengthen multi-sectoral roles in the management of biodiversity resources, Malaysia enacted a National Policy on Biological Diversity (NPBD) in 1997 (Raman Letchumanan, 2002). According to the NPBD, holistic planning takes into account how ecosystems, animals, and human activity are connected. Collaboration among representatives from several sectors, including forestry, agriculture, and local communities, are necessary to make sure that conservation initiatives are a part of a larger, sustainable development plan rather than happening in isolation.

There are NPBD Goals and Strategies Related to Holistic Planning and it comes out with a total of goal 5 with 17 targets (NRE). For example, goal 2 in National Policy on Biological Diversity 2022-2030 was to decrease both direct and indirect threats on biodiversity which comes from the unsustainable grazing and farming methods. To maintain the ecosystem health, NPBD encourages the use of best practices in grazing which can be in the form of rotational grazing and rehabilitation of damaged land. Another example can be seen in goal 5 where it encourages the adoption of comprehensive and sustainable methods in grazing and other sectors by enhancing the ability and understanding of all stakeholders. Therefore, indigenous people and grazing

communities can be acknowledged as the important collaborators in biodiversity conservation which majorly benefits from their traditional knowledge and management techniques.

However, it must be noted that this policy does not mention holistic planning grazing directly. Apparently, the principles, the goals and objectives are almost identical to sustainable land management approaches which include holistic planning and grazing management. This policy framework sets a strong foundation for a better implementation of holistic grazing practices as part of Malaysia's broader commitment to biodiversity conservation and sustainable development.

Similarly, the National Agrofood Policy 2021–2030 (NAP 2.0) further elaborates Malaysia's agricultural sustainability priorities. In Part B of Chapter 3 of the National Agrofood Policy 2021–2030 (NAP 2.0), several critical issues and challenges facing Malaysia's agrofood sector are highlighted. It mentions the issue of land scarcity which is degraded primarily by agricultural activities thus diminishing the ecosystem to provide goods and services. Cultivation through deforestation is no longer sustainable as clearing the forest will only cause severe damage to the environment including reducing the quality of drinking water. The Food and Agriculture Organization (FAO) estimates globally that arable land per person will continue decreasing until 2050 (Ministry of Agriculture and Food Industries Malaysia, 2021).

Furthermore, this also discusses water scarcity which is a limited resource sought for agricultural and other activities. Globally, agriculture used up about 70% freshwater and up to 95% in some developing countries (FAO, 2017). Experts forecasted that by 2050, the usage of water by agriculture is expected to increase by more than 50% for irrigated food production purposes. To produce a person's daily food, it will take between 2000 - 5000 litres of water (FAO, 2009). This policy advocates for sustainable increase in productivity in agriculture in order to feed a population of 10 billion by 2050 while also avoiding negative outcomes such as soil degradation and reduction of water quality over time (Ministry of Agriculture and Food Industries Malaysia, 2021).

One of the policy objectives of the NAP 2.0 (2021–2030) is articulated in Chapter 5 under Objective 6, where it promotes the widespread adoption of Sustainable Consumption and Production (SCP) practices. This includes water footprint reduction. The policy incorporates the United Nation policy that emphasised to implement a holistic and integrated manner in the agriculture system in order for it to become more productive and less wasteful. Plus, the rising global issue like water scarcity and climate changes is highlighted because it can affect the production in the food system. The adoption of Sustainable Consumption and Production (SCP) is necessary in achieving SDG goals, specifically Goal 12: Responsible Consumption and Production (Ministry of Agriculture and Food Industries Malaysia, 2021).

Additionally, Policy Thrust 4 in NAP 2.0 underscores the need to advance sustainable farming practices that protect and enhance environmental health. This is to improve soil productivity and minimise the adverse effect on climate, soil, water, air, biodiversity and human health (Ministry of Agriculture and Food Industries Malaysia, 2021).

To better understand the legal and governance dimensions of these policies, it is important to consider Malaysia's alignment with international sustainability commitments. At the international level, the United Nations established the Sustainable Development Goals (SDGs) in 2015 providing a broad and legal framework for addressing the energy, water and land nexus. SDG 6 emphasizes universal clean water and sustainable management of water resources, while SDG 7 highlights the access to affordable and sustainable energy for all (United Nation, 2023). These goals conclude that both effective water and energy governance are reinforcing cooperatively. These international obligations affect domestic environmental and energy laws including Malaysia's policy on advancing towards sustainable development.

Malaysia's domestic legal approach to energy and land sustainability has been formed along the lines of conforming to international SDG targets. This can be seen through the National Renewable Energy Policy and legal instruments such as the Renewable Energy Act 2011 and the Sustainable Energy Development Authority Act 2011. These are the regulations for the legal basis of promoting bioenergy and other renewables such as

alternative energy to fossil fuels. This framework is still in need of modification as it lacks integrated planning between energy generation and land use.

Furthermore, challenges in integrating federal-level energy policy with state level land administration can be seen as land use in Malaysia that is governed primarily by National Land Code 1965. As has been stated in the Federal Constitution, land matters fall under state jurisdiction which further emphasized the need for a more nexus focused legislation.

In the local context of a tropical and humid climate in Malaysia convenient for agricultural and forest plantation to utilize biomass energy, or bioenergy, is a powerful underlying potential that may be utilized to grow Malaysia's local renewable energy landscape and as a means of lowering greenhouse gas emissions. Due to its similarity to conventional diesel in terms of energy content and chemical structure, as well as its low sulphury content, non-toxicity, high biodegradability and efficient combustion, bioenergy, particularly palm biodiesel has shown considerable promise as a sustainable and environmentally friendly fuel in Malaysia. Coal, oil, and gas are the main sources of Malaysia's principal energy supplies, as the country is one of the biggest owners of fossil fuel resources in Southeast Asia. Consumption of resources is encouraged in order to lessen environmental risks (Rashidi et al., 2022)

Moreover, the bioenergy production that requires a copious amount of water for the feedstock production and fuel refining is one of the barriers for the bioenergy deployment, given some regions in the country suffer from water scarcity. The sustainability challenge of the bioenergy industry is mainly related to the feedstock availability for the sufficient supply. In this sense, low-cost biomass needs to be immediately produced to ensure sustainable biomass supply for the bioenergy production, high-yield, high-quality. Therefore, valorization of the various types of biomass materials for the bioenergy production is significant in ensuring the long-term development of the biomass energy sector in Malaysia.

Due to the low reporting from industrial resources and the lack of wastewater, this poses a risk to more than 3 billion people who live in places with unknown freshwater quality. Farming practices and treatment of wastewater must evolve particularly in regions with high population growth. Moreover, improved agricultural management is needed in order to upgrade water use efficiency. In order to achieve the targets of Goal 7 and the Paris Agreement, consistent policy momentum is needed to increase the deployment of renewable energy and energy conservation across all sectors, as well as to mobilise public and private investment, especially in developing countries. Developing countries had reached record breaking of renewable energy-generating capacity in 2021 over two decades of constant growth that has continuously exceeded population expansion (United Nations, 2023). While these policy efforts outline a structural approach to sustainability, they must be critically examined through the lens of environmental justice and socio-political theory.

Karl Marx is widely known for his critique of capitalism and his argument that the abolition of class structures is essential for achieving true justice. In his first volume of Capital, said that there is a correlation between labour and nature. He proposed that labor is a cooperative process in which humans and nature work together to initiate, control, and supervise the physical interactions between the two. A person will use his own physical capabilities, such as his arms, legs, head, and hands, to appropriate natural items in a way that best suits his needs. The main source of human nutrition is soil in its original, undisturbed state, combined with its water content. It is the omnipresent product of human labor and exists on its own. The items that labor takes out of their immediate surroundings are regarded as naturally occurring labor subjects. Timber extracted from forests and fish captured from bodies of water are examples of natural resources (Marx, 1998).

Marx also pointed out that self-sustaining agriculture can be negatively affected by capitalism. Furthermore, he said that the natural circumstances needed for agricultural output were no longer easily accessible inside the sector, instead, it existed as a distinct and autonomous industry (Marx, 1973). This leads to what he terms a “metabolic rift”, a rupture in the material exchange between humans and nature caused by capitalist production. Marx claims that the concentration of people in urban areas and the ensuing disruption of the flow of matter between humans and the soil prevent the return of essential elements that humans consume in the form of food and clothing, which is why he attributes the depletion of soil fertility to capitalist production. It is possible to see

every development in capitalistic agriculture as a skill improvement in taking advantage of the soil and the worker. This suggests that nations like the United States that base their development on modern industry accelerate the process of destruction (Marx, 1998).

Expanding on Marx's critique, eco-Marxist Derek Wall, asserts that capitalism contributes to the deterioration of the environment such as depletion of water resources for subsistence farmers (Wall, 2005).

From Marxism's perspective, humans will exploit nature for its own use and profits. Plus, in a capitalist industry, the more nature is utilized, the more depletion in resources will happen as well as depletion in soil fertility. A similar approach by Wall, where capitalism can contribute to depletion of water resources Thus, the approach for holistic planned grazing is aligned with Marx's perspective because we can restore the soil fertility holistically without depending on modern industry as we mimic the natural grazing of animals with livestock.

While Marx offers a systemic critique of economic structures, legal philosopher Ronald Dworkin contributes a moral and interpretive lens to the conversation. Ronald Dworkin has found that Hart's theory fails to take into account concepts beyond rules such as body of custom as well as principles that can influence judicial decision making. Dworkin believed that Hart's theory was the "ruling theory of law". In the early stages of developing his theory, Dworkin's main focus was on differentiating between principles and rules. He differentiates between rules and principles where rules are applied in an "all or nothing manner". Instead, a rule is either legitimate or incorrect, as opposed to principles, which are less applicable in some situations. Moreover, according to Dworkin the judges need to have moral principles when interpreting laws, especially in hard law cases where rules do not provide clear guidance. In Dworkin's "Right Answer Thesis", judicial discretion is necessary in resolving legal disputes. Judges should aim to find the right answer by interpreting the law in light of moral principles. Dworkin relied on Hercules' holism as a super judge with remarkable moral judgment and interpretative skills. As stated by Elise G. Nalbandian (2009), Hercules is an ideal judge who can resolve complex legal disputes by interpreting the law in a way that brings together moral principles with legal regulations.

Although HPG is in line with national sustainability goals such as the SDGs and NPBD 2016–2025, it currently lacks formal recognition under Malaysian law. Through Dworkin's theoretical lens, the absence of legal acknowledgment reflects the law's failure to incorporate moral principles that encourage sustainable land stewardship. Despite the fact that HPG promotes intergenerational justice, food security, and biodiversity, its lack of legal authority illustrates a positivist gap that overlooks morally significant considerations. Additionally, although HPG is not specifically covered by law, its benefits are implied by a number of programs in NPBD, NAP 2.0, SDGs. Dworkin's distinction between rules and principles implies that even in the absence of explicit legislative provisions on HPG, courts and policymakers should continue to maintain the concepts that support environmentally sustainable land management. Legislative development should be informed by sustainability values embedded in international obligations such as SDG 15. In situations when the law is silent or fragmented, the legislative and courts must interpret the law by using ethical and ecological principles that support food security, intergenerational justice, and sustainable energy use, much like Dworkin's Judge Hercules. Despite not being expressly legislated, HPG reflects sustainability principles that are consistent with Malaysia's constitutional and policy commitments.

Brian Barry's intergenerational theory further emphasizes that the present generation has the moral obligation to manage environmental resources responsibly so as not to place an excessive burden on future generations. Barry emphasizes that those living today act as "temporary custodians of the planet" and have a moral duty to ensure that future generations inherit conditions that allow for a decent and meaningful life (Barry, 1999) In his seminal work Sustainability and Intergenerational Justice (1999), he contends that justice must transcend time and to be extended beyond our current generation, requiring the preservation of the ecological circumstances necessary for the welfare of future generations. According to Barry, the reckless exploitation of finite resources or abusing limited resources for short benefit without regard for the long term effects constitutes a serious failure of justice. Following Barry's theory, sustainability is a fundamental requirement in achieving intergenerational justice rather than a preferred policy.

This principle strongly supports the granting of legal recognition of regenerative approaches such as Holistic Planned Grazing (HPG). By restoring soil health, improving water retention, and reducing environmental damage, HPG contributes to a lasting ecological resilience. Integrating such practices into legal and policy frameworks aligns with Barry's call to structure laws that prevent ecological burden to future generations and instead uphold intergenerational fairness. Accordingly, HPG in Malaysia serves not only as a strategy for climate change mitigation but also an ethical obligation essential for achieving sustainable energy and effective energy governance.

METHODOLOGY

This research explores the feasibility of implementing Holistic Planned Grazing (HPG) into Malaysia's legal and policy frameworks employing a qualitative, doctrine-based legal research approach, interdisciplinary theoretical examination, and comparative policy research. The method used illustrates the broad scope of the research challenge, which occurs at the linkages of sustainability theory, energy policy, agricultural governance and environmental law.

FINDINGS AND DISCUSSION

Based on the study's finding, Malaysia's problems of water scarcity, land degradation and reliance on virtual water can be effectively addressed through Holistic Planned Grazing (HPG) which is a type of regenerative land management that is in line with the national policy framework such as National Agrofood Policy (NAP 2.0) 2021–2030 and the National Policy on Biological Diversity (NPBD) 2016–2025. These place importance on biodiversity conservation, sustainable practices and lowering Malaysia's dependency on imported water-intensive animal feed. HPG has majorly contributed to long-term environmental sustainability and national food security by restoring damaged soil, improving water retention in the landscape and promoting ecological restoration.

Despite being in line with the global framework such as the Sustainable Development Goals (SDGs), specifically on Goal 6 (Clean Water and Sanitation, Goal 12 (Responsible Consumption and Production) and Goal 15 (Life on Land), this study also shows that Malaysian domestic law does not explicitly recognize holistic planned grazing (HGP). The lack of its legal recognition in so many ways hindered its application in important mechanisms such as land use planning, agricultural subsidy programs and national climate adaptation initiatives. This creates a gap between Malaysia's sustainability objective and their practical implementation which is caused by its lack of specific law provisions for regenerative grazing.

While the literature review primarily examined philosophical perspectives and policy frameworks concerning sustainability and intergenerational justice, it did not specifically analyze Malaysia's current environmental legislation. Nonetheless, the findings indicate that Malaysia already has a strong legal framework that is capable of assisting regenerative initiatives such as HPG. Land use, water resources, and environmental protection are governed by key statues such as the National Land Code of 1965, the Environmental Quality Act of 1974, the Land Conservation Act of 1960, and the Waters Act of 1920. While HPG is not specifically included in these laws, they could be interpreted or amended to incorporate sustainable land management practices in line with Malaysia's broader aims for climate adaptation and ecological conservation.

Based on the comparative viewpoint from the Energy Law in Malaysia's presentation, it shows that Malaysia's approach to energy law contains useful ideas on how to put HPG into the legal system. Renewable energy sources such as biomass and biogas have been promoted and been legally recognized in the statutes such as Renewable Energy Act 2011 and the Sustainable Energy Development Authority Act 2011.

Finally, the study identifies a larger structural issue, which presents legislative frameworks in approaching land use, water management and energy policy in Malaysia. By introducing regenerative land management methods such as HPG in the legislative framework, various sectors can be connected to promote a holistic approach in sustainability. By putting HPG into the policy, it can facilitate its practice while also applying the concept of

intergenerational justice and environment equity thus, ensuring a longer use of natural resources for Malaysia's future generations.

RECOMMENDATIONS

A few recommendations for implementing Holistic Planned Grazing (HPG) into Malaysia's legal and policy frameworks have been provided in this research. First and foremost, holistic managed grazing needs to be acknowledged legally. Through national legislation, the Malaysian government should officially recognize Holistic Planned Grazing (HPG) as a sustainable land management strategy. In order to make it happen, it can be done by amending or supplementing the National Land Code 1965 and Environmental Quality Act 1974 to clearly acknowledge HPG as a legitimate, sustainable land management method, as well as the Land Conservation Act 1960, which includes regenerative practices such as HPG.

However, authorities are required to implement an exhaustive holistic legal strategy that connects the differences in land management, water governance, and energy law. In order to acknowledge regenerative biomass from HPG as an important part of Malaysia's renewable energy plan, the Renewable Energy Act 2011 and the Sustainable Energy Development Authority Act 2011 must be extended. As part of sustainable energy projects, the SEDA Act of 2011 should also give governments the authority to grant permission and encourage agricultural regeneration processes. Furthermore, to promote Malaysia's commitments to SDGs 6, 7, and 15 as well as national efforts like NPBD and NAP 2.0, a consistent legislative framework will enhance collaboration across energy institutions, land offices, and environmental authorities. This may increase self-sufficiency, reduce reliance on imported feed, and maintain environmental justice for future generations.

Finally, it is necessary to make a few moves to educate and guide agricultural stakeholders on the basics and benefits of HPG. For example, this involves informing and preparing stakeholders like farmers and livestock managers. They must understand how to properly plan and cycle grazing, assess soil health, and use sustainable practices. For government people, particularly those who are working for the agriculture, land, and environment departments, they need to successfully support and monitor regenerative methods. Besides that, there also should be public awareness. As we notice, people who are particularly urban consumers and policymakers, frequently are unaware of the relationship between land degradation, water scarcity, and imported animal feed.

Thus, awareness campaigns are necessary to highlight the environmental and food security benefits of HPG, change the public's view of more sustainable and local food production and increase community support for regenerative agriculture. This can be done by using media campaigns, informative videos, and social media posts. Not only that, introducing HPG into academic programs, particularly in agriculture, environmental science and legal faculties.

CONCLUSION

As humans keep on deriving the natural resources on earth to produce energy, there will be lots of other consequences such as problems as to how to maintain such resources for a long-term use of those resources for future generations. So, as a responsible human being to keep the longevity of future generations and keep resources for the use of everyone, it is important to make an effort to maintain the sustainability of such resources. Nature has given us lots of resources to keep us surviving and continue living. However, its quantities and qualities will keep on declining if humans do not use it wisely. This can be seen in human activities that are plainly causing further land degradation and water scarcity which is very important in making our food to survive.

Allan Savory introduced the methods of holistic grazing that can be used to restore back the land or soil health and address the issue of water scarcity. By using this method, we can ensure the sustainability of these resources for a much longer period. This method also aligns with many national and international goals to address the threats to ecosystem health, biodiversity, agricultural sustainability, virtual water trade, water scarcity and climate problems. Despite that, holistic grazing remains invisible in the eyes of the law thus, making it harder to be implemented.

It is important to acknowledge this method to ensure the implementation of it. Also, this makes it a responsibility of everyone to apply this method and no one will get away with using natural resources without the effort of sustaining it for future generations use. Considering the Marxist perspective where humans will exploit nature for profits just strengthens the idea that nature sustainability is important and humans must be restricted in doing so.

In conclusion, not just Malaysia but, every nation globally must recognize the methods of holistic planned grazing as the problems of land degradation and water scarcity are very dangerous to human longevity and must be addressed. The idea of natural resources depleting is unstoppable as it is limited in quantities. Therefore, humans are responsible for using it wisely and try to sustain it for a longer use. Having a robust legislative framework is essential to approach the problems in order to keep natural resources justly used and sustained for future generations and longer use.

ACKNOWLEDGEMENT

This publication stems from a group project undertaken by students of the Faculty of Law, Universiti Teknologi MARA (UiTM), and we gratefully acknowledge their collective effort, research commitment and dedication in developing the foundational analysis that shaped this work. We also extend our appreciation to the Faculty of Law, UiTM, for providing an enriching academic environment that fosters rigorous inquiry and meaningful engagement with real-world industrial relations issues. Finally, we acknowledge the valuable industrial linkages supporting the publication of this article.

REFERENCES

1. About Holistic Planned Grazing. (2015). What Is Holistic Planned Grazing? https://savory.global/wp-content/uploads/2017/02/about-holistic-planned-grazing.pdf
2. Allan, J. A. (2003). Virtual water—the water, food, and trade nexus. Useful concept or misleading metaphor? Water International, 28(1), 4–11. https://doi.org/10.1080/02508060.2003.9724812
3. Brian Barry (1999), "Sustainability and Intergenerational Justice", in Andrew Dobson (ed.), Fairness and Futurity, New York: Oxford University Press, pp. 93-117. (2017). In Routledge eBooks (pp. 359–384). https://doi.org/10.4324/9781315256306-27
4. Dalin, C., Konar, M., Hanasaki, N., Rinaldo, A., & Rodriguez-Iturbe, I. (2012). Evolution of the global virtual water trade network. Proceedings of the National Academy of Sciences, 109(16), 5989–5994. https://doi.org/10.1073/pnas.1203176109
5. Edith Brown Weiss, In Fairness to Future Generations: International Law, Common Patrimony, and Intergenerational Equity (United Nations University Press 1989).
6. FMT. (2024). Malaysia's food imports hit RM71.6bil in 2023, says Mat Sabu. Free Malaysia Today. https://www.freemalaysiatoday.com/category/nation/2024/02/28/malaysias-food-imports-hit-rm71-6bil-in-2023-says-mat-sabu
7. Gosnell, H., Charnley, S., & Stanley, P. G. (2019). Climate change mitigation as a co-benefit of regenerative ranching: Insights from Australia and the United States. Rangeland Ecology & Management, 72(6), 850–861. https://pmc.ncbi.nlm.nih.gov/articles/MC7435039/pdf/rsfs20200027.pdf
8. Konar, M., C. Dalin, S. Suweis, N. Hanasaki, A. Rinaldo, and I. Rodriguez-Iturbe (2011), Water for food: The global virtual water trade network, Water Resour. Res., 47, W05520, doi:10.1029/2010WR010307
9. Land Degradation. (2023, June 7). UNDRR. https://www.undrr.org/understanding-disaster-risk/terminology/hips/en0004
10. Malaysian Investment Development Authority. (2023, March 15). Animal feed – A critical component in the global food chain. MIDA. https://www.mida.gov.my/animal-feed-a-critical-component-in-the-global-food-chain/
11. Maria Nordborg. (2016). Holistic Management– a critical review of Allan Savory's grazing method. https://orgprints.org/id/eprint/34330/1/holisticmanagement_review.pdf
12. Ministry of Agriculture and Food Industries Malaysia. (2021). National Agrofood Policy 2021-2030 (NAP 2.0): Agrofood modernisation: Safeguarding the future of national food security. Ministry of Agriculture and Food Industries Malaysia. https://ppl-ai-file-upload.s3.amazonaws.com/web/direct-

files/attachments/18042386/45445a3a-7be0-4638-a40e-1dd00c0060ec/national_agrofood_policy_2021-2030_nap-2.0.pdf
13. Ministry of Natural Resources, Environment and Climate Change, Malaysia. (2022). National Policy on Biological Diversity 2022-2030. https://www.nres.gov.my/ms-my/pustakamedia/Penerbitan/NPBD%202022-2030%20(Spread%20View).pdf
14. Nalbandian, E. G. (2009). Notes: Ronald Dworkin's Theory of Law. Mizan Law Review, 3(2), 370–377. https://www.africaneditors.org/journal/MLR/abstract/50891-84035
15. Rashidi, N. A., Chai, Y. H., & Yusup, S. (2022). Biomass Energy in Malaysia: Current Scenario, Policies, and Implementation Challenges. Bioenergy research, 15(3), 1371–1386. https://doi.org/10.1007/s12155-022-10392-7
16. Ronald Dworkin, Taking Rights Seriously (Harvard University Press 1977).
17. Savory, A., & Butterfield, J. (2016). How Biodiversity-Friendly Is Regenerative Grazing? https://www.frontiersin.org/journals/ecology-and-evolution/articles/10.3389/fevo.2021.816374/full
18. Smith, R., Lacefield, G. Burris, R. Ditsch, D. Coleman, B. Lehmkuhler, J. and Henning J. (2011), Rotational Grazing, https://grazer.ca.uky.edu/sites/grazer.ca.uky.edu/files/id143.pdf
19. Stack Whitney, K., & Whitney, K. (2018). John Anthony Allan's 'virtual water': Natural resources management in the wake of neoliberalism. Environment & Society Portal, Arcadia, (11). Rachel Carson Center for Environment and Society. https://doi.org/10.5282/rcc/8316
20. Sysop. (2025). What is water scarcity? Fluence. https://www.fluencecorp.com/what-is-water-scarcity/
21. Tozzini, L., Pannunzio, A. and Soria, P.T. (2021) Water Footprint of Soybean, Maize and Wheat in Pergamino, Argentina. Agricultural Sciences, 12, 305-323. https://doi.org/10.4236/as.2021.123020
22. Tunku Mahmud bin Tunku Yahya, & Sarmin bin Sukir. (2005). Prospects of feed crops in Malaysia (Working Paper No. 79). UNESCAP-CAPSA, Centre for Alleviation of Poverty through Secondary Crops' Development in Asia and the Pacific. https://ppl-ai-file-upload.s3.amazonaws.com/web/direct-files/attachments/18042386/1bb8a8c0-0b15-41ab-a07b-1e0ed364b535/wp050079.pdf
23. Understanding virtual water trade | AR18. (n.d.). https://ar18.iiasa.ac.at/virtual-water/#:~:text=Virtual%20water%20trade%20refers%20to%20the%20unseen,process%20%E2%80%93%20from%20water%2Dabundant%20regions%20or%20countries.
24. United Nations Department of Economic and Social Affairs. (2023). The sustainable development goals report 2023: Special edition. https://unstats.un.org/sdgs/report/2023/The-Sustainable-Development-Goals-Report-2023.pdf
25. Water Footprint Network. (2003). Water footprint of crops and crop products. https://www.waterfootprint.org/resources/Report12.pdf
26. Zaheer-Ahmed, Z., Shah, M. A., & Saleem, M. (2023). The idea of environment in Marxist philosophy. Russian Law Journal, 11(4), 502–505
27. Zhang, M., Zhang, Y., Tian, Q., Man, X., & Wang, M. (2024). Virtual water flows and drivers in the international trade of agricultural products of the regional comprehensive economic partnership. Water Science & Technology, 89(3), 730–744. https://doi.org/10.2166/wst.2024.022