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Understanding ecosystem services: A shift in modern environmentalism

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ABSTRACT

Ecosystem services have rarely been discussed in the same framework with modern environmentalism. Therefore, understanding the interactions and relationship between ecosystem services and modern environmentalism was little to be known. We conducted a review of studies that aims to understand the relationship and interaction between ecosystem services and modern environmentalism to summarize research from this emerging topic and to identify the patterns for a new shift of these two concepts from different case studies. Our review found that ecosystem services and modern environmentalism can be described in the same particular framework. Therefore, this research also proposed an ecosystem services-modern environmentalism framework to help scientists in this area to have a better understanding of how these two concepts could be connected. In this paper, we also discussed and analyzed how the connection between ecosystem services and modern environmentalism in ASEAN can be the reason for numerous multi-lateral an environmental agreement such as the Paris Agreement.

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1. Introduction

In recent years, the ecosystem service has been on the headline more often compare to 10 years ago. Numerous studies have been done in order to understand how it works and what can be done in this newly discovered sub-discipline (Tahir and Malek, 2018). The concept of ecosystem services became prominent thanks to the MEA (2005) and The Economics of Ecosystems and Biodiversity Synthesis Report (Sukhdev et al., 2014) both of which emphasized the importance of natural capital for socio-economic systems and warned of the potential socioeconomic drawbacks of ecosystem degradation. According to Reid et al. (2005), ecosystem services were defined as the benefits that human attain from the environment whether it is provision services (e.g.: food, timber, raw materials and medicinal products), regulating services (e.g., extreme events mitigation, water quality control and carbon sequestration), cultural services (e.g., recreation, spiritual and aesthetic) or supporting services (e.g., habitat conservation and primary

production). Even the smallest ecosystem such as fish aquarium has its services towards human. The term “ecosystem services” have been introduced in 2005, since that there were changes in how scientist perceived social-ecological system. Social-ecological system can be defined as a coherent system of biophysical and social factors that regularly interact in a resilient, sustained manner (EU, 2012). Lot of studies have been done on the integration of social-ecological system for example the study on social-ecological system modeling by Sibertin-Blanc et al. (2011) that proposed a meta-modeling of social-ecological systems (SES). The model shows that the interaction between social system and ecological system bring a new paradigm of resilience. The meta-model of social-ecological systems depicting almost the same process and indication like ecosystem services where improving the ecological services would be more beneficial towards social component.

UN (2015a, 2015b) announced the Sustainable Development Goals (SDGs) to replace the Millennium Development Goals (MDGs) which expired in the same year. The Sustainable Development Goals aim to protect the planet and ensure all people enjoy peace and prosperity worldwide. The SDGs have not only produced stronger connection between environmental and developmental outcomes but have also assimilated ecosystem services and social thinking in order to accomplish the objectives and

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goals. Developing the right and accurate social ethic is the most crucial thing to be done because the absence of it will only demolish what had been planned for years. Social ethic is a blend of differing aspects of how society are structured and managed by their participants. For example, in environmental management, there are few ethics been structured and practiced such as anthropocentrism, technocentrism and ecocentrism (Friess et al., 2016). The selection of what kind of ethics the society wants to use towards their environment will play a major role whether the society can achieve or attain the aim of the Sustainable Development Goals. The rise of concern and awareness among the society towards environment is called environmentalism. In recent years, there is an elevation among people's awareness plus numerous researches have been conducted in order to ensure the sustainability of our planet. At one point, the introduction of ecosystem services also been counted as a form of environmentalism where people concern on what could they gain if they put effort on nature conservation and preservation. For example, the ratification of Paris Agreement on December 2015 has been taken as one of the actions towards sustaining our ecosystem services by reducing carbon emission and it also has been recognized as a form of environmentalism. Besides that, the Paris Agreement 2015 also was ratified in order to achieve the Sustainable Development Goals which sustaining the elevation of temperature between 1-2°C for the next 10 years is part of the objectives in the agreement.

In recent years, the terms ecosystem services and environmentalism have taken into the spotlight where numerous studies based on systematic approaches been conducted and a lot of discussions had happened for both. But, there are no studies that bridging ecosystem services and the modern environmentalism though there are many researchers in both fields. This study aims to establish the nexus between ecosystem services towards modern environmentalism thinking plus this study also want to identify the research gap that existed in understanding the ecosystem services among modern environmentalism. In this paper, we provide explanation on the basic concept of ecosystem services, its type, the operationalization and its impact towards human well-being. Besides that, this paper also provides the depiction of how the evolution in modern environmentalism happened throughout modern generations, the structure, the thinking and the philosophical behind it. Based on the review, we also have hypothetically proposed a concept of "bridging ecosystem service-modern environmentalism" that seek to comprehensively detail how ecosystem services have been discussed, analyzed and evaluated towards modern environmentalism. We also discuss how these concepts can adjunct existing sustainable development's policies. This summary can mount further debates on ecosystem services and its connection with environmentalism movement, help

pursuit on the ecosystem services thinking among modern society, plus it also can deepen practitioners' potential to better plan and plot conservation procedure towards a sustainable development. This paper was written and organized as follows; the elaboration on ecosystem services impacts on human well-being which introduces on how Millennium Ecosystem Assessment (MEA) structuralized ecosystem services effects towards human, the evolution in modern environmentalism which discuss how the society thinking shift from human-centered thinking to eco-centered thinking; and the subsequent sections present the development of ecosystem services-modern environmentalism concept, the debates, critics and conclusions.

2. Ecosystem services vs human well-being

Ecosystem services are sets of environmental properties derived from ecosystem structures and processes which are arranged from an anthropocentric point of view: They describe those products and outcomes from complex ecological interrelations which are useful and necessary for human well-being. Ecosystem services are the benefits people obtain from ecosystems, and thus they can be used to represent the environmental interrelations between the three sectors of sustainability. From an economic view point, they can be understood as "flows of value to human societies as a result of the state and quantity of the natural capital" (Wallis et al., 2011). These definitions seem to be very similar, but they do differ in some points: On the one hand, some authors make a difference between goods and services (Costanza et al., 1997) while in most cases both aspects are unified in the term service. On the other hand, in some definitions the ecosystem services inevitably have to be based on ecosystem functions and biological processes, thus some sections of the natural capital (e.g., mineral resources, wind, solar radiation) are not taken into account (Heather, 2006). These features of the mainly abiotic sphere of nature can be assigned as parts of the environmental services, which more or less represent the overall natural capital (Wallis et al., 2011). Furthermore, in some definitions the ecological processes, conditions, or functions which produce the services are significant elements while in others the resulting benefits are the focal point of view. Also human investments and the combination of natural and human capital are components of some definitions while others do not consider these inputs. Another problem which appears in several discussions (Boyd and Banzhaf, 2007; Wallace, 2007; 2008; Costanza, 2008; Fisher and Turner, 2008) is related to the challenge of double counting: Some ecological processes have an indirect effect on those ecosystem services which are finally consumed (and paid). Pollination is an example which in many cases is investigated as a significant service, although the final products are the fruits which can be harvested.

In an accounting system there is also the danger that these components are added and hence producing an unbalanced outcome. Consequently, some authors propose to concentrate only on the end-products, the so-called final ecosystem services and to neglect the intermediate services, which are not directly consumed. Other scholars state that also the intermediate products/producers are services, and that they can play major roles in assessments: “as long as human welfare is affected by ecological processes or functions, they are services, be it direct or indirect” (Fisher and Turner, 2008). This discussion is a detailed continuation of the decline of supporting services, which have been defined by the MEA (2005) as ecosystem components which are not directly consumed but which contribute to the output of those services which provide such a final product. To solve this double counting dilemma, service and function have to be distinguished. While the functional quality of an ecosystem can be described un-valued by integrity variables or state indicators, ecosystem services have to provide a contribution to human well-being; there must be a demand for the results of the respective environmental processes (Heather, 2006). This demand can be formulated rather easy for ecosystem goods or cultural contributions, but is becomes difficult if the results of ecological regulations are discussed. For example, the storage of carbon compounds in the soil is the result of typical and complex ecological processes. At a first glance there is no obvious direct demand. But the demand is formulated from the viewpoint of global climate change: To reduce the greenhouse effect, we should attempt to store as much carbon as possible. Therefore, carbon sequestration is related with positive influences on human well-being. Thus, the CO₂ fixation can be assigned to benefits for human society and consequently be understood as an ecosystem service. The difference is a matter of recognition, and thereby the threshold between function and service becomes a little diffuse: it is dependent on the societal perception, and although many services are not known by the public (or even by science), they are existing. And even if we follow Boyd and Banzhaf (2007) in concentrating on final services, we should be aware that the accounted final end-products are connected within a complex network of ecological interrelations that have to be supported if the demanded services shall be used by human society.

2.1. Regulating services

Regulating services are the benefits people obtain due to the regulation of natural processes and the control or modification of biotic and abiotic factors (Nedkov and Burkhard, 2012). Being hardly visible and comparably difficult to understand, these services are not widely acknowledged by the society. This undervaluation displays an enormous error: As all produced goods or enjoyed structures depend on the healthy coordination of ecological controls and

feed backs, the regulations in ecological systems are the very basic requirements for any ecosystem service. Therefore—in the opposite with the public recognition—they have to be listed at first due to their enormous significance. As the regulations can hardly be measured by tangible products, they are often understood as indirect or intermediate services. Due to the double counting challenge, three of the services from Table 1 have been highlighted with a remark on this point. All the others are prominent benefits of natural systems for the sake of human environmental management. They are basic requirements for adequate human living conditions and—from that perspective—extremely important services.

2.2. Provisioning services

Provisioning services comprise all material outputs from ecosystem processes that are used for human nutrition, processing and energy use. These products can be traded and consumed or used directly, thus they are the desired ‘end-products’ of nature providing clearly visible benefits to society. Provisioning services can be divided into the subcategories of food, materials and energy (de Groot et al., 2010; Heather, 2006). In Table 2 some non-ecological goods (which are not products of recent ecosystem processes) are listed as well, because these facets of natural capital can play major roles in environmental management.

2.3. Cultural services

Cultural ecosystem services are the intangible benefits people obtain from ecosystems in form of non-material spiritual, religious, inspirational and educational experience (Table 3). These services provide benefits for human recreation and mental and physical health, experience by tourism, aesthetic appreciation and inspiration for culture, art and design, spiritual experience and sense of place.

2.4. Supporting services

Supporting services (e.g. primary production, soil fertility) were understood as basic necessities for the production of all other ecosystem services. A reflection of this concept makes clear that all ecosystem processes consequently can be called supporting services. And of course then all structural items (e.g., biodiversity) would also fit into this category.

3. Evolution in modern environmentalism

The term “modern environmentalism” was first used and stressed by Pepper et al. (1984) in his book entitled “The Roots of Modern Environmentalism”. Ever since, it has been an indispensable text for any student of environmental issues in postmodern society. Environmentalism was described as a

perspective or thinking that are favor to the environment. It's not limited only to conservation and preservation act, but it is also a broad philosophical, ideology and social movement base on concerns for the needs of environmental protection

and improvement of the health of environment, particularly as the measure for this health seeks to incorporate the impact of changes to the environment on humans, animal, plants and non-living matters.

Table 1: Regulating services type and definition

Regulating service	Definition
Global climate regulation	Long-term uptake and storage of greenhouse gases in ecosystems providing reduced pressures from atmospheric CO ₂ concentrations; - Exemplary benefits: Deceleration of global climate change dynamics;
Local climate regulation	Regulation of local climate components like wind, precipitation, temperature, or radiation due to ecosystem properties and control processes; - Exemplary benefits: Optimization of local living conditions;
Air quality regulation	Capture, absorption and filtering of air particles, dust, chemicals and gases due to eco-chemical processes; - Exemplary benefits: Cleaning the air to improve people's health;
Water flow regulation	Control of processes of the water cycle (e.g., water storage and buffer, natural drainage, irrigation and drought prevention); - Exemplary benefits: Providing usable quantities and ratios of water and water products;
Water purification	Control of chemical compositions in waters, e.g., operating sediments, pesticides, disease-causing microbes and pathogens; - Exemplary benefits: Providing usable quantities and ratios of water and water products;
Nutrient regulation	Recycling, metabolization and storage of nutrients, e.g., N, P, K; - Exemplary benefits: Quality of drinking water and aquatic ecosystems;
Erosion regulation	Soil retention and avoidance of soil erosion and landslides; - Exemplary benefits: Optimization of soil fertility and water quality;
Natural hazard protection	Protection and mitigation of floods, storms (hurricanes, typhoons...), fires and avalanches; - Exemplary benefits: Risk reduction for the human population;
Pollination	Assistance of plant reproduction and fruit growth by bees, birds, bats, moths, flies, wind; - Exemplary benefits: Food provision and biodiversity of plants;
Pest and disease control	Control of pests and diseases due to genetic variations of plants and animals making them less disease-prone and by actions of predators and parasites; - Exemplary benefits: Human health;
Regulation of waste	Control of filter and decomposition processes concerning organic material in water and soils; - Exemplary benefits: Secure storage and degradation of human wastes;

Table 2: Provisioning services type and definition

Provisioning services	Definition
Crops	Cultivation of edible plants and harvest of these plants on agricultural fields and gardens that are used for human nutrition.
Biomass for energy	Plants used for energy conversion (e.g., sugar cane, maize)
Fodder	Cultivation and harvest of fodder for domestic animals.
Livestock (domestic)	Production and utilization of domestic animals for nutrition and use of related products (dairy, wool).
Fibre	Cultivation and harvest of natural fibre (e.g., cotton, jute sisal, silk, cellulose) for e.g. cloths, fabric, paper.
Timber	Wood used for construction purposes.
Wood fuel	Wood used for energy conversion and/or heat production.
Fish, seafood and edible algae	Catch of seafood/algae for food, fish meal and fish oil.
Aquaculture	Harvest of seafood/algae from marine and terrestrial aquaculture farms.
Wild food, semi-domestic livestock and ornamental resources	Harvest of berries, mushrooms, (edible) plants, hunted wild animals, fish catch from recreational fishing, semi-domestic animal husbandry and collection of natural ornaments (e.g., seashells, leaves and twigs for ornamental or religious purposes).
Biochemical and medicine	Natural products used as biochemical, medicine and/or cosmetics.
Freshwater	Used freshwater (e.g., for drinking, domestic use, industrial use, irrigation).
Mineral resources	Minerals excavated close from surface or above surface (e.g., sand for construction, lignite, gold)
Abiotic energy sources	Sources used for energy conversion (e.g., solar power, wind power, water power and geothermic power)

Table 3: Cultural services type and definition

Cultural service	Definition
Recreation and tourism	Opportunities for outdoor activities and tourism in the environment or landscape, including forms of sports, leisure and outdoor pursuit;
Landscape aesthetic, amenity and inspiration	Visual qualities of ecosystems and ecosystem complexes which influence human well-being, providing a source of inspiration for art, folklore, national symbols, architecture, advertising and technology;
Knowledge systems	The potential for environmental education, i.e., out of a formal schools context, and the knowledge in terms of traditional knowledge and specialist expertise arising from living in a particular environment;
Religious and spiritual experience	Spiritual or emotional benefits that people attach to local environments or landscapes due to religious and/or spiritual experience;
Cultural heritage and cultural diversity	Benefits that humans obtain from on the maintenance of historically important (cultural) landscapes and forms of land use (cultural heritage);
Natural heritage and natural diversity	The existence value of nature and species themselves, beyond economic or human benefits, support of bequest and existence values;

Environmentalism as a philosophical thought stems from our conscious desire and concern towards improving our environment, eventually reducing degradation and pollution. According to

Pepper et al. (1984), environmentalism is very pertinent because humanity inherently places 'undesirable' value for environmental resources as we have always consumed and destroyed them as

though we were superior and in charge to do as we wish. Therefore, this points to the deduction that we are responsible for the environment and must ensure that we live up to this important responsibility.

The concept of environmentalism has come into the concern of environmentalists since 1960s and 1970s when Rachel Carson wrote "The Silent Spring" in 1962 which spread the adversity of pesticide towards environment. Before the environmentalism or environmental movement arose, human believe that they have all the rights to degrade natural resources and pollute the environment all for the reasons of their survival. This human-centered thinking or also known as "anthropocentrism" also believe the creation of other living or non-living things are solely to be used by human and only human. Hence, every decision, policy, regulation that has been implemented during this time was designated according to this belief and thinking. According to Rae (2014), anthropocentrism is an integral part of Western culture and is the driving force behind overpopulation, species loss, environmental degradation, and air and water pollution. The conclusion drawn is that a new non-anthropocentric ethics is required to ensure that humans have a more harmonious relationship with the natural environment. White's article was hugely influential in the subsequent decades giving rise to various attempts to create a non-anthropocentric ethic (White, 1967). From the late 1980s, the anthropocentric position increasingly came to be rejected as a consequence of perceived flaws in its understanding and growing awareness of environmental degradation. There was a return to White's original thesis to suggest that the anthropocentric position is simply based on a flawed fundamental premise that the human is, in some way, unique or to be privileged over its environment. Rather than the human being privileged in the human-environment relationship, the privileged term was reversed with the consequence that renewed focus was given to what is good for the environment (Chandruppa et al., 2011). This was defended using a realist position that recognized that the environment has intrinsic value that must be protected. Alternatively, it was simply thought that the fundamental division between the human and environment constitutive of the anthropocentric strand was based on a mistaken metaphysical/ontological analysis of the human-environment relationship.

The concern towards environment has occurred among human when the degradation of natural resources seemingly uncontrolled. Man at power arbitrarily looting and plundering all of the natural resources without thinking what might happen in the future as the casualties for their bad decisions and deeds. As stated, the rise of people awareness for the needs of environmental protection and conservation were helped by the articles such as "The Silent Spring", "Tragedy of the Common" and "The Population Bomb". As sequence for the past

event, people with the lead from the environmentalists start to put pressure to the government where issues such as pesticide utility, carbon elevation, uncontrolled population and urbanization were on the spotlight and headline on every newspaper. This had makes the government starts to think and debate on how to protect the environment in the same time the development of economy need to be maximized. Therefore, if the current developmental path of greed-fueled materialism and consumerism continues, we will not only significantly reduce the quality of life but may eventually become homeless as the environment would have exceed its carrying capacity to support our superfluous lifestyle (Moraes et al., 2009). In the same vein, global environmental pollution and degradation have increased as technological advancements have improved in the 20th and 21st century (Erb, 2015). This correlative relationship maybe as a result of the anthropocentric purposes for which most of these technological advancements were made; most technological innovations are simply geared towards making life easier without considering the cumulative effects on ecosystems across the globe. Consequently, the key issues lie on how we can utilize environmental resources, promulgate technology and still sustain the earth for future generations yet unborn. The relevance of technology in today's world is exemplified by its easy accessibility and this is demonstrated by how technology affects our daily lives. For example, the mobile phone is usually the first thing that comes to mind when in urgent need of contacting someone out of shouting distance. This is because it is more convenient and faster for us to engage a conversation over the phone as opposed to travelling long distances in order to do the same thing. Technology plays a lot of role in broadening 21st century environmental management; apart from its role in providing solutions in managing environmental problems, technological tools are very important in creating environmental awareness (Calel, 2011). This implies that technology has come to stay and will be fundamental in shaping environmentalism in the 21st century, whether we like it or not.

Technocentrism may be termed as 'shallow ecology' due to its anthropocentric tendencies and is centered on the belief that environmental problems are always within the mitigating capacity of science and technology; it is a modern perspective on environmentalism based on humanitarian ethical principles. Though technocentric perspective acknowledges the pernicious nature of environmental problems, it is not interested in making the revolutionary changes in values which is required if humanity intends to mitigate environmental problems like climate change. According to Van de Loo (2007), technocentrism unlike ecocentrism which posits that far-reaching modifications in economic, social and political values are pertinent in meeting environmental challenges, firmly believes that advancements in science and

technology are all needed to protect and conserve environmental resources. However, it is important to note that ecocentrism is not completely against technology; it supports development of 'green' technologies that are environmentally friendly with little or no pollution to the ecosystem. According to O'Riordan (2002), modern viewpoints on technocentrism have two angles: Interventionist are of the opinion that environmental problems will be taken care of by science and technology so that the world can continue on the path of perpetual progression while Accommodators believe that thoughtful economic and innovative environmental management principles are the panacea to all environmental problems. Technocentrism does not call for adequate consultation or any serious ethical changes in environmental perception but rather advocates the importance of science and technology in solving the world's environmental problems. According to Meadows et al. (1972), technocentric principles were explicated by global think tank 'Club of Rome' in their position that a technology driven society will surmount its environmental problems as long as they are optimistic. Studies by O'Riordan (1981) and Pepper et al. (1984) provide the background for modern understanding of technocentrism; these studies all posit that technological advancements are simply a continuum of both intrinsic and extrinsic human developments.

Goodin (1992) asserts that ecocentrism is based on the concept of 'deep ecology' which points to the reverence of all natural resources whether they are valuable to humanity or not; all natural resources have intrinsic value which surpass their ability to satisfy the needs of humanity. This implies that humanity is not only part of a universal natural entity, but also has a moral duty as the main custodian of environmental resources. According to Yew et al. (2016), ecocentrism underscores the need for involving all stakeholders in the environmental decision making and also understanding that there are limits to the rights humanity has over environmental resources; the role humanity is expected to play as the most advanced ecological specie is that of a steward responsible for conservation and protection of environmental resources from exploitation and destruction. However, theoretical principles can be different when it comes to application.

4. Bridging ecosystem service and modern environmentalism: A conceptual framework for South East Asia (ASEAN)

In this new age of era, environmental issue has been tackled very differently if we compare from the previous decades ago. The shifting of modern environmentalism has caused a lot of changes in the world's government policy and engagement (Emetumah, 2017). One of the major changes is the introduction of the term "Ecosystem Service" in 2005 by the Millennium Ecosystem Assessment. We define the ecosystem services as one of the modern

environmentalism because of the subjectivity this concept has to offer. We called it subjective because ecosystem services are not only limit to numerical, empirical and objectivity but it also touches and discuss on the non-empirical aspects such as cultural, aesthetic and spirituality. As we discussed in the previous section, the social thinking among humanity has shift from the anthropocentrism (human-centered) to either technocentrism (technology-centered) or ecocentrism (eco-centered). This shifting was being catalyzed by the elevation of human awareness and concern towards environmental protection. The necessity and urgency to preserve and conserve environment has been the main issue when the pollution and degradation of earth's natural resources become chaotic and uncontrolled. Human awareness towards environment has shone when the extinction of certain animal and plant species results from the industrial and commercial activities. South East Asia Countries (ASEAN) is group of countries with multi-diverse ecosystem containing mega diversity of flora and fauna. ASEAN consist of 10 states which are Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam (Heather, 2006). ASEAN's countries such as Indonesia, Philippines, Malaysia and Thailand are very prompt to natural disaster due to rapid climate changes. Disasters such as Aceh Tsunami in 2004, Typhoon Haiyan in 2013, and Kelantan Big Flood in 2014 have killed thousands of people in ASEAN. Climate change would bring more frequent and more severe storms that could cause further flooding. The increased precipitation would also make the destructive lahars (strong mudflows of ash and debris) more common. Climate-induced ocean acidification, and coral bleaching events, also would threaten the food security of coastal residents. Moreover, warmer temperatures would also reduce the entire region's agricultural productivity. These risks would compound the ever-present threats of typhoons and volcanic eruptions (Rasiah et al., 2018). Geographically, ASEAN's countries are located in the Tropical Rain Belt and very near to the Ring of Fire. Southeast Asia's biodiversity is under serious threat; some parts of the region are projected to lose up to 98% of their remaining forests in the next nine years. It's also thought to be the world's most threatened region for mammals. Sadly, the region's fragile biodiversity is frequently forgotten by the global media. It also suffers lower publishing rates than other tropical regions for ecology and biodiversity research. It's perhaps no surprise, then, that Southeast Asia has some of the highest rates of deforestation on the planet, having lost 14.5% of forests in the last 15 years. Some areas, such as Philippines, have lost up to 89% of their original forest cover. This loss is rendered especially stark using recent advances in satellite imagery, such as Google Earth time-lapse, which shows that many regions have been transformed from pristine forest to agriculture within the last decade or two. Forest loss is one of the major drivers of species loss in the

region, and pulp-paper, rubber and oil palm production are the main drivers of forest clearance. Southeast Asia exports 86% of the world's palm oil and 87% of the world's natural rubber. The areas where these grow are projected to expand by over 4.3 to 8.5 million hectares to meet demand by 2024. All of this had affected the quality of services provided by ASEAN multi-ecosystem such as tropical rainforest, coastal, mangrove forest and montane forest (Krishnan et al., 2015).

The degradation of environmental quality of ASEAN and the loss of flora and fauna if referred to anthropocentrism is a must. This is because without the degrading the natural resources, there is no way a developing country such as ASEAN could generate their economic development. Hence, between 1950s -1990s, most of ASEAN countries promoted human-centered policy where ASEAN governments tore down almost 30% of their tropical rainforest solely for development purposes. But now, since the introduction of Sustainable Development Goals in 2015, this way of thinking has been shifted towards modern environmentalism (technocentrism and ecocentrism). In Fig. 1, the connection between ecosystem services, human well-being and modern environmentalism have been shown. Ecosystem services help improving the human quality of life by increasing people's sense of security, the needs for basic materials, quality of health and fluid social relations. Based from the Millennium Ecosystem Assessment Framework, the human well-being aspects are directly and indirectly affected by the ecosystem services. Security is affected both by changes in provisioning services, which affect supplies of food and other goods and the likelihood of conflict over declining resources, and by changes in regulating services, which could influence the frequency and magnitude of floods, droughts, landslides, or other catastrophes. It can also be affected by changes in cultural services as, for example, when the loss of important ceremonial or spiritual attributes of ecosystems contributes to the weakening of social relations in a community. These changes in turn affect material well-being, health, freedom and choice, security, and good social relations. Access to basic material for a good life is strongly linked to both provisioning services such as food and fiber production and regulating services, including water purification. Health is strongly linked to both provisioning services such as food production and regulating services, including those that influence the distribution of disease-transmitting insects and of irritants and pathogens in water and air. Health can also be linked to cultural services through recreational and spiritual benefits. Social relations are affected by changes to cultural services, which affect the quality of human experience. Freedom of choice and action is largely predicated on the existence of the other components of well-being influenced by changes in provisioning, regulating, or cultural services from ecosystems. Human well-being can be enhanced through sustainable human interactions with ecosystems

supported by necessary instruments, institutions, organizations, and technology. The improvement of human well-being will shift human thinking from anthropocentrism to modern environmentalism. When people start to feel their quality of life have increased, their well-being have secured, therefore they begin to aware and have moral duty towards environment. The needs to degrade environment become lesser and the concern towards environmental protection spike up. Human eventually turn to modern environmentalism which contain two major environmental ethics which technocentrism and ecocentrism. Technocentric tend to use the technology they created and acquired during the development period to repair and conserve the environment which they had already destroyed and degraded. The technology they used must be sustainable, cost efficient, green and more importantly renewable. Ecocentrics think that human and other living and non-living things are equal and have the rights to each other. Human have the rights to water, water have the rights for frogs, frogs have the right for oxygen in the atmosphere and etc. Therefore, from these two modern thinking we know that the urgency and the needs of protecting environment were coming from stabilized quality of life. By the shift of social thinking to modern environmentalism, it means that holistically the way of human perceiving on environmental issues will be changed. Human will improve their environment by start conducting research, ratifying agreements for environmental sustainability (Paris Agreement, 2015), conservation and preservation efforts from government, non-government and local community. This will improve the quality of services provided by the ecosystem for example, the enforcement of green and renewable technology in agriculture will increase the production of food, the ratification in Paris Agreement will help improve urban climate and decrease carbon emission, and preservation and conservation of tropical rainforest will help saves millions of flora and fauna species from extinction. Therefore, this paper agreed that elevation in the understanding for ecosystem services are the sign of shifting modern environmentalism.

5. Conclusion

To ensure ASEAN countries achieve the Sustainable Development Goals, a brief and deep understanding of ecosystem services is indeed critical. This paper used the substantive review method in order to have a better understanding about the concept of ecosystem services and how it can connect with modern environmentalism thinking. Overall, from all the papers we have studied and reviewed, we found out that the concept of ecosystem services was very much dependent on the current social thinking. In the 1960s, most ASEAN countries struggled in order to develop their economy. Therefore, they need to degrade their natural resources to stabilize and increase the

nation's revenue. This paper also proposed a framework that bridges the ecosystem services and modern environmentalism. In summary, improving

social thinking will directly improve the ecosystem services and eventually augment the human well-being of ASEAN countries.

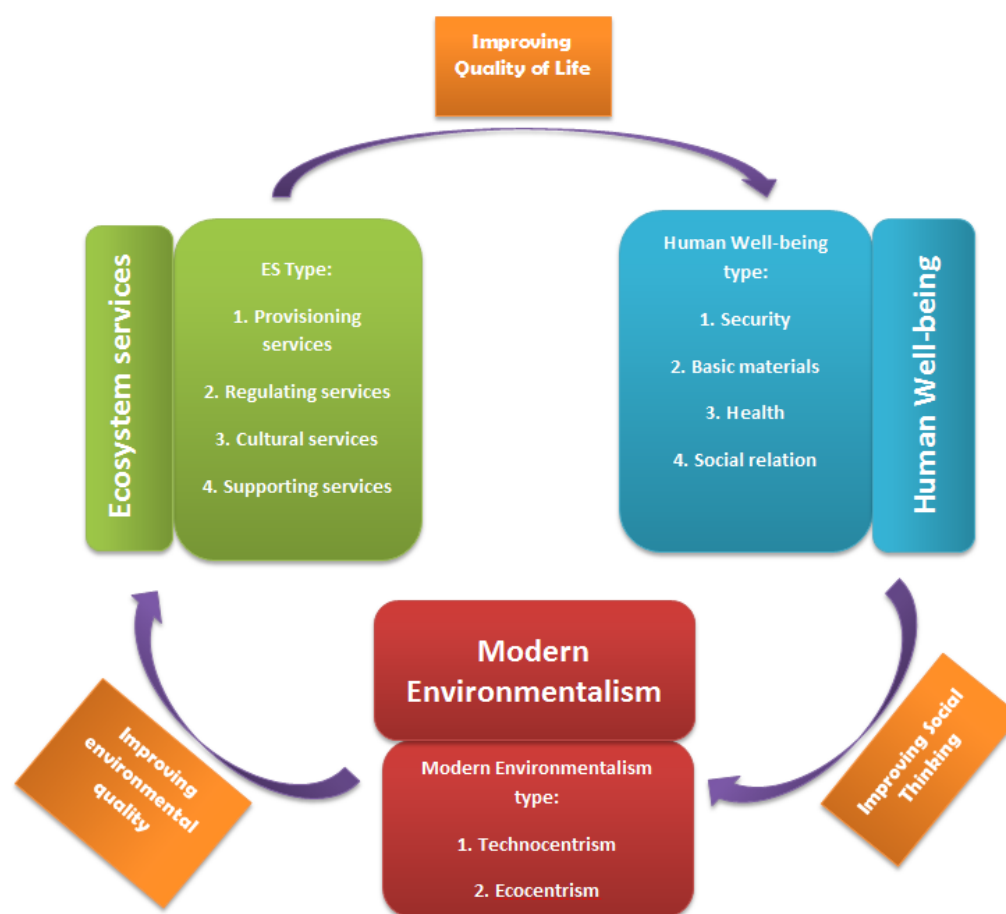


Fig. 1: Ecosystem services-modern environmentalism framework

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Compliance with ethical standards

Conflict of interest

The authors declare that they have no conflict of interest.

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