

# Sustainable Development

## *Role of Education*

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**Abstract:** Sustainable development is a concept of development in regards to fulfilling the present generation needs and improving their welfare without sacrificing those of the future generations. This should be implemented by every United Nation member country. In order to implement it effectively, it needs knowledge, skills, attitude, and awareness of the people; quality human resources, and the involvement of stakeholders. Education plays an important role in cultivating awareness, knowledge, skills, and attitude toward the sustainable development implementation. It is also capable of producing the quality of human resources. Their involvement in the development will take into consideration its negative impact so the sustainability can be achieved. That is why education for sustainable development becomes the program formulated by UNESCO which encourages every member country to implement. Regarding its implementation, it needs relevant curriculum and effective teaching-learning strategy and evaluation plan which are emphasized on practical experience.

## 1 INTRODUCTION

The development in every country does not only give various positive impacts such as economic growth and improvement of people's welfare but also gives negative ones such as deterioration and destruction of the environment. Recent data indicates 50% of the tropical forest which covers 6% of the earth land and consists of high biodiversity is in the risky condition. 29% of the total land has become a desert, around 7.6 through 10 million hectares of the forest disappeared, and this condition is still continuing so far. Furthermore, the use of fossil fuel energy by industries and various vehicles give a significant contribution to the accumulation of carbon dioxide in the atmosphere which affects the global warming and climate change, and those increase sea level surface due to the pole's ice melting (Arjen, 2010).

The environment destruction has become the United Nations (UN) concern and it leads the organization to conduct the UN Conference on Human Environment (UNCHE), in Stockholm, Sweden in June 1972. This became the historical conference, for it was the first UN initiated conference discussing an environment which was participated by 114 countries. This also became the initial step in environment conservation. The

conference concluded the connection among development, poverty, and lower education level. Poverty and lower education level are the key factors causing damage to the environment, so the forum agreed to connect national development policy, in every member country, to the policy of environment conservation.

The environment problem needs a strategic and long-term solution. This became the collective agenda of the global community that every UN member country should implement (UNESCO, 2005). World Commission on Environment and Development (1987) formulates a concept of Sustainable Development (SD), which is later also known as Sustainability. The commission defined: “. . . *sustainable development is a type of development which combines the fulfillment of present needs without risking the future generations' ability to cater their own needs*” (p. 43). Based on this definition, SD is a concept of development with regards to fulfilling the present generation's needs without sacrificing needs fulfillment of the future generation. The environmental damage actually has both the economic and social effects, such as the increase in social costs for environmental repairs. Therefore, it is basically a concept of national development combining the present and future development.

This is an essential concept to overcome the planet's complex and uncontrolled problems resulted by the irresponsible behavior of society in managing and using the natural resources. National development should apply the concept in order to fulfill the people's needs and to improve their welfare in the present time while taking into account the needs of the future generations. Among the efforts in fulfilling the needs and improving the people's welfare are often carried out by exploring and making use of the existing natural resources. If this is done in a reckless manner, the natural resources will be depleted sooner (Ali, 2014). This, in turn, will destroy the environment if it is conducted without renewable resources for the seeks of its sustainability.

The development is usually related to the efforts of improving the people's welfare. With respect to the economy, it is designed for economic growth as measured by certain indicators, such as the increase in gross domestic product (GDP), gross national product (GNP), and income per capita which often include output from exploiting the natural resources at the cost of environment. By implementing the SD concept, the natural resource exploitation takes into account the environmental damage prevention as best as it can. To achieve this, it needs agents who are equipped with not only a certain level of competence and professionalism but also wisdom and virtue, based on the awareness of the importance of preserving the natural environment in a wider context.

It is believed that the quality of human resources, as the development agents, gives a significant influence in the true application of this concept. Education produces the quality of human resources for it shape not only their knowledge, understanding, skill, and awareness on SD but also their innovation on technology which may produce eco-friendly products. This paper reviews the role of education in developing the quality of human resources which in turn will give significant influence to the national SD.

## 2 THE NATURE OF SUSTAINABLE DEVELOPMENT

The term sustainable development or sustainability, which was initially used in the 1980s in the context of natural and biosphere protection, was further extended its application by including economic, ecological, and social aspects as it was stated in the Brundtland Report in 1987. In order to make its

application extensive, UN organized a United Nations Conference on Environment and Development (UNCED) in 1992 in Rio de Janeiro, Brazil. Its report formulated the "Concept of Sustainability: From Theory to Application" which emphasized the conservation and improvement of social, ecological, and economic needs as its main aims which refer to three sustainability pillars, namely ecology, economy, and society (Ali, 2014).

During the conference on Environment and Development organized by UN in Rio de Janeiro in 1992, various critiques were raised against the concept of environmentally-based development (eco-development) which was considered a failure since it did not bring any significant changes. For example, the development of new science and technology was considered disadvantageous to the developing countries since around 70% of world citizens living in developing countries only receive 30% of world income, resulting in continuous inequality.

The World Commission on Environment and Development, known as The Brundtland Commission, formulated the concept of sustainable development in its report entitled "Our Common Future". The result of the Rio de Janeiro conference is reflected in the convention on biodiversity and climate change, and the declaration of sustainable development of forest management, as well as in Agenda 21.

Universal Declaration of Cultural Diversity further explores the concept of sustainable development by stating that cultural diversity to human is as important as biodiversity to nature. Therefore, development is not only regarded as economic growth, but also the means to achieve intellectual, emotional, moral, and spiritual satisfaction.

The concept of sustainable development includes a very vast scope, while its parameters and indicators continue to grow according to the understanding of each organization involved. However, based on aforementioned backgrounds and conception developed by the UN, we have to be aware of the importance of sustainable development since the damage inflicted on the environments as a result of economic development is already at an alarming level. This can be observed by the phenomena of climate change, global warming, drought, natural disasters, etc. This paradigm is supposed to be a collective awareness of all nations of the world in implementing their development programs.

By applying this concept, the existing natural resources can be used wisely as it is indicated in its meaning, as follows:

*Sustainable development is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts (1) the concept of needs, in particular the essential needs of the world's poor, to which overriding priority should be given, and (2) the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs" (<http://www.iisd.org/sd/>).*

As an organization under UN which is responsible for promoting education, UNESCO adopted the concept and infused it in the education sector. Concerning its implementation, regarding achieving SD goals, this organization proclaimed 2004-2014 as Decade of Education for Sustainable Development or DESD (UNESCO, 2005). This can be viewed from three perspectives namely socio-cultural, environmental, and economic (Ali, 214; Summers, 2013; Pradhan and Mariam, 2014):

- from the socio-cultural perspective, it is seen as the attempts to fulfill human rights and achieve national defense, world peace, national life survival, gender equality, cultural diversity, intercultural understanding, healthcare, and prevention and management of harmful diseases SD goals, such as HIV/AIDS.
- From the environmental perspective, it becomes the attempts to utilize the natural resources equally with regard to the future generations' needs, climate change anticipation, changes in the natural environment in both urban and rural areas due to urbanization, and prevention of the disasters which is triggered by human activities such as forest exploitation causing floods and droughts.
- From the economic perspective, it is seen as the efforts to reduce poverty, to improve welfare, to achieve sustained economic growth, and to establish economic independence and national competitiveness.

The current threats to the environment are related to uncontrolled population growth, urbanization, development of infrastructures triggered by the expansion of development in urban and industrial areas. This has resulted in the increase of land and air pollution and problems related to volumes of garbage or industrial waste and household trash, which can be hazardous to our health. It has also increased the society's consumption on a global scale, causing the rise of demands on raw materials, energy, and water. It gives some implications dealing with degradation of humanity, cultural and spiritual values.

The world change has certainly brought impacts on the environment, which must be well anticipated. The rise of the world population, described above, triggers escalating the increase in the needs of food, clothes, housing, and energy. Countries are competing with each other to carry out the development for fulfilling the increasing needs. However, many of them still base their standards on conventional development model, focusing only on economic growth. In the conventional development model, the achievements in form of increased production of goods and services, which are the elements of Gross Domestic Product (GDP) and Gross Regional Domestic Product (GRDP), do not accommodate the environmental aspect. Besides, social development is also overlooked so that in many aspects poor people are marginalized during the development.

The use of fossil fuel (oil, gas, and coal) increased tremendously with the modernization of the lifestyle around the world. This has resulted in an increase in carbon dioxide and sulfur oxide gas content in the atmosphere, rising earth temperature and melting ice in the poles. Its long-term effect may come in the form of submersion of many seaside cities in the whole world. It is necessary to know that the use of fossil fuel may diminish the ozone layer, or even create a hole on it, rendering life forms on Earth vulnerable to ultraviolet radiations from the sun. Its collective effect may threaten the very existence of life on Earth.

Another issue that we need to be aware of is the contamination of nature by waste products. Many irresponsible businessmen dispose their toxic industrial waste to improper places for their private cost-saving reasons. In addition, thick smoke coming out of factory chimneys or turbid solution containing awful stench is disposed of a running river. These are examples of environmental damages caused by irresponsible behaviors in the development of economy with no regard to the sustainability of development or environment.

The types of industries prone to causing damages to aquatic environment include vegetable oil, chemical, textile, bottled drinks, canned meat, pulp and rayon, soybean sauce, canned fruits, and wood industry. Meanwhile, those which often cause noises are metallurgy, zinc, iron industries etc. Dust and ashes circulated around the factory area, like dust from cement industry, chalk industry and toxic gas from the aluminum processing factory can cause air pollution. The toxic gas waste is absorbed by local plants that are consumed by the human.

The threat against environment does not only come from manufacturing industries as mentioned in the examples above but also from an exploration of natural resources. A lot of natural resources are exploited in such a way that they are almost exhausted. Crude oil supply is reducing by the lot, and at the same time, alternative fuel has not yet been developed. The same goes for other types of mining, such as coal and gold, and lead to which the exploration usually causes damages to the environment. If the exploration of the natural resources done unwisely even for the purpose of economic growth, then it will have negative effects on the quality of living, which can eventually cause the economy to collapse. For example, environmental degradation even around the company area will create a higher social cost to the economy. The company must allocate extra cost to clean contaminated water and air.

The global community has realized that environmental issues are closely related to the economic and social conditions. This justifies that the social, environmental and economic needs must be fulfilled equally so that the development results can be enjoyed by future generations as well. However, one of the most crucial issues is to find the ways to improve social welfare by using natural resources wisely, so that the renewable natural resources can be conserved and non-renewable resources are utilized wisely and efficiently, and the needs of future generations will still be fulfilled.

### 3 ROLE OF EDUCATION

Quality human resource plays an important role in the implementation of SD. On their hands, development will be carried out wisely by taking many aspects into consideration, including the balance between economic benefit and environmental disadvantages. Otherwise, it will overlook many negative impacts of the development, resulting in an imbalance between the benefit of the development and the damages of the environment.

The quality of human resources can be seen from their capabilities, knowledge, skills, and behavior. We can also identify their quality from the criteria of health and intellectual, emotional, social, and spiritual intelligence; morality reflected by their behavior in interacting with other human beings and with the environment; and their liability. These indicators are the products of education, particularly that of quality education. Mochizuki and Bryan (2015), explained:

According to UNESCO, there are two key dimensions of educational quality: promotion of cognitive development; and the cultivation of skills, knowledge, values, and attitude necessary for responsible, active and productive citizens. Culturally inclusive curricula and methods which include indigenous perspectives also help to create an educational experience that is more relevant to indigenous learners and to ensure that multiple and diverse intercultural perspectives are embraced in the learning environment (p. 14).

Education, therefore, gives significant impacts to the implementation of SD concept. According to Wragg (1997): *“Education is a continuous and timeless human process, stretching from the past through the present and into the future. It is the vehicle by means of which the wisdom and experiences accumulated over several millennia are transported to the next and following generation”* (pp. 39-40).

Education for sustainable development (ESD) means education with regards to implementing SD by taking into consideration its pillars, as the independent and interrelated dimensions, i.e., environment, economy, and society and culture, in an attempt to improve the quality of life. Jenkins and Jenkins (2015) explained the position of the three pillars in the implementation of sustainable development: “. . . ESD, which includes economics and social dimension as well as environmental ones, is viewed as being less constrained and more holistic than traditional forms of education “about” the environment (p.115). This is a dynamic concept as well as a collective attempt to look into the future when everyone will reap benefit from the opportunity to obtain an education, learn about important lifestyle, behavior, and values for the creation of a sustainable future.

In regard to implementing the concept, the 58th UN General Assembly in December 2005 agreed on the implementation of the DESD starting in the year 2005 through 2014. As development itself, by its nature, is the process of learning, every education institution, at all levels, plays an important role in making the learners learn this process (Lenglet, 2014).

The basic vision of DESD is the achievement of a world where everybody has equal opportunities to obtain benefits from education for the sake of social transformation. Kahrman-Ozturk, Olgan, and Guler, (2012) explained its goal:

Goals of the UN Decade of Education for Sustainable Development (2005-2014 DESD) (2005) recommended that principles, values,

and practices of sustainable development should be integrated into all aspects and levels of educations and learning within three pillars. In summary, ESD aims to work with all levels of formal education on local and global issues and to develop appropriate ideas, attitudes, values, and behaviors with respect to sustainability in all levels of the formal curriculum starting from the early childhood. (pp. 2988-2989).

It was UNESCO which was assigned as the key organizer of DESD. The organization has worked closely with its partners, including the United Nations Environmental Program (UNEP) and United Nations University (UNU). The basis of DESD implementation is the partnership, ownership, and leadership. The partnership is cooperation and the call for the creation of interpersonal and inter-institutional network to successfully enact the ESD Declaration. Ownership underlines the fact that it belongs to every human being since it is related to everyone in the present and in the future. Leadership at every level and in every field is the motor for human mobilization, to change their ways of thinking and to create meaningful works.

In order to implement ESD, the government in each country must pay attention to self-reliance in carrying out its country's development. It includes the following three aspects:

1. Community-oriented. Development is based on the needs of the local people;
2. Community-based. Development is based on the local resources available to the local society, human resources, natural resources, economic-social-political, and institutional resources as well as the supporting values.
3. Community-managed. Development involves the local society since the planning stage up to the implementation and outcome of the activities, which gradually shifts the local people's position from the object to the subject of development.

It must be a concrete reality for us all, whether to individuals, organizations or governments, in every action and decision we make every day. That way, we can ensure a sustainable planet and a safer world for our children, our children's children and so on. In relation to this matter, education becomes the most important element of the SD. Education for sustainable development shall be carried out with the purpose of giving the required understanding, skills, and values for sustainable social life. In addition, education shall be seen as the responsibility of all, so that each member of the society should take part.

The concept of ESD includes a new education vision with an attempt of empowering people to

participate in creating a sustainable future. It is an integral part of achieving the three pillars of human development, as suggested by the United Nations Development Program (UNDP) and enforced in the World Summit on Sustainable Development in Johannesburg in 2002. The three pillars include economic growth, social development, and preservation of the natural environment. Cultural element is also identified as the basic theme essential to the ESD. It considers the importance of ESD involves the stakeholders and new partners in a local relevant framework.

This concept does not necessarily mean that ESD is merely a transfer of knowledge, it is rather related to the attempts of changing behavior and lifestyle for positive transformation of the society. This is different from the environment education which is one of the components for SD and is related to a study discipline focused on the relationship between human being and its surrounding and how to preserve and conserve the environment (Sleeter, 2005).

The application of this concept involves the socio-cultural and socio-political issues, including equality of rights, poverty, democracy, and life quality. Theoretically, ESD can be integrated into all school subjects (Hofman, 2015). The integration is done in the form of themes, each includes various subjects such as education for the eradication of poverty, human rights, gender equality, democracy and good governance. That way, the learning goals become so vast that it must be integrated into various school subjects, in school and in university. Based on this, education should:

1. Provide abilities that enable the participants to have forward views anticipate and solve all life-threatening problems on this planet.
2. Understand the concepts and weigh the values as well as principles for SD such as:
  - a. Equality of rights and opportunities between generations
  - b. Tolerance and difference
  - c. Protection and restoration of the environment
  - d. Conservation of natural resources
  - e. Peaceful and just people
  - f. Gender equality
  - g. Eradication of poverty
3. Identify the complexity and inter-dependency of social, cultural, economic, and environmental dimensions in the SD.

Education within the perspectives of sustainability basically teaches values as mentioned above. With education, a human can understand themselves and other creatures as well as their relationship with the natural environment and wider

social environment. Education teaches the value of appreciating other creatures, the value of understanding diversity and difference as well as justice, responsibility and tries to bring out dialogues on the subjects. That is why education can be an important means to promote the values in order to achieve SD.

Since this constitutes a global awareness, the message is directed to all developed and developing countries. In its implementation, every country must define their own priorities, goals, and action programs which must be adjusted to the local environmental and socio-economic conditions. Furthermore, the resolution of several issues requires international cooperation, such as climate change and biodiversity issues.

Educational reorientation, from primary education to university, which clearly focuses on the development of knowledge, skills, perspectives, and norms related to the SD, becomes very important for present and future generations. Reviewing the objectives, contents and teaching method of the existing curriculum is required in order to develop a trans-disciplinary understanding in viewing social, economic and environmental issues.

Awareness of such matters should be introduced since childhood up until adulthood by putting these subjects in the curriculum and syllabus of every school subject. The biodiversity resources, in addition to the natural resources, are also an asset for SD which must be introduced to students through formal or non-formal education.

At higher education level, the level of understanding of SD must also be larger and more complete. Education on ecology or control of waste must be given in every subject and integrated into the general college subject given to all students from all majors. Since it is general and multidisciplinary in nature, the delivery must also be carried out using a simple and popular language. Understanding of waste and pollution (land, water, and air) can be integrated into a particular subject, such as combustion engine subject for students of technical engineering. In addition to explaining the mechanism of car machine, it should also explain the negative impacts of reckless fuel consumption. Hospital waste processing must also be taught to medical and hospital management students. The environmental economy subject is also recommended as one of the subjects that every economy student needs to learn. These are examples of how educational programs for SD must be integrated into university curricula.

In order to achieve all of the above purposes, all stakeholders should try to:

1. Promote and improve the quality of education: the purpose will be more focused on the lifelong education in order to obtain the knowledge, skills, and values required by the society in order to improve their living quality;
2. Redirect the curriculum: starting from pre-school to university, education must be reviewed and reconstructed to become a vehicle for knowledge, way of thinking and values required to build a sustainable world;
3. Improve public awareness of SD concept: improving the awareness will make it more possible to produce citizens who understand, active and responsible locally, nationally and internationally;
4. Educate workers: sustainable technical and skills education for directors and workers, especially those working in the fields of industry and commerce, so that they will be able to adopt sustainable production and consumption patterns.

Since 2015 through 2024 every UNESCO member countries are entering the decade of *global action program* (GAP) achieving sustainable development goals (SDGs). The GAP will focus on five priority action areas:

1. Advancing policy;
2. Integrating sustainability practices into education and training environments ( the whole institution approaches);
3. Increasing the capacity of educators and trainer;
4. Empowering and mobilizing youth; and
5. The GAP will also encourage local communities and municipal authorities to develop community-based ESD programs.

There are 17 goals the ESD is to achieve during the global action program, 2015-2024, namely: 1) no poverty, 2) zero hunger, 3) good health and well-being, 4) quality education, 5) gender inequality, 6) clean water and sanitation, 7) affordable and clean energy, 8) decent work and economic growth, 9) industry innovation and infrastructure, 10) reduced inequality, 11) sustainabilities and communities, 12) responsible consumption and production, 13) climate action, 14) life below water, 15) life on land, 16) peace, justice, and strong institution, 17) partnership for the goals (UNESCO, 2015).

In fact, SD by itself is unsustainable unless all stakeholders concern and have the commitment to its implementation. Sterling (2014) explained: "*Sustainable development is not itself sustainable (i.e., lasting and secured) unless relevant learning among all stakeholders is central to the process*" (p. 93). This is due to the fact that education improves competencies. Therefore, in its implementation it

requires: "... long-term and systems thinking, dealing with complexities and working in partnerships. It also entails specific knowledge related to areas of ones' personal and professional life that impact local and global communities and ecosystems" (Fadeeva, Petry, and Payyappalimana, 2012, p.8).

This also needs to identify the type education and instruction that improve this particular competency. Ohman and Ostman (2008), explained:

Thus, from this practical perspective, fulfilling the intention of the education for sustainable development policy documents basically means to offer various kinds of situations where students can display, and experience others displaying, what they regard to be the correct way of acting and the values they believe in. In this way, opportunities are created for students to increase their sensitivity to the subtle nuances of language when it comes to communicate the ethical tendency (p. 66).

In order to develop the related curriculum its curriculum needs to be developed and effective teaching-learning strategy, as well as its evaluation, need to be planned (Pruneau, Lang, Kerry, Fortin, Langis, and Liboiron, 2014). Its curriculum implementation should emphasize on practical experience in order to cultivate awareness, attitude, and value system toward sustainable development. This requires every education institution (at all levels) to reorientate its system, policy, the education practice aimed at encouraging the students to make the proper decision on tackling the future threats (Ali, 2014). This is in line with Cincera (2013), "According to our experience, it seems to be reasonable to use experiential education as a theoretical background for ESD programs", p.35. For this regard, the curriculum should be formulated in thematic forms related to three types of competencies, i.e., "... learning and innovation skills, information, media, and technology skills, and life and career skills" (p. 48). Furthermore, according to Baiquni and Astuti (2015), the key to success of ESD teaching and learning is the critical learning, joyful learning, and competitive learning on environment betterment; and these need long-term and various learning process.

## 4 CONCLUSIONS

1. Sustainable development is a global agenda, promoted by UNESCO, that should be implemented by its member countries. It is important in regard to overcoming the planet's complex problems related to irresponsible human

behavior in managing and using the natural resources for the fulfillment of their present needs and improvement of their welfare without taking into account the needs of the future generations.

2. When the SD concept is applied, exploitation of the natural resources for their present needs fulfillment and welfare improvement is done without sacrificing the future generations' right to enjoy the resources.
3. The successful implementation of SD is in the hands of the wise and quality human resources who play the role either as the development policy makers, managers, planners, and implementors.
4. Education plays an important role in producing the wise and quality human resources who are responsible for the implementation of SD. Therefore, education for sustainable development also becomes the global action program of UN to be implemented by every member country regarding the attempts to achieve its goal.

In order to implement the programs, it needs to develop relevant curriculum from preschool through university, formulate a plan of effective teaching-learning strategy and evaluation, which are emphasized on practical experience in order to cultivate awareness, attitude, and value system toward sustainable development.

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