

Integration Interconnections of Biology and Islamic in Learning as Efforts to Support *Education for Sustainable Development Goals (ESD)*

Elvara Norma Aroyandini

Department of Biology Education Faculty of Science and Technology
State Islamic University Sunan Kalijaga Yogyakarta - Indonesia
Correspondency email: elvarazakiya@gmail.com

Abstract

The world has faced a quite serious problem, namely decreasing environmental quality. As data released by UNEP in 2011 and 2012, that some indicators of the environmental quality are getting worse as occurs in Indonesia. Indonesia has the second highest biodiversity in the world after Brazil, but before that diversity has been successfully learned and utilized, nature is already damaged. It is marked by the loss of natural forest, coral reef damage, and so on. If there is not immediately respond, the environment will not able to support human life in a sustainable manner. Therefore, inculcation is important as the value to students who will use nature as the next generation. Planting can be realized through education, it is known the Education for Sustainable Development (ESD). One kind of learning is biology which has the same material curriculum and will be integrated with Islamic material. The author hopes that in the next will be born the students who are able to support the sustainability of development. Both because of scientific awareness of science taught through biology or awareness of God's command taught through his fusion with religion. This paper used an explorative writing that is qualitative-descriptive and pure research. The results concluded that the learning of integration-interconnection of Islam and science in biology learning can help the success of Education for Sustainable Development (ESD).

Keywords: Biology, Education for Sustainable Development (ESD), Interconnection Integration in Learning, Islam, Environment.

Introduction

Countries in the world have faced a serious problem, namely the decreasing environmental quality. As data released by UNEP in 2011 and 2012, that some indicators of environmental quality are getting worse as occurs in Indonesia. Among the highlights is the globally water use that has increased tripled in the last 50 years, primary forest has fallen by 300 million hectares since 1990, the use of plastics has increased dramatically over a period of 18 years; from 116 tons in 1992 to 265 tons in 2007, as well as conditions such as unsustainable agriculture, loss of natural habitat and biodiversity, and so on (UNEP, 2012).

The declining level of environmental quality also occurs in Indonesia. Indonesia has the second highest biodiversity in the world after Brazil, it was a high potential to be explored into new science and use to meet various needs. However, before all these potentials can be used optimally, the environment is already damaged and extinct along with the various species (Widjayanti, 2014).

There is a various thing to support it: **First**, *State of World's Forest* report issued by World Food and Agriculture Agency which states, that the rate of forest loss during the period of 10 years, from 2000 to 2010, reached 498,000 hectares per year (FAO, 2011) and replaced by the increasingly widespread of critical land, due to land clearing for dwellings, factories, mines, tourist sites, and so forth (Widjayanti, 2014).

Second, coral reefs that become residential for various marine biota are also damaged, as reported by Indonesian Institute of Oceanographic Research Center (LIPI) in 2011 which showed that the total area of coral reef 30,76 % severely damaged and 36,90 % suffered moderate damage. That is, only about 32,53 % of the coral reefs still support optimal marine life, where 26,95 % are in good condition and only 5,58 % are in optimum condition (Kesra, 2012). Other problems such as decreasing sources and water quality; increasing amount of waste, especially plastic, and so on. If there is not immediately respond, the environment will be damaged, so it is not able to support human life in a sustainable manner. In other words, that future generations can not use nature to

meet their needs. In addition to the environmental crisis, Indonesia also faced moral crises, ranging from cheating, a brawl between students, to drug abuse. Even the latest case, the tragedy of Budi an art teacher one high school in East Java be murdered by his own pupil

Therefore, it needs to invest value to the children who will use nature as the next generation, that the utilization of nature must be done in such a way that nature continues to provide humans need (Segara, 2015). The most strategic planting is through education, that can change perceptions, behaviors, and attitudes toward a better one, which one of them is the attitude toward the environment in a sustainable development effort (DESD, 2012). Therefore, the *Education for Sustainable Development* (1987) was adopted by the *World Commission on Environment and Development* (Brundtland Commission) through his book *Our Common Future* (Hariadi, 2016).

One part of education that most effective to instill the value is through Biology education. Biology education has materials that closers to nature along with its condition and strongly supports sustainable development (Hariadi, 2016). The existence of material that same meaning with the intended in sustainable development is also been written in the Qur'an which is the source of Islamic, in the form of human assignment as a *khalifah* on earth (Mufid, 2013). Therefore, the integrated between Biology and Islam, in this case, is expected to be a builder of awareness and responsibility for students to be more enthusiastic in maintained and cared for the earth, so as to support sustainable human life. Some expectation that there will be students who are able to do so. Both from scientific awareness of science taught through biology and awareness of God's command is taught through his fusion with religion. Given the importance of the problem which should be immediately instilled in the students so that will create a generation aware of the sustainable development, then written this paper. Based on the background, the problem formulation is: What is the role of education in Sustainable Development (*Education for Sustainable Development*). How is the integration of biological and Islamic interconnects in education? How is the integration of biological and Islamic interconnections in learning can help succeed *Education for Sustainable Development* (ESD)?

Method

Types Writing

This paper used explorative writing that is qualitative-descriptive and pure research, specifical research is conducted by expanding and deepen a knowledge theoretically. The purpose is to develop a discipline or

theoretic-discipline. Meanwhile, the step of writing is as follows.

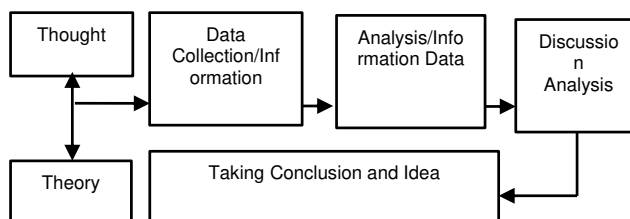


Figure 1. Step of Writing.

Focus of Writing

The focus writing of this paper is to integration and interconnection biology with Islam on learning, so as to help make success *Education for Sustainable Development* (ESD). It is based on two major problems in Indonesia, namely the existence of environmental and moral degradation.

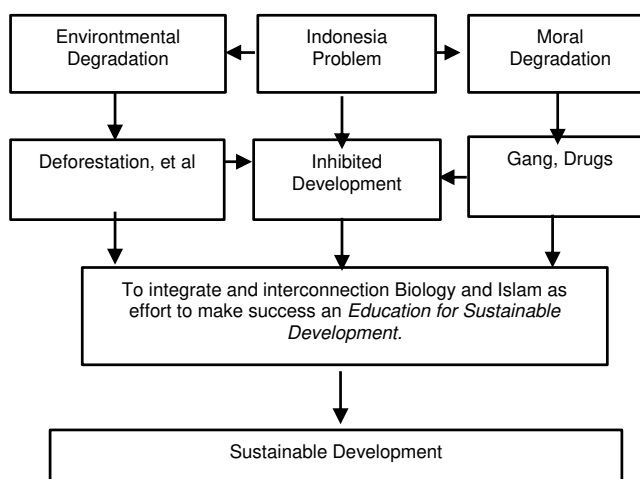


Figure 2. Flow Chart.

Data Sources

Data sources in this paper are from book, magazine, journal, photos, and relevant document that support a theme.

Collecting Data Technique

The technique used library research that supports from relevant research.

Analysis Data

This paper is use content analysis and exploration, that some analysis textual in literature study by investigation towards the content in some literature and relevant research.

Discussion

Role of Education for Sustainable Development (ESD)

Education has an important role to respond to some social problem include for degradation environmental problem and moral. This problem is responded by *Education for Sustainable Development (ESD)* that the first educational environment ideology has become a global program at United Nations Conference. After the conference at *Rio De Janeiro* in 2002, the study of ESD has changed. Which is initially only focused on the environment and now has divided become five types, ie educational environment, global education, educational nationality or educational politic, education against violence and racism, and medical education (Mathar, 2015). It means, that the goals of the ESD not only wanted the sustainable environment, but also in other aspects, such as culture, responsibility, social relation, and how student thinking to citizen nor world citizens responsible, so students are able to think globally. It is remembering that in addition to experienced environmental problems, the world also experienced socio-cultural problems, such as sexual harassment, racism, discrimination, the extinction of local languages, the extinction of noble values, and etc (Segara, 2015).

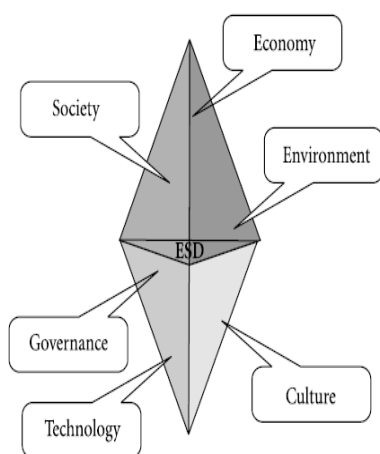


Figure 3. The Implementation of ESD from Related Perspectives

Figure 3 is showed the illustrated of ESD implementation. Initially, the approach used only 3 types, namely Environment, Economy, and Society. However, these three approached are not sufficient for building sustainable values in society, and then addition of Culture, Technology, and Governance (Segara, 2015). It is based on the awareness that the sustainability of nature will be meaningless if the sustainability of the social environment was disturbed (Nikolopoulou, 2010).

The role of education in sustainable development, as described in the *Australian Curriculum* that development of knowledge, skills, values, and views for students, so the students can be contributed and have a passion to implement the sustainable lifestyle. The result of the development is not only oriented by the problems that faced today, but also in the future. Therefore, the taken actions should be supports the pattern of sustainability by considering the environmental conditions, social, cultural, and an interrelated economic system. These actions include the development of values and skills so that students can be used them to contribute to support sustainable development activities (Segara, 2015).

Integration-Interconnection of Biological and Islamic in Learning

The dichotomy between science and Islam is still common, where scientists only think about science and research, while preachers only studied the Qur'an and Islamic sources, which are focused on the text only. In fact, these things have the same basis that synergizes, because both studies the verses of God, where science has studied the verses of nature (Kauniyah) and religion studied the verses of revelation (Kauliah). This is evidenced by various scientific research, that there is no single verse of the Qur'an that is not in accordance with the order of the universe. Some of the cues given by the Qur'an concerning the universe are numerous, which related to the biological sciences about the environment, the universe, biodiversity, and even various micro-living things (Mufid, 2013).

According to Campbell, biology is a science that studied about living things and life, that exist in present or which has lasted millions of years ago (Campbell, 2010). Biology in education curriculum in Indonesia has been taught to students since Elementary School as Natural Science (IPA); at Junior high school as an Integrated Science subject; as well as in High School level, ie Biology subject. Biology has been introduced to students when they're in elementary school level, the higher levels of students, the scholarship of biology is also deepened. Big scientists who are successful in research, especially in the Biology, they initially through the step to learn the basic of biology, one of which is in the classroom.

Scientists who will play an important role in life must be introduced early on with the concepts in religion, especially those concepts that have been integrated with biology, so that students are increasingly aware of its role as one of the inhabitants of the earth, so they believe and spirit will get stronger in sustaining sustainable development. Therefore, it is important to integrate biology and Islam in learning, especially on materials that intersect with sustainable development. The integration that can be done as an explanation such as on the material:

a. Biodiversity

Through various verses of the Qur'an, Allah SWT explained the biodiversity, there's the existence of animal society (Surat al-An'am (6): 38), various fruit seed plants (QS Al-An'am 6): 95, livestock (QS Al-Ma'idah (5): 1), reptiles (QS Hud (11): 56), etc. Allah also said in Surah Adz-Dzaariyaat (51) 20 to 21, which reads, "And on the earth are the signs of Allah for those who believe, and (to) yourself. Allah (SWT) commands the people to pay attention to the signs of Allah Almighty. "Noting" in this case is of course not only to see and observe solely, or to use it in need only, but also how to care for and preserve it, so as not to experience degradation, quality, and quantity.

Students as the next generation they would be used the services of the environment, it is also obliged to participate in maintained the biodiversity. What the teachers can do is introduce the names of every flora and fauna in Indonesia, especially those in the around of students and schools, whether by direct observation or using media. Students are then taught how to deal with forest destruction; that is with reforestation, selective planted, reduced paper making and tissue with the main material of wood, and so on; on the way of planting and plant propagation, especially vegetatively involving humans, so that students can play an active role in their activities, such as by grafting technique; etc. Students are also encouraged by the hadith of the Prophet (s) who ordered people to plant, although tomorrow will happen doomsday, so students have a high spirit in maintaining the environment, especially in creating a healthy and green environment.

b. Environmental Damage (Pollution)

The current environment is damaged, it has been mentioned in the Qur'an Surah Al-Baqoroh (2): 30, which is all due to the destructive nature of man and the shedding of blood, as it is said, "... The angel said: "Why do you want to make (khalifah) on earth is the one who will make damage to him and shed blood ..". Allah SWT also mentions that the role of man, in this case, is as *Khalifah*. Therefore, there must be a re-awareness that humans as khalifah who are certainly charged with certain tasks, so that people can use their minds to think, reflect, reason, be creative, innovate, etc., all of which are intended to avoid and reduce the damage that is on earth.

The above integration can be applied in a learning, one of which is problem-based learning, where students are invited to go directly to the environment to see the various environmental problems that occur, then the teacher provides problems that must be solved by students based on the observation which he has done. Teachers also stimulate students so that students can issue "ideas" related to what he must do to overcome and reduce the damage of nature, as an effort to perform obligations as a khalifah on earth.

Such learning can develop students interest in continuous learning, even though learning about the environment has been completed, so that students can continue to apply their knowledge in everyday life, until later adult. In addition, students can also learn actively and fun, so that they can easily understand the lesson being taught (Sanjaya, 2014).

c. Waste and Recycling

The rest of the activities of living things, especially humans, are numerous. In general, the residue is called trash or waste. However, various trash has *Xenobiotic* trait or substances that are difficult to degrade, such as plastics, glass, and so on. If thrown into the environment, it will cause over-accumulation of trash that affected to human life, both in terms of health, aesthetics and so forth. Meanwhile, the Qur'an also mentions that Allah created anything on earth with nothing in vain, including (in this case) the trash. As mentioned in Surah Al-Imran (3): 191, which means: "O our Lord, you have not created this in vain". That is, waste that is residual and tends to dirty must be processed in such a way, so as to be able to meet human needs and support the sustainability of human life. Utilization that can be done include by applying the 5R principle, namely Rethink, Reduce, Reuse, Recycle and Repair.

The learning that can be done is to directly jump into the environment where students are asked to collect solid-waste, then make the solid-waste into a more valuable product. Teachers, in this case, reinforce the perception that Allah SWT has never been in vain in creating something, so trash or waste that is considered dirt and no longer functioning is actually still has a function, but people who have to think more for how to make trash become usable and can support human activities. Teachers also explain how the 5R principle can be done in everyday life so that no objects around us are wasted in vain. In addition, waste can be avoided, especially harmful waste for the environment. Remember a spender is a man who disbelieves in Allah SWT, as mentioned in Q.S Al-Isra ': 27 which means, "The spender is the brethren of Shaytan and Shaytan is very disobedient to his Lord." Examples of wasteful actions that harm the environment are the use of practical plastic bottles that once used once dumped, in mineral water. Instead, the beverage is placed on a single container that is continuously used, so it can reduce trash plastic bottles.

The three materials above are examples of materials that combine Islam with biology, which is biological materials can be used to support sustainable development, through early value investments to students. Teachers who are creators in classroom learning can integrate other materials, or keep using the material in different models and learning methods, which depend on the creativity of each teacher (Al-Tabany, 2014). The most important thing is that the

learning does not separate between Islam and biology, but instead respect each other and build and support, so that will produce maximum output, that is the form of students who later have an awareness of the environment in order to continue sustainable, accompanied by appropriate character that expected by the religion and norms prevailing in society (Amri, 2017).

The Role of Learning Integration of Biological and Islamic Interconnection in Assist ESD Success

One of the programs that are emphasized in the ESD school is through Adiwiyata program with various programs, such as trash processing, planting medicinal plants, candor canteen establishment, and drainage preparation. However, these programs, according to research conducted by Heri Prasetyo, especially in West Nusa Tenggara, is only realized by certain schools with good infrastructure and school management, which is only located in the city. The activities carried out were nothing more than merely achieving Adiwiyata schools that outperformed other schools, but did not get the essence to change the behavior of teachers and students to care about and take concrete action on the environment. Finally, these activities became a formal activity that was only done before the appraisal of the Adiwiyata school was done, but then disappeared after the implementation of the Adiwiyata school was completed. In other words, that these positive activity has not become a character that embedded on students and teachers (Sutanto, 2017).

Ineffectiveness of Adiwiyata school causes the integration of ESD aspects into learning, such as biology learning. Integrated learning is fairly enough to build students to have the character as desired by ESD. However, it turns out that religious-based Islamic boarding school education is more successful in applying the concept, so that Nurul Islamic boarding school which is the object of Heri Prasetyo's research succeeded in developing nature conservation by reforestation of Lembah Madani which is 36 Ha, where the seeds of the plants used in the activity is self-planted by the students. Based on the discussion, it can be seen that religious-based education will actually produce the characters of students as expected by ESD (Sutanto, 2017). Characters that can be established and grown by integrating biology and religion include (Majid, 2012):

a. Religious

Religious character student is formed through the integration of the material with religion so the students can more obey their religion, that is to do what is ordered and away from forbidden. Carry out orders, among which are active in maintained nature, planting on bare land, and so forth. While away from the forbidden thing is to avoid wasteful

and useless actions, destruction of nature, and so forth.

b. Teamwork

Students' social skills, especially their teamwork-skill will increase. Because the learning to demand teamwork with the group is active and fun, for example, in the process of processing used stuff, where the students certainly not able to do it themselves, so they must get a teamwork with friends.

c. Responsible

This learning makes the students have more responsibility for their environment, as a member of this planet, as well as the khalifah which Allah SWT assigned to keep and care of universe so that able to sustainable. Especially with the "sin and reward" that exist in the rules of religion, so students become afraid if violated the religion rules, such as fear if illegal logging, afraid to use excessive pesticides because it can damage nature.

d. Hard work

The character of hard work will be formed because the activities of caring for the environment certainly cannot be done easily, but it requires a high work ethic. For example, in processing used stuff, first students collect the trash, then wash the trash that is usually still dirty, and then change it into goods that are much more useful. Of course, it takes extra hard work and patience to get it done.

e. Creative

The process of the used stuff can certainly sharpen the creative ability of students, because to change the various plastic garbage, cardboard, paper, glass, etc. then become items much different from their original material, for example made into slot pencil, wall decoration, and so on, would require a touch of creativity is high. If at the assignment time the students have not been able to do so, then automatically students will learn the various techniques first, both through print and electronic media, so that students who are initially not creative to be creative, while students who have creative ability can also improve the ability.

f. Spirit of nationality

The spirit of nationalism, the spirit to safeguard and protect Indonesia is also higher. Biodiversity learning tells about the various diversity of Indonesia will make the students more familiar with the extended nature of Indonesia. It is integrated with the Qur'an, that the extent of nature becomes one form power of Allah SWT that must be preserved. After knowing the great and glorious nature of Indonesia, the students will be loving environment more, that Indonesia has a beautiful natural wealth compared with various other countries, so the spirit of nationality, especially in protecting the environment will be formed.

g. Environmental care

Students also become concerned about the environment, students would think that if the environment continues to be damaged, then it will be harmful to both present and future generations. As a result, students become more concerned with the environment, although for little things, such as dumping trash in place, utilizing items that can still be used, not littering the river, and so on.

h. Social care

Students also become increasingly concerned with their social environment through various small things that indirectly formed in the learning process, such as working together with friends (not individuals/asocial), reminds his friends to do not damage the environment, and so forth. All the character formed above are appropriate with an expected by the ESD goal, that is not only the sustainability of the natural environment have been formed, but also the sustainability of the social environment, both in terms of culture, technology, and government (Segara, 2015).

Therefore, to achieve maximum results, biological learning which is proper with sustainable development can be integrated also with religious aspects, so that the various good attitudes formed in the learning will be a character that is always used by students in their daily life, even to adulthood. The hope will create the next generation of nations that have a concern for the environment sustainable, where it is formed through a combination of character planting done in biology learning that is integrated with religion.

Conclusion

Based on the discussion, it can be concluded:

1. The role of education in sustainable development is in the development of the knowledge, skills, values, and views that students can contribute and spirit in applying sustainable lifestyles.
2. Integration of biological and Islamic interconnections can be made on materials that support sustainable development, including in biodiversity materials, environmental degradation, and waste treatment.
3. The integration of biological interconnection and Islam can help the success of ESD through the establishment of a character that supports it, that is a religious character, teamwork, responsibility, hard work, creative, nationalism, caring, and social.

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