The role of knowledge-based ecological pesantren in environmental conservation

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Abstract. This study aims to analyze the ecological Islamic boarding school (Eco-Pesantren) and its role in environmental conservation. The study was conducted in an ecological boarding school in Garut, Indonesia. Data collection techniques are conducted through interviews, focus group discussions, and observations to obtain information on knowledge-based Eco-Pesantren and its role in efforts to preserve environmental and actualize the sustainability of organization. Research result shows that the sustainability of Eco-Pesantren is actualized by the role of pesantren leaders who put into practice the importance of caring for environmental conservation and then followed by the santri (students of pesantren) as full support to preserve the environmental. A significant contribution of Eco-Pesantren in preserving the environmental is demonstrated through the cultivation of various types of plants and the use of knowledge-based sustainable agriculture models.

1. Introduction
Ecological Islamic boarding school (Eco-Pesantren) is one of the pesantren provides deepen knowledge of Islamic religion and introduction of environmental science to students. By preserving environmental, nature will provide more benefits to human life. When ecological quality decreases due to over-exploitation of natural resources, the economy will increase but only temporary. The impact of such exploitation in the long term will cause a detriment, including economic failure. Eco-Pesantren, aside from providing religious knowledge, also teaches how to preserve environmental, including through the use of land for rice farming and various types of herbs, as well as other plants needed by the community.

In managing agricultural sector, pesantren uses sustainable concepts by viewing ecology as a subject and not an object in the activity of empowering the environmental around pesantren. Agricultural activities are carried out with the aim to fulfilling primary needs and contributing to environmental conservation and community health with the emphasis on ‘back to nature’. If we maintain and preserve nature as an expression of our gratitude, then the nature will give us more. This is the concept pesantren believes will provide good things for human life and the environment.

Economic independence of pesantren through the management of agricultural sector is inseparable from the application of Islamic values. Islam clearly states the importance of preserving environmental, and vice versa, prohibiting unmanageable exploitation which will trigger natural disasters. Preserving environmental is considered an act of good deed, and conversely, the exploitation which causes environmental damage is as an act of sin. This concept is the basis of sustainable agricultural activities run by Eco-Pesantren. As a dedication to ecological movements, pesantren strictly limits students’ daily
consumption by providing organic-based foods only. Knowledge-based Eco-Pesantren has a special characteristic of having concern for environmental preservation; therefore, this study is conducted to further analyze the existence of such Eco-Pesantren and its role in preserving environmental.

2. Research method
This research used descriptive analysis method with techniques of data collection done through interviews, focus group discussion, and observation. This research was conducted at Ath-Thaariq Islamic Boarding School in Garut, Indonesia, which was taken as a model of ecological Islamic boarding school (Eco-Pesantren).

Focus group discussions were conducted involving the leadership of Ath-Thaariq pesantren, santri, and representatives of the community related to the existence of pesantren with the intention to find out the role of knowledge-based ecological pesantren to preserve the environment. Meanwhile, observation is performed directly in the field.

3. Ecology and environmental conservation
This research refers to the science of environmental economics management and literatures which state that environmental problems are related to how to manage the environment and its role towards a better life in the present and future. Theirfelder et al. stated that the increasing demand has put farmers to face various ecological issues such as land erosion, depletion of water reserves, decreasing biodiversity, etc., which in the long term will threat the existence of food security and sustainable agriculture [1]. Similar to the statement, Joshi stated that every year around 10 million hectares of good quality land are lost as a result of increased production and agricultural profitability [2]. Responding to the challenges in agricultural sector, a concept that combines agriculture and conservation has emerged. It is called sustainable agriculture which first initialized by agricultural practitioner.

Knowledge-based approach and effective communication is crucial to create a combination of natural conservation concept and effective agriculture (also known as sustainable agriculture) [3]. Sustainable agriculture is a model approach to conservation agriculture. It focused on preservation of water resources, land quality, production, environment, and agricultural efficiency to minimize disruption to environmental [4]. The principle of conservation agriculture has received attention from agricultural actors, but the lack of knowledge of implementation and technical references became major obstacles to developing this concept [5]. Similar to what happens in other countries, majority of farmers in Indonesia experience the same difficulties in applying sustainable agriculture, despite many conservation activities have been carried out by Muslim communities [6,7]. To support these findings, Saniotis found that in Indonesia, almost 17,000 pesantren were involved in various ecological practices [8], especially at the grassroots level by emphasizing community participation. Similar to these findings, McKay et al. discovered there was an increased concern to support conservation activities among religious groups and in pesantrens in Indonesia [9].

Although pesantrens face various difficulties in practicing conservation agriculture, in the end they emerged as centers of learning and teaching in the environment [10]. The increased awareness of environmental conservation from religious groups has a strong connection with religion and religiosity [11]. Islam emphasizes the importance of environmental conservation activities and encourages prevention of damage to environment, exploitation, and pollution so that a healthy environment can be maintained throughout the generations [12]. A concept which emphasizes agricultural sustainability is the concept of green economy. It generally emphasizes the creation of a better future for humanity, economically, socially and environmentally, by achieving economic and environmental sustainability through the implementation of various environmental conservation efforts [13,14].

4. The existence of Eco-Pesantren
Knowledge-based Eco-Pesantren are Islamic boarding schools which emphasize the importance of Islamic religious education and knowledge of environmental management to be practiced as an effort to conserve a sustainable environment. The implementation of environmental preservation as the main
principle of Eco-Pesantren management is a manifestation of great concern regarding environmental
damage and a number of natural disasters occurred in Indonesia due to the lack of knowledge in
managing natural resources properly; and the practices of erroneous natural resource management
mainly caused by little knowledge possessed by environmental managers.

Pesantren is an educational institution teaches religion to their students, and Eco-Pesantren adds
the teaching by creatively participate in caring for and preserving the environment. The strong concept of
environmental preservation in Eco-Pesantren is based on the belief that human is inseparable part of the
nature in life. When humans make efforts to preserve nature, nature will provide various elements
needed by humans in their lives. This Eco-Pesantren through its teaching delivers and practices the
importance of environmental preservation to protect ecosystem balance in life.

Eco-Pesantren is Islamic education institution which also practices agricultural activities as one of
the main sectors to actualize economic independence of pesantren. These agricultural activities are still
intended to dominantly fulfill the internal needs, but some of their processed products in form of food
and drink are sold to limited market. The management of agricultural sector and the cultivation of
various types of plants are carried out with the aim to realize the environmental sustainability.

5. The role of Eco-Pesantren in environmental conservation
Pesantren supports the environmental conservation by providing knowledge and education to the
students on the importance of managing and maintaining the environment well. In an environment,
land/soil is a complex ecosystem and becomes a place for various important elements in life such as
microbes, biota, minerals, organic matter, and other important elements need to be maintained. Land is
an important subject of life, especially in agricultural activities. Land is not an object that can be
overexploited which will cause a decrease in quality of the environment and influence the overall quality
of life. Knowledge of the importance of land will provide a strong understanding to the students that by
maintaining the stability of land ecosystem means they have contributed to improving the quality of
their own lives.

By having knowledge of the importance of maintaining soil quality, Eco-Pesantren runs a naturally
sustainable farming system. Enriching the soil for rice field and garden is carried out manually to
maintain the quality of soil and avoid the damage of its important elements. This processing technique
turns out to provide great benefits for fertility and quality of plants. Without having to pay high
operational costs, Eco-Pesantren and the students are able to produce good quality agricultural products.

In agricultural practice, Eco-Pesantren avoid the use of chemical-based fertilizers and choose
compost made from animal waste to prevent the possibility of consuming dangerous chemical elements.
It also protects the land used for agricultural from damage as a result of chemicals contamination
contained in the fertilizer. To secure agricultural crops from pests, Eco-Pesantren develops a natural pest
control system working without destroying the balance of food chain in ecosystem. For example, they
plant betel plants in one corner of their farm to protect snake species which function to control number
of rat pests. Killing any animal found in agricultural land is prohibited so that the optimization of
agricultural products can be achieved without destroying the balance of nature. To prepare post-harvest
rice fields, Eco-Pesantren apply a system of natural soil decay by spreading grain on rice fields that have
been harvested and left to rot for two weeks. This technique is useful for maintaining soil fertility without
having to do forced enrichment.

Pesantren initiates biodiversity conservation efforts by providing land of 12 hectares outside
pesantren area for a Biodiversity Laboratory. The land is used for the cultivation of various species of
plants and herbs by utilizing organic seeds produced through natural pollination. The plants then used
as basic ingredients for making herbal medicines and alternative food ingredients for santri (students).
By performing those activities, Eco-Pesantren has made a significant contribution to efforts of
preserving the environment and at the same time carrying out the functions of Islamic education
institutions that teach natural science, particularly related to better and sustainable agricultural
management.
In addition to managing the land by paying attention to environmental preservation, Eco-Pesantren also run a water management system well. The cleanliness of irrigation channel is maintained to make water continues to flow without any blockages so that there will be no puddle of dirty water around pesantren. A good irrigation system can prevent santri from various diseases, especially skin diseases. In addition, the water used in the farming system is cleaner and healthier. The concept of agriculture run by Eco-Pesantren can be developed into a model of sustainable agriculture beneficial for environmental sustainability.

6. Conclusion
The sustainable agricultural model practiced in Eco-Pesantren has made a significant contribution to environmental conservation efforts. The emphasis that nature is an important subject in agricultural practice has interrelated relations with humans as Khalifah (leaders) and managers of natural resources. The use of natural materials instead of chemical elements in Eco-Pesantren farming practices is proven to be able to produce quality agricultural products. One of the pesantren's efforts to preserve biodiversity is to open planting land outside the pesantren area intended as a Biodiversity Laboratory. Eco-Pesantren concern for environmental conservation is realized through the use of land for cultivating various species of plants and herbs. The knowledge-based sustainable agriculture model run by this Eco-Pesantren has brought significant changes in environmental conservation efforts.

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References
[1] Thierfelder C, Rusinamhodzi L, Ngwira A R, Mupangwa W, Nyagumbo I, Kassie G T and Cairns J E 2015 Conservation Agriculture in Southern Africa: Advances in Knowledge Renewable Agriculture and Food Systems 30(4) 328-348
[2] Joshi P K 2011 Conservation Agriculture: An overview Indian Journal of Agricultural Economics 66(1) 53-63
[3] Tangvitoontham N, Hengpatana S, and Kotrajaras P 2015 Philosophy of Sufficiency Economy, Environmental Protection and Natural Resource Conservation Behaviors International Journal of Arts & Sciences 8(4) 125-133
[4] Grigoras M A, Popescu A, Pamfil D, Has I, and Gidea M 2012 Conservation Agriculture Versus Conventional Agriculture: The Influence of Agriculture System, Fertilization and Plant Protection on Wheat Yield Notulae Botanicae Horti Agrobotanici Cluj-Napoca 40(1) 188
[5] Peigné J, Casagrande M, Payet V, David C, Sans F X, and Blanco-Moreno J 2016 Mäder, P. How Organic Farmers Practice Conservation Agriculture in Europe Renewable Agriculture and Food Systems 31(1) 72-85
[6] Islam S 2012 Old Philosophy, New Movement: The Rise of The Islamic Ecological Paradigm in The Discourse of Environmentalism Nature + Culture 7(1) 72-94
[7] Reuter T A 2015 The Green Revolution in The World's Religions: Indonesian Examples in International Comparison Religions 6(4) 1217-1231
[8] Saniotis A 2015 Muslims and Ecology: Fostering Islamic Environmental Ethics Contemporary Islam 6(2) 155-171
[9] McKay J E, Mangunjaya F M, Dinata Y, Harrop S R and Khalid F 2014 Practise What You Preach: A Faith-Based Approach to Conservation in Indonesia Oryx 48(1) 23-29
[10] Mohamed N 2014 Islamic Education, Eco-Ethics and Community Studies in Philosophy and
Education 33(3) 315-328

[11] Rice G 2006 Pro-Environmental Behavior in Egypt: Is There A Role For Islamic Environmental Ethics? Journal of Business Ethics 65(4) 373-390

[12] Helfaya A, Kotb A, and Hanafi R 2018 Qur’anic Ethics For Environmental Responsibility: Implications For Business Practice Journal of Business Ethics 150(4) 1105-1128

[13] Ehresman T G and Okereke C 2015 Environmental Justice and Conceptions of The Green Economy International Environmental Agreements: Politics, Law and Economics 15(1) 13-27

[14] Musvoto C, Nortje K, de Wet B, Mahumani B K and Nahman A 2015 Imperatives For An Agricultural Green Economy in South Africa South African Journal of Science 111(1) 1-8