



TEACHING YOUNG PEOPLE IN A FOREST COMMUNITY: LINKING CLIMATE EDUCATION WITH LOCAL REALITIES

Case Study Final Report
Indonesia

This research was conducted by



This research was made possible with funding from



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Case Study Summary

Madrasah Tsanawiyah (MTs) Piety, Achievement, Knowledge, Integrity, and Sincerity (PAKIS) is a school located on steep-sloped hills 400 to 900 meters above sea level in Pesawahan Hamlet, Gununglurah Village, Indonesia. This region has an annual rainfall of up to 3000 millimetres and is upstream of several river basins. Most households work in the agricultural sector. The students of MTs PAKIS come from Sambirata Village and Gununglurah Village, which are directly adjacent to the forest. Due to remoteness and lack of access to schools, many school-age children cannot afford an education. As a result, many of these children must work in the fields or marry early, continuing the cycle of poverty. Several environmental activists initiated a madrasa in collaboration with the Pesawahan Hamlet community in 2011 to enable children to access quality formal education through distance classes in partnership with existing formal madrasas in the district. So far, this madrasa has graduated nine batches of junior high school students. The madrasah's educational philosophy is reflected in the school's acronym, PAKIS: Piety, Achievement, Knowledge, Integrity, and Sincerity.

The objective of the case study on MTs PAKIS is to identify how concepts and theories about environmental education, including climate change, have been applied by MTs PAKIS. The case study also aims to evaluate and assess the environmental education and climate change activities that are being applied so that they are more meaningful and become a reference for planning future climate change education designs.

The research methods used for this case study include participant observation and in-depth interviews. During participant observation, the researchers were directly involved with the community groups that were studied. The case study team members who are also managers of MTs PAKIS are teaching volunteers who provide education to students every day. Other case study team members also provided educational materials on climate change. In-depth interviews were conducted with students, school administrators and parents. A total of 21 MTs PAKIS students (14 boys and 7 girls) participated in this case study. This group includes eight students in Class VII, seven in Class VIII and six in Class IX. Seven students, five girls and two boys, were interviewed. Two parents of students and three school staff members were interviewed, including one of the school's founders and two students (male and female) pursuing Package C (equivalent to high school) who teach MTs students.

The case study results show that school-age children can continue their studies without spending money on education or transportation because they are still in the same local environment. In addition to formal education, children also receive knowledge appropriate to their local needs as a community on the edge of the forest. They learn about agriculture, agroforestry, animal husbandry, biodiversity and climate change. By continuing their education, MTs PAKIS has been able to keep these children living in the village instead of migrating to the city and allowing them to study and work in the village, preventing them from getting married at a very young age. The knowledge and education at MTs PAKIS can prepare children with more skills, knowledge and self-confidence to meet the economic needs of their families in the future. Their knowledge of climate change is obtained from field practice and theory, which enable understanding and giving explanations of why seasonal changes are detrimental to family-production crops such as cardamom. PAKIS MTs must be supported due to its positive change in the perceptions of the community where now they believe that

¹The views in the report are not necessarily endorsed by the MECCE Project, which funded the research. This report was republished in 2025 following additional copy editing to increase the report's clarity.

education will make better changes in life. The community has high expectations that children can continue to go to school. However, the volunteerism of the teaching staff is an obstacle because the teaching staff has not been permanent for the children of MTs PAKIS. Managerial systems must be able to answer the weaknesses of the human resources of volunteer-based teaching staff.

CCE Initiative

Madrasah Tsanawiyah PAKIS is an educational institution built based on community problems. Once, the community of Pesawahan Hamlet, Gunung Lurah Village, lacked access to education due to their remoteness. The community is situated on the edge of the forest, causing many school-aged children could not afford education. Further, many school-aged children were forced to work in the field or married at an early age, continuing the circle of poverty in their realm. Some environmental activists initiated the madrasah in collaboration with the community of Pesawahan Hamlet in 2011 to enable children to access quality formal education through a partnership with the existing formal madrasah in the district. So far, the madrasah has graduated nine batches of junior-high-school level children. The philosophy of education is reflected in the school acronym: PAKIS as Piety, Achievement, Knowledge, Integrity, and Sincerity.

Madrasah Tsanawiyah (MTs) is one of the education systems for junior high school-age children under the Ministry of Religious Affairs administration and allocates Islamic teachings at 17% of the total lessons. Since the 2000s, many schools in Indonesia have included environmental education in the curriculum for local content so as MTs PAKIS. However, MTs PAKIS emphasizes practical and applicable aspects of local-characteristic ecological education such as agroforestry because most students live at the edge of the forest. The location of the school is also adjacent to the state forest area. Therefore, education in this school also utilizes the natural conditions of the surrounding environment as a medium of learning. Environmental education carried out by MTs PAKIS includes mitigation and adaptation to climate change. In addition, conservation education is also carried out practically, both around the school and in the forest.

MTs PAKIS works with the community to find solutions for families who have problems accessing schools due to remoteness, high costs, and environmental issues in the area. The founders who initiated the establishment of MTs PAKIS were environmental activists, educational activists, bird watchers, observers, and conservationists. They found that many school dropouts came from the Sambirata and Gununglurah Village areas, which are adjacent to the state forest area. Besides having poor access to secondary school facilities, these dropout children play an economic role for their families. Livelihoods in agriculture and plantations are earned through labour, and due to low incomes, it is difficult to employ workers from outside the family. From these conditions, the designed form of education for school children seeks to answer the needs of the students' families, not to be deprived of their daily environmental conditions and socio-economic systems. Livelihoods based on agriculture, plantations and processing of natural resources are integrated into the designed education system. In addition, there is a strengthening of conservation values to maintain the preservation and continuity of the carrying capacity of natural resources. This is integrated into the cognitive aspects of everyday learning. Cognitive aspects that are structured together with the primary and secondary education systems built by MTs PAKIS are also combined with socio-ecological aspects of their identity as a community of farmers.

Case Study Methods

This case study was conducted by the National Research and Innovation Agency of The Republic of Indonesia. The objective of the case study at MTs PAKIS was to identify how concepts and theories about climate change and environmental education have been applied by MTs PAKIS. So far, MTs PAKIS has built a model greenhouse, cultivated food crops, enriched useful plant species around schools, participated in agroforestry activities, educated on climate change mitigation and utilization of biodiversity, and produced an inventory of forest plants. This case study at MTs PAKIS also aims to evaluate and assess the maps of environmental education and climate change activities that are being applied to become a reference for planning future climate change education designs.

There were three variables in this Indonesian case study: MTs PAKIS' program performance, educational effectiveness, and problem identification. Climate change education programs performance assessment uses the parameters defined in the Action guidelines for climate empowerment (UNESCO and UNFCCC 2016), including education, training, public awareness, public access to information, public participation, and international cooperation. In the second variable, the assessment of the effectiveness of teaching climate change uses the guidelines given to educators. The approach taken uses a modification of the NAAEE Excellent Professional Development Guidelines for Environmental Educators (2019):

1. Literacy on climate change;
2. Basic understanding of climate change education;
3. Taking responsibility for climate change;
4. Planning and implementing climate change education;
5. Development of inclusive learning;
6. Assessment and Evaluation.

The third variable is about the challenges and obstacles faced by a systematic review to obtain representative data.

The fundamental change that was obtained by MTs PAKIS was that school-age children can continue their schooling without spending money on education or transportation because they were still in the same region, even though the distance is still relatively far (about an hour's drive in hilly terrain). In addition to formal education, children also receive knowledge appropriate to their local needs as a community on the edge of the forest. They learn about agriculture, agroforestry, animal husbandry, biodiversity and climate change. Education has been able to keep children living in the village. Instead of migrating to the city, the students study and work in the village, preventing them from getting married at a very young age. The knowledge and education obtained at MTs PAKIS have answered and prepared children to have more skills, knowledge and self-confidence to meet the economic needs of their families in the future. Their understanding of climate change is obtained from field practice and theoretical knowledge to understand and explain why seasonal changes detriment the family production of economic crops such as cardamom.

MTs PAKIS has achieved a positive change in the community's perceptions, wherein the residents believe that education will make changes for a better life. Community members eagerly allow their children to continue to go to school. However, the volunteerism of the teaching staff is one of the challenging obstacles to sustainability because the teaching staff is

not permanent. Managerial systems must be able to answer the weaknesses of the human resources of volunteer-based teaching staff.

The research methods used include participant observation and in-depth interviews. In participant observation, researchers interact directly with the community groups to be studied. The research participants are MTs PAKIS students, MTs PAKIS administrators who are volunteers who provide education to students every day, and parents of MTs PAKIS students.

Those involved during participant observation in this case study were all MTs PAKIS students, a total of 21 persons consisting of 14 boys and 7 girls; of these, 8 students were in Class VII, seven students in Class VIII and six students in Class IX. Meanwhile, seven students participated in in-depth interviews. Two parents of students and three school administrators were interviewed, including one of the school's founders, and two teachers who were former students of MTs PAKIS, (one male and one female) who assist the learning process for MTs students. The female teacher is 29 years old and is responsible for administration at MTs PAKIS as well as a non-permanent teacher for early childhood education (PAUD). The 22-year-old male teacher is an alumnus of the first batch of MTs PAKIS who is currently teaching at MTs PAKIS and specializes in horticulture, especially coffee - maintenance, harvesting, processing and marketing. All participants live at the forest's edge. Their livelihoods depended on the forest on the slopes of Slamet Volcano.

The interview questions in this study were intended for two populations: students and school administrators. The questions posed to the students cover their background, beliefs regarding MTs, and the Effectiveness of School Learners assessment by NAAEE (2019). The questions for the school administrators covered challenges and obstacles within the school, how these issues are mitigated, as well as questions on educational effectiveness, including performance measurement, and effectiveness of teaching.

Case Study Findings

The daily learning and teaching activities at MTs PAKIS use a spatial material delivery model and action-based learning. Classroom learning is often combined with out-of-class activities, including observations, discussing joint findings and taking action. Aspects of learning and action are exemplified in the activities of exploring the surrounding environment, such as documenting and identifying birds. Learning activities in this way also include identifying and protecting bird habitats and planting various types of plants. This activity maintains the density of hilly vegetation cover specific for the region altitude and improves the habitat for birds and other animals. The varieties of plants and trees planted, such as coffee, also have economic value. From these coffee plants, a local coffee commodity is planned, which can become an additional income for the community and MTs PAKIS students. In the long term, it is expected that coffee plants can help sustain the school's institutions.

The typical MTs PAKIS learning, action, and work activities also attracted the attention of many volunteers to come and contribute according to their abilities. This activity was also directed by the managers of MTs PAKIS, who facilitated volunteers who play a role in the learning process. These volunteers come from various backgrounds and are a way of enriching students' knowledge with a variety of new knowledge. They also assist students in understanding learning materials. Most volunteers are students from various universities with different scientific backgrounds, including activists and researchers who are eager to participate in helping MTs PAKIS educational outcomes.

MTs PAKIS introduces students to information on climate change and its relevance to where they live. Students living in the forest and rural areas are invited to discuss how climate change affects their villages and local environment. In basic education, climate change material is

often taught in outdoor discussion activities, in forest exploring sessions, and in activities related to agriculture and household waste treatment. MTs PAKIS students also participate in creative activities, including writing, painting and social media. These creative activities take the form of writing short stories, posters and documentation of various species of birds in photos and narrations that are collected as they study and explore the environment in which they live. Currently, MTs PAKIS has carried out three activities. First, a poster-making contest about climate change. Nineteen posters exploring various themes about the environment and climate change were made. Secondly, MTs PAKIS and students developed a short film that talks about their activities, their school, the environment where they play and learn, the local wisdom of the community where they live and grow, as well as the hopes and aspirations for the earth and a climate that is friendly again to everyone. MTs PAKIS and the students hope that this medium will be more accessible for communicating their efforts to reduce the impact of climate change. Third, MTs PAKIS students have created various materials documenting the learning process, which will be arranged into a book. The book will be a medium for conveying ideas about changes in a community. Specifics are being developed with partners in children's publishing. The hope is that this book will become an intermediary to communicate with PAKIS children.

The various activities carried out by MTs PAKIS are not only oriented towards learning but also campaigning to a wide audience about the phenomenon of climate change. This campaign aims to provide awareness and literacy to the public about climate change. Currently, formal education at the primary and secondary levels only rarely includes climate change as

knowledge in teaching. The students and administrators of MTs PAKIS publish the various activities they perform and become a link to climate change literacy that has not been touched on in primary and secondary education. This aligns with literacy education as understood by the school's management - that essential literacy must come from what is read, what is written and what can be done so that students have the necessary provisions and skills, which includes climate change literacy. MTs PAKIS integrates this by understanding the global context of climate change and local actions that can be taken by communities.

Psychosocial Learning Dimension

The case study participants did not struggle with the psychosocial aspects of climate change. However, there are concerns, including why rains are less predictable, causing cardamom crops to be damaged and unable to be dried in the sun. This decreases the crop's quality and value, resulting in reduced family income. Knowledge about climate change and how it impacts life helps students understand how climate change impacts their local environment. Students, in turn, explain these concepts to their families.

Action Learning Dimension

The action learning aspect of climate change education at MTs PAKIS involves efforts to inspire individuals and communities to take concrete action to reduce the impact of climate change. The purpose of this action learning aspect is to encourage active participation and sustainable contribution in mitigation (emission reduction) and adaptation efforts to climate change. Students are taught about climate change and how to overcome it and take action by planting trees and campaigning about climate change on social media.

Indigenous Knowledges/Participatory Methods Influence

The community believes that if their forest is good, they will also receive good benefits, so this program encourages them to provide awareness and knowledge to the younger generation so that they can identify biodiversity in the forest and the environment around them and sustain

it for the next generation. Local knowledge influences the case study process in the dynamics of using the target students' and parents' time in studying and earning a living. Students are only active at school from morning to noon, and during the day, they join their parents, who are working in their respective farm fields to help with the work. So, the effective research time is in the morning with students and administrators and in the evening with parents. The case study team members followed the flow of this activity both at school, in the fields and at home to produce intense and natural interactions.

Cultural and Regional Context Influences

The background of MTs PAKIS establishment was to solve the access problem to education and prevent early migration and marriage. In this way, the school has been adapted to the real needs of the community. As religion-based schools, they teach various life skills. Keeping the nearby forests sustainable and productive is another important need that this school is meeting.

Sharing Learnings Across Geographies

Education about climate change has become a necessity for the community to increase awareness and know the measures individuals and communities can take in dealing with climate change. This system must be extended to reach not only the people who live in the discussed setting but also in national and international contexts.

Case Study Impacts

Internal Impacts

From this case study, we conceptualised a curriculum and syllabus for learning about climate change that will be implemented in other schools, which we call "climate care schools" with the title: "Climate-Care School For Tsanawiyah/Secondary Education Students." Climate change education is applied in a structured and planned manner to overcome the existing climate change problems. This material puts emphasis on climate change, its causes, and monitoring techniques. In addition, the benefits of climate monitoring knowledge are also introduced.

The material consists of basic knowledge of climate change, weather and climate monitoring techniques, and techniques for reading data and analysing weather and climate data. Regarding climate change adaptation, children are given material related to climate change adaptation, including waste management, tree planting (reforestation), and a biodiversity inventory. For climate change mitigation, children are given the material on climate change mitigation, including an introduction of non-timber forest products as a means of food security, efforts to overcome forest destruction, and soil and water conservation efforts by making biopore infiltration holes.

The subjects are offered in the classroom and out-class. The material in class is delivered using presentations, practice simulations, and discussions. Material outside the class is delivered using the case and project-based methods. Subjects can be prepared for six meetings, which combine methods for inside and outside the classroom. See Annex 1 for the climate learning table for secondary/Tsanawiyah students.

External Impacts

From our observations, research, and practices conducted at MTs PAKIS, we have designed a learning curriculum and syllabus for junior high school students (secondary students) or Madrasah Tsanawiyah students. The curriculum may be used by other parties and will be disseminated through collaborative research and community service programs which have

been built by three major institutions: the Society and Culture Research Centre of the National Research and Innovation Agency, the Faculty of Agriculture of Brawijaya University and the Faculty of Social and Political Sciences of General Soedirman University. Students from the two universities will become facilitators in the initiation practice applied by researchers, lecturers/teachers and practitioners who are members of this team at the internship and community service practice sites that the students take.

Applicability and Scaling of the CCE Initiative

It is likely that the initiative described here can be developed in other regions, as there are many cases like this in Indonesia. Finding local people who care about education and the environment in the surrounding community and making MTs PAKIS a learning experience is a critical first step.

Appendix A. Climate Learning Table for Secondary/Tsanawiyah Students

No.	Subjects	Sub-Subjects	Teaching Forms	Tools	Duration	Class Location
1.	Introduction to Climate Change	Introduction to climate change. The importance of climate change adaptation and mitigation	Lecturing, discussion, simulation	Poster, writing board, marker, gas stove, ice block, pan, water, fan	4 – 6 hrs	In-class
2.	Introduction to Climate change	Weather and climate monitoring, weather and climate data analysis and interpretation	Practice making a simple rainfall monitoring tool (case base), and the simulation of monitoring analysis.	Bucket, ruler, pipe, funnel, jerry can, stationaries	4 – 6 hrs	Out-class (schoolyard)
3.	Climate change adaptation	Waste separation and management	Practice composting from organic waste, practice handicraft making from inorganic waste.	Separated waste, creative tools, compost hole, waste shredder.	4 – 6 hrs	In-class and out-class (schoolyard)
4.	Climate change adaptation	Biodiversity monitoring, replantation	Practice biodiversity monitoring and replanting the rehabilitation area.	Camera, guidebook, plant seeds.	6 – 8 hrs	Forest around school
5.	Climate change mitigation	Introduction to non-timber forest products as food products, to overcome forest degradation.	Introduce forest-based food and medicinal plants. Establishment of forest-based arboretum. Monitoring. Assessment and tree maintenance.	Stationaries, forest-based food seedlings and medicinal plants.	6 – 8 hrs	Schoolyard and forest around the school.
6.	Climate change mitigation	Soil and water conservation	Introduction of soil and water conservation technique. Biopore infiltration holes.	Biopore bore pipe, plough	4 – 6 hrs	Around school



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Recommended Citation: Desmiwati, Asyieff, K.B.M., As'atohara, B.P., Novianti, W., & Christian, Y. (2025). Teaching Young People in a Forest Community: Linking Climate Education with Local Realities. MECCE Project Funded Case Study. Retrieved from <https://mecce.ca/publications/teaching-young-people-forest-community>.