



Knowledge hub - Collection of best practices

Summary of the best practice

1. Title of the best practice (e.g. name of policy, programme, project, etc.) *

Ecology Note: Promoting Action-based Environmental Education

2. Country or countries where the practice is implemented *

Myanmar, Cambodia, Bhutan, Viet Nam

3. Please select the **most relevant** Action Track(s) the best practice applies to *

- Action Track 1. Inclusive, equitable, safe, and healthy schools
- Action Track 2. Learning and skills for life, work, and sustainable development
- Action Track 3. Teachers, teaching and the teaching profession
- Action Track 4. Digital learning and transformation
- Action Track 5. Financing of education

4. Implementation lead/partner organization(s) *

IGES Centre Collaborating with UNEP on Environmental Technologies (IGES-CCET), the Mandalay City Development Committee (MCDC), the Phnom Penh Capital Administrative, Department of Education, Youth and Sports (DoEYS) of Cambodia, the National Environment Committee (NEC) and the Royal Education Council (REC) of Bhutan, Department of Natural Resources and Environment and Department of Education and Training of Hoi An City in Vietnam

5. Key words (5-15 words): Please add key descriptive words around aims, modalities, target groups etc. *

Waste management, Ecology Note, Action-based education, behaviour changes, integration into the official curriculum

6. What makes it a best practice? *

A simple and replicable environmental education material entitled Ecology Note enhanced the young generation's self-motivated active learning on waste management in several Asian countries. Each of the Ecology Note series was customised to fit the local context in each partner country or city, which would ensure that students are given the opportunity to recognise and consider the actual local waste issues and take actions. In addition, the contents of the booklet focus on creating incentives for students to change their behaviour through more experiential activities such as carrying out surveys, holding discussions, engaging in handicrafts for upcycling, and making compost. At the same time, in order to carry out these activities and ensure they are effective, educators' capability was reinforced through teacher training sessions conducted in the partner cities and countries. The Ecology Note and its implementation program began at a few model schools in Myanmar's city, subsequently, it has been replicated and scaled up in Cambodia, Bhutan, and Vietnam.

Description of the best practice

7. Introduction (350-400 words)

This section should ideally provide the context of, and justification for, the practice and address the following issues:

- i) Which population was affected?
- ii) What was the problem that needed to be addressed?
- iii) Which approach was taken and what objectives were achieved? *

Along with rapid urbanisation, economic growth and changes in lifestyles and consumption patterns, one common issue among countries in Asia is the dramatic increase in the amount of waste generated. Governments in the region have made it a priority to tackle various challenges related to waste management, and have established strategies and legislation for proper waste management to protect the environment. Such strategies and legislation have positioned behaviour change and capacity development, especially targeting young people, as critical factors for improving waste management. Environmental education has been identified as an important element by key international agencies such as United Nations Educational, Scientific and Cultural Organization (UNESCO) and Organisation for Economic Co-operation and Development (OECD), and also by national governments, and as such, IGES Centre Collaborating with UNEP on Environmental Technologies (IGES-CCET) has developed an environmental education booklet entitled "Ecology Note" as well as developing related programmes. In addition, IGES-CCET also assisted central and local governments in establishing waste management strategies. This Ecology Note has so far been introduced into schools in South-east Asia, including Myanmar's last royal capital and its second largest city, Mandalay, in Cambodia's capital, Phnom Penh and in Hoi An, Viet Nam's ancient trading port town designated as a World Cultural Heritage site. It has also been introduced in South Asia through the application in Bhutan. In line with other economically growing Asian cities, these cities and countries are facing urgent waste management issues. For example, in Mandalay, daily waste generation increased from 259 tonnes in 2005 to 975 tonnes in 2025, and in Phnom Penh, collected waste amounts to around 3,000 tonnes per day.

In order to enhance understanding and encourage behaviour change among young people in these cities and countries, the Ecology Note aims at mainstreaming sustainable waste management, including the principles of the 3Rs (reduce, reuse and recycle), into the primary education system. The booklet was designed to deepen students' understanding on sustainable waste and resource management, and explain how climate change and Sustainable Development Goals (SDGs) are interlinked with waste and resources which are produced or consumed in daily activities. The booklet incorporates experiential and mutual learning activities such as exploration, discussion, and presentation. In addition, there is a Teacher's Guide attached to the booklet and this provides procedures and tips to enhance the activities. Furthermore, in collaboration with local government agencies, schools and other related organisations, the book and programme have been replicated and expanded in the target cities and countries. The contents of the Ecology Note were also integrated into the official school curriculum in some cities and countries. In this way, the Ecology Note and its programme established the groundwork to promote education on waste and waste management among the young generation.

8. Implementation (350-450 words)

Please describe the implementation modalities or processes, where possible in relation to:

- i) What are the main activities carried out?
- ii) When and where the activities were carried out (including the start date and whether it is ongoing)?
- iii) Who were the key implementation actors and collaborators? (civil society organizations, private sector, foundations, coalitions, networks etc.)?
- iv) What were the resources needed (budget and sources) for the implementation? *

The development of the Ecology Note and its programme began in Mandalay City in 2014. The local key implementer, the Mandalay City Development Committee (MCDC), together with IGES-CCET conducted Participatory Action Research, including a series of consultations and focus group workshops with local key stakeholders, to understanding the existing situation. The research found that existing education merely focused on awareness-raising about environmental issues, and did not aim to motivate students in taking the right decisions or actions. Therefore, the Ecology Note was designed to develop a sense of ownership and responsibility, to foster the ability to identify and analyse issues, and then find the optimal solution. Local actors including MCDC, the Department of Basic Education, the Ministry of Education, and NGOs launched the Ecology Note programme at three model schools in Mandalay, which was then expanded to 18 other model schools in 2016, and eventually, reached all 250 schools the city.

Next, the Ecology Note of Phnom Penh, Cambodia was developed in 2018 by the Phnom Penh Capital Administrative, Department of Education, Youth and Sports (DoEYS) based on the experience in Mandalay City. The implementation of Ecology Note in Phnom Penh City was started with a pilot project in two primary schools in the city, both of which have more than 2,000 students. Subsequently, the experience was shared with about 164 schools in Phnom Penh and all primary schools in neighbouring Battambang and Serey Soaphoan Municipality.

After the successful adoption in Myanmar and Cambodia, the Ecology Note was adopted by the National Environment Committee (NEC) of Bhutan in March 2019. After developing the Ecology Note, the Royal Education Council (REC) integrated those contents into the official science curriculum for grades 4-8. It is also distributed to all the schools in the country, and translated it into the local language, Dzongkha. In addition, it was recommended to use in the monastic and nunnery institutions which play an important role as non-formal educational institutions in Bhutan. Aiming at the optimal use of the booklet, a nationwide online Training of Trainers (TOT) was conducted, with the participation of more than 500 science teachers across the country.

The most recent application of the Ecology Note was in Hoi An City, Viet Nam in 2021, The city is facing various emerging environmental issues, including waste management due to the growth of the tourism sector in this popular World Cultural Heritage site. With the technical support of Da Nang University and IGES-CCET, Hoi An City took a lead in developing "Ecological Education for Schools in Hoi An: A Teacher's Guide" based on the Ecology Note. It provides primary school teachers with practical guidance and tips for enhancing students' understanding of the shift to an ecological lifestyle.

9. Results – outputs and outcomes (250-350 words)

To the extent possible, please reply to the questions below:

- i) How was the practice identified as transformative? (e.g., impact on policies, impact on management processes, impact on delivery arrangements or education monitoring, impact on teachers, learners and beneficiary communities etc.);
- ii) What were the concrete results achieved with regard to outputs and outcomes?
- iii) Has an assessment of the practice been carried out? If yes, what were the results? *

Mandalay, Phnom Penh and Hoi An officially declared their commitment to become green and clean cities, while Bhutan designated waste management as one of its national flagship programmes. In this regard, the Ecology Note has been contributing to achieving these city's vision from an educational perspective. In Mandalay, an initial survey found that while 90% of students at the model school were aware of waste issues, only 17% of them were involved in waste management and 3R practices at school. The Ecology Note programme gave the students opportunities to participate in various waste management practices including waste separation, waste audit, and making compost. The students gradually recognised the importance of proper waste management through their learning environment activities at schools.

In Phnom Penh, surveys carried out before and after the programme implementation show that the students gained a better understanding of waste categories such as recyclable and compostable, and learned how to separate them thanks to the programme. Composting facilities were newly installed or renovated at the schools, with the involvement of students, teachers, and even students' parents, thus encouraging a better understanding of proper waste management.

Local governments and schools in the partner cities have been making efforts to ensure that the waste management topics set out in the Ecology Note are integrated into the school curriculum. In Cambodia, the Ecology Note was shared as a resource material at the Environmental Education Curriculum Development workshop organised by the Environment Ministry. Another notable case was integration into the official science curriculum by the Bhutanese government. Waste management topics were linked with science subjects, thereby helping students to understand various waste issues based on scientific data and theories. Another remarkable benefit of the curriculum integration was that although environmental education often used to be conducted as an extracurricular activity at school, it is now carried out in the official classes. This made it easier for teachers to deliver waste management and environmental topics in the classroom, and also might reduce the burden on teachers to carry out extracurricular activities besides their official classes.

In Bhutan, school environmental club activities launched by Her Majesty, Queen Gyaltsuen Jetsun Pema Wangchuck have spread nationwide. The Ecology Note was also presented to the queen as well.

In Hoi An City, a survey on the current pedagogies and approaches on environmental education by the local teachers revealed that although most of the teachers recognise the importance of action-based or active learning, they are not skilled enough to deliver classes in these methods due to lack of knowledge and teaching materials to guide them. In light of this, the "Ecological Education for Schools in Hoi An: A Teacher's Guide" provides instructions and tips for teachers to enhance students' self-motivated and mutual learning.

10. Lessons learnt (300 words)

To the extent possible, please reply to the following questions:

- i) What were the key triggers for transformation?
- ii) What worked really well – what facilitated this?
- iii) What did not work – why did it not work? *

One of the key triggers for transforming school education in the partner countries was that the Ecology Note enables learners to have deeper insights and better consideration on waste and resource management, 3Rs, and their relationships with climate change and SDGs through the following key components.

(i) Awareness and Sensitivity: Understand the existing situation of waste, realise the seriousness of the issues and its risks to the global issues like climate change and SDGs, and consider the outlook for the future. For those points, Ecology Note includes lessons on exploring waste issues in the neighbourhood, and looking at consumption patterns in daily life, etc.

(ii) Investigation and Evaluation: Identify the cause and results of the issues, analyse the causal sequence by scientific methods, and evaluate the cultural and economic value of traditional and modern lifestyles. Ecology Note includes some activities to conduct surveys and generate statistics to develop analytical skills.

(iii) Action Skills: Evaluate the desirability of specific actions, identify optimal approaches and outcomes, and implement them to avoid or reduce the risks caused by waste issues. Ecology Note introduces some activities which are feasible at schools such as waste segregation, composting, and action proposals to reduce CO₂ emissions.

Another key factor of the success of this project was that the contents of the Ecology Note were designed to fit neatly into the local context based on consecutive discussions with local stakeholders. Through a series of consultations with ministries, city governments, and other local representatives, some of the partner countries' key policies and social issues have been reflected into the Ecology Note. For example, the Ecology Note for Bhutan gives students opportunities to consider how their practices on waste management can contribute to achieve the goal of Bhutan's globally-admired development philosophy, Gross National Happiness. Through the activities in the Ecology Note, students look into their traditional and modern lifestyles, and consider how the traditional lifestyle could prevent waste generation and lead to a happier and healthier life, while recognising that a modern lifestyle brings with it some very attractive economic benefits. Through such contents, students learn how their behaviour and customs in daily life are interlinked with economic and social issues on waste.

In addition, to properly implement waste education in these cities and countries using the Ecology Note, it was crucial to have collaboration and networking among the governments, local public authorities, schools, and teachers and local environmental education experts.

11. Conclusions (250 words)

Please describe why may this intervention be considered a “best practice”. What recommendations can be made for those intending to adopt the documented “best practice” or how can it help people working on the same issue(s)? *

While most of the contents set out in the Ecology Note are replicable and scalable in any country, each of the Ecology Note series was customised to fit the local context in each partner country or city, following intensive consultation with local stakeholders. This would ensure that students are given the opportunity to recognise and consider the actual local waste issues and take local actions to address global environmental issues.

Another critical point is that the best practices and case studies in the booklet that focus on creating incentives for students to change their behaviour. Theoretically, there are two steps to such behaviour change: 1) cognitive change, and 2) making different behaviour choices than previous ones. Having recognised what the issues are surrounding waste and waste management, the next step is to make the right decisions and take appropriate action. In order to foster this ability, the Ecology Note offers more experiential activities such as carrying out surveys, holding discussions, engaging in handicrafts for upcycling, and making compost. For example, students can carry out a small survey on what their classmates or family think about modern and conventional lifestyles by conducting questionnaires and discussions. At the same time, in order to carry out these activities and ensure they are effective, educators’ capability should be also reinforced through teacher training sessions conducted in the partner cities and countries. As revealed by the survey in Hoi An City, teachers often do not have enough opportunities to gain or update their teaching skills or methods for action-oriented pedagogies, which are a recent global trend. Thus, support for teachers is also crucial to enhance students’ self-motivated and mutual learning.

12. Further reading

Please provide a list and URLs of key reference documents for additional information on the “best practice” for those who may be interested in knowing how the results benefited the beneficiary group/s. *

“Ecology Note - Towards a Clean and Green Mandalay City-”

<https://www.iges.or.jp/en/pub/ecology-note-towards-clean-and-green-mandalay/en>

“Ecology Note - Towards a Clean, Green and beautiful Capital City- Phnom Penh City”

<https://www.iges.or.jp/en/pub/ecology-note-towards-clean-green-and-beautiful/en>

Ecology Note – Towards a Clean, Green and Beautiful Bhutan -”

<https://www.iges.or.jp/en/pub/ecology-note-bhutan/en>

“Ecological Education for Schools in Hoi An: A Teacher’s Guide”

<https://www.iges.or.jp/en/pub/ecological-education-schools-hoi/en>

“Environmental Education and Learning Materials for a Smart and Green Mandalay City”

<https://www.iges.or.jp/en/pub/environmental-education-and-learning-0/en>

“Development of Environmental Learning Programme for Establishing a Sustainable Solid Waste Management System in Mandalay City, Myanmar”

<https://www.iges.or.jp/en/pub/development-environmental-learning-programme-0/en>