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

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

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Abstract

This paper discusses the experience and lessons learned from the development of a new environmental learning programme and materials for the junior high schools in Mandalay City with key stakeholders to address waste management and its environmental issues. Aiming to establish the 3R practices (reduce, reuse and recycle) to reduce waste generation at source, environmental learning materials are developed to foster more sustainable lifestyles and practices. The results acknowledge that key organisations have already established some environmental learning programmes in schools even though most of these learning materials and tools are merely focused on awareness raising on environmental issues. Although knowledge and awareness are a prerequisite of environmental behavioural changes, learning materials should be designed to give the opportunity to students to develop a sense of ownership and empowerment which motivates them to be responsible and take actions as active citizens. Thus, the new environmental learning materials developed under this study combine knowledge, skills and actions. Through piloting the newly developed programme and materials in three model schools, the study also identified that environmental learning programmes should be action-based thereby providing the opportunity for students to actually change something and see an effect in the real world. Direct involvement of students in their community-based programmes encourage them to become more active and responsible. Further, the study identified that the successful planning and implementation of new environmental education programme depends on a combination of action principles, namely responding to emerging environmental issues; encouraging all relevant stakeholders (different disciplines and actions) to engage in developing the programme and learning materials; sustaining a long-term process of change; and encouraging transformation of the system. The study also identified that content development, capacity building, networking and necessary resources are required for the effective implementation of new environmental learning programmes in developing cities.

Keywords

Education for Sustainable Development (ESD), Environmental Learning, Sustainable Solid Waste Management, 3R (reduce, reuse, recycle), Mandalay City

1. Introduction

Management of increasing waste generation is a common concern in fast-growing cities in Asia. The city of Mandalay, the last royal capital and the second largest city in Myanmar, is no exception. Rapid urbanisation, economic growth and changes in lifestyles and consumption patterns have all resulted in a remarkable increase and diversity in waste generation in the city over the past decade. According to the Mandalay City Development Committee (MCDC), a local government body which is in charge of the city administration, daily waste generation has increased from 259 tonnes in 2005 to 975 tonnes in 2015 (MCDC, 2015). In addition, the costs of waste management are also rising, related environmental degradation is occurring and controversies are arising over finding suitable sites for new final disposal sites. Aiming to overcome this fast-growing environmental issue, MCDC has been promoting sound solid-waste management, integrating 3R practices (reduce, reuse and recycle) which encourages waste reduction at source, rather than later at the end of the cycle. Ultimately, it will reduce landfill waste and open burning, increase job opportunities, ensure effective resource consumption, and improve the environment.

At the global level, there is now more focus on establishing fundamental changes in the way that society produces and consumes natural resources aiming to achieve sustainable development. Goal No.12 of the 2030 Agenda for Sustainable Development or Sustainable Development Goals (SDG) aims to *ensure sustainable consumption and production (SCP) patterns, which respond to basic needs and bring a better quality of life while minimising the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the lifecycle of the service or product so as not to jeopardise the needs of future generations* (UN, 2016). Further, the 10 Year Framework of Programmes (10 YFP) on SCP implies a systemic change and innovation *to foster the uptake of sustainable lifestyles as the common norm to ensure the positive contribution in addressing global challenges, such as consumption and production patterns, climate change mitigation and adaptation, resource and biodiversity conservation, poverty eradication and social well-being* (UNEP, 2016). The Way Forward of the Earth Charter also emphasises the importance of the transition to a more sustainable way of life (Earth Charter Initiative, 2016).

Across many countries, a strong trend can now be seen to make education more relevant to achieve the social, environmental and economic challenges that the world faces today and in the future. They also agreed that education for sustainable development (ESD) reinforces people's sense of responsibility as global citizens and better prepares them for the world they will inherit (UNESCO, 2004). Further, previous research identifies that Environmental Education (EE) should emphasise the importance of promoting both knowledge and action. It also goes beyond an awareness of issues to give more opportunity to the students to develop a sense of ownership and empowerment so that they fully become active citizens (Hungerford and Volk, 1990). Thus, active learning programmes involving students directly in their community and in the resolution of environmental issues have a great effect on students' attitudes towards their environment (Hewitt, 1997).

Considering this local and global situation of the importance of EE to achieve a more radical shift in thinking and behaviour towards sustainable lifestyles in establishing 3R practices, the Institute for Global Environmental Strategies (IGES) initiated an action research project in Mandalay City in which an environmental learning programme for junior high schools was developed and piloted in three model schools. The project was carried out together with MCDC, Department of Basic Education (Ministry of Education) and other key stakeholders during the period of 2014 – 2015. This paper, therefore, aims to discuss the experience of this model project and identify key action principles and policy challenges in developing an environmental learning programme in schools to facilitate the sustainable solid waste management and 3R practices. This study is still in the initial stage of its implementation and thus the findings are still very limited and general. More detailed analysis is required in the future to understand the positive behavioural changes within the students in the pilot schools. The paper consists of four sections. After this brief introduction, Section 2 gives the concepts of ESD and analytical framework for the practice of environmental learning in achieving sustainable development. A case study of Mandalay that describes the key stakeholders involved, the specific measures adopted and the key results are achieved is presented in the results and discussion of the Section 3. In addition, it discusses the key action principles and necessary policy supports for establishing an effective environmental learning programme in schools based on the lessons learned. Finally, the paper concludes by discussing the key findings in Section 4.

2. Materials and Methods

The term EE was first used in international development in 1948 at the International Union for the Conservation of Nature and Natural Resources (IUCN) Conference (English, 2015). However, it did not gain much popularity until the First Intergovernmental Conference on Environmental Education organised by the United Nations Educational, Scientific and Cultural Organisation (UNESCO) in Tbilisi, Union of Soviet Socialist Republics (USSR), from 14 to 26 October 1977. The Tbilisi recommendations emphasise that EE is a "*comprehensive lifelong education and prepares the individual for life through an understanding of the imagined problems of the world and the provision of skills and attitudes needed to play a productive role towards improving life and protecting the environment with due regard to ethical value"* (UNESCO, 1978). This shows that the ultimate aim of the EE programme is promoting responsible citizenship behaviour that goes beyond basic education in its traditional sense to a broader picture of behaviour encompassing not only knowledge, attitudes and skills, but also active participation in society (Hungerford and Payton, 1976; Hungerford and Volk, 1990; Vasake and Kobrin, 2001).

The traditional thinking in the field of EE has been that it is possible to change people's behaviour by making them more knowledgeable about environmental issues. It was assumed that when people are more knowledgeable and become more aware of environmental issues, they will be motivated to act toward the environment in a more responsible manner (Heimlich and Ardoin, 2008; Hungerford and Volk, 1990; Hines, Hungerford and Tomera, 1986). Though, knowledge appears to be a prerequisite to action, several environmental behaviour theories and models identify that the intention or desire to act is an important factor to engage in the action (Monroe, 1993; Hines et al., 1986; Hwang et al., 2000). The intention to act is a combination of number of factors such as knowledge, skills, experience and opportunity to act (Hungerford and Volk, 1990). This emphasises that a curriculum that teaches facts and concepts can have an effect on student's attitudes towards the environment. However, involving students directly in their community and in the resolution of environmental issues encourages them to become more active and responsible citizens in the society (Hewitt, 1997).

Considering the above key factors, this action research made efforts to develop an environmental learning programme with key stakeholders in Mandalay City to establish a 3R society and sustainable lifestyles. As shown in Figure 1, environmental learning is a process that allows students to explore environmental issues, engage in problem-solving, and take action to improve the environment. As a result, individuals develop a deeper understanding of environmental issues and have the skills to make informed and responsible decisions. For this, awareness and sensitivity, knowledge and understanding, attitudes, skills and participation are considered key elements for environmental learning programmes. Both primary and secondary survey methods were adopted in collecting the relevant information and developing the environmental learning materials which are finally compiled as an Ecological Note: Towards a Clean and Green Mandalay City. The identification of general information related to key challenges in the current waste management system and in formal and non-formal education system in Mandalay City, as well as development of new environmental education materials was conducted by inviting relevant stakeholders to participate in a series of participatory workshops during the period of 2014-2015.

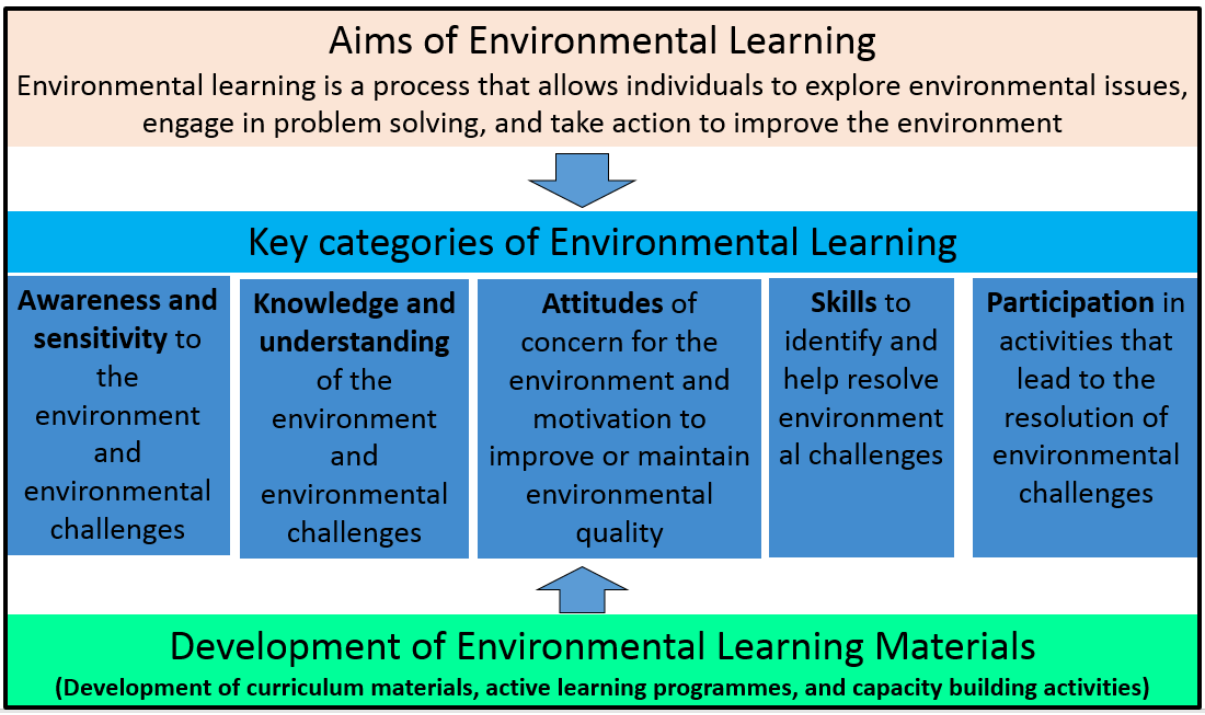


Figure 1: An Analytical Framework. Source: By Authors adapted from UNESCO, 1978; Hungerford and Volk, 1990

3. Results and Discussions

3.1. Development of Environmental Learning Programme to Establish 3R Society in Mandalay City

This section briefly discusses the experience in developing an environmental learning programme to establish a 3R society in Mandalay City. The development of a new environmental learning programme and relevant education materials was conducted through a series of participatory workshops in the city with relevant stakeholders. Key results are explained in more detail below.

(1) Participatory Learning Workshop 1 - Needs Assessment for Planning of the Environmental Learning Programme in Mandalay City

Aiming to encourage the diverse groups and individuals in Mandalay city to learn and act together in identifying key challenges and possible actions to move away from the current waste management system (throw-away society) to a more sustainable waste management system (3R society) in the future, a two-day participatory learning workshop was organised on 11 and 12 November 2014 at the City Office of MCDC. About 50 citizens, 30 men and 20 women, from different professional and age ranges (15-60 years) joined the group discussions. To facilitate the active participation of all members in the discussion, a colour card game was conducted by the research team (facilitators). Different coloured cards were distributed to participants who were asked to identify and write down the most challenging factor in establishing a 3R society in Mandalay City. After all participants had finished with writing their answers, facilitators asked one of them to present the answer and checked with others who have the same answer. Similar answers were collected and posted on the white board by the facilitators. Finally, the different answers were checked and the discussion continued until all answers were put into groups, encouraging discussion among participants (See Figure 2).

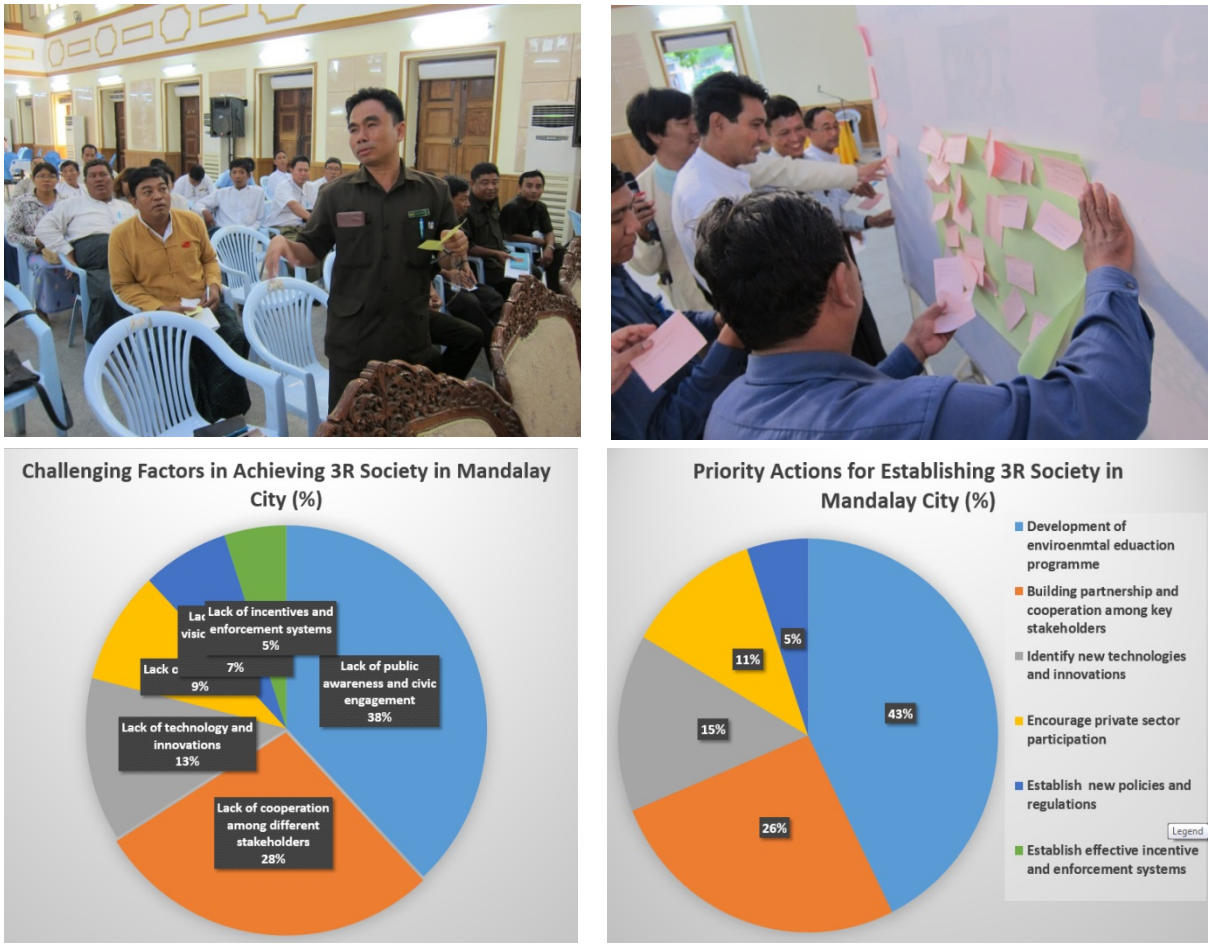
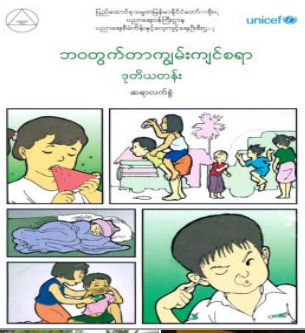


Figure 2: Results of Participatory Workshop 1 (top/left: a participant explains his view; top/right: prioritising the actions on the whiteboard; down/left: challenging factors in achieving 3R society; down/right: priority actions for achieving 3R society in Mandalay City). Source: By Authors, 2016

According to the answers given by the participants, the most challenging factor to building a 3R society in Mandalay City is the lack of public awareness and civic engagement (38%).Additional factors were identified as a lack of cooperation among the different sectors (public, citizen and private) (28%), a lack of technology and innovations (13%), a lack of investment (9%), the lack of a common vision, policies and laws (7%) and a lack of incentives and enforcement (5%). The participants were then also asked to identify a priority action to overcome these challenges. The answers were later collected and grouped using the same methodology as previously. According to the answers of the participants, development of an environmental education programme starting from schools is the first priority (41%) for moving towards establishing a 3R society in Mandalay City. Other priority actions include building partnership and cooperation (25%), identifying/ studying new technology and innovations (16%), encouraging private sector participation (11%), establishing new policies and regulations (5%), and establishing an effective incentive and enforcement system (4%). These results motivated both MCDC and the research team to start a trial programme to develop environmental learning materials for schools.

(2) Participatory Learning Workshop 2: A Review of Existing EE Programmes in Schools in Mandalay City and Identification of Gaps

Table 1: Existing EE Programmes in Mandalay City

Agency	Target Areas Activities/materials	
(1) Department of Basic Education (Ministry of Education)	• Development of curriculum and teacher training (Primary – Grade 8, All schools) • Life Skill classes for grades 1-3 (main curriculum) and grades 4 and above (co-curriculum) • School greening day (July), School health day (August), School cleaning day (October), Hand washing day (October)	
(2) Model Schools (BEHS 4, 14 and 26)	• Conduct Life Skill classes based on the curriculum • Some practical activities such as composting, reuse of water pots, waste separation, handicrafts, tree planting, biological lifecycle, and laboratory production	
(3) MCDC	• Waste management lectures for students • Media coverage (newspaper article, radio programme and flyers)	
(4) Environmental Conservation Department (MONREC)	• School lectures (one school per week) for grades 7 – 10 (minimum 40 schools per year) • Media coverage (flyers, cartoons, guide books) • Organisation of events, such as Environmental Conservation Day (5 June), World Ozone Day (16 September), Annual competition (essay, cartoon, art).	

Source: By Authors, 2016

Aiming to understand the existing EE programmes and tools that are practiced in the schools of Mandalay City, a participatory learning workshop was organised on 2 July 2015 in Mandalay City inviting representatives from MCDC, the Department of Basic Education, Ministry of Education, and the Environmental Conservation Department of the Ministry of Natural Resource and Environmental Conservation (MONREC). Further, representatives from three model schools (BEHS 4, 14 and 26) were also invited to the discussions. Table 1 summarises the key elements of existing EE programmes shared in the workshop.

The results found that all key organisations have made some efforts to implement EE programmes, including in the area of waste management practices in schools. The Department of Basic Education which is responsible for preparing the curriculum and teacher training in schools introduced the Life Skill Subject (45 minutes/ one class per week as a main curriculum for grades 1-3 and a co-curriculum for grades 4 and above) to provide knowledge and some skills on environmental conservation. According to representatives from the three model schools who joined the workshop, schools educate the students about 3R practices by conducting classroom lectures and some practical activities, such as practice of waste separation at school, making compost with organic waste, tree planting using compost and making handicrafts using recyclable materials.

In addition, both MCDC and the Environmental Conservation Department have introduced the information on waste separation at source and conduct some awareness raising activities at the schools. Further, all organisations are involved in organising some events at the schools related to EE based on National Days, such as Environmental Conservation Day (5 June) and the World Ozone Day (16 September).

When considering the key factors responsible for environmental behaviour, the results of discussion revealed that the current educational efforts in Mandalay City are more focused on the awareness level. The students typically receive incidental exposure to environmental issues with the emphasis of ecological foundation and awareness. Most of the educational materials and tools are developed to provide information on environmental issues including waste management and 3R activities. Very few programmes incorporated positive attempts to develop skills and personal responsibilities which are assumed to be important in developing environmental responsibility in daily life. As a result of the workshop, the participants agreed to develop a new environmental learning programme and materials to (i) foster awareness and common concern about environmental issues and waste management; (ii) provide adequate knowledge and skills needed to take action to protect and improve the environment; and (iii) provide an opportunity to actively participate in environmental conservation activities in the community.

(3) Participatory Learning Workshop 3: Development of a New Environmental Learning Programme in Mandalay City

Figure 3: Development of environmental learning materials (left: participants discussed the necessary contents in groups; right: participants present their ideas). Source: By Authors, 2016

Aiming to build a consensus among key stakeholders in developing a new environmental learning programme and materials in Mandalay City which goes beyond the awareness level to develop students' skills associated with investigating and evaluating issues and take actions move away from throw-away society to 3R society in their day to day lives, a two-day workshop was organised on 21-22 November 2015 in Mandalay City. The same participants who joined the second workshop (representatives of MCDC, the Department of Basic Education, Ministry of Education, and the Environmental Conservation Department of the MONREC, and three model schools) were invited again to attend the discussions to identify the appropriate contents and learning methods. Further, a research team shared some experiences (good practices) of environmental learning programmes in Kitakyushu City, which is one of the leading environmental model cities in Japan and well-known for its successful efforts in adopting an environmental learning and partnership model for overcoming environmental pollution in the 1960s. Kitakyushu City has been involved in sharing this experience with other Asian cities, including Mandalay through technical transfer projects. To help students become environmentally knowledgeable, skilled and dedicated to take actions toward achieving environmental friendly lifestyles, there is an urgent need to establish a 3R society in Mandalay City. The following contents have been identified as priority issues in developing the environmental learning programme.

Awareness and Sensitivity: Contents to provide sufficient knowledge and guide the development of a conceptual awareness of how individual and collective actions may influence the relationship between quality of life and the quality of the environment. For example, new material has been developed to

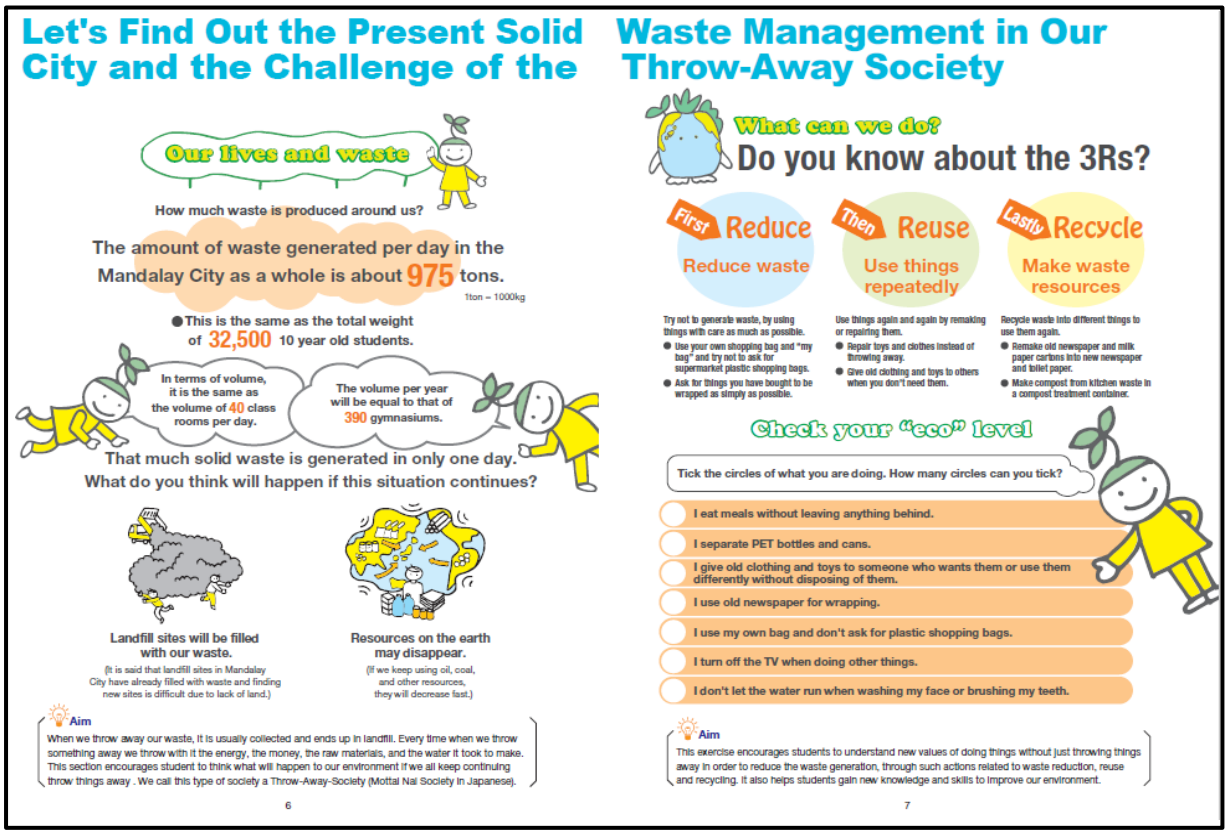


Figure 4: Education materials for learning the challenges of throw-away society and values of 3R society. Source: Adapted from Ecology Note, IGES, 2016.

encourage students to critically think about the issue of waste management in the city and what will happen to their environment if they all continue to throw things away. Students are encouraged to think that every time they dispose of some item, they also dispose of the energy, money, raw materials, and water it took to make the item. Further, new materials are introduced to encourage students to understand the value of reducing waste generation, through such actions related to waste reduction, reuse and recycling (See Figure 4)

Investigation and Evaluation: Contents to provide sufficient skills to investigate environmental issues and evaluate alternative ways to solve problems. For example, when we reuse or recycle materials, it helps to reduce the amount of solid waste that we throw away. There are different recycling methods and industries available in Mandalay City to convert waste into resources. New content was added to encourage students to investigate the different recycling methods and industries in the city and also find out how their waste can become a resource for making a valuable product again (See Figure 5).

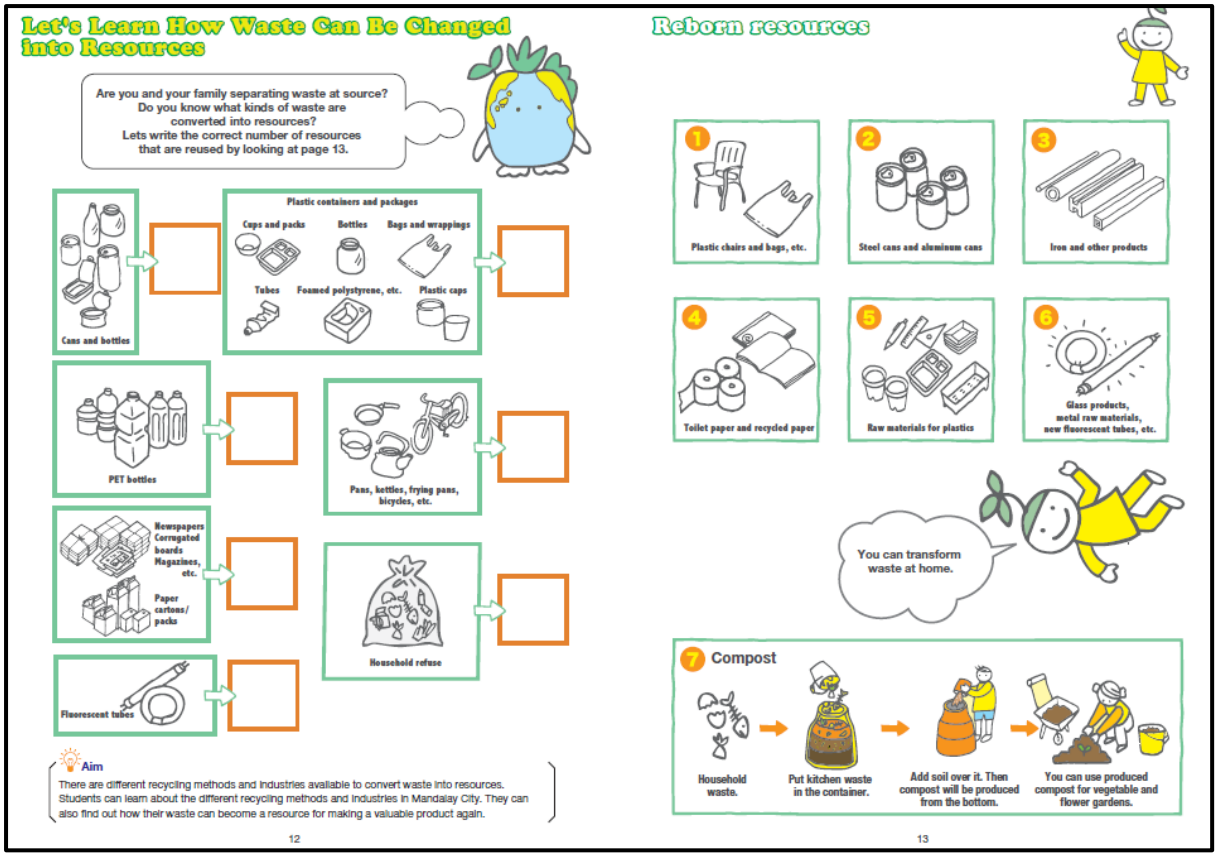


Figure 5: Recycling Systems in Mandalay City. Source: Adapted from Ecology Note, IGES, 2016.

Action Skills: Contents to develop the skills necessary to take positive actions for the purpose of achieving environmental improvements. For example, the waste that citizens generate in households can be broadly divided into three categories: (i) recyclable materials (paper, plastic, bottles, cans etc.); (ii) biodegradable waste (leftover vegetables and fruits); and (iii) other waste that must be disposed of in landfill sites. The new contents are developed to improve skills and encourage students to get involved in waste separation activities in their classrooms as well as home with their family. Additional content was also developed to increase skills to make compost for eco-friendly farming (See Figure 6).

3.2. Key Action Principles and Policy Support for Successful Implementation of Environmental Learning Programme

The study identifies that the successful planning and implementation of a new environmental education programme depends on the combination of action principles and supportive policies established by the local and national governments. These points are briefly summarised below.

(1) Action Principles

- ***Responding to a local issue*** - it was learned that facilitating environmental learning is more success and effective if this programme is focused and responsive to urgent environmental issues experienced by the local communities. In this case, the waste management issue is being addressed due to the strong request and needs of the MCDC. It was relatively easy to gain focus and support from all stakeholders because the issue was one that they felt was most important and interesting for them. However, to establish an effective environmental learning programme, being responsive and directly addressing the issue or its visible symptoms is only the entry point for designing the programme. T programme should then further develop an understanding of the complex and interconnected nature of its causes and potential effects as well as the appropriate response.

- ***Engaging with different key stakeholders*** – considering the complex nature of environmental issues, specially waste management, it is required to engage with different disciplines in order to identify

comprehensive and long-term solutions. Engaging these different disciplines requires the project team to work in partnership with different key players both within and outside the immediate communities, engaging with a number of implementing agencies. Allowing different generations, sectors and cultures to actively contribute their own knowledge and ways of learning is vital to finding sustainable solutions. This calls for working and learning in partnership with each other.

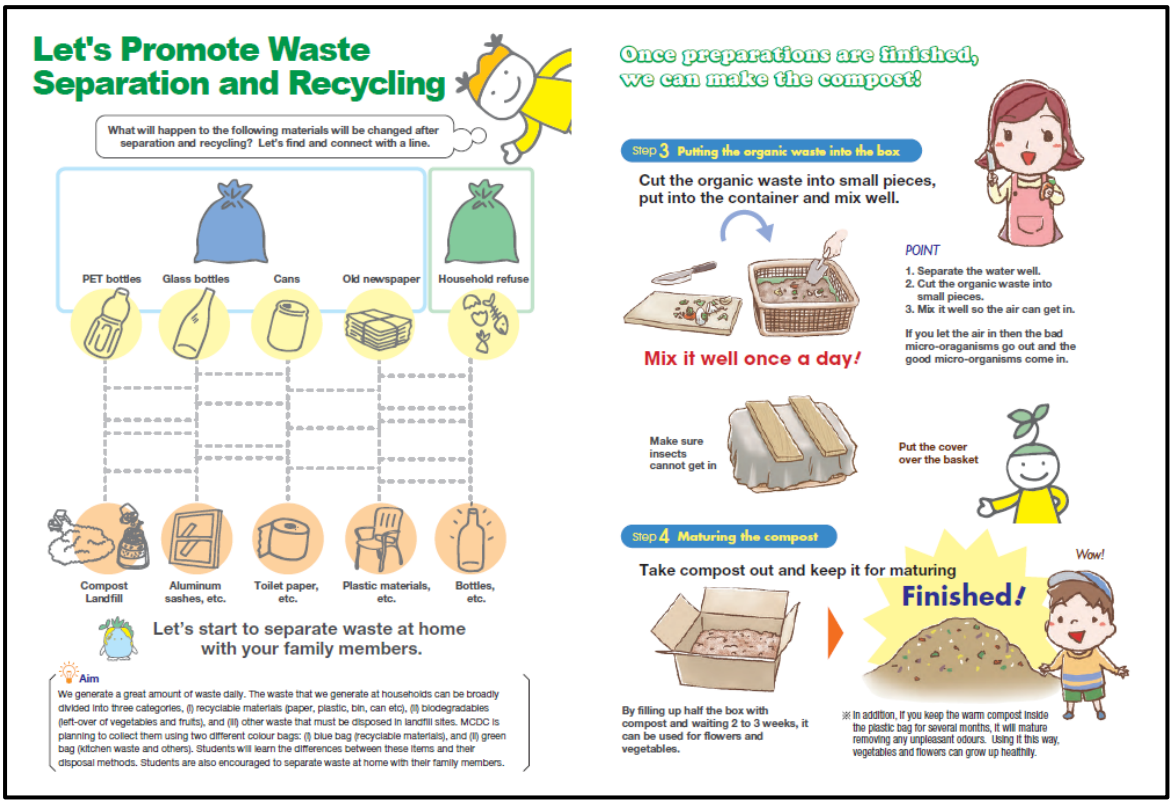


Figure 6: Encouraging actions towards sustainable lifestyles (left: waste separation at source; right: making compost for organic farming). Source: Adapted from Ecology Note, IGES, 2016.

- ***Long-term sustainability*** – environmental learning is a long-term process of behavioural change that will need to be sustained. Though this study is still in the implementation stage, it was identified that some materials are needed (physical infrastructure, human and financial resources) to achieve the sustainability of the programme. Further, the study acknowledges that sustainability of the programme also depends on the capacity of the local institutions that conduct the environmental learning programmes.

- ***Transforming the system*** – the ultimate aim of the environmental learning programme involves not just changes to the way we learn or the way we live, but a complete transformation of the social, economic, political and cultural systems that have contributed to the issues that we are trying to address. Part of this transformation will require that we embrace the new ways of teaching and learning that have been made available by the new waste management system and infrastructure.

(2) Support Mechanism

- ***Allocating resources –*** this seems to be the most important support mechanism that can be established by policymakers in both local and national governments. These resources can be material, human and infrastructural as well as financial. However, this study identifies that public resources allocated for environmental learning are still very limited in Mandalay City.

- ***Building partnerships and networking*** - these often facilitate sharing of the available resources and mutual learning among institutions and people working for the same group of target participants. These partnerships can be built between civil society organisations, community groups, universities, research

institutions and non-governmental organisations (NGOs), as well as governments with the private sector. However, it is also important to remember that partnerships are about more than just sharing resources; they also rest on a shared vision of sustainable development.

- **Capacity-building** - through training courses and workshops, this is one mechanism that facilitated development of new knowledge and skills. While often perceived as something that needs to be provided to the local community, there is a need for greater capacity building among policymakers, community organisations and community education professionals and practitioners themselves.

- ***Content development*** **-** concerns the support provided by policymakers in identifying the relevant issues or entry points for engagement. While these are often made clear by the immediate problems experienced, facilitators can see links between these obvious issues and other related issues that can be present within the communities.

4. Conclusions and Recommendations

This paper discussed the experience of developing a new environmental education programme and materials for the junior schools in Mandalay City with key stakeholders. The results identified that all key organisations in the city are making some efforts to implement EE programmes (formal and non-formal set-up), including the area of waste management practices in schools. However, the current learning materials and tools are merely focused on awareness-raising on the environmental issues. Although knowledge and awareness are a prerequisite for environmental behavioural changes, learning materials should be designed to give the opportunity to students to develop a sense of ownership and empowerment which will motivate them to become responsible and to take actions as active citizens. Therefore, new environmental education materials developed under this study aims to combine knowledge, skills and actions. Through piloting the newly-developed programme and material in three model schools, the study also identified that environmental learning programmes should be action-based, providing the opportunity for students to change something and see an effect in the real world. Direct involvement of students in their community-based programmes encourage them to become more active and responsible. Further, the study identified that the successful planning and implementation of a new environmental education programme depends on the combination of action principles. These are responding to emerging environmental issues; encouraging all relevant stakeholders (different disciplines and actions) to engage in developing the programme and learning materials; sustaining a long-term process of change; and encouraging transformation of the system. The study also identified that content development, capacity building, networking and necessary resources are necessary for the effective implementation of new environmental learning programmes in developing cities.

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