APEC Sustainability and Environmental Education for Post Disaster

APEC Human Resources Development Working Group

February 2025

Asia-Pacific
Economic Cooperation

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APEC Project: HRD 10 2022A

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REPORT OF APEC SEE-PD

SUSTAINABILITY AND ENVIRONMENTAL EDUCATION FOR POST DISASTER

Executive Summary

The increasing frequency and severity of hazards and natural disasters in many APEC member economies, has prompted the need to embed sustainability in managing the environment especially through formal education. This project seeks to develop human potential and capacity building of undergraduates population in university to act as agent of planetary health at their future workplaces. Thus, by enhancing knowledge, skills and attitudes toward environmental sustainability, the APEC Sustainability and Environmental education for Post-Disaster (APEC SEE-PD) project aims to strengthen disaster preparedness and recovery efforts across APEC economies by integrating Environmental Education with Sustainability into disaster management strategies. The methodology involved two key sequential components. First, an online survey to collect opinion on the proposed framework and 14 weeks course content that was reviewed and validated by team of experts focusing on Post-disaster. Feedback from 30 invited respondents were analyzed and reviewed. The survey findings informed the curriculum design and highlighted areas for improvement. Second, a two days APEC SEE-PD conference attended by 72 participants including local and international participants and speakers served as a platform of discussion and interdisciplinary input on the proposed framework and curriculum. Researchers, educators, policymakers, industry professionals and postgraduates students shared insight and practical solutions in term of learning outcomes, course content, delivery methods and assessments on integrating environmental education into disaster management. Key findings reveals a strong consensus on the overall content of the curriculum and the need of adaptable, region-specific framework and detailed syllabus to suit the local context. This also include the importance of a multidisciplinary approaches and collaborative effort with community and industry as part of the curriculum content and delivery. The project's findings demonstrate that sustainability and environmental education can play a pivotal role in enhancing disaster awareness, preparedness, mitigation and recovery and long-term sustainability. By fostering collaboration and sharing of knowledge and practices, the APEC SEE-PD project establishes a foundation for continued efforts to integrate Environmental Education into disaster preparedness and resilience strategies across APEC economies through a formal undergraduate course, contributing to the achievement of the Sustainable Development Goals.

1.0 INTRODUCTION

Hazards are potential sources of harm while disasters are the actual events that cause significant amount of damage and disruption to human and the environment. This distinction underscores the importance of proactive strategies to prevent, manage and mitigate the impacts of these inevitable events.

Hazards and disaster pose significant challenges to several APEC economies. They not only result in widespread property and infrastructure damage but also impose severe psychological and economic burdens while disrupting environmental sustainability. For instance, in 2021 alone, the global cost of such catastrophes reached USD 342 billion, a sharp increase from USD 210 billion in 2020.

In this context, addressing issues of environmental sustainability and education has become essential for ensuring the long-term prosperity of current and future generations. To tackle this issue, this project aims to enhance disaster preparedness at both the prevention and intervention stages by developing human capacity as a crucial agent for environmental conservation. The project employs a bio-psycho-social-spiritual model through Sustainability and Environmental Education, with a particular focus on the university population across APEC economies.

Aligned with the Aotearoa Plan of Action, this project seeks to foster strong, sustainable growth by promoting collaboration between academia, industry, and communities to address critical challenges and devise practical solutions. Supported by the APEC Support Fund (ASF) and ECOTECH Priority Themes, the project complements and improves existing frameworks like the APEC Disaster Risk Reduction Framework (DRRF) and the APEC Disaster Risk Reduction Action Plan.

The project emphasizes Environmental Education and Education for Sustainable Development (ESD), both pivotal in achieving the Sustainable Development Goals (SDGs), particularly SDG 11 (Sustainable Cities and Communities), SDG 13 (Climate Action), and SDG 17 (Partnerships for the Goals).

This project produced two key outputs: (1) Framework and Curriculum for Post-Disaster Environmental Education. A comprehensive curriculum was developed, reviewed, and validated by a panel of experts. Initially, information was gathered through a survey using an online questionnaire, providing valuable insights for shaping the curriculum. The proposed framework and curriculum was then discussed in the conference. (2) The APEC Conference on Sustainability and Environmental Education for Post-Disaster (APEC SEE-PD) is the flagship event of this project that serve as an interdisciplinary platform for various stakeholders, including researchers, practitioners, government and non government agencies, industry and community advocates. The conference aims to foster collaboration and exchange of knowledge and best practices, contributing to the development of more resilient and sustainable disaster prevention, intervention and post-vention strategies across APEC economies.

2.0 SURVEY REPORT ON COURSE AND CURRICULUM OF APEC SEE-PD

This preceding section presents a discussion on a framework for addressing planetary health by integrating components of sustainability and environmental education through a formal course curriculum and syllabus. The intended outcome is the enhancement of knowledge, skills and attitudes necessary for effective disaster awareness and recovery. By reviewing the existing literature and the intersection between environmental hazards, disaster management, and education, the framework offers a structured 14-weeks course syllabus designed to equip participants with critical concepts and principles in disaster management.

This section outlines key components of the framework, including input (academic elements, learning material and resources), throughput (pedagogical stand, educational methodologies, scenario and experiential learning), and expected outputs (competencies on disaster related, community based solution and responsibilities on environmental advocacy).

Through an in-depth review of the course design, learning outcomes, and pedagogical strategies, this section highlights the role of formal education in the tertiary institutions in fostering long-term resilience and ecological

sustainability of disaster. It is hope that it can shape future policies and practices aiming at building a more sustainable and disaster-resilient world.

2.1 Introduction

The objective of HRD 10 2022A APEC is to enhance environmental knowledge, sensitivity, and concerns of relevant stakeholders through a sustainable environmental education focusing on post-disaster issues. This aim is then to be realized through a brief survey, an international conference with a round-table program during the conference, bringing together local and international leading scientists and policymakers from all APEC member economies. It hopes to provide a premier interdisciplinary platform for researchers, practitioners, educators, government agencies, industry players, and communities to discuss recent innovations, practical challenges encountered and solutions adopted in the fields of Sustainability and Environmental Education for Post-Disaster Recovery.

2.2 Scope of this survey

For this survey, an Environmental Education consists of environmental literacy focusing on post-disaster management, intervention, and prevention. The post-disaster in this survey and conference only focused on natural and man-made hazards concerning the environment. To limit the discussion, the post-disaster is defined as a minimum of three months after the emergency state ends and may include rehabilitation and recovery stages.

Output of this survey is an academic curriculum that will span for 14 weeks, incorporating theoretical knowledge, practical skills, and case studies to equip undergraduate students with the tools needed to effectively address environmental sustainability and disaster management in a post-disaster context. This curriculum will be introduced as an elective subject and APEC members can make improvement to suit their local context.

2.3 Objective of this survey

The objective of this survey includes:

A. To develop a robust framework for Sustainability and Environmental Education tailored specifically for Post-Disaster contexts .
B. To design a comprehensive course curriculum for Post-Disaster Sustainable Environmental Education (PD-SEE), aimed at undergraduate programs in higher educational institutions.

2.4 Methodology

The first draft of questionnaire containing the suggested curriculum was prepared by the team based on literature relevant to ‘sustainable’, ‘environmental education’, ‘post-disaster’, and ‘academic curriculum’. Prior to data collection, questionnaire was validated by person in charge for MADMA and expert from UPM. It was then modified for greater clarity and scope was added based on feedback.

Survey for data collection was carried out via online using Google Form. Link to form was provided to invited respondents and was advertised in social media for general public. The survey was conducted in February 2024 to April 2024. A total of 30 responses were analyzed before the APEC SEE-PD conference on 20 and 21 August 2024. Minor changes were made in terms of terminology. The edited framework and course content including the 14 weeks curriculum was presented at the conference to get feedback from invited experts, speakers and participants.

2.5 Results

2.5.1 Quantitative data

Respondents were asked to score their level of agreement with six specific statements using a five-point Likert scale. The scale was structured as follows: 1 represented “Strongly disagree,” 2 “Disagree,” 3 “Agree,” 4 “Moderately agree,” and 5 “Strongly agree.” Higher scores indicated greater agreement with the statements, which pertained to various aspects of the course.

Table 1 provides the mean and standard deviation for each item, offering a quantitative overview of the results. The highest level of agreement was observed for the course description, which had the highest mean score, indicating broad consensus among respondents. In contrast, grading received

the lowest mean score, with the average response being “agree.” This suggests that, although most respondents were generally satisfied with the grading system, it was the least favorably rated among the six items. Furthermore, respondents' evaluations of grading exhibited the widest range of responses, as indicated by the higher standard deviation, pointing to greater variation in how respondents felt about this aspect of the course.

Table 1: Evaluation Scores (N=30)

No	Item	Mean	Std Dev.
1	Course Descriptions	4.20	0.76
2	Learning Outcomes	4.13	0.73
3	Grading	3.77	1.07
4	Course Contents	3.93	0.94
5	Detailed Weekly Syllabus	4.00	0.83
6	Detailed Delivery Method	4.10	0.71

2.5.2 Qualitative data

In addition to scoring their agreement with the statements, respondents were also asked to provide open-ended feedback and suggest improvements for the course. Their feedback highlighted several key areas of concern and potential improvement, including:

A. Course Descriptions

Some of the responses includes:

a. Should include brief learning modes and assessment methods,
b. Ambiguous, so can't really grasp what the course is all about
c. Can be improved by adding broader community
d. understanding multidisciplinary approach needs to be emphasized
e. The bio-psycho-social perspective should be highlighted in order to enhance the course and modules for future generations, with a focus on environmental elements
f. Integrate information about the active learning aspects
g. Scenario thinking should be a part of this course as well
h. Include primary healthcare (PHC) from the aspects of physical and psycho-social health
i. It's more on sustainability and not environment.

B. Learning outcomes

Some of the responses include:

a. How Learning Outcomes will be measured. It seems not appropriate as the LO3 talk on taking appropriate action
b. Depends on the length of the course, possibly can take note whether is is enough to propose a comprehensive community prevention program
c. Some statements in the learning outcomes seem difficult to measure
d. The concepts of post-disaster management need to be clearly communicated to the audience in order to effectively address prevention, intervention, and post-intervention strategies within sustainability and environmental education programs. Incorporating a psychological perspective can strengthen the curriculum by balancing scientific components with a focus on human behavior and emotions
e. While community prevention programs exist to mitigate the impact of disasters on various populations, there is still room for improvement in achieving desired learning outcomes. It is essential to enhance understanding and implementation of these strategies to better prepare communities for future disaster.
f. There are many learning outcomes for undergraduate level. If (c) and (d) can be merged;

C. Grading

Some of the responses include:

a. A detailed information on the three assignment is needed and to map which LOs is to be measured and achieved in which assignment
b. CLO4 not being measured
c. With the MQA agreement in place, it may be possible to reduce the weight of the final exam component. This program is focused on sustainability and aligned with the Sustainable Development Goals (SDGs), therefore, incorporating more hands-on practice into the grading criteria would be beneficial
d. Instead of having final exams, make case studies a must

e. Not emphasizing on paper and pencil exam (40% to reduce into 20%) but to do problem-solving contextual-based case study or project-based activities (PBA) or problem-based learning (20%)
f. Paper reports does not assess skill. Better to do objective structured scenario
g. based assessment; Instead of topical term, more project based; More hands-on based assessment should be included.

D. Content and detailed weekly syllabus

Some of the responses include:

a. Some of the detailed curriculum in the weeks are huge. Wondering if it is enough to be covered in just a week
b. Some nomenclature of the content is vague for 'detailed' content
c. Too much in one week; need more about critical appraisal and evaluation
d. Include post-disaster management in support of primary healthcare (PHC) from the aspects of physical and psycho-social health
e. Handling social unrest and political interference; depth should be suitable for an undergraduate level because the title is a bit deep for their level; include some basic info on the role of relevant agencies at various levels.

2.6 Discussion

Based on the feedback, some improvement were made and adjusted to ensure the main idea about the course is maintained and include more nuanced agreement by respondents and team of researchers.

2.6.1 Course descriptions

Clarity and Scope of Content: Clarify the multidisciplinary approach, emphasizing the bio-psycho-social perspective and highlighting environmental aspects, with clearer links to sustainability.

Learning and Assessment Methods: Include more specific details about learning modes to be reflected also in the delivery methods, and assessment methods. The course can integrate scenario thinking and healthcare aspects including physical and psycho-social health that would provide a clearer picture of course expectations.

Community Engagement and Practical Application: Information on community involvement and practical applications, such as addressing broader societal challenges through scenario-based learning and multidisciplinary approaches would enhance its appeal for future students

2.6.2 Learning Outcomes

Clarity of Learning Outcomes: The clarity of certain learning outcomes to be made easier to measure, more clear or unquestionable. Simplifying or merging similar outcomes could help improve focus and assessment.

Community Programs: The inclusion of community prevention programs and disaster management strategies needs to be more robust to ensure students can achieve the desired learning outcomes. As such, the learning outcomes must permit ample time to plan across-the-board community prevention programs.

Integration of Key Concepts: Incorporating a psychological perspective alongside the scientific elements would strengthen the curriculum, allowing for a more holistic understanding of human behavior in disaster scenarios. The need for more clarity in communicating key concepts, especially around post-disaster management and sustainability.

2.6.3 Grading

Alignment with Learning Outcomes (LOs): A more elaborated information on assignments, with clearer mapping of which learning outcomes (LOs) each assignment is intended to evaluate.

Traditional Exams: Reducing the weight of final exams by proposing a transformation away from conventional paper-and-pencil tests towards more practical, hands-on assessments. This includes integrating case studies, problem-solving, and project-based activities, aligning the program with sustainability goals and the MQA agreement.

Practical Assessments: Advocate for more skill-based, hands-on assessments, such as objective structured scenario-based assessments, rather than written reports, which do not adequately measure practical skills. This would ensure a better evaluation of real-world competencies

2.6.4 Content and detailed weekly syllabus

Weekly Content: To avoid overwhelming amount of content, making it challenging to cover everything adequately in the allotted time. Redistributing the material to allow for more in-depth discussions, particularly on critical appraisal and evaluation.

Terminology: Certain terms and nomenclature used in the syllabus to be improved for clarity, especially for detailed topics. Simplifying and clarifying the content could help ensure students fully apprehension of the key concepts.

Inclusion of Relevant Topics and Skills: Syllabus to include topics such as post-disaster management in the context of primary healthcare, handling social unrest, and political interference. Also the need for content that aligns with the undergraduate level, including an introduction to the roles of relevant agencies , as well as soft skills development.

2.7 Conclusion

The feedback gathered from 30 respondents, representing diverse academic backgrounds and levels of training, through an online survey using a validated questionnaire, has significantly contributed to enhancing the 14-week curriculum on sustainability and environmental education for post-disaster contexts. Designed as an elective course for undergraduate students, the revised curriculum incorporates key insights from the survey to better align with students' needs and the evolving demands of the field. Following critical analysis, it now features clearer measurable learning outcomes, improved grading practices and assessment portfolio, and a more balanced and workable weekly syllabus that integrates practical, hand-on learning with sound theoretical foundations.

By embedding the responses from diverse respondent’s academic background and experiences, this course provides a grounded framework for addressing sustainable development concept in pre and post-disaster management. The curriculum’s adaptability and format also ascertain it can be customized to meet the specific needs of higher education institutions across APEC member economies.

This also ensure that participants gain not only knowledge but critical skills in sustainability, disaster management, and environmental stewardship, applicable to their local context.

3.0 REPORT OF APEC SEE-PD CONFERENCE

3.1 Introduction

The APEC Conference on Sustainability and Environmental Education for Post Disaster (APEC SEE-PD) took place at Le Quadri UCSI University, Kuala Lumpur, Malaysia, on 20-21 August 2024 with great success. Policymakers, educators, and researchers from APEC economies attended the conference, and they discussed how environmental education can improve disaster preparedness and recovery.

A string of costly wildfires, floods, hurricanes, typhoons and earthquakes have compelled APEC member economies to heightened collective actions to respond to the increasingly complex disaster landscape and instill long-term climate resilience. Such disasters have caused serious economic losses and pressure on ecosystems.

The APEC SEE-PD aims to promote cross-border cooperation and make an opportunity for APEC economies to share practical experiences. By doing so, the conference hopes to come up with an approach to environmental education. The approach can be adapted across APEC economies to enhance preparedness and recovery efforts after disasters.

3.2 Objective

The key objectives of the APEC SEE-PD conference were:

a. Enhance environmental knowledge and resilience by integrating environmental education into disaster preparedness and recovery strategies.
b. Promote collaboration among APEC economies to share resources, policies, and frameworks for environmental education, ensuring that best practices are implemented in both pre- and post-disaster contexts.

c. Develop an adaptable educational framework that can be applied across APEC economies, with a focus on building sustainable and disaster-resilient communities.

3.3 Event

Date: 20 & 21 August 2024 (Tuesday & Wednesday)

Venue: Le Quadri, UCSI University, Kuala Lumpur, Malaysia

Time: 9.00 am- 5.00 pm

The conference includes 9 keynote presentations and 2 sharing sessions. It provided an opportunity for participants from different APEC economies to collaborate, share their experiences and ideas, explore how environmental education can contribute to disaster reduction and recovery, and discuss new ideas and practical solutions.

3.4 Participants

The conference has 72 participants, including five categories of participants. There were 9 speakers, 5 international participants, 7 researchers, 8 conference secretaries and 43 local participants. There were more women participants, with 41 women and 31 men. The conference was attended by representatives from Australia; China; Japan; Republic of Korea; Malaysia, the Philippines; Viet Nam; France; and Pakistan, who shared their views. Please refer to Appendix 1.

3.5 Keynote Highlights and Takeaways

At the APEC Conference on Post-Disaster Sustainable Development and Environmental Education, experts delivered a series of insightful presentations focusing on various aspects of disaster management, sustainable development and environmental protection. They highlighted innovative strategies, case studies and practical experiences for building resilience and promoting sustainable recovery in the Asia-Pacific region, which provided valuable references on how to address the challenges of sustainable development and

environmental education after disasters. Detailed highlights of these presentations are summarized in Table 2 below.

Table 2: Summary of Key Points from Keynote Speeches

Speakers	Title of Speech	Key points
Dr. Norhazni Mat Sari	Sustainable Environmental Management	✓ Provided an overview of the Environmental Quality Act (EQA) 1974 and the establishment of the Department of Environment (DOE) in Malaysia. ✓ Emphasized the importance of "SMART ENFORCEMENT" to enhance enforcement efficiency, as well as public awareness and education. ✓ Described DOE's critical role in pollution prevention, post-incident cleanup, and public education. ✓ Presented specific cases of air and water pollution, as well as the National Haze Action Plan and efforts to combat illegal waste dumping.
Professor Dr. Ahmad Zaharin Aris FASc	Sustainable Campus: Green and Beyond - University as Living Labs for Sustainable Development	✓ Universities can lead in sustainability by integrating it into operations, curriculum, research, and community engagement. ✓ Emphasized balancing economic growth, social inclusion, and environmental protection. ✓ Goes beyond "green" practices to cultivate future leaders with a commitment to sustainability. ✓ Promotes co-creation and real-world experimentation to develop scalable and replicable sustainable solutions.
Professor Dr. Rajib Shaw	Role of Science Technology Innovation for Disaster Risk Reduction and Climate Change Adaptation	✓ Highlighted various global risks, including environmental risks, infectious diseases, digital divides, and energy crises. ✓ Stressed the importance of adaptive governance and emerging technologies. ✓ Introduced the concept of Health Emergency Risk Management (Health EDRM). ✓ Emphasized the importance of technology access in disaster-prone areas. ✓ Advocated for youth involvement in science-based entrepreneurship to support SDGs and disaster risk reduction. ✓ Highlighted the importance of community and compassion-based approaches to

		strengthen societal resilience.
Professor Dr. Meriam Nik Sulaiman FASc	Sustainability Literacy for Planetary Health	✓ Addressed current environmental challenges and the urgent need for sustainability literacy. ✓ Discussed its impact on ecosystems and human health. ✓ Examined shifts in the global risk landscape, emphasizing human influence on the environment. ✓ Defined as the knowledge, skills, and values necessary for sustainable development and planetary health. ✓ Linked human health to the health of the planet, advocating for a holistic sustainability approach. ✓ Highlighted the role of transformative education in promoting sustainability literacy.
Mr. Muhammad Fauzie Ismail	Post Disaster Support and Rehabilitation: Learning from Malaysian Experiences	✓ Introduced the formation and role of the National Disaster Management Agency (NADMA). ✓ Disaster Risks and Response in Malaysia: Discussed risks from floods, cyclones, and droughts, with examples from the 2023/2024 flood season. ✓ Case Studies: Covered the 2004 Indian Ocean Tsunami and 2014 East Coast Flood, and subsequent recovery efforts. ✓ Identified key challenges in disaster management, such as logistical difficulties, resource allocation, and mental health. ✓ Stressed the importance of real-time data and community-based disaster risk management programs.
Professor Alain Rival	The Science of Sustainability in Environmental Education	✓ Introduced CIRAD's mission in promoting sustainable development in tropical and Mediterranean regions. ✓ Discussed various risks in sustainable agriculture, including socioeconomic and climatic risks. ✓ Covered topics like agro-ecology, precision agriculture, waste management, and greenhouse gas mitigation. ✓ Emphasized the balance of inputs and outputs in agriculture to provide services like pollination and erosion control. ✓ Highlighted selective breeding and sustainable waste management practices. ✓ Stressed the importance of incorporating sustainability principles into education to equip future generations.

Professor Deborah Turnbull	Curriculum Design for Post Disaster Management and Adaptation: a Psychology Perspective	✓ Disasters have significant psychological impacts like PTSD and anxiety. ✓ The curriculum aims to prepare students for disaster response with a focus on mental health. ✓ Emphasizes critical thinking, problem-solving, and interdisciplinary collaboration. ✓ Incorporates psychological research and cultural responsiveness in disaster management.
Associate Prof. Dr Haliza Abdul Rahman	Adaptation, Recovery and Rehabilitation: from Classroom to Disaster Area	✓ Adaptation involves adjusting to new post-disaster conditions. ✓ Recovery focuses on restoring services and livelihoods, often taking years. ✓ Education plays a key role in disaster awareness, skill development, and mental health support. ✓ Case studies from Japan; Malaysia; and Nepal highlight effective adaptation and recovery practices
Professor Dr. Ahmad Ismail FASC.	Social Desirability and Livelihood after a Disaster: A community expectation	✓ Understanding disasters and their impact on communities is crucial. ✓ Case studies (e.g., oil spills, nuclear accidents) show severe effects on ecosystems and health. ✓ Emphasizes public awareness, education, and sustainable environmental practices. ✓ Collaboration between global and local entities is essential for effective disaster response.

(Refer Appendix 2, and Appendix 3)

3.6 Discussions

3.6.1 Summary

The main themes discussed at the conference included several aspects.

First, participants emphasized the importance of putting environmental education into disaster recovery plans. Improving communities' environmental knowledge can help them better understand the risks they face and take sustainable measures to reduce those risks. It can help to enhance their resilience.

Besides, APEC economies face multiple challenges in responding to natural disasters, due to different locations, economic conditions and environmental characteristics. It is important to create an diverse educational frameworks adapted to specific situations.

Furthermore, cross-border cooperation is important to improve disaster preparedness. By sharing knowledge, resources and implications, APEC economies can strengthen their collective ability to respond disasters.

Finally, it is importance of training measures for promoting sustainable disaster recovery for educators, government officials and community leaders. Refer Appendix 3 for the final Framework and Curriculum of APEC SEE-PD

3.7 Conclusion

In conclusion, the conference highlighted the importance of environmental education in improving disaster response and resilience. The APEC economies should put environmental education into disaster management strategies to enhance resilience and sustainability.

In addition, there is an urgent need for a education framework that can be used across APEC economies to raise environmental awareness, promote sustainable development and strengthen communities' resilience to disasters.

All in all, by sharing resources and best practices, economies can strengthen disaster management and recovery efforts and ensure that communities are better prepared for future disasters.

3.8 Recommendations

Based on the outcomes of the APEC SEE-PD conference, the following list of recommendations for future planning is developed:

There is a need to develop a regional framework for post-disaster environmental education to meet the different needs of each APEC economy. The framework should focus on disaster preparedness, sustainability and community resilience.

In addition, it was recommended that it would beneficial to establish a global knowledge-sharing platform, so that the APEC economies can continuously exchange their research findings, best practices and disaster recovery plans. They will improve their ability to handle disasters.

Furthermore, future efforts should focus on training programs for educators, policymakers, and community leaders to ensure they have the knowledge and skills to run effective environmental education programs. Participate in educational events with the community to make them more aware of how

important it is to protect the environment during disasters, especially for weak communities in high-risk areas, and teach them useful skills that will lower the risk of disasters and speed up recovery.

Finally, a monitoring and evaluation system should be established. This system will regularly check the effectiveness of education frameworks and programs. Its purpose is to ensure that these frameworks and programs can respond to changing challenges in disaster recovery.

4.0 OVERLALL CONCLUSION

In conclusion, the APEC Sustainability and Environmental Education for Post-Disaster (SEE-PD) project represents a significant step forward in addressing the growing challenges posed by natural disasters across the APEC economies. By integrating Environmental Education into post-disaster recovery and preparedness efforts, the project not only enhances resilience at the community level but also fosters a deeper understanding of sustainable recovery practices. The development of a validated framework and curriculum for post-disaster environmental education, alongside the dissemination of best practices through the APEC SEE-PD conference, ensures that the project's impact will extend across educational institutions, government agencies, and local communities.

Looking ahead, the SEE-PD project offers a valuable framework for ongoing collaboration among APEC economies, with the potential to significantly improve disaster education at the tertiary level. The interdisciplinary platform provided by the conference has enabled key stakeholders to share knowledge, address practical challenges, and develop innovative solutions, reinforcing the importance of education in building disaster-resilient communities. By focusing on capacity building within the education sector, this project contributes to both short-term disaster risk reduction and long-term environmental sustainability, in line with the Sustainable Development Goals (SDGs).

Appendix 1

LIST OF PARTICIPANTS
APEC SEE-PD

LIST OF PRESENTERS

No	Name	Institution
1	Prof. Dr. Alain Rival	CIRAD, France
2	Prof. Dr. Deborah Turnbull	University of Adelaide, Australia
3	Prof. Dr. Rajib Shaw	Keio University, Japan
4	Prof. Dr. Ahmad Zaharin Aris	Universiti Putra Malaysia
5	Prof. Dr. Meriam Nik Sulaiman	Universiti Malaya
6	Prof. Dr. Ahmad Ismail	Academy of Sciences, Malaysia
7	Assoc. Prof. Dr Haliza Abdul Rahman	Universiti Putra Malaysia
8	Mr. Muhammad Fauzie Ismail	National Agency of Disaster Management, Malaysia
9	Dr. Norhazni Mat Sari	Department of Environment, Malaysia

LIST OF INTERNATIONAL PARTICIPANTS

No	Name	Institution
1	Mr. Elly M. Cortes Jr	Department of Energy, The Philippines
2	Mr. Lionel O. Ebante	
3	Mr. Anh Tuan Nguyen	Multilateral Trade Policy Department, Ministry of Industry and Trade, Viet Nam
4	Ms Weiwei Gao	Ministry of Education, China
5	Mr Yuanmeng Zhang	

LIST OF RESEARCHERS

No	Name	Institution
1	Prof Dr Mansor Abu Talib	UCSI University
2	Prof Dr Zahari Ishak	UCSI University
3	Prof. Ong Eng Tek	UCSI University
4	Prof Chan Nee Nee	UCSI University
5	Asst. Prof Dr Vimala	UCSI University
6	Asst Prof Dr Saeid Motevalli	UCSI University
7	Asst Prof Dr Chew Li Li	UCSI University

LIST OF SECRETARIAT

No	Name	Institution
1	Pei Xiaoge	FOSSLA, UCSI University
2	Wei Dan	FOSSLA, UCSI University
3	Yu Xingtong	FOSSLA, UCSI University
4	Hu Yue	FOSSLA, UCSI University
5	Zhang Fengjiao	FOSSLA, UCSI University
6	Guo Juncheng	FOSSLA, UCSI University
7	Guo Rongrong	FOSSLA, UCSI University
8	Zhu Mengjun	FOSSLA, UCSI University

LIST OF LOCAL PARTCIPANTS

No	Name	Institution
1	Prof. Ir. Ts. Dr. Teo Fang Yenn	University of Nottingham
2	Asisstant Professor Anne Noor Sri Juwaneeta Jamaludin	UCSI University, Head of Department, Psychology
3	Prof Dr Haslinda Abdullah	Nilai University
4	Lt Col Dr Maimunah Omar	MiDAS
5	Lee Gin Lim	Universiti Kebangsaan Malaysia (UKM)
6	Kapten Dr. Rayyan Cheong Tian Ming Abdullah	UPNM
7	Dr. Zahid Saeed	National Defense University of Malaysia
8	Dr. Nadhirah binti Nordin	Universiti Pertahanan Nasional Malaysia
9	Dr. Aisyah Abu Bakar	UPM
10	Adjunct Asst Prof. Dr Ng Khar Thoe	UCSI University and Asia e University (AeU)
11	Hou Huihui	UCSI University
12	Thenmozhi Subramanian	SK TAMAN SERI GOMBAK 2
13	Dr. Low Suet Fin	Institute Of Teacher Education International Languages Campus
14	Andrew loi	Retired teacher
15	Peng Yu	UCSI University
16	Luping	UCSI University
17	Amelia Hazreena Binti Abdul Ghani	Malaysian Institute of Road Safety Research
18	Roziana binti Shahril	Malaysian Institute of Road Safety

		Research
19	Wan Anis Afeeqa Wan Mohammad Azhar	SEADPRI UKM
20	Dr. Evelyn Lim Ai Lin	Faculty of Forestry and Environment, UPM
21	Tan Booi Charn	Kuala Lumpur Residents Action Plus for Sustainable Development Association
22	Zhao Xiao Jie	UCSI University
23	Mohamad Faizal Bin Mansor	LESTARI UKM
24	Dato' Ir. Lim Chow Hock	MyCDNet
25	Norfaizadatul Akma Binti Mohamad Maswan	UCSI University
26	Dr. Siti Rohani Abdul Samat	UCSI University
27	Melvin Lam	ACTnow
28	Dr. Mohd Yusoff Ishak	UPM
29	Dr. Adlina Suleiman	IMU
30	Nurul Izza Ab Ghani	UPM
31	Ts Ir Shazana Mohd Ibrahim	DOE
32	Maniyammai Kumaresen	Nottingham University
33	Wong Chee Fui	UTAR
34	Chuah Peng Aik	Sunway University
35	Anurita Selvarajoo	Nottingham University
36	Niu Lezheng	UCSI University
37	Dr. Masanori Fukui	Iwate Prefectural University
38	Dr. Siti Balqis Mohd Azam	UCSI University

39	Abdul Latiff Bin Hj. Jamaludin	UCSI University
40	Wan Farizatul Shima Binti Wan Ahmad Fakuradzi	Universiti Pertahanan Nasional Malaysia
41	Izet Daniel	MiDAS
42	Eun Hee Lee	Univerdity of Mottinghum
43	Rani Wemel	LTT Global/MyMobileUni

Appendix 2

APEC SEE-PD CONFERENCE
PROGRAM SCHEDULE

APEC Conference on Sustainability and Environmental Education for Post Disaster (APEC SEE-PD)

August 20 & August 21, 2024

Frangipani Room, Level 2

Le Quadri Kuala Lumpur

UCSI University Campus, Kuala Lumpur, Malaysia

Time	Conference details
Day 1 – August 20, 2024 (Tuesday)	
0900 am - 1000 am	Registration of participants Refreshment and Networking
1000 am - 1030 am	**Opening Ceremony** **Professor Ts Dr Lionel In Lian Aun** Director Centre of Excellence for Research, Value Innovation and Entrepreneurship, UCSI University
1030 am - 1115 am	**Keynote 1:** *Sustainable Environmental Management* **Dr. Norhazni Mat Sari** Deputy Director General (Operational) Department of Environment Malaysia
1115 am - 1200 pm	**Keynote 2:** *Sustainable Campus: Green and Beyond - University as Living Labs for Sustainable Development* **Professor Dr. Ahmad Zaharin Aris FASc** Director International Institute of Aquaculture and Aquatic Sciences (I- AQUAS), Universiti Putra Malaysia
1200 pm – 1300 pm	**Keynote 3:** *Role of Science Technology Innovation for Disaster Risk Reduction and Climate Change Adaptation* **Professor Dr. Rajib Shaw** Graduate School of Media and Governance Keio University, Japan
1300 pm - 1400 pm	Break and Lunch
1400 pm - 1445 pm	**Keynote 4:** *Sustainability Literacy for Planetary Health* **Professor Dr. Meriam Nik Sulaiman FASc** University of Malaya Advisor of SDC UM & Council Member Academy of Sciences Malaysia (ASM)

1445 pm - 1530 pm	**Keynote 5:** *Post Disaster Support and Rehabilitation: Learning from Malaysian Experiences* **Mr. Muhammad Fauzie Ismail** National Disaster Management Agency (NADMA)
1530 pm - 1600 pm	**Keynote 6**: *The Science of Sustainability in Environmental Education* **Professor Alain Rival** Senior Project Manager Centre de Cooperation Internationale en Recherche Agronomique pour le Developpement, (CIRAD) Paris, France
1600 pm - 1645 pm	**Sharing Session 1:** APEC Members' Experiences of Post-Disaster Moderator: **Prof. Dr. Zahari Ishak**, Wellbeing Research Centre & FOSSLA, UCSI University
1645 pm - 1700 pm	Refreshment and break.

Time	Conference details
Day 2 – August 21, 2024 (Wednesday)	
0900 am - 1000 am	**Keynote 7:** *Curriculum Design for Post Disaster Management and Adaptation: a Psychology Perspective* **Professor Deborah Turnbull** School of Psychology University of Adelaide South Australia
1000 am - 1045 am	**Keynote 8:** *Adaptation, Recovery and Rehabilitation: from Classroom to Disaster Area* **Associate Prof. Dr Haliza Abdul Rahman** Department of Environmental and Occupational Health Faculty of Medicine and Health Sciences Universiti Putra Malaysia
1045 am - 1100 am	Break and refreshment
1100 am - 1145 am	**Keynote 9:** *Social Desirability and Livelihood after a Disaster: A community expectation* **Professor Dr. Ahmad Ismail FASC.** Council Member Academy of Sciences Malaysia (ASM), and President, Malaysian Ecology Society, Malaysia

1145 am - 1230 pm	**Sharing Session 11 :** *APEC Members' Experiences of Post-Disaster* Moderator: **Asst. Prof. Dr. Saeid Motevalli,** Wellbeing Research Centre & FOSSLA, UCSI University
1230 pm - 1400 pm	Break and Lunch
1400 pm - 1500 pm	**Presentation and Discussion:** Framework and Curriculum of SEE-PD Lead by expert: Team from UCSI University (Kuala Lumpur Campus)
1500 pm - 1530 pm	Reflection and Evaluation
1530 pm - 1600 pm	**Closing speech** by Distinguished Professor Dr. Phang Siew Moi, FASc. Deputy Vice Chancellor (Research and Postgraduate) UCSI University (Kuala Lumpur Campus)
1600 pm	Refreshment
1630 pm	End of programme.

Appendix 3

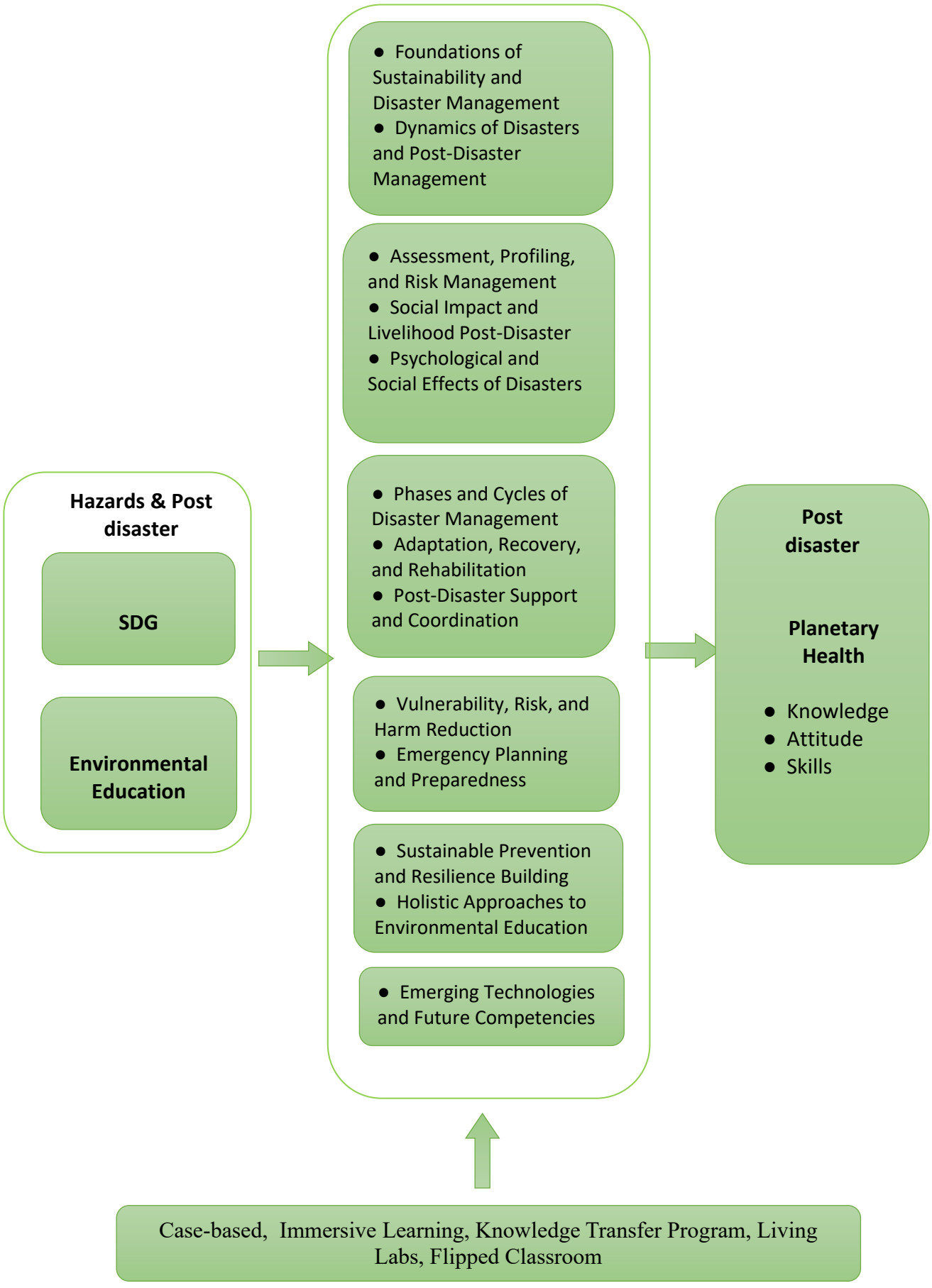
APEC
SUSTAINABILITY AND ENVIRONMENTAL EDUCATION FOR POST DISASTER
FRAMEWORK AND CURRICULUM

1.0 Framework

The APEC Sustainability and Environmental Education Framework for post-disaster recovery outlines key concepts and processes. It begins by mapping out the foundational components, which include inputs, throughput, and expected outputs. This framework leverages the United Nations' Sustainable Development Goals (SDGs) and Environmental Education principles, particularly in the context of hazards and post-disaster scenarios.

The framework forms a guiding principles that focuses on developing a curriculum that addresses the critical need to enhance participants' knowledge, skills, and attitudes towards planetary health. This is achieved through a structured educational approach that emphasizes sustainable recovery and resilience-building. The framework's curriculum is designed to advance the participants' understanding of environmental sustainability in the aftermath of disasters, with particular attention to fostering behaviors that promote long-term ecological well-being.

Figure 1 presents the framework in detail, including a comprehensive description of the 14-week course syllabus. This syllabus outlines essential content areas, practical exercises, and key learning objectives aimed at equipping participants with the tools to contribute to the improvement of planetary health and sustainability post-disaster in advancing their knowledge, attitudes and skills.


Hazards & Post disaster
SDG
Environmental Education
● Foundations of Sustainability and Disaster Management
● Dynamics of Disasters and Post-Disaster Management
● Assessment, Profiling, and Risk Management
● Social Impact and Livelihood Post-Disaster
● Psychological and Social Effects of Disasters
● Phases and Cycles of Disaster Management
● Adaptation, Recovery, and Rehabilitation
● Post-Disaster Support and Coordination
● Vulnerability, Risk, and Harm Reduction
● Emergency Planning and Preparedness
● Sustainable Prevention and Resilience Building
● Holistic Approaches to Environmental Education
● Emerging Technologies and Future Competencies
Post disaster
Planetary Health
● Knowledge
● Attitude
● Skills
Case-based, Immersive Learning, Knowledge Transfer Program, Living Labs, Flipped Classroom

B. Curriculum

1.0 Course Descriptions

This course engages students in exploring critical issues related to hazards, disaster and post-disaster management through the lens of sustainability and environmental education through a multi-disciplinary approach. By analyzing key concepts of disaster development and post-disaster intervention and strategies for preventing future disasters emphasizing the bio-psycho-social-spiritual perspective, participants will develop a comprehensive understanding of the subject. Through various delivery method and collaborative discussions of relevant case studies, students will evaluate real-world scenarios by integrating scenario thinking and best practices. Ultimately, they will create targeted environmental education programs aimed at specific groups and communities affected by disasters, applying their knowledge, awareness and skills to design effective interventions that promote resilience and sustainability.

2.0 Learning Outcomes

At the end of the course, students should be able to:

a. State various concepts of disaster and post-disaster management and sustainability.
b. Analyze appropriate prevention, intervention, and post-intervention strategies within sustainability and environmental education programs.
c. Design a community prevention program tailored to mitigate the effects of a post-disaster on diverse populations.

3.0 Grading

Assignment 1: Post Disaster Self-reflection Report	15%
Assignment 2: Disaster Analysis	20%
Assignment 3: Topical Term Paper	25%
Project	40%
Total	100%

4.0 Content

a. Sustainable Environmental Education and Disaster Management
b. Types and Causes of of Hazards, Disaster and Post-Disaster
c. Assessment of Emerging Risk
d. Social desirability and Livelihood after a disaster
e. Bio-psycho-social-spiritual effects of Post Disaster
f. Cycle of post-disaster
g. Adaptation, Recovery and Rehabilitation
h. Support and Coordination
i. Risk Analysis and Harm Reduction
j. Crisis and Preparedness
k. Individual, Family, Community resilience
l. Holistic approaches in Sustainable Environment Education
m. Geo-Spatial Technologies and Sustainable competencies
n. Community engagement/Case study presentations

5.0 Detailed content

Week 1: Sustainability, Environmental Education and the Disaster Framework
Sustainable Development Goal and Disaster Risk Reduction (DRR)
International and Domestic policies, regulations and Institutions
Local Guidelines, Roles of Government and relevant stakeholders

Week 2: Types and Causes of Disaster and Post Disaster
Natural vs Human made hazards - risk and protective factors
Disaster Management Cycle - Mitigation, Preparedness, Response, Recovery
Disaster and Post Disaster Management Cycle

Week 3: Assessment and Emerging Risk
Disaster, Post Disaster and Risk Management
Managing emerging risk to post disaster
Need Assessment, Risk Management and Risk Reduction

Week 4: Social Desirability and Livelihood
Bias, stigma, effect on psychological and emotional well-being
Survivor's vulnerability, resources, support including community network
Reconfiguration of vulnerability through through character strength

Week 5: Bio-psycho-social-spiritual effects of Hazards and Disaster
Psychological effect to human - anxiety, stress, depression, PTSD, trauma
Interconnection of Bio-Psycho-Social-Spiritual that effecting well-being
Coping resources and styles, sustainable strategies

Week 6: Cycle of Post Disaster
Linear cycle and Iterative nature of recovery including Learning and Adapting

Early restoration, Transition from emergency to rehabilitation and Normality
Mitigating impact of future hazard and disaster

Week 7: Adaptation, Recovery and Rehabilitation
Achieving homeostasis and return to stability
Enhancing survivor's quality of live and well-being
- Collaborative approach to rehabilitation by various stakeholders

Week 8: Support and Coordination
Local agency, government, non-governmental agencies, industry
Risk reduction policy in enhancing family and community resilience
Critical role of effective leadership, communication and best practices

Week 9: Risk Analysis and Harm reduction
Vulnerability management including specific at-risk population
Assessing hazards, community vulnerability and prioritize risk
Harm reduction for individual and communities

Week 10: Crisis and Preparedness
Mitigating potential impact of future hazards and disaster
Emergency Planning and Post Disaster scenarios
Case studies and Best Practices on real cases

Week 11: Sustainable Prevention and SDG
Disaster Resilient Education including training and community empowerment
Fostering resilient through holistic mental health intervention
Health and well-being, poverty reduction and sustainable cities

Week 12: Holistic approaches in Sustainable Environmental Education
Integrating multidisciplinary modalities
Incorporating local knowledge and wisdom
Gender sensitivity and public awareness

Week 13: Geo-Spatial Technologies and Competencies
Case studies utilizing technology in local and international program
Designing an integrated Environmental Education Program on Post Disaster
Integrating future competencies and Geo-Informatics technologies

Week 14: Community Engagement
Community engagement with targeted population
Presentation of Case study

6.0 Suggested Main Text

Bob Jicking & Stephen Sterling (Eds) (2017). Post Sustainability and Environmental Education:Remaking Education for Future: Palgrave MacMillian.

Elizabeth A. Lange. (2023). Research and Teaching in Environmental Studies: Transformative Sustainability Education-Reimagining Our Future: Routledge Earthscan.

Helen James, Rajib Shaw, Vinod Sharma, & Anna Lukasiewicz. (2022). Disaster Risk Reduction in Asia Pacific: Governance, Education and Capacity; Spronger Nature

Rajib Shaw & Yukihiko Oikawa (2014). Education for Sustainable Development and Disaster Risk Reduction:

Sanneh Edward Saja. (2018). Systems Thinking for Sustainable Development Climate Change and the Environment: Springer International Publishing

7.0 Suggested Readings

Australian Institute for Disaster Resilience (2001), Post Disaster Survey and Assessment, Australian Disaster Resilience Handbook Collection, Manual 14 https://knowledge.aidr.org.au/media/1961/manual-14-post-disaster-survey-and-assessment.pdf

FAO/ILO (2007), Integrated Livelihood Assessment Guidelines: a tool kit for rapid analysis and response to the impact of disasters on the livelihoods of people https://www.fao.org/fileadmin/templates/tc/tce/pdf/LAT_Brochure_LoRes.pdf

Katja Brundiers (2018), Educating for post-disaster sustainability efforts, International Journal of Disaster Risk Reduction, 27, 406–414 https://doi.org/10.1016/j.ijdrr.2017.11.002

UNDP (2007), Review on Post Disaster Recovery Needs Assessment and Methodology: Experiences from Asia and Latin America, United Nation Office for Disaster eduction https://www.undrr.org/publication/review-post-disaster-recovery-needs-assessment-and-methodologies-experiences-asia-and