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Learning lab on disaster risk management for sustainable development (DRM-SD)

An evaluation

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Abstract

Purpose – A series of "learning lab" projects on disaster risk management for sustainable development (DRM-SD) have been accomplished from 2014 to 2016 in Malaysia, Vietnam, Lao PDR and Cambodia by the Centre for Global Sustainability Studies. The project is designed for professionals from the disaster risk management field to encourage integration of sustainable development (SD) concerns into the larger planning framework for DRM. As a case study for capacity building (CB) evaluation, the central purpose of this study is to explore the approaches, feedbacks and implications of the DRM-SD CB project that have been developed and carried out.

Design/methodology/approach – Three methods have been used which are participation observations, surveys and document analysis. The results show that the project had successfully applied seven different tools to enhance analytical skills and professional knowledge of development practitioners in specific areas of DRM-SD.

Findings – Based on the survey, the project received positive response and valuable information from participants for future project development. Regarding the perspective of outcomes, the result indicates that south–south, ASEAN regional and triangular cooperation and role of higher education in DRM-SD are significant impacts from this project which can bring several benefits and should be promoted as an approach for the DRM-CB project as a whole.

Originality/value – It is hoped that this study will serve as a transfer learning initiative to provide approach guidelines and innovative mechanisms for DRM practitioners who will have the know-how and potential for leadership in DRM-SD.

Keywords Evaluation, Disaster risk reduction, Capacity building, ASEAN, South–South and Triangular cooperation

Paper type Research paper

1. Introduction

A series of catastrophes witnessed in recent times provide a strong reminder that disaster risks associated with hazards such as tropical cyclones, floods, earthquake, droughts and

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tsunamis constitute to be a major challenge for sustainable development (SD). This is due to a variety of considerations that affect both disaster risk management (DRM) and SD, such as the way climate change and climate variability, poor land-use planning and ecosystem degradation endanger people, assets and development efforts. Synergisation of DRM and SD in development policy, development plans or activities and individual development is urgently needed to reduce risks that are more inclusively used to cover both "rapid onset–high impact" events such as floods, cyclones and tsunamis, and "slow onset–high impact" events, such as climate change, poverty and health, and, consequently, it will empower and strengthen the communities towards disaster resilience.

These synergies are explicitly recognised in the strategic goal of the Hyogo Framework for Action 2005-2015 that relates to "the integration of disaster risk reduction into sustainable development policies and planning", and paragraphs 186-189 under the sub-section "disaster risk reduction" of the Rio + 20 outcome (UNESCO Green Citizen, 2016). The post-2015 agenda for disaster – The Sendai Framework for Disaster Risk Reduction 2015-2030 – also states that while disasters significantly impede progress towards sustainable development, conversely effective disaster risk management contributes to sustainable development (United Nation, 2015a). Meanwhile, the sustainable development goals (SDGs) explicitly target risk reduction under 4 of its 17 goals – the relevant goals focus on ending poverty (Goal 1); ending hunger, achieving food security and improving nutrition and promoting sustainable agriculture (Goal 2); making cities and human settlements inclusive, safe, resilient and sustainable (Goal 11); and taking urgent action to combat climate change and its impacts (Goal 13) (United Nation, 2015b). Thus, enhanced integration of disaster risk concerns and sustainable development into national plan, projects or activities [e.g. capacity building (CB)] would provide significant opportunities for stakeholders and societies to get a holistic picture in exploiting synergies between actions intended to strengthen disaster resilience and to achieve progress towards the achievement of SDGs.

Capacities' strengthening for disaster resilience in institutions, societies and individuals have become an urgent global sustainability goal to minimise the domino effect of "upcoming" disaster. Strengthening and stimulating the capacities of stakeholders or actors through CB for DRM might systematically contribute to building society resilience towards disaster hazards. CB can be defined as:

> [...] efforts to strengthen the competencies and skills of a target organisation, group or community so that the target could drive DRR efforts, or in a broader sense development, in a sustainable way in the future (Walker, 2013).

Training and skills development encompasses many aspects, but it often focuses on technical fields such as support in understanding hazards, using climate information systems, raising public awareness of risk and response measures, conducting vulnerability assessments and in using these to formulate action plans (Scott *et al.*, 2014).

Heazle *et al.* (2013) highlighted that to achieve greater resilience as a community, individuals, groups and institutions need to have the urge to alter the behaviours, that is "learn", in ways that reduce exposure and vulnerability to threats without changing the fundamental structure and function of that society or community. Thus, it seeks to foster complementary practices and coordination between multiple actors towards disasters resilience communities. CB has consistently been identified as a critical component in development of policy and practices over the past two decades (Lucas, 2013). This has been mentioned in the Sendai Framework for Disaster Risk Reduction 2015-2030, the Hyogo Framework for Action (2005), the Paris Declaration (2005), the Accra Agenda for Action

(2008) and the Busan 4th High Level Forum (2011) (Scott *et al.*, 2014). Notably, every skills or approach of CB project must be unique and tailored to current global and national disaster risk reduction (DRR) strategy to meet the desired outcomes.

Following the need to synergise the element of DRM and SD, and strengthen the capacity development of stakeholders towards disaster resilience, the Centre for Global Sustainable Studies, Universiti Sains Malaysia (CGSS@USM), Penang, Malaysia, has accomplished a series of "learning labs" (from 2014-2016) on shaping the DRM stakeholders' capacity among ASEAN members (Malaysia, Vietnam, Lao PDR and Cambodia) through the innovative educational surges with build professional development and technical capacity. Hence, it is a best practice to highlight the crucial parts of this project which are concerned with the understanding on how the project has been sourced, how the information has been delivered (or approaches), how the project has been evaluated and how the project contributes to the significant results. Scott *et al.* (2015) highlight there had been little formal research conducted on CB for DRM, and as a result, international actors lacked robust, evidence-based guidance on how capacity for DRM can be effectively generated at national and local levels. Scott *et al.* (2015) added that there is a gap in empirical, independent research focused on analysing DRM CB activities in low- and middle-income countries to determine what works and why. Thus, a project case-study is needed as a support step towards filling knowledge and evidence gaps. The central aim of the study is to draw lessons and guidance on "how to" build the DRM-SD capacity development in a range of contexts. The specific objectives of this project case study are to identify the resources, to highlight the approaches and practices of DRM-SD on how CB have been developed and carried out, to evaluate the outputs and to determine the outcomes of project.

2. Background and literature review

2.1 Disaster and South East Asia

The ten countries in the Association of South East Asia Nations, whose combined population is 622 million, experience average direct economic losses from disasters of US$4.4bn every year, representing "an enormous socio-economic cost" which threatens sustainable development and livelihoods (McElroy, 2016). Damage from disasters is usually more significant and widespread in South East Asia, where a higher number of people live in risk-prone areas, for example, along rivers and coasts that are vulnerable to flooding and storm surges. ASEAN Secretariat News (2016) highlight that from 2004 to 2014 South East Asia contributed to more than 50 per cent of the total global disaster fatalities, or 354,000 of the 700,000 deaths in disasters worldwide. The total economic loss was US$91bn and about 191 million people were displaced temporarily and disasters affected an additional 193 million people. In short, about one in three to four people in the region experienced different types of losses. There was an increase in the rate of disaster mortality from 8 (during 1990 to 2003) to 61 deaths per 100,000 people (during 2004 to 2014) (Lassa, 2015). According to the United Nations Statistical Yearbook for Asia and the Pacific 2014, among Asia-Pacific sub-regions, South East Asia – predominantly Indonesia and the Philippines – was the hardest hit by natural disasters that killed more than 350,000 in more than 500 incidents (Beck *et al.*, 2014). Most recently, the UN's 2016 Global Climate Risk report identified Myanmar as one of 20 countries in a "conflict–climate nexus", a combination of severe environmental vulnerability along with pre-existing social fragility and weak institutions (Phyo, 2016).

A study by the Center for Hazards and Risk Research (2005) shows that floods is the primary hazard affecting Malaysia, ranking in the top deciles for most of the western half of the country. Landslides and droughts are also significant, although their effects are limited to much smaller areas in the eastern regions. When weighted by mortality, landslides pose a

large risk for the north-eastern part of the country. The hazards affecting the western region are distinctly different than those impacting the eastern areas. According to Cambodia Disaster Loss and Damage Information Centre (2014), the key findings form the analysis report show that Cambodia is prone to flood, fires, droughts, storm, lightening, pest outbreak, epidemic and river bank collapse. In the context of mortality, 2,050 people died from all disaster between 1996 and 2013, and floods is the number-one killer which accounts for 53 per cent of the total number of human lives lost. Meanwhile, Center for Excellence in Disaster Management & Humanitarian Assistance (2014) highlighted that Lao People's Democratic Republic (Lao PDR) is exposed to natural disasters such as flooding, drought, earthquakes, cyclones and infectious disease epidemics. In the past five years, Lao PDR has been affected by severe flooding owing to tropical storms, causing hundreds of thousands of deaths and millions in damages. Forecasts project that the intensity and frequency of natural disasters in the Lao PDR will likely increase because of climate variation and change. Other than that, World Bank (2013) stated that natural hazards in Vietnam have resulted in average annual economic losses estimated between 1 and 1.5 per cent of the gross domestic product (GDP) between 1989 and 2008. For instance, the Typhoon Xangsane in 2006 caused damages of US$1.2bn in the 15 provinces in the Central Region.

ASEAN has a track record of global leadership on cross-border cooperation on disasters' risk management to build upon. ASEAN has been at the forefront of using international law to attempt to cooperate in DRR and response – the ASEAN Agreement on Disaster Management and Emergency Response (AADMER) is a regional treaty that has been hailed as among the world's best practice: progressive, comprehensive and, unusually for a disaster instrument, legally binding (Gabrielle, 2016). The objective of AADMER is to provide effective mechanisms to achieve substantial reduction of disaster losses in lives and in the social, economic and environmental assets (of member states), and to jointly respond to disaster emergencies through concerted national efforts and intensified regional and international cooperation. The ASEAN Community was formally launched in the end of 2015, marking that a significant and greater regional cooperation to achieve resilient and sustainable development is a priority.

The Director of the Sustainable Development Directorate of the ASEAN Secretariat's Socio-Cultural Community Department, Adelina Dwi Ekawati Kamal, said the region needed to address and adapt to a "new normal" of increasingly extreme and frequent weather events:

> The enormous socio-economic cost of such phenomenon not only hinders development prospects and productivity of our peoples, but it also poses a clear and present threat to our stability, environmental sustainability and multi-fold security, especially food security (McElroy, 2016).

Thus, to reduce the adverse impacts of natural disasters, especially on the most vulnerable populations, the ASEAN countries must be able to make their communities more sustainable and more resilient. The ASEAN needs to further strengthen national multi-sectoral coordination, enhance partnerships with civil society, the private sector and other stakeholders and particularly, the cooperation with regional nations within the context of knowledge transfer and CB. According to Anbumozhi (2016), in particular, emerging middle-income economies like Indonesia, Malaysia and Thailand have a great opportunity to receive financing from several sources, including public and private sources and the market. However, Cambodia, Lao PDR, Myanmar and Vietnam still need to rely on public financial sources and international funds until they can develop an environment that enables or encourages private sector investment and finance. Thus, south–south, regional and triangular cooperation, therefore, may be expected to play a role in providing an

opportunity for these countries to easily access the need capacity in strengthening disaster resilience.

2.2 Capacity building and South East Asia

The United Nations Office for Disaster Risk Reduction defines capacity as "the combination of all the strengths, attributes and resources available within a community, society or organization that can be used to achieve agreed goals" and capacity development as the process by which people, organizations and society systematically stimulate and develop their capacities over time to achieve social and economic goals, including through improvement of knowledge, skills, systems and institutions. CB is an ongoing process that equips government officials and other stakeholders with the tools necessary to perform their functions in a more effective manner during all phases of the disaster cycle (White, 2015).

There are a few literature studies available on research and project related to DRM and CB. Scott *et al.* (2015) higlight that between 2013 and 2015, the IFRC contracted Oxford Policy Management and the University of East Anglia to conduct "Strategic Research into National and Local Capacity Building for Disaster Risk Management". This review study aims to identify and analyse evidence of CB for DRM and DRR in developing countries. They stated that there is very little academic research that focuses on CB for DRM, and during the team's searches, only one journal article, published in a peer-reviewed journal, was found that detailed multi-country research analysing CB for DRM in low-income countries. Meanwhile, report by Rajib *et al.* (2010) highlights the analyses and outcomes of the Climate and Disaster Resilience Initiative (CDRI) Capacity-building Program in which the following cities participated: Chennai (India), Colombo (Sri Lanka), Dhaka (Bangladesh), Hue (Vietnam), Kuala Lumpur (Malaysia), Makati (Philippines), Sukabumi (Indonesia) and Suwon (South Korea). The CDRI Capacity-building Program was a three-month-long comprehensive and action-oriented programme conducted from February to April 2010 to help city government officials become more aware and to be able to communicate more easily on the current and future potential climate-related risks faced by their cities.

In the context of South East Asia, a study by Petz (2014) was painting a broad-stroke overview of DRM capacity development in ASEAN with a particular focus on the cooperation of ASEAN and National Disaster Management Organizations (NDMOs) in building DRM capacity. Petz concluded that the ASEAN has embarked on an ambitious DRM programme through AADMER, which is one of the few binding single-issue DRM treaties in the world, and he has seen that CB in ASEAN is a multi-level process that includes a large number of stakeholders other than ASEAN institutions and NDMOs, but nonetheless, both are strong drivers of the CB process and their cooperation will go a long way in ensuring that gains are sustainable. The "Disaster Resilience Education Capacity Building in South-East Asia" project draws upon the University of Newcastle's particular position as a centre for resilience education excellence to build capacity in the ASEAN region (Malaysia, Thailand, Philippines and Vietnam). The project furthers the understanding of regional challenges that result from complex problems generated by natural hazards and human-induced threats. The overarching aim of the project will be to create regional synergies between leading higher education institutions (HEIs) while building capacity in ASEAN countries to proactively address disaster risk and build resilience through education (source: Australian Government website). Specially, in a study on South East Asia countries' progress, Alcayna *et al.* (2016) studied on the resilience and disaster trends in the Philippines: opportunities for national and local CB have hilighted that CB is occurring across levels from local to national in the Philippines, but focus is predominantly at the local level where numerous actors and networks are collaborating with

communities to identify existing capacities, as well as are providing the opportunity to build infrastructure, which could minimise the impacts of a hazard.

Based on the online search, the authors have a similar issues with Scott *et al.* (2015). Scott *et al.* (2015) highlighted that very little academic research focuses on CB for DRM, and there are many resources that identify a need for CB for DRM but do not give any further details on what to do or how to do it. Nonetheless, the literature studies that have been highighted above will serve as support for this study.

2.3 Capacity building and evaluation

An effective CB initiative is one that produces significant implication that contributes to the change. Thus, programme evaluation lets organiser know whether the time and effort they are putting in to their project are worth it. Evaluation is a crucial aspect of the training process, and without it, there is no way to know if the information being delivered was effectively communicated and received. Evaluation refers to a periodic process of gathering data and then analysing or ordering it in such a way that the resulting information can be used to determine whether your organization or project is effectively carrying out planned activities, and the extent to which it is achieving its stated objectives and anticipated results (Martinez, 2005).

Morariu (2012) highlights that the evaluation of CB is the process of improving an organization's ability to use this evaluation to learn from its work and improve results. Patton (1987) highlighted that the evaluation is a process that critically examines a programme, and it involves collecting and analysing information about a programme's activities, characteristics and outcomes. Its purpose is to make judgements about a programme, to improve its effectiveness and/or to inform programming decisions. There is great potential for the learnings from all of the evaluations to be fed back into the existing pool of knowledge to increase the capacity for programme development (Woodland and Hind, 2002).

Preskill and Boyle (2008) describe a model of evaluating CB that may be used for designing and implementing CB activities and processes as well as for conducting empirical research on this topic. Evaluations are needed to test the theories and assumptions on which capacity development programmes are based, to document their results and to draw lessons for improving future programmes (LaFond and Brown, 2003). Khan (1998) highlights that it is not easy to define evaluation and it becomes more complex when one tries to make a distinction between monitoring and evaluation (M&E) (many use the terms interchangeably). In the context of the logical framework concept of a project cycle, monitoring would look at the input–output processes (i.e. implementation), whereas evaluation would examine the output–effect (i.e. project results) and effect–impact (i.e. project impacts) processes. According to Bakyaita and Root (2005), evaluations can be used to link any two parts of the M&E framework (inputs, processes, outputs, outcomes or impact). At the national and subnational levels, where efforts to implement interventions are functional, monitoring of programme inputs (human resources, financing), processes (procurements and supplies, training) and outputs (services delivered by programmes) is also needed for understanding the complete picture of programme activities for improved performance.

There are numerous ways to perform an evaluation of a CB programme (Brown *et al.*, 2001; van der Werf and Piñeiro, 2007). Nonetheless, choosing a method by which to evaluate a training programme presented a great challenge because the success of a training programme depends on the ability of the participants to learn and retain the information presented. Scott *et al.* (2014) mentioned that the CB objectives are typically hard to measure

and require an understanding and appreciation of the changing political and institutional context. The Organisation for Economic Co-operation and Development (2006) highlights many resources which emphasise that outcomes and impact should be monitored in addition to the assessment of operational inputs or outputs as has traditionally been the case with CB, for example, the number of persons attending training (Scott *et al.*, 2014). Scott *et al.* (2014) stated that the training evaluation forms completed by participants do not lead to an understanding of impact unless there is follow-up with participants and their organisations after they have returned to their working environment.

3. Methodology

The research methodology was based on a project case study approach representing a range of CB interventions. The focus in this CB evaluation was on investigating input, process, outputs and the prospects for potential outcomes. The definition of the evaluation framework [inputs, process (or activities), outputs and outcomes] for this study is guided by Horch (1997), as follows: *Input* indicators measure resources, both human and financial, devoted to a particular project or intervention (i.e. number of case workers), and input indicators can also include measures of characteristics of target populations (i.e. number of clients eligible for a project); *Process* indicators measure ways in which project services and goods are provided (i.e. error rates); and *Output* indicators measure the quantity of goods and services produced and the efficiency of production (i.e. number of people served, speed of response to reports of abuse). These indicators can be identified for projects, sub-project, agencies and multi-unit/agency initiatives; *Outcome* indicators measure the broader results achieved through the provision of goods and services. Although the researchers were not able to evaluate performance outcomes in terms of sustained raised capacity, and sufficient signs of emerging outcomes existed such as impact to individual, organisation, management, etc. because of a few limitation factors. Thus, this study evaluates the outcomes of project implementation within the context of strategic cooperation.

Three methods are used in this case study project which are participation observation, survey and document analysis. The participation observation was conducted through attending the three-day four in-countries' learning labs which carried were out in Malaysia (3-5 December 2014 and 5-7 January 2016), Vientiane, Lao PDR (19-21 January 2016) and Siem Reap, Cambodia (2-4 February 2016) to understand the project approaches and contents. Participant observation has been used in a variety of disciplines as a tool for collecting data about people, processes and cultures in qualitative research, and observations enable the researcher to describe existing situations using the five senses, providing a "written photograph" of the situation under study (Kawulich, 2005). This method is used to understand process, contents and approaches of the programme. The questionnaires were distributed to respondents or participants (n = 120) by the end of the project to evaluate the overall understanding and effectiveness of the learning lab that serves as the project output. For the survey form design, the first part of the survey contained questions about the respondents' demographic profile. In the second part, participants were asked to evaluate the effectiveness of the learning lab according to three different aspects:

(1) workshop content;

(2) workshop design; and

(3) workshop content using a Likert scale of 1 to 5, where 1 was "strongly disagree" and 5 was "strongly agree".

In the third part of the survey, participants were asked to evaluate their understanding of DRM-SD before and after attending the learning lab using the five-point Likert, with 1 being

"very low" and 5 being "very high". The last part of the survey gives participants an opportunity to write recommendations to improve the learning lab. The collected data were analysed using descriptive statistics (percentage) using Statistical Package for the Social Sciences (SPSS) software.

Relevant documents such as reports, slide presentations, online articles and journals were interpreted to give voice and meaning around an assessment topic; to understand the concepts, terminologies and previous projects; and to support the research data and discussion. The reviews are focused on the South East Asia-DRM, CB evaluation and DRM-SD project.

The results of this study are presented and discussed in the following section of result and discussion. The CB programme evaluations are categorised in three subsections. The first subsection highlights the input and process of DRM-SD CB that has been implemented, and the second subsection indicates the participants' improvements in the level of understanding regarding the material presented and opinions on the project. Finally, the third subsection outlines the outcomes of project in the context of its implication towards cooperation strengthening.

4. Result and discussion

4.1 Approaches of the CB project

In 2014, the CGSS was awarded a project funding by Asia-Pacific Network for Global Change Research (APN), Japan, under the research proposal on "Building Capacity for Reducing Loss and Damage Resulting from Slow and Rapid Onset Climatic Extremes through Risk Reduction and Proactive Adaptation within the Broader Context of Sustainable Development". The two-year (end 2014-early 2016) project on "learning labs" in Kuala Lumpur (Malaysia), Ho Chi Minh (Vietnam), Vientiane (Lao PDR) and Siem Reap (Cambodia) successfully involved 120 professionals in total which were from various backgrounds. Participant selection and distribution are important to access the success of the project. Selecting a group of participants with the right academic and professional background and organising a team of resource persons to handle the rigour of the curricular aspects was the key for the success of the training. As the interviews were to be conducted in English, participants were expected to have an adequate working knowledge of the language. Following a rigorous selection procedure, a total of 120 participants were selected representing Malaysia, Vietnam, Lao PDR and Cambodia. The selection process involved careful consideration of the applicant's academic qualifications, professional experience, career background and the overall suitability of the candidate to be a high-quality participant groups for the training.

The material covered in the lectures was consolidated through structured tutorials, and its practical application was accomplished through a suite of hands-on learning activities. The participants worked in teams lead by the resource persons and facilitators throughout the three days presenting their output and ideas at the end of the course. Modules and hands-on activity include topics such as:

- Training overview.
- Development with a Difference.
- Risk and Disaster.
- Pre-Disaster DRM: Discussion of SE Asian climate, Risk Management;
- The Event: Dealing with Disaster.
- Post-Disaster: Disaster Management and Post-Disaster Stage: Response & Recovery – Linking to the Goals of Sustainable Development.

- LFA for Project Management (Risk Reduction Project Design & Implementation.
- AtKisson's Compass Methodology for Interdisciplinary Climate Risk Reduction Project Management.
- Project Planning for Risk Reduction.
- World Café Activity on DRM-SD.
- Case study 1: The International Experience.
- Case study 2: The National Experience.

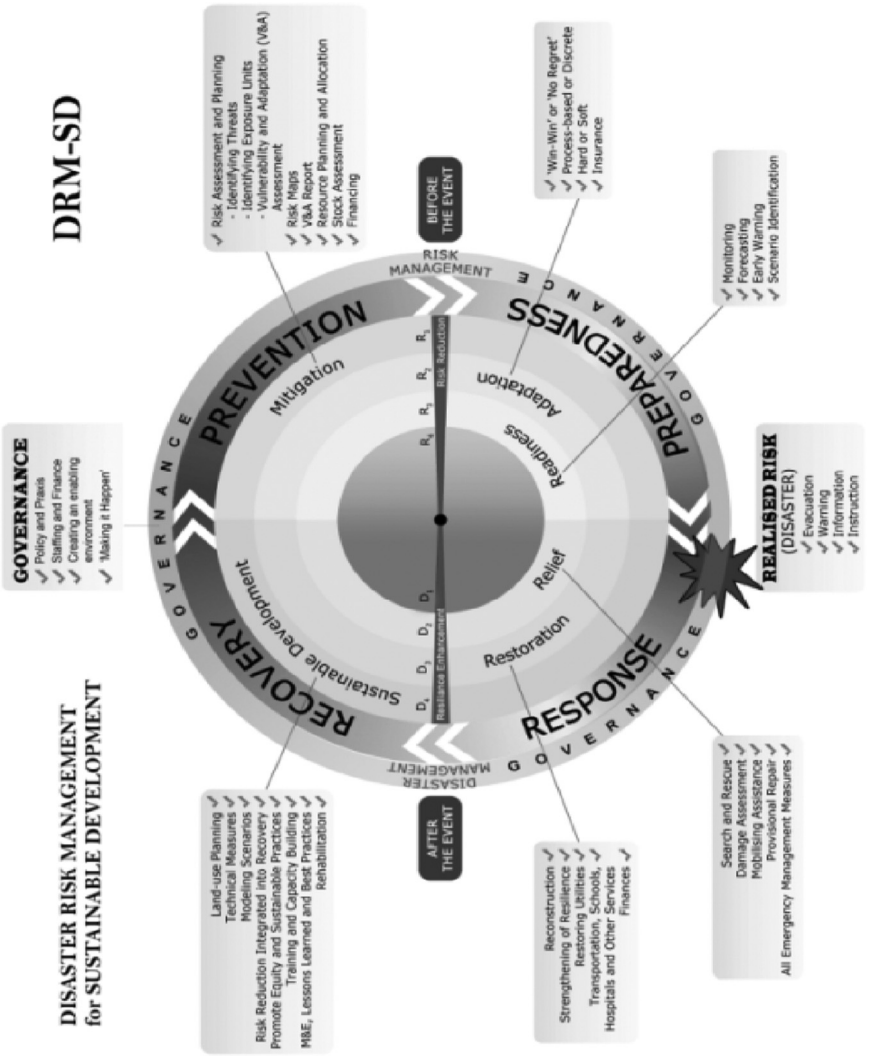
The workshops addressed DRM-SD issues by connecting risk to climate impact, vulnerability of exposure units and the role of adaptation in enhancing capacity to address risks. The thrust was on ways to progressively reduce risk to acceptable levels; levels that, if realised as disaster, will be within the capacity of the communities to manage without considerable adverse losses and damages. The specific highlight of the learning lab involves:

- Discussion of South East Asia climate trend and scenario with focus on climatic extremes.
- Definition of terms, risk equations, disaster trends, climate change and disasters, population, urbanization and DRM, Malaysia and DRM.
- *DRM-SD cycle*: Risk management side (before the event) – Prevention and Preparedness; the role of mitigation, adaptation and readiness; the role of science and technology for DRM.
- *DRM-SD cycle*: Disaster management side (after the event) – Response and recovery; the role of relief, restoration and recovery; closing the loop for resilience building, especially for the most vulnerable; sustainable living and human well-being.

The central focus of this unique training is personalised instruction and hands-on learning. The context of the learning lab also highlighted the uniqueness of the project's approach in factoring SD consideration in all four major phases of the DRM loop – prevention, preparedness, response and recovery. Benson (2016) highlighted that the disaster risk poses a significant risk to sustainable development. Likewise, disaster risk is exacerbated by lower levels of human development. By implication, there is scope for mutually supportive actions, both to strengthen disaster resilience and to advance sustainable development. These synergies need to be explicitly recognized and effort taken to ensure they are realized. Besides, this project is tailored to address closely the capacity needs of linkages between climate change adaptation (CCA), DRR and loss and damage (L&D). de Guzman *et al.* (2014) highlight that there is a significant overlap of concepts and shared goals between DRR and CCA, especially in the context of L&D. As climate change brings a series of disaster and societal impacts to vulnerable countries and communities, it is also putting development at risk owing to L&D.

To enhance analytical skills and professional knowledge of development practitioners in specific areas of DRM-SD, seven different tools has been successfully applied in the learning lab. These tools are DRM-SD model, the Logical Framework Analysis (LFA), World Café, Mind maps, AtKisson Compass, Conflict Management and System Thinking. The details of the tools are discussed later in the section.

4.1.1 DRM-SD model. The DRM-SD model has been developed by CGSS@USM (published in Ibrahim *et al.*, 2013) which is an attempt to re-orienting its research priorities while pursuing knowledge-based engagement for community development and security of livelihoods. As shown in Figure 1, the DRM-SD model is a cyclic and iterative process in which "risk reduction" and "resilience enhancement" are given equal importance. These are the pre- and post-disaster activities (shown as radii of the hemispheres). It is assumed that the radius of the



Source: *Ibrahim et al.* (2013)

Figure 1.
DRM-SD Model

right hemisphere represents the full risk and that on the left, the full disaster. The key to the successful implementation of the model is the ability to progressively reduce risk through mitigation (R1), adaptation (R2) and readiness (R3) measures carried out "before the event" under prevention and preparedness. The residual risk is shown by R4 which, when realized as disaster (D1), is presumably small and manageable. The post-disaster activities relief (D2), restoration (D3) and sustainable development (D4) will enhance resilience (reduced disaster) under response and recovery phases. The governance segment is the ever-present enabling environment required for the other four components to operate efficiently.

The checklist items shown outside the circle in pockets are examples of activities that form part of Neo-DRM-SD. This model requires that we move from an "event-based" to an SD-compatible "process-based" approach for improved results. In this approach, the overall risk (in the absence of any risk reduction measures) will be progressively reduced to a level where any resulting disaster from the residual risk will be considered manageable. As simple as it might sound to disaster risk managers, this approach demands a rigorous implementation of SD measures in practice.

The DRM-SD will prompt strategic intervention at the risk level to continue to reduce multiple risks posed by SD challenges to levels manageable by people and planet alike. This model is a cyclic and iterative process in which "risk reduction" and "resilience enhancement" are given equal importance. The approach will require us to start taking here-and-now steps through no-regret measures, while simultaneously intensifying efforts on more involved mitigation challenges that will require policy, finance and mindset changes. For developing countries, more than a mindset change will be required; empowerment and creation of an enabling environment will be critical.

4.1.2 Logical Framework Analysis. To plan and implement risk reduction projects, a popular project management tool, "Logical Framework Analysis" (LFA) was introduced. LFA is an approach to develop well-analysed and logical project framework and activities. LFA thinking is usually presented as a logical framework (log-frame or project structure) which is a matrix of rows and columns that shows a summary of the project design, activities and the indicators used to measure progress in a clear, concise, logical and systematic way. The systematic application of the method, with good judgement and sound common sense, can help improve the quality, and hence the output, relevance, feasibility and sustainability of project implementation in general. The need of this tool is important to realise that a project has, in fact, a hierarchy of linked objectives that can be identified and structured (Baccarini, 1999).

By bringing stakeholders together to discuss problems in all its dimensions, set objectives and strategies for action, LFA encourages people to consider issues in detail, frame achievable expectations and evaluate means of implementation. By stating objectives clearly and setting them out in a "hierarchy of objectives", the log-frame matrix that results thus provides a means of checking the internal logic of the project plan and ensures that activities, results and objectives are well linked. Baccarini (1999) highlights the hierarchy display a series of cause-and-effect linkage between one level of objective and the next higher level and towards the ultimate highest objective- which offers a top-down vision of the project and provides a common understanding of the project scope between all participants.

It also forces planners to identify critical assumptions and risks which may affect project success, thus encouraging a discussion on project feasibility. In stating indicators of achievement and means of measuring progress, planners are made to think about how they will monitor and evaluate the project right from the start. A clear identification of the activity schedule is also the basis for a well-thought-out budget or resource schedule. All these key information is brought together in a single document – the log-frame – which provides a useful and visible project summary (Figure 2).

The approach presented here, is not an end in itself, instead it is to be seen as a user-driven and objective-led project planning process which uses specific terms that help visualize and implement projects more successfully. Jackson (1997) highlighted that when LFA is used correctly, provide a sound mechanism for developing a project concept into a comprehensive project design document. Very often, formal training will be required to fully benefit from the LFA methodology.

4.1.3 World Café. World Café is a typical example of the group discussion mode – an expansion of the traditional workshop modes outlined by Brown and Isaacs (1998). World Café is a methodological approach used to help groups to engage in constructive dialogue around critical questions and manage break-up group discussion very effectively during formally organised conferences or meetings, build personal relationship and foster collaborative learning (Horng *et al.*, 2017). This approach has also been used widely in various strategy workshop (Carter *et al.*, 2012; Fouche and Light, 2011; Hodgkinson *et al.*, 2006; Johnson *et al.*, 2010; Schieffer *et al.*, 2004). It is a very practical approach in terms of the evolving rounds of information sharing and exchange. On top of that, discussion can bring out synchronized dialogue, aid in reflection on issues, encourage the sharing of knowledge and even uncover new opportunities for action (Chang and Chen, 2015).

In World Café discussion, participants from various disaster stakeholders' background were seated in a group of four tables to discuss the four pillars of the DRM-SD model – prevention (Prev), preparedness (Prep), response (Resp) and recovery (Reco) – the 2Ps and 2 Rs – which are called the independent variables in this case. The table arrangement is shown in Figure 3 by the bigger of the two concentric circles a, b, c and d. The smaller inside circles labelled 1, 2, 3 and 4 represent a pair (two people) consisting of a moderator (or host) and a scribe (a person to record and summarise the discussion) at each table.

Participants were given a topic on the flood disasters in their respective countries. Each assigned table discussed their topic table as much as possible, for a present period. A

Figure 2.
LFA activities

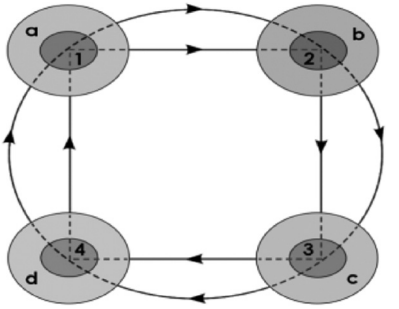


Figure 3.
World Café approach

moderator in each table played an important role to guide and encourage the team to share ideas and input. A guide sheet containing sub-topics, to help focus on the topic of discussion, was made available for all group members. For example – Prev might consider environment (rivers, drainage and agriculture), society (health, housing and education), economy (industry, business/trade and infrastructure) and governance (standard operating procedures [SOP], policy/action plan and finance aspects of flood disaster prevention. The Prep group will discuss along the same line but from a preparedness angle. The same logic applies to the Resp and Reco tables as well. The final summary of all discussion can be used in different ways by many stakeholders to reduce L&D associated with future floods and to make the community and nation resilient towards flood hazards. A similar approach could be used to address any other hazard, including sustainability challenges such as poverty, climate change, green growth, etc.

Study by Lorenzetti *et al.* (2016) shows that World Café was reviewed and considered to be an effective conversational tool for sharing ideas on learning and development, although it has been questioned whether it has sufficient attention to reflexivity, power differentials and structural inequalities within its process, specifically in relation to World Café facilitators. Horng *et al.* (2017), however, stressed that opportunities for diversified communications among stakeholders are generally insufficient during the roundtables because of:

- the overly formal procedure of such discussion;
- the limited time for speakers; and
- the limited interaction in the conversation.

Authors have also observed that most of the participants are not familiar with the World Café approach which has caused several problems during the discussion such as, but not limited to:

- some of the participants dominate a group with a lengthy opinion which can be unrelated to the topic of discussion;
- lack of leadership in gearing up the discussion; and
- the redundancy of similar statements for different tables.

This is where Mind map is required to fill in the gaps and enhance the discussion more effectively.

4.1.4 Mind map. While World Café only focuses on the mechanism and the participation of the participants, the authors found that the Mind map tool is a crucial approach that needs to be implemented to fill in the gaps of World Café by focusing on how the discussion is geared and structured from various angles. Rosenbaum (2003) highlighted that Mind maps eliminate gaps and omissions in important information and can be used to take notes,

plan projects, solve problems, improve recall, and much more. Unlike human brain, the Mind map is a "whole-brain alternative to linear thinking". Mind maps promote critical thinking by establishing nonlinear relationship between related concepts (Zipp *et al.*, 2009; Davies, 2010). Authors agree with Katagall *et al.* (2015) who highlighted a Mind map could be advantageous, as it is easier to remember a sketch/diagram or a map rather that remembering its description. A finished structure of Mind maps may be principally associate with the map of a city, where the centre of the Mind map represents the centre of the city – our most important ideas; whereas "main roads" and secondary roads' links from the centre represent the main and secondary thoughts, respectively. Figure 4 shows a group of participants involved in Mind mapping during a training workshop in Lao PDR. Discussion topic of Mind maps was similar to the topic given during World Café (flood disaster) where mapping takes into consideration many angles and perspectives, unlike during World Café discussion. Thus, unlocking creativity, boosting memory and changing mindsets during open discussion, Mind maps are a great way to discuss project ideas for collective good.

4.1.5 AtKisson's Compass. Unlike World Café and Mind maps, AtKisson's Compass becomes an important tool to connect the dots among the discussion topics. The AtKisson Compass or Sustainability Compass ("Compass" for short) is a tool for orienting people to sustainability. Figure 5 shows the AtKisson's Compass activity during the learning lab. The Compass is a way of representing both the different dimensions of sustainability, and of supporting true multi-stakeholder engagement (AtKisson *et al.*, 2004). AtKisson *et al.* (2004) further explained that the Compass is the base on which the pyramid of sustainable development is built, where it defines what sustainability is and the pyramid supports users through the process of sustainable development. The compass can also be used to understand the major areas of focus by analysing the 17 SDGs into the four thematic directions and establishing their interconnectivities (Figure 6).

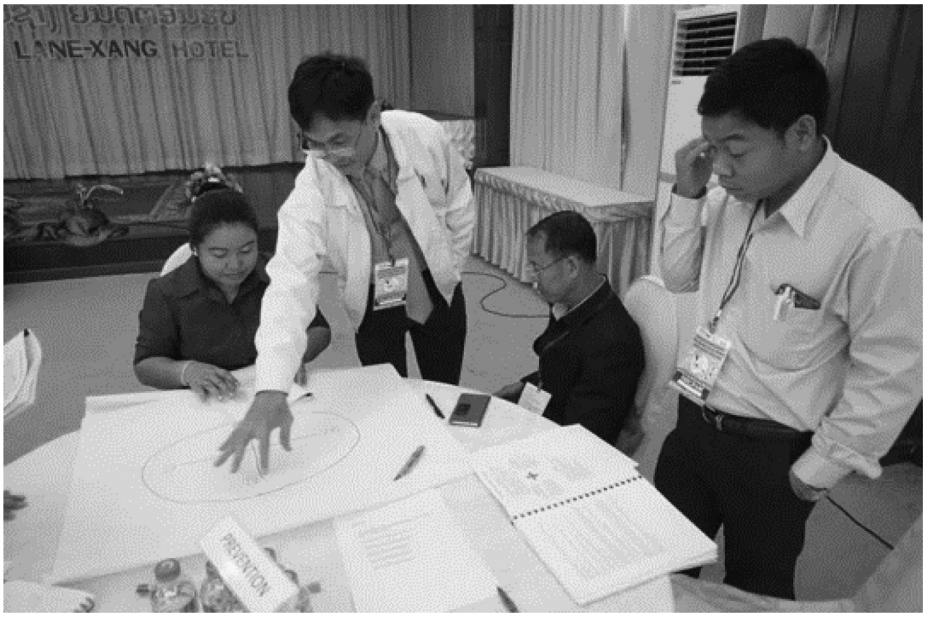


Figure 4.
Mind map activity

Figure 5.
AtKisson's compass activities

During this session, CB participants were seated in group for a short Compass exercise on "Planning for Community Climate Resilience and Disaster Risk Management & Response". The goal of the exercise is to develop the foundational systems-based situational scoping for resilient long-term climate change risk reduction and sustainable development management plan. In this exercise, participants' knowledge on AtKisson Compass, conflict management and system thinking tool is tested to successfully conduct the exercise and achieve the set goal. Participants are required to record all information on the Compass and develop a pyramid (by identifying indicators and linkages) and create a system connection circle. This is a very interactive way of learning and orienting people to sustainability. By doing so, participants get a chance to discuss and identify in depth the importance of each indicator and how it is linked with one another.

4.1.6 Conflict management. Conflicts are likely to occur in any project during the implementation without any compromise on how well planned the project or discussion is. Conflicts occur mainly owing to the different priorities of each stakeholder or participant as the case may be. These priorities are the result of different values we attach to our priorities. Understanding the role that conflict management plays in the relationship between commitment to team goals and team outcomes is vital in preventing relationship conflict while supporting constructive disagreements (Agrawal and Pazos, 2012). The example applied in this project is the use of water in a river by different stakeholder communities.

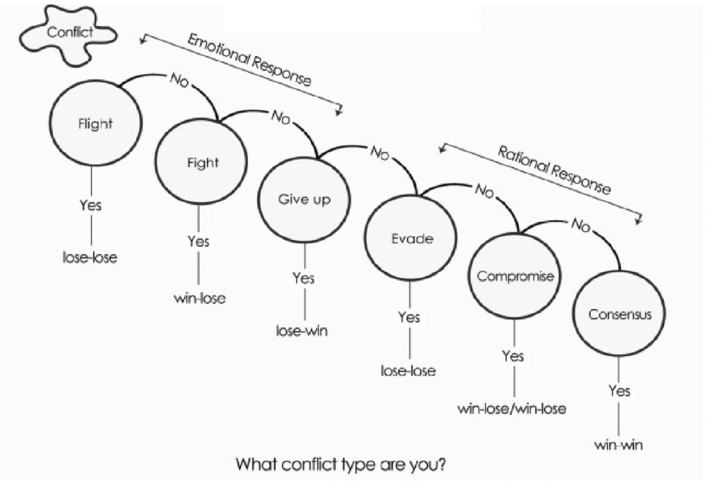
For instance, we know that communities value water for various reasons, such as: food, bathing, domestic and spiritual uses, recreation, drainage, irrigation, industrial production and waste removal. There would be no conflict as long as supply and demand are balance. When the demand exceeds supply, tensions start. This has been the case for millennia. What has changed is the scale: there are many more people on earth now, and we are approaching water resource scarcity. This puts the various "water values" listed above into competition with one another, because allocating water resources to fulfil one value reduces the

Note: Copyright: Sustainability Compass © AtKisson Inc. 2017

Figure 6.
The sustainability compass and the SDGs

availability of water for another. This is why we require scientific evidence and practical value judgements to secure lasting solutions, knowing where and how to prioritize one value over another (Sharp, 2013). Decisions must be inclusive after all views are considered and they must be taken in the collective interest. We must always be open to further iterations of the process when there are clear changes in stakeholder priorities.

As Figure 7 illustrates, if we start at the top left and proceed forward to the right bottom, depending on several "yes or no" responses possible, we may be in a variety of situations ranging from total loss, lose-lose, to a happy ending, win-win. These results would depend on how we respond to the conflict situation: flight (avoid the problem or escape) – this way neither side will gain anything, and it is a lose–lose situation; fight – this is usually the



Source: Adapted from Krogerus and Tschäppeler (2010)

Figure 7.
Conflict management

tendency of many and they fight to win, but someone loses too. The result is a win–lose situation; give up – this is solving a conflict by retreating, i.e. they lose and the end result is a lose–win; evade responsibility – overwhelmed by complexity, some delegate responsibility to higher authorities, and they get some solution eventually, not necessarily in the concerned parties interest, and often it ends up as a lose–lose situation; compromise – both parties give-in a bit and, although not ideal, the solution is reasonable under the circumstances (win–lose/win–lose); and consensus – this is a diplomatic solution, having considered all angles, the parties come up with a "third way" out, and although it takes longer and engages high-level diplomacy, the result will be long-lasting and it is a win–win solution. Most UN agreements are consensus outcomes.

4.1.7 Systems thinking. Systems thinking is defined as an approach to problem-solving that attempts to balance holistic thinking and reductionistic thinking, that tackles problems by examining the context of the system in which they occur (Martin, 1991) and is particularly relevant to tackling ill-structured "messy" problems (White, 1995). Systems thinking approach from Checkland's (1990) perspective is based on four ideas as characteristics of systems, which are emergence; hierarchy; communication; and control. Hogan (2000), on the other hand, defines systems thinking as an important skill for navigating information highways, making decisions and solving problems in all aspects of personal, social and professional life. Simply said, systems are a group of discrete elements that work together to make a whole, while system thinking is seeking to understand the connection among elements in the system. The field of systems thinking has generated a broad array of tools that let participants:

- graphically depict participants understanding of a particular system's structure and behavior;
- communicate with others about your understandings of the system; and
- design high-leverage interventions for problematic system behavior.

By taking the overall system and its parts into account, systems thinking is designed to avoid potentially contributing factor that can cause further development of unintended consequences. There are many methods and approaches to systems thinking (what systems thinking researchers call as "pluralism"). Midgley (2000) and Boyd *et al.* (2004) further explain that synergy of boundary critique and methodological pluralism ensures that each aspect corrects the weaknesses of the other. For example, the Waters Foundation presents that systems thinking is not one thing but a set of habits or practices within a framework that is based on the belief that the component parts of a system can best be understood in the context of relationships with each other and with other systems, rather than in isolation, and that systems thinking focuses on cyclical rather than linear cause and effect. However, other models may characterize systems thinking quite differently. One of the key benefit of system thinking according to Aronson (1996) is its ability to deal effectively with just these types of problems and to raise our thinking to the level at which we create the result we want as an individuals and organisations even in those difficult situations.

The learning lab was an excellent blend of theory, personalised instruction and hands-on learning where participants worked in groups using training materials provided and sustainability tools shared. In this context, the utilization of these seven tools seems to be an attractive and effective approach in generating ideas, improve communication between stakeholders, critical thinking, brainstorming and to enhance analytical skills and professional knowledge of development practitioners in specific areas of DRM-SD. Thus, relevant stakeholders could make use of the approach to collect opinions, solve conflicts and/or for project evaluation.

4.2 Feedback of the CB project

Each training programme should be evaluated by obtaining feedback from the participants to enable the organiser to assess the effectiveness of the training conducted, and good suggestions from participants can be incorporated in the courses to be organised in the future. Based on demographic data, it was found that 70 per cent male participants attended the CB. Apart from that, it was also recorded that 40 per cent of the participants were university staffs and researchers, 42 per cent were officials and directors from governmental bodies/ministries, while 18 per cent were from the non-governmental organization (NGO). In the context of Workshop content, 22 and 69 per cent participants, respectively, were very highly and highly informed about the objectives of this workshop. Conversely, the other 8 per cent believed that they were moderately informed. The majority of the participants (93 per cent) conjectured that the workshop has fulfilled their expectations, while 5 per cent presumed that the workshop moderately met their expectations. The workshop content was found to be highly job-relevant according to 93 per cent of the participants, while 7 per cent of the participants felt that the content was moderately relevant.

In terms of workshop design, 29 per cent of the participants agreed that the workshop objectives were very highly comprehensible. More than half of the participants believed the objectives were favourably clear, while the other 10 per cent believed the objectives were moderately clear. In terms of learning experience, the workshop activities were stimulating for 91 per cent of the participants. The activities in this workshop provided extremely sufficient practice and feedback for 16 per cent of the respondents, while another 75 per cent considered that the activities were satisfactory. According to 8 per cent of the participants, the difficulty level of the workshop was very highly appropriate, while 64 per cent of them considered the difficulty level was highly appropriate. Only 26 per cent of the participant regarded the difficulty level as moderately appropriate. The predominance of participants (79 per cent) agreed that the pace of this workshop was appropriate, while only 21 per cent of the participants concurred that the workshop pace was moderately appropriate.

In the context of workshop implementation, 89 per cent of participants are well received on the objectives of the workshop and only 11 per cent achieved moderate objective accomplishment According to 66 per cent of the participants, the knowledge garnered from this workshop was highly useful, while 29 per cent stated that the knowledge gained was very useful. Only, 5 per cent of the participants found that the knowledge gained was of moderate usage. Majority of the participants (64 per cent) were of the opinion that the workshop was a good way of learning the content, while 31 per cent were of the opinion that the workshop was the best way of learning. Meanwhile, 5 per cent of the participants were moderately convinced by the statement.

Prior to participation in the programme, participants' level of understanding was assessed and identified. About13 per cent of the participants possessed a very low understanding level, while 16 per cent had a low understanding. Meanwhile, 52 and 19 per cent participants, respectively, possessed medium- and high-level understanding. After the programme ended, the percentage of participants who possessed very low and low understanding had declined sharply to none. In addition, the percentage of participants who possessed medium understanding has slightly increased to 26 per cent. An incredible increment from 19 to 52 per cent of participants who developed high understanding after joining the programme was also witnessed. Meanwhile, 22 per cent of the participants achieved a very high understanding.

In the last section of the survey, participants are welcome to voice any opinions and recommendations to improve the learning lab. Several opinions and recommendations were raised throughout the four-in-country learning lab as follows:

- The DRM-SD learning lab is a new way of introducing stakeholders to different types of methodologies and approaches in dealing with disasters.
- The learning lab should be organized more frequently to expose stakeholders to DRM-SD.
- The introduction of many tools used in the learning lab is new for us and this learning lab is a good approach.
- The lab should be extended to a five-day lab instead of a three-day one owing to time constraints for each given tasks and hands-on activity.
- World Café discussion method was found to be very effective in exchanging and sharing ideas.
- The CB was an interactive and innovative approach by organisers and facilitators in making the learning lab more lively and attractive.
- Learning lab should consider providing workshop materials in bi-language (English and respective country's language) as communication barrier may exist.

Feedbacks from participants are a vital step towards identifying the flaws and improving of programme for the benefit of the institution, company or process concerned. High-performing organisations seek and use data and feedback to continually assess and improve their work, and sometimes behind such efforts are supportive grant makers that embrace the unique role they can play in helping grantees make effective use of information (Morariu, 2012). Although feedback received from the evaluation phase may be positive or vice versa, the data received will tell organisation which effort to maintain (at least) or requires improved. Welsh and Morariu (2011) further added that organisation that are adept at learning from mistakes and adapting to new challenges are more likely to be successful.

4.3 Implications of the CB project

The authors highlighted the major primary outcomes of the project which has links with international DRM cooperation. From the case study project, the study indicates that the cooperation among ASEAN countries will bring several beneficial outcomes, and should be promoted as a collaborative approach for DRM capacity-building projects. This study is intended to support the realisation of the potential synergies and cooperation in actions to strengthen disaster resilience through the CB project. Importantly, this study was highlighted the south–south, regional and triangular cooperation and higher educations' role as a part of outcomes for the project implementation.

The south–south approach is the exchange of resources, skills, expertise and knowledge between developing countries. South–South cooperation is a broad framework for collaboration among countries of the south such as in the political, economic, social, cultural, environmental, disaster and climate change. South–South technical cooperation can take different and evolving forms, including capacity development, knowledge sharing, exchange of experiences and best practices, training and technology transfer (Amorim *et al.*, 2014). Recent developments in south–south cooperation has taken the form of increased volume of south–south trade, south–south flows of foreign direct investment, movements towards regional integration, technology transfers, sharing of solutions and experts and other forms of exchanges (United Nations Office for South-South Cooperation, 2015). South–South approaches have become popular for CB project in recent years and developing country governments tend to prefer south–south arrangements for CB stating that providers have a greater understanding of contextual issues (Scott *et al.*, 2015). Global Facility for

Disaster Reduction and Recovery (2009) highlighted that the south–south cooperation also fosters developing country leadership and ownership of the disaster risk.

The project had two key significance within the context of south–south cooperation. The first was to facilitate knowledge exchange between countries of the ASEAN region and to provide them with opportunities to learn about different approaches to synergise the element of DRM and SD. The second objective was to provide CB for designing risk reduction project which stakeholders could be implemented the approaches. The south–south cooperation continues to expand, and through this project, it is clearly indicated that Malaysia as an emerging economy nation is playing a more active role in the disaster risk capacity of their own countries and that of the countries around South East Asia. Besides, this project is a part of initiatives by Malaysia in mainstreaming south–south cooperation through the DRM capacity development which aligned with Sendai Framework for Disaster Risk Reduction 2015-2030. Malaysia will contribute to enhance and promote the south–south cooperation for CB in synergisation of DRM-SD for the benefit of South East Asia and in support of the agenda of Sendai Disaster Framework and SDGs.

Regional organisations have become increasingly active in DRM and this reflects a broader growing trend of intensifying regional cooperation (Petz, 2014). Multilateral and regional organizations such as the Asia-Pacific Economic Cooperation (APEC), Association of South East Asian Nations (ASEAN) and Pacific Islands Forum (PIF) have significant roles to play in advancing disaster cooperation in the Asia-Pacific region. A whole-of-society approach, involving comprehensive strategies, initiatives and mechanisms developed within the frameworks of regional organizations will prove an invaluable way for nations to collectively share information, knowledge and resources (Ear and Campbell, 2012). The countries should also agree on linking specific risk reduction objectives or issues with broader goals of regional development owing to the nature of transboundary impacts of disasters. According to Bethke (2009), regional cooperation can be a significant enabler for CB, supporting peer learning, knowledge management and the exchange of good practice (Scott *et al.*, 2014).

Within the project context, this project had successfully gathered the involvement of five ASEAN countries, namely, Malaysia, Vietnam, Cambodia, Loa PDR and Thailand (one of the speakers). The project will contribute to Malaysia's progress to get involved in networking activities for strengthening regional cooperation thought joint CB measures and regional events which will contribute to addressing common challenges and interests. In fact, the regional cooperation between Malaysia and other South East Asian countries which aligned with the spirit of ASEAN moves towards a disaster-resilient ASEAN Community. As the region journeys forward in forging the ASEAN Community, the field of disaster management continues to face challenges and opportunities brought about by increasingly complex disasters and the evolving humanitarian landscape (Anbumozhi, 2016).

Triangular cooperation involves "southern-driven partnerships between two or more developing countries, supported by a developed country (ies) or multilateral organisation(s), to implement development cooperation programmes and projects" (Wang and Banihani, 2015). Triangular cooperation consists mainly of technical cooperation aimed at CB and takes place mostly in the same region where both emerging donors and beneficiary countries are located (Ashoff, 2010). This project strengthens triangular cooperation through Asia-Pacific Network (funder – multilateral organisation), CGSS@USM (organiser) and other South East Asian nations (participants). CB interventions should be designed with equality in mind, where actors are partners in a shared learning journey rather than one party being the expert provider of knowledge to the other (Lucas, 2013). The partners involved in triangular cooperation benefit from the constant exchange of information and knowledge sharing on DRM-SD, and networking that takes place during any triangular activity.

On the other hand, the project also supports the crucial role of HEIs or university in advancing skilled human capacity in the disaster risk domain and supporting disaster CB at all scales. Holloway (2015) stated that the DRR is an integral element of sustainable development and that HEIs play central roles in advancing knowledge and human capital developmentally. HEIs and universities need to share experiences with and transfer knowledge to other HEIs, public and private institution and communities on the implementation of DRM CB to enrich the knowledge base and identify better ways to design projects. In this context, the concept of university social responsibility evolves from the concept of corporate social responsibility, incorporating new issues about the university's relationship with society, such as the revision of the curricula in light of socioeconomic and environmental challenges that we face today (Vallaeys, 2014). Within the higher education context, such projects promote and enhance the collaborative work among academics and professionals (public and private) in ASEAN. The involvement of four universities as the main collaborators, government and private sector disaster managers, and the community groups make it a proactive engagement than the "event-based reactive approach" of the present. Thus, strengthening partnerships, risk reduction project development, specialised CB, documenting current approaches and recommending better approaches for improved policies are integral to the training.

The DRM-SD CB project has shown a practical and significant implication of collaborative partnerships to strengthen capacities of DRM among professionals from ASEAN members. There will also be a set of secondary outcomes from this project which are:

- A group of well-trained DRM professionals will have a clear understanding of the connection between CCA, DRR and L&D and their overall linkages to national development and in particular to the broader concept of SD.
- Increased regional ability to plan and implement climate adaptation projects, participate meaningfully in international conferences where national interests need to be highlighted, more local people need to be trained, academic curriculum at all levels needs to be influenced, climate documentation and publication need to be increased and there need to be leaders in climate change disaster risk management, all will lead to reduced losses and damages.

5. Conclusion and recommendations

In general, this study sets out the findings of the research, covering mechanisms in CB for DRM-SD, providing lessons learned in relation to the process and content of DRM-SD capacity-building interventions, evaluating programme effectiveness and improvement and outlining recommendations for policymakers and project implementers. The project process has addressed theoretical and technical terms involved in the DRM cycle, clearly explaining the connection between DRM and SD, training participants on the use of an easy-to-use risk assessment methodology (R.A.M developed by CGSS), exposing participants to L&D assessment approaches, helping prioritise adaptation options and training them on risk reduction project planning and promoting the tools needed to develop and implement interdisciplinary risk reduction projects. This project has trained practitioners who will have the know-how and the potential for leadership in CCA, DDR and L&D. Through this project, it is hoped that the participants get a clear picture that there is need for improved understanding of climate science, assessment and risk reduction for both slow and rapid climatic disasters, adaptation to build resilience and efficient policies coupled with an empowered community to effectively reduce L&D. Consequently, the skills developed during the training will be suitable for leadership roles in DRM-SD project management, especially with vulnerable communities. Meanwhile, for the project output, the survey reveals the significant differences of participants'

understanding before and after the programme, and needs, ideas and recommendations from participants for future project planning. Notably, the project has successfully brought together diverse stakeholders from each of the four ASEAN members at the national level, and it will be an opportunity to strengthen their existing networks and to find better operational strategies. It is hoped that this study will serve as a showcase on DRM-CD in low- and middle-income nations – low income (Cambodia), lower middle (Vietnam and Lao PDR) and upper middle (Malaysia) [source of nations' income status from the World Bank Group (2016)], south–south and triangular cooperation and ASEAN Community spirit. Nonetheless, the real outcomes from the prospect of individuals and individuals' organisation performance improvement or changes need to be measure in the future as an effort to further strengthened the project's goals and approaches. In fact, the long-term outcomes of evaluation CB are hoped to improve the performance in relation to mission and vision of project, to improve delivery of effective services, to strengthen credibility and legitimacy internally and externally and to increase the ability to renew and continually adapt and achieve sustainability of project.

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References

Agrawal, V. and Pazos, P. (2012), "Conflict management and effectiveness in virtual teams", *Team Performance Management: An International Journal*, Vol. 18 Nos 7/8, pp. 401-417.

Alcayna, T., Bollettino, V., Dy, P. and Vinck, P. (2016), "Resilience and disaster trends in the Philippines: opportunities for national and local capacity building", *PLoS Currents*, Vol. 8.

Amorim, A., Dale, A., Maldonado, C., de Oliveira, P.A.F., Bockstal, C., Hoffer, F. and Gutierrez, M.T. (2014), *Global South-South Development Expos DECENT WORK SOLUTIONS (2010-2013)*, International Labour Organization, Geneva, available at: www.ilo.org/wcmsp5/groups/public/—dgreports/—exrel/documents/publication/wcms_244336.pdf

Anbumozhi, V. (2016), *Convergence of Opportunities: Resilience and the ASEAN Community (No. DP-2016-02)*, Economic Research Institute for ASEAN and East Asia (ERIA), available at: www.eria.org/ERIA-DP-2016-02.pdf

Aronson, D. (1996), "Overview of systems thinking", pp. 518-560, available at: http://resources21.org/cl/files/project264_5674/OverviewSTarticle.pdf (accessed 8 January 2009).

Ashoff, G. (2010), "Triangular cooperation: opportunities, risks, and conditions for effectiveness", *Development Outreach*, Vol. 12 No. 2, pp. 22-24.

AtKisson, A., Hatcher, R.L., Green, S. and Lovins, H. (2004), "Introducing pyramid: a versatile process and planning tool for accelerating sustainable development", *Draft Paper for Publication in the Forthcoming Volume the Natural Advantage of Nations*, EA Books, Australia.

Baccarini, D. (1999), "The logical framework method for defining project success", *Project Management Journal*, Vol. 30 No. 4, pp. 25-32.

Bakyaita, N. and Root, G. (2005), "Building capacity in monitoring and evaluating Roll Back Malaria in Africa: a conceptual framework for the Roll Back Malaria Partnership", available at: www.rollbackmalaria.org/files/files/partnership/wg/wg_monitoring/docs/merg_ConceptualFramework.pdf

Benson, C. (2016), "Promoting sustainable development through disaster risk management", ADB Sustainable Development Working Paper Series No 41, Asian Development Bank, available at: www.adb.org/sites/default/files/publication/182652/sdwp-041.pdf

Bethke, L. (2009), *Capacity Development in Education Planning and Management in Fragile States*, IIEP and UNESCO, availabe at: www.etf.europa.eu/pubmgmt.nsf/(getAttachment)/278378C19FEA93D6C1257611002F8192/$File/NOTE7UVHDR.pdf

Boyd, A., Brown, M. and Midgley, G. (2004), "Systemic intervention for community OR: developing services with young people (under 16) living on the streets", in Midgley, G. and Ochoa-Arias, A.E. (Eds), *Community Operational Research: OR and Systems Thinking for Community Development*, Kluwer, New York, NY.

Brown, J. and Isaacs, D. (1998), "Welcome to the World Café", available at: www.theworldcafe.com

Brown, L., LaFond, A. and Macintyre, K.E. (2001), *Measuring Capacity Building*, Carolina Population Center, University of North Carolina at Chapel Hill, Chapel Hill, NC.

Cambodia Disaster Loss and Damage Information Centre (2014), *Cambodia Disaster Loss and Damage Analysis Report 1996 – 2013*, UNDP, available at: www.kh.undp.org/content/cambodia/en/home/library/environment_energy/cambodia-disaster-loss-and-damage-analysis-report-1996—2013.html

Carter, E., Swedeen, B., Walter, M.C.M. and Moss, C.K. (2012), "I don't have to do this by myself? Parent-led community conversations to promote inclusion", *Research & Practice for Persons with Severe: Disabilities*, Vol. 37 No. 1, pp. 9-23.

Center for Excellence in Disaster Management & Humanitarian Assistance (2014), *Lao PDR Disaster Management Reference Handbook*, Hickman: Center for Excellence in Disaster Management & Humanitarian Assistance, available at: http://reliefweb.int/sites/reliefweb.int/files/resources/LaosHandbook_Final_Mar3_HiResSingle.pdf

Center for Hazards and Risk Research (2005), *Malaysia Natural Disaster Profile*, available at: www.ldeo.columbia.edu/chrr/research/profiles/malaysia.html

Chang, W.L. and Chen, S.T. (2015), "The impact of World Café on entrepreneurial strategic planning capability", *Journal of Business Research*, Vol. 68 No. 6, pp. 1283-1290.

Checkland, P. (1990), *Systems Thinking, Systems Practice*, John Wiley & Sons, Chichester.

Davies, M. (2010), "Concept mapping, mind mapping and argument mapping: what are the differences and do they matter?", *Higher Education*, doi: 10.1007/s10734-010-9387-6.

de Guzman, C., Deng, X. and Stevenson, L.A. (2011), *Linking Disaster Risk Reduction, Climate Change Adaptation and Loss and Damage: Activities under the APN Climate Adaptation Framework. Asia-Pacific Network*, Asia-Pacific Network, available at: www.apn-gcr.org/resources/files/original/53762ab3016149b55f6c9a8613e98869.pdf

Ear, J. and Campbell, J. (2012), *Regional Cooperation on Disaster Management and Health Security: APEC and Comprehensive Regional Strategy*, Cooperation on Disaster Management and Health Security, available at: http://apcss.org/wp-content/uploads/2012/09/Chapter5.pdf

Fouche, C. and Light, G. (2011), "An invitation to dialogue: 'the World Café' in social work research", *Qualitative Social Work*, Vol. 10 No. 1, pp. 28-48.

Gabrielle, S.I.M.M. (2016), "Disaster response in Southeast Asia: the ASEAN agreement on disaster response and emergency management", *Asian Journal of International Law*, pp. 1-27.

Global Facility for Disaster Reduction and Recovery (2009), *South-South Cooperation Program for Disaster Risk Reduction (Policy Brief)*, available at: http://siteresources.worldbank.org/CMUDLP/Resources/Policy_Note.pdf

Heazle, M., Tangney, P., Burton, P., Howes, M., Grant-Smith, D., Reis, K. and Bosomworth, K. (2013), "Mainstreaming climate change adaptation: an incremental approach to disaster risk management in Australia", *Environmental Science & Policy*, Vol. 33, pp. 162-170.

Hodgkinson, G., Whittington, R., Johnson, G. and Schwarz, M. (2006), "The role of strategy workshops in strategy development processes: formality, communication, coordination and inclusion", *Long Range Planning*, Vol. 39 No. 5, pp. 479-496.

Hogan, K. (2000), "Assessing students' system reasoning in ecology", *Journal of Biological Education*, Vol. 35 No. 1, pp. 22-28.

Holloway, A. (2015), "Strategic mobilisation of higher education institutions in disaster risk reduction capacity building: experience of Periperi U", *Global Assessment Report on Disaster Risk Reduction*, pp. 49-72.

Horch, K. (1997), *Indicators: Definition and Use in a Results-Based Accountability System*, Harvard Family Research Project, available at: www.hfrp.org/publications-resources/browse-our-publications/indicators-definition-and-use-in-a-results-based-accountability-system

Horng, C.Y., Fan, C., Chen, S.C., Tsai, Y.S., Lin, C.Y., Wu, C.C. and Yeh, J.H. (2017), "Enhancing river patrol team management through stakeholder discussion facilitated by World Café methodology: a case study in Taiwan", *Journal of Cleaner Production*, Vol. 140, pp. 1263-1271.

Ibrahim, K., Koshy, K. and Asrar, G. (2013), "Development with a difference: neo-disaster risk management for sustainable development", *Geomatics, Natural Hazards and Risk*, Vol. 4 No. 3, pp. 187-192.

Jackson, B. (1997), "Designing projects and project evaluations using the logical framework approach", *UCN Monitoring and Evaluation Initiative*.

Johnson, G., Prashantham, S., Floyd, S. and Bourque, N. (2010), "The ritualization of strategy workshops", *Organization Studies*, Vol. 31 No. 12, pp. 1589-1618.

Katagall, R., Dadde, R., Goudar, R.H. and Rao, S. (2015), "Concept mapping in education and semantic knowledge representation: an illustrative survey", *Procedia Computer Science*, Vol. 48, pp. 638-643.

Kawulich, B.B. (2005), "Participant observation as a data collection method [81 paragraphs", *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research*, Vol. 6 No. 2, available at: http://nbn-resolving.de/urn:nbn:de:0114-fqs0502430

Khan, M.A. (1998), "Evaluation capacity building: an overview of current status, issues and options", *Evaluation*, Vol. 4 No. 3, pp. 310-328.

Krogerus, M. and Tschäppeler, R. (2010), *The Decision Book: 50 Models for Strategic Thinking*, Profile Books, London.

LaFond, A. and Brown, L. (2003), "A guide to monitoring and evaluation of capacity-building interventions in the health sector in developing countries", *Measures Evaluation Manual Series (7)*, Carolina Population Center, University of North Carolina, Chapel Hill, available at: http://portals.wi.wur.nl/files/docs/ppme/PNADA065.pdf

Lassa, J.A. (2015), "Priorities for disaster risk reduction", *The Jakarta Post*, available at: www.thejakartapost.com/news/2015/08/18/priorities-disaster-risk-reduction.html

Lorenzetti, L.A., Azulai, A. and Walsh, C.A. (2016), "Addressing power in conversation enhancing the transformative learning capacities of the World Café", *Journal of Transformation Education*, Vol. 14, pp. 200-219.

Lucas, B. (2013), *Current Thinking on Capacity Development*, GSDRC, University of Birmingham (Helpdesk Research Report No 960), Birmingham, available at: www.gsdrc.org/docs/open/HDQ960.p

McElroy, A. (2016), *ASEAN Moves to Strengthen Disaster Cooperation*, UNISDR, available at: www.unisdr.org/archive/47609

Martin, J. (1991), *Working with Systems: Diagnosis*, Open University Press, Milton Keynes.

Martinez, C.L. (2005), *The Importance of Evaluation*, Guidestar, available at: www.guidestar.org/Articles.aspx?path=/rxa/news/articles/2005/importance-of-evaluation.aspx

Midgley, G. (2000), *Systemic Intervention: Philosophy, Methodology, and Practice*, Kluwer/Plenum, New York, NY.

Morariu, J. (2012), *Evaluation Capacity Building: Examples and Lessons from the Field*, Innovation Network, available at: www.pointk.org/client_docs/tear_sheet_ecb-innovation_network.pdf

Organisation for Economic Co-operation and Development (2006), *The Challenge of Capacity Development – Working Towards Good Practice*, OECD, Paris, available at: www.oecd.org/development/governance-development/36326495.pdf

Patton, M.Q. (1987), *Qualitative Research Evaluation Methods*, Sage Publishers, Thousand Oaks, CA.

Petz, D. (2014), *Strengthening Regional and National Capacity for Disaster Risk Management: The Case of ASEAN*, Brookings Institute, Washington, DC.

Phyo, P.T. (2016), "Myanmar most disaster-prone in Southeast Asia: official", *Myanmar Times*, available at: www.mmtimes.com/index.php/national-news/23166-myanmar-most-disaster-prone-in-southeast-asia-official.html

Rajib, S., Yukiko, T., Jonas, J., Glenn, F., Bernadia, T., Chosadillia, I., Eiko, W., Bob, M., Ryu, F., Anshu, S., Etsuko, T. and Yuki, M. (2010), "Climate and disaster resilience initiative capacity-building program", UNISDR, available at: www.unisdr.org/we/inform/publications/16723

Rosenbaum, A. (2003), "Chart the course of your negotiation", Harvard Management Communication Letter, Article Reprint C03088.

Schieffer, A., Isaacs, D. and Gyllenpalm, B. (2004), "The World Café: part two", *World Business Academy*, Vol. 19 No. 9, pp. 1-9.

Scott, Z., Few, R., Leavy, J., Tarazona, M. and Wooster, K. (2014), *Strategic Research into National and Local Capacity Building for Disaster Risk Management: Literature Review (Version 1)*, Oxford Policy Management, available at: www.preventionweb.net/files/39416_39416opmifrcliteraturereviewv11.pdf

Scott, Z., Few, R., Leavy, J., Tarazona, M., Wooster, K. and Avila, M.F. (2015), *Strategic Research into National and Local Capacity Building for Disaster Risk Management: Literature Review (Version 3)*, Oxford Policy Management, available at: www.ifrc.org/Global/Documents/Secretariat/Research/version-2/Literature_Review_v2_2015.pdf

Sharp, T. (2013), *Personal Communication; Strategic Policy Advisor*, Hawke's Bay Regional Council, Napier.

UNESCO Green Citizen (2016), *Disaster Risk Management for Sustainable Development*, available at: http://en.unesco.org/greencitizens/stories/disaster-risk-management-sustainable-development

United Nation (2015a), *Sendai Framework for Disaster Risk Reduction 2015–2030*, United Nations, New York, NY.

United Nation (2015b), *Transforming Our World: The 2030 Agenda for Sustainable Development*, United Nations, New York, NY.

United Nations Office for South-South Cooperation (2015), "What is South-South Cooperation?", available at: http://ssc.undp.org/content/ssc/about/what_is_ssc.html

Vallaeys, F. (2014), "University social responsibility: a rational and mature definition", Higher Education in the World 5, available at: www.guninetwork.org/files/ii.4_1.pdf

van der Werf, H. and Piñeiro, M. (2007), "Evaluating the impact of capacity building activities in the field of food quality and safety: design of an evaluation scorecard and indicators", Draft Paper, available at: www.fao.org/fileadmin/templates/agns/pdf/capacity_building_indicator_paper.pdf

Walker, P. (2013), "Annotated bibliography: local capacity building for disaster risk reduction", unpublished document, Feinstein International Center.

Wang, X.G. and Banihani, S. (2015), "Scaling-up South-South cooperation for sustainable development", Working Paper, Internal Document for Silk Road Forum 2015, available at: http://en.drc.gov.cn/GraceWang.pdf

Welsh, M. and Morariu, J. (2011), "Evaluation capacity building", available at: https://pdfs.semanticscholar.org/f8c3/8288d99887f36bd4b52695e8847b5e549618.pdf

White, D. (1995), "Application of systems thinking to risk management", *Management Decision*, Vol. 33 No. 10, pp. 35-45, available at: http://dx.doi.org/10.1108/EUM0000000003918

White, S. (2015), *A Critical Disconnect: The Role of SAARC in Building the DRM Capacities of South Asian Countries*, Brooking Institution, Washington, DC.

Woodland, J. and Hind, J. (2002), "Capacity building evaluation of capacity building programs", Australasian Evaluation Society International Conference, *Wollongong*.

Zipp, P.G., Maher, C. and D'Antoni, A.V. (2009), "Mind maps: useful schematic tool for organising and integrating concepts of complex patient care in the clinic and classroom", *Journal of College Teaching and Learning*, Vol. 6 No. 2, pp. 59-68.

Further reading

Assaraf, O. and Orion, N. (2005), "Development of system thinking skills in the context of earth science system education", *Journal of Research in Science Teaching*, Vol. 42 No. 5, pp. 518-560.

Habitat for humanity Cambodia (2015), *Building Holistic Disaster Risk Reduction Capacity in Cambodia*, available at: http://habitatcambodia.org/building-holistic-disaster-risk-reduction-capacity-in-cambodia/

Koshy, K., Abdul Rahim, A., Khelghat-Doost, G. and Jegatesen, G. (2013a), *Disaster Risk Management for Sustainable Development (DRM-SD): An Integrated Approach*, Centre for Global Sustainability Studies, Penang.

Koshy, K., Osman, O., Kamarulazizi, I. and Abustan, I. (2013b), "A use-inspired approach to sustainable water management", paper by invitation from UNESCO-Tudor Rose (UK) for the book: 'Free Flow – Reaching Water Security Through Cooperation', Published in 2013 by UNESCO/Tudor Rose, pp. 291-294.

Metz, B. (2001), *Climate Change 2001: Mitigation: Contribution of Working Group III to the Third Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, Cambridge, MA, Vol. 3.

Ogiogio, G.O. (2005), "Measuring performance of interventions in capacity building: some fundamentals", *ACBF Occasional Papers No 4*, ACBF, Harare.

Villasana, M., Cárdenas, B.E., Adriaenséns, M., Treviño, A.C. and Lozano, J. (2016), "Mainstreaming disaster risk management in higher education", *AD-minister*, Vol. 28, pp. 243-253.

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