

Disaster Risk Reduction in Myanmar: A Need for Focus on Community Preparedness and Improved Evaluation of Initiatives

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ABSTRACT

Myanmar is a country in political and economic transition. Facing a wide-variety of natural hazards and ongoing conflict, the country's under-developed infrastructure has resulted in high disaster risk. Following the devastation of Cyclone Nargis in 2008 and increased global focus on disaster management and risk reduction, Myanmar has begun development of national disaster policies. Myanmar's Action Plan for Disaster Risk Reduction addressed multiple stages of disaster development and has made progress towards national projects, however, has struggled to implement community-based preparedness and response initiatives. This article analyses Myanmar's disaster strategy, though the use of a disaster development framework and suggests areas for possible improvement. In particular, the article aims to generate discussion regarding methods of supporting objective evaluation of risk reduction initiatives in developing countries. (*Disaster Med Public Health Preparedness*. 2018;12:422-426)

Key Words: disaster risk reduction, DRR evaluation, disaster frameworks

Disaster medicine and policy has historically lacked a robust evidence base. The United Nations Office for Disaster Risk Reduction (UNISDR) Science and Technology Conference in January 2016¹ addressed the need for scientifically informed disaster risk reduction (DRR) strategies with a variety of stakeholders to improve practice. This article aims to summarize Myanmar's DRR policy, critique its design and implementation and generate discussion regarding the application of evaluation frameworks in disaster medicine.

BACKGROUND

Disaster Risk in Myanmar

Myanmar is a country emerging from international isolation. Under military rule since gaining independence in 1948, the government was widely criticized and faced international sanctions until 2012.² Subsequently, development was stunted and resulted in 1 in 4 of the country's citizens living in poverty,³ with the 2012 "Human Development Index" ranking Myanmar 150th out of 187 countries.⁴

The largest mainland country in South-East Asia, Myanmar has an estimated population of 53 million people, consisting of 135 recognized "ethnic groups." The country has one of the lowest population densities in the region, with 70% of its population living in rural areas including the large river deltas and coastal plains.

Myanmar's topography and climate expose its population to a spectrum of extreme natural events. The low-lying delta and coastal plains are at high risk of flooding and damage from tsunamis or cyclones, and 3 major fault lines running through the country present a constant threat of seismic events.² Combined with under-developed infrastructure and public services, disaster risk is substantial. Furthermore, this risk is increasing due to epidemiological and climatological trends observed in Myanmar and other developing countries, including population growth,⁵ urbanization,⁶ deforestation,⁷ and climate change.⁶

The increasing impact of natural events was demonstrated by "Cyclone Nargis" in 2008, which claimed 130,000 lives and severely affected 1.5 million people.⁸ The unprecedented damage prompted criticism of the government's preparedness initiatives and response capacity,⁸ as well as triggering a drive towards developing robust DRR policy.⁹

DRR in Myanmar

Following the Indian Ocean tsunami (2004), the "Hyogo Framework for Action" (HFA) was implemented across the world.¹⁰ Its successor, The "Sendai Framework,"¹¹ emphasized the need to prioritize risk reduction, health resilience, and robust evidence to inform policy.¹¹ Collaborative efforts through the Association for South-East Asian Nations (ASEAN) have supported the implementation of global DRR

recommendations in Myanmar and the region,^{12,13} including the ASEAN Agreement on Disaster Management and Emergency Response (AADMER).¹⁴

After the devastation of Cyclone Nargis, the United Nations, ASEAN and Myanmar's government formed the "Tri-partite Core Group" to conduct the "Post-Nargis Joint Needs Assessment"¹⁵ and the "Recovery and Preparedness Plan," a 3-year strategy for recovery.¹⁶ The strategy was aligned with global goals and proposed the need for "comprehensive" DRR policy, endorsing wide community involvement.¹⁶ The DRR Working Group was established 2008¹⁷ and "Myanmar's Action Plan on Disaster Risk Reduction" (MAPDRR) was published in 2012.¹³

Myanmar's "Triple Transition"

Myanmar is said to be going through a "Triple Transition."¹⁸ The general election in 2015 saw victory for the democratic opposition to the military government,¹⁹ economic reform towards a more market-based economy and a peace process aiming to end decades of conflict.¹⁸ While this presents challenges to DRR prioritization, great opportunities exist to engage with communities and build DRR into economic and development plans. In light of this; what factors contributing to disaster risk does MAPDRR prioritize? Are there areas that require further development? And how can the efficacy of initiatives be evaluated?

MAPDRR

MAPDRR reviewed existing DRR efforts, identified areas for improvement and made recommendations in accordance with HFA¹⁰ and AADMER¹⁴ commitments. Contribution from relevant stakeholders was encouraged, with input from United Nations Development Programme (UNDP), United Nations Office for the Co-ordination of Humanitarian Affairs, Myanmar Red Cross Society and ASEAN.¹³ 65 projects were proposed, designated "High" or "Medium" priority and organized under 7 key components:

- (i) Policy, Institutional Arrangements, and Development
- (ii) Hazard Vulnerability and Risk Assessments
- (iii) Multi-hazard Early Warning Systems
- (iv) Preparedness and Response Programmes at State, Regional, and Local levels
- (v) Mainstreaming of DRR into Development
- (vi) Community-based DRR and Preparedness
- (vii) Public Awareness, Education, and Training

Authors acknowledged the need for external collaboration to ensure projects were sufficiently implemented.¹³ DRR-WG secured substantial investment from UNDP²⁰ and collaborated with several INGOs.²¹ Furthermore, the relationship between DRR and attainment of other health goals was highlighted and recommendations made to work in partnership with national programmes focused on the attainment of the "National

Adaptation Plan of Action (NAPA) on climate change"²² and the "National Sustainable Development Strategy."¹³

DEVELOPING AND EVALUATING DRR POLICY Using Disaster Frameworks to Develop Policy

The drive to promote evidence-based DRR policy has seen a move away from the "Disaster Management Cycle,"²³ towards more detailed models. The World Association for Disaster and Emergency Medicine (WADEM) recently published a "Conceptual Framework," proposing several stages between the identification of a "hazard" and development of a "disaster."^{24,25} Clearly defined transition points between each stage of development help stakeholders isolate areas of risk, and as such, identify targets for DRR interventions.

By representing the initiatives proposed in MAPDRR through the "Conceptual Framework," the specific risks to be targeted can be identified (Figure 1).

The projects proposed in MAPDRR address all transition points in the "Conceptual Framework," from "hazard mitigation" to "state response capacity."²⁴ While ambitious and wide-ranging, in light of unmet rural health needs,² evidence of poor health education and promotion,² as well as significant disaster risk in rural communities,¹³ greater emphasis could have been placed on the need for community-based preparedness projects. Furthermore, desired outcomes were vague and there remained limited evidence to guide specific interventions.

Progress and Pitfalls in Implementing MAPDRR

The DRR-WG launched a "Situation Analysis,"²⁶ in 2013, in order to review progress towards MAPDRR. While achievements were made in national policy, with the development of the "Disaster Management Law,"²⁷ community-focused policies and local education strategy remained poorly developed and there continued to be no standardized method for mass communication. In addition, despite initial recommendations, the disconnect between DRR and wider national policy persisted. Myanmar's "Framework for Economic and Social Reforms" (FESR)²⁸ did not address the importance of urbanization and the role of DRR in development, nor Myanmar's NAPA for Climate Change²² specify DRR considerations.

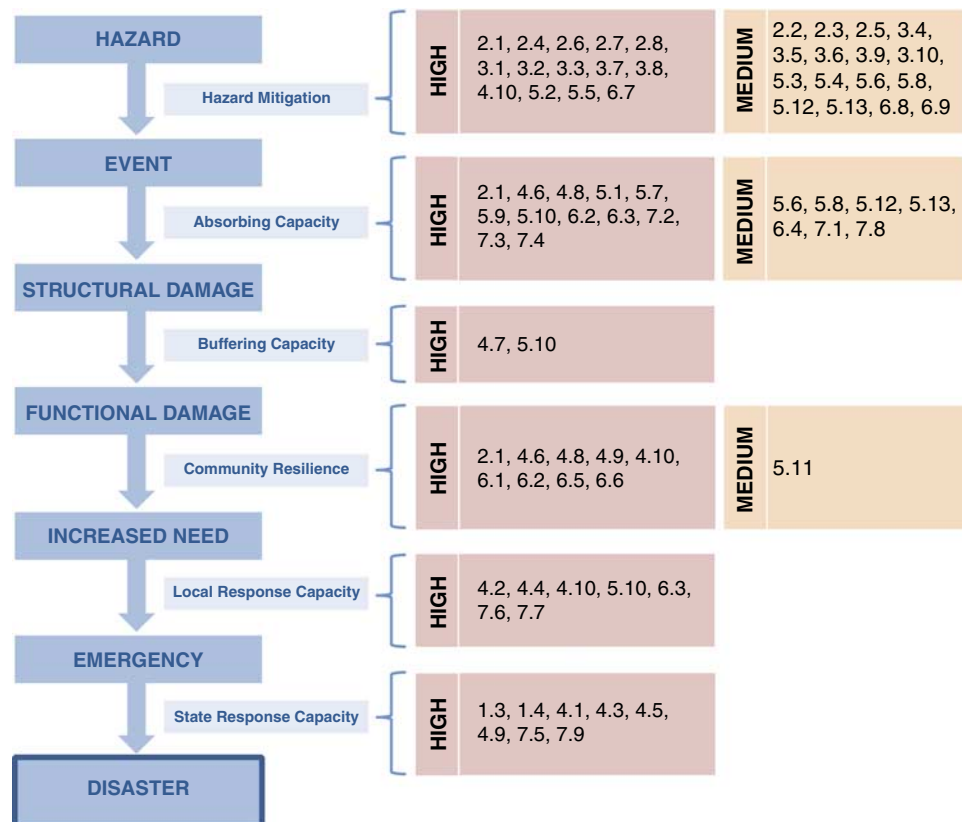
Weaknesses highlighted in the "Situation Analysis" prompted the DRR-WG to develop a "Strategic Framework and Plan (2014–18),"²⁹ with 6 clear objectives, including:

1. policy and legal DRR framework (including climate change adaptation);
2. increase capacity for local project implementation;
3. community access to DRR frameworks.

Estimated to require 2.8 million USD to deliver, the strategy also emphasized the need for improved evaluation of projects,

FIGURE 1

Myanmar’s Action Plan for Disaster Risk Reduction (MAPDRR) Proposed Projects Mapped to World Association for Disaster and Emergency Medicine (WADEM) “Conceptual Framework” for Disaster Development. Of the 65 projects proposed in MAPDRR, 41 were denoted as “High” priority and 24 as “Medium” priority. Combined, the projects address every transition point in the WADEM framework (some individual projects address multiple transition points and therefore have been represented in the figure multiple times). Most projects focus on “hazard mitigation” and “absorbing capacity”, including regional risk assessments for specific hazards. Adapted from Birnbaum et al.²⁴



with commitment to record all activities and strive towards a means of objective assessment.²⁹ Since then, Myanmar’s Information Management Unit has made key documents and meeting minutes publically available³⁰ and substantial investment from DRR-WG supported climate change adaptation and DRR projects in the country’s dry zone following the El Nino phenomenon in 2015.³¹ Projects engaged stakeholders at multiple-levels, including focus on local dissemination of climate hazard information.³¹

A formalized review of MAPDRR followed in April 2016,³² involving over 80 stakeholders, with UNDP conducting a quantitative assessment of MAPDRR projects. The review found 98 projects had been commissioned (51 completed projects and 47 projects ongoing), addressing all 7 specified components.

Despite the wide prevalence of projects and changes made following the “Situation Analysis” in 2013,²⁶ evidence from

large research surveys demonstrated gaps in community DRR awareness, local communication plans and DRR education throughout the country.³³⁻³⁵ In addition, previously identified weaknesses of MAPDRR persist, with repeated focus on the lack of evaluation and co-ordination between agencies (see Table 1).

Evaluating DRR Initiatives

With natural disasters generating record levels of economic damage,³⁶ it is critical that the most effective DRR initiatives are identified. The lack of robust evidence and evaluation makes this challenging. International efforts have been made to develop evaluation tools, such as “Catastrophe Risk Models,”³⁷ use of a “Risk Management Index”³⁸ and disseminated guidance on how developing organizations can best utilize available tools.³⁹ While local efforts have been made to appraise DRR projects in Myanmar, such as

TABLE 1

Summary of Successes and Challenges of Myanmar's Action Plan for Disaster Risk Reduction (MAPDRR) Implementation.**MAPDRR—Specific Successes**

Component 1: Policy, Institutional Arrangements, and Development	Disaster Management Law (2013) and Disaster Management Rule (2015) publication
Component 2: Hazard, Vulnerability, and Risk Assessments	Risk assessments completed in areas at high risk of natural hazard events (eg, delta and Rakhine state) Flood hazard maps developed for high-risk flooding areas (eg, Mandalay) National seismic zone mapping, with specific focus on major cities (eg, Yangon)
Component 3: Multi-hazard Early Warning Systems	Automatic Weather Observation System established for 30 townships (including weather radar capability) Seismic monitoring stations established across country (including Yangon, Mandalay and Tamu)
Component 4: Preparedness and Response Programmes	Emergency Operation Centre established in Nay Pyi Taw Significant development of "Safe Shelters" in Ayeyarwaddy delta and Rakhine region
Component 5: Mainstreaming of DRR into Development	National Building Code developed to mainstream DRR into construction industry (including Construction of storm resistant schools in areas at high risk of extreme weather events) National Housing Development Law and Policy drafted Safer construction training programme developed for those working in the industry
Component 6: Community-based DRR and Preparedness	Programmes developed to promote volunteer work amongst young adults Small grants program supporting local infrastructure development in partnership with multiple agencies Regeneration of mangrove forest growth in coastal areas
Component 7: Public Awareness, Education and Training	Celebration of "International Day for Disaster Risk Reduction" Inclusion of DRR at different stages of school curriculum Disaster Management courses expanded at all state and regional levels Public awareness programs expanded to discuss climate change and inclusive DRR

MAPDRR—General Challenges to Implementation

Lack of Regulatory Support	No directives or regulations that reinforced the central role of MAPDRR in projects
Short-term Interest in Projects	Multiple simultaneous aims of MAPDRR making sustaining projects difficult
Departmental Leadership	Appointment of lead departments/agencies made accountability for MAPDRR projects
Restrictive Aims of Activities	Proposed activities have been criticized as too specific in their aims, reducing the opportunities for collaborative work with agencies on preexisting projects
Absence of Clear Activity Costing	Some activities lacked costing, reportedly making it difficult for local departments to incorporate MAPDRR projects into their budgeting

Abbreviation: DRR, disaster risk reduction.

Adapted from Myanmar DRR Working Group.³²

the "Inclusive Toolkit"⁴⁰ for use by DRR workers in communities, an accepted system for standardized monitoring and evaluation remains in its infancy. Until these challenges are overcome, stakeholders will not be able to determine the efficacy of different projects and hence prioritize investment.

CONCLUSION

This article provides an example of how disaster frameworks can be used to guide DRR policy. With Myanmar at persisting risk from a wide-range of natural disasters, the ambitious initiatives proposed in MAPDRR were highly relevant and applicable. While the country has made significant progress since 2008, implementation of recommendations has proved inconsistent and questions remain regarding methods to evaluate projects.

Collaboration among multiple stakeholders will be key in the delivery of sustainable DRR projects, as will continued engagement of the Burmese people in national policy and development. Great opportunities exist to further DRR throughout the country; however, developing community resilience and preparedness will be paramount.

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REFERENCES

1. Aitsi-Selmi A, Murray V, Wannous C, et al. Reflections on a science and technology agenda for 21st century disaster risk reduction [published online March 24, 2016]. *Int J Disaster Risk Sci*. 2016;7:1-29. <https://doi.org/10.1007/s13753-016-0081-x>.
2. World Health Organization. The Republic of the Union of Myanmar Health System Review. *Health Syst Trans*. 2014;4(3):1-15.
3. United Nations Development Project. Integrated household living conditions survey in Myanmar (2009–2010). Yangon; 2011.
4. United Nations Development Programme 2015; Human Development Index. UNDP website. <http://hdr.undp.org/en/content/human-development-index-hdi-table>. Accessed November 1, 2016.

5. United Nations Department of Economic and Social Affairs, Population Division. World Population Prospects: The 2015 Revision, Key Findings and Advance Tables. New York: United Nations; 2015.
6. United Nations Habitat. Global report on human settlements. UN-Habitat website. http://unhabitat.org/wp-content/uploads/2008/07/5199_19769_dis-5.pdf. Accessed November 24, 2015.
7. Zhao S, Peng C, Jiang H, et al. Land use change in Asia and the ecological consequences [published online October 25, 2006]. *Ecol Res*. 2006;21:890-896. <https://doi.org/10.1007/s11284-006-0048-2>.
8. Webster PJ. Myanmar's deadly daffodil [published online July 20, 2008]. *Nat Geoscience*. 2008;1:488-490 <https://doi.org/10.1038/ngeo257>.
9. Perry P, Winkleman S. What does Cyclone Nargis tell us about Burma? *N Z Int Rev*. 2009;34(4):10.
10. United Nations Office for Disaster Risk Reduction (UNISDR). Hyogo Framework for Action. UNISDR website. <http://www.unisdr.org/we/coordinate/hfa>. Published 2005. Accessed November 24, 2015.
11. United Nations Office for Disaster Risk Reduction (UNISDR). Sendai Framework for Disaster Risk Reduction 2015–2030. <http://www.unisdr.org/we/inform/publications/43291>. Published 2015. Accessed November 24, 2015.
12. Association for South-East Asian Nations. ASEAN Committee for Disaster Management. <http://www.asean.org/communities/asean-socio-cultural-community/category/asean-ministerial-meeting-on-disaster-management-ammdm>. Published 2003. Accessed November 25, 2015.
13. Government of Myanmar. Myanmar Action Plan on Disaster Risk Reduction (MAPDRR). <http://reliefweb.int/report/myanmar/myanmar-action-plan-disaster-risk-reduction-mapdr>. Published June 30, 2012. Accessed November 26, 2016.
14. Association of South-East Asian Nations. ASEAN Agreement on Disaster Management and Emergency Response, work programme for 2010–2015. [http://www.asean.org/images/resources/ASEAN%20Publication/2013%20\(12.%20Dec\)%20-%20AADMER%20Work%20Programme%20\(4th%20Reprint\).pdf](http://www.asean.org/images/resources/ASEAN%20Publication/2013%20(12.%20Dec)%20-%20AADMER%20Work%20Programme%20(4th%20Reprint).pdf). Published 2013. Accessed November 24, 2015.
15. Association of South-East Asian Nations, United Nations, The Republic of the Union of Myanmar. Post-Nargis Joint Assessment. http://themimu.info/sites/themimu.info/files/documents/Ref_Doc_Post-Nargis_Joint_Assessment.pdf. Published 2008. Accessed November 24, 2015.
16. Association of South-East Asian Nations, United Nations, The Republic of the Union of Myanmar. Post-Nargis recovery and preparedness plan. http://themimu.info/sites/themimu.info/files/documents/Ref_Doc_Post-Nargis_Recovery_and_Preparedness_Plan.pdf. Published 2008. Accessed November 24, 2015.
17. Disaster Risk Reduction Sector. Myanmar Information Management Unit website. <http://www.themimu.info/sector/disaster-risk-reduction>. Published 2014. Accessed December 5, 2016.
18. United Nations Development Programme in Myanmar. United Nations Development Programme website. <http://www.mm.undp.org/content/myanmar/en/home/ourwork/overview.html>. Accessed December 5, 2016.
19. Singh UB. Significance of the November 2015 Myanmar elections. *Strategic Analysis*. 2016;40(2):88-91.
20. Myanmar Programme Framework. United Nations Development Programme website. http://www.mm.undp.org/content/dam/myanmar/docs/Documents/UNDP_MM_Pillar_2_Project_Document.pdf. Published 2012. Accessed November 24, 2015.
21. The Impact of Disaster Risk Reduction Field Sessions in Myanmar. International Federation of Red Cross & Red Crescent Societies website. http://www.ifrc.org/Global/Documents/Asia-pacific/201403/Myanmar_RiskReduction.pdf. Published 2014. Accessed November 15, 2015.
22. Myanmar's National Adaptation Programme of Action (NAPA) for Climate Change. United Nations Framework Convention on Climate Change website. <http://unfccc.int/resource/docs/napa/mmr01.pdf>. Published 2012. Accessed December 12, 2016.
23. Neal D. Reconsidering the phases of disaster. *Int J Mass Emerg Disasters*. 1997;15(2):238-264.
24. Birnbaum ML, Daily EK, O'Rourke AP, Loretta A. Research and evaluations of the health aspects of disasters, part II: the disaster health conceptual framework revisited. *Prehosp Disaster Med*. 2015;30(5):523-538.
25. The World Association for Disaster and Emergency Medicine, The Nordic Society for Disaster Medicine. Health disaster management: guidelines for evaluation and research in the Utstein Style. Volume I: conceptual framework of disasters. *Prehosp Disaster Med*. 2003;17(Suppl 3):1-177.
26. Myanmar DRR Working Group. A situation analysis of disaster risk reduction in Myanmar. http://www.themimu.info/sites/themimu.info/files/documents/Ref%20Doc_SituationAnalysis%20of%20DRR%20in%20Myanmar_DRRWG_Jun13.pdf. Published February 5, 2014. Accessed December 1, 2016.
27. Government of Myanmar. Natural Disaster Management Law. http://www.themimu.info/sites/themimu.info/files/documents/Ref_Doc_Natural_Disaster_Management_Law_31Jul2013.pdf. Published July 31, 2013. Accessed December 1, 2016.
28. Government of Myanmar. Framework for Economic and Social Reforms. <http://www.eaber.org/sites/default/files/FESR%20Official%20Version%20-%20Green%20Cover.pdf>. Published December 14, 2012. Accessed November 24, 2016.
29. Myanmar DRR Working Group. Strategic Framework 2013–2018. http://www.themimu.info/sites/themimu.info/files/documents/Core%20Doc_DRR_Strategic%20Framework%202013~18_DRRWG.pdf. Published February 5, 2014. Accessed November 24, 2016.
30. Disaster Risk Reduction Sector. Myanmar Information Management Unit (MIMU) website. <http://www.themimu.info/sector/disaster-risk-reduction>. Published 2014. Accessed December 1, 2016.
31. Myanmar DRR Working Group. Members Plans for 2014–15. http://www.themimu.info/sites/themimu.info/files/documents/Presentation_Members_plan_for_2014-15_DRRWG_31Jan2014.pdf. Published 2014. Accessed December 1, 2016.
32. Myanmar DRR Working Group. Lessons Learnt Workshop on MAPDRR Implementation. http://www.themimu.info/sites/themimu.info/files/documents/Report_MAPDRR_Lesson_Learn_Workshop_Apr_2016.pdf. Published April 8, 2016. Accessed December 1, 2016.
33. REACH. A study on knowledge, attitudes & practices for disaster risk reduction in Northern Rakhine State. http://www.themimu.info/sites/themimu.info/files/documents/Assessment_Report_KAP_for_DRR_in_Northern_Rakhine_REACH_Aug2015.pdf. Published August 2015. Accessed December 1, 2016.
34. Myanmar Consortium for Community Resilience. Baseline KAP Survey. http://www.themimu.info/sites/themimu.info/files/documents/Report_Baseline_KAP_Survey_Pyapon_Labutta_Pathein_Nga_Pu_Daw_Sittwe_Jan2015.pdf. Published January 8, 2015. Accessed December 1, 2016.
35. Myanmar DRR Working Group. Desk Review & Recommendations for the Improvement of Early Warning Formulation and Dissemination/Communication in Myanmar. http://www.themimu.info/sites/themimu.info/files/documents/Desk_Review_and_Recommendations_EWS_Formulation_Dissemination_Communication_DRRWG.pdf. Published 2016. Accessed December 1, 2016.
36. 2015 Disaster Trends Infographic. United Nations Office for Disaster Risk Reduction (UNISDR) website. http://www.unisdr.org/files/47804_2015disastertrendsinfographic.pdf. Published 2015. Accessed December 1, 2016.
37. Michel-Kerjan E, et al. Catastrophe risk models for evaluating disaster risk reduction investments in developing countries. [Published online December 12, 2012]. *Risk Anal*. 2012;33:984-999. <https://doi.org/10.1111/j.1539-6924.2012.01928.x>.
38. Carreno M, Cardona O, Barbat A, et al. A disaster risk management performance index [published online February 7, 2007]. *Nat Hazards*. <https://doi.org/10.1007/s11069-006-9008-y>.
39. Provention Consortium. Evaluating disaster risk reduction activities. http://www.proventionconsortium.net/themes/default/pdfs/tools_for_main_streaming_GN13.pdf. Published 2007. Accessed December 1, 2016.
40. Myanmar Consortium for Community Resilience. Inclusive framework and toolkit for community-based disaster risk reduction in Myanmar. http://www.proventionweb.net/files/48286_48286inclusiveframeworktoolkitforcb.pdf. Published 2015. Accessed December 1, 2016.