

2022 PARTICIPATORY DISASTER RISK MANAGEMENT (PDRM) PROGRAM: TOPIC 10 - DISASTER RISK MANAGEMENT (DRM) & CLIMATE CHANGE

Introductions

Welcome to Topic 10 of this online, accredited, Participatory Disaster Risk Management (PDRM) program¹. The eleven PDRM topics on offer are the following:

- TC01: Key Disaster Risk Management (DRM) Diagrams & Issues
- TC02: Global Natural Disaster Trends & SW Pacific hazards
- TC03: Humanitarian Attributes & Competencies
- TC04: Humanitarian Standards & Codes of Conduct
- TC05: Risk Management
- TC06: Community Based Disaster Risk Management (CBDRM) Initiatives
- TC00: Participatory Project Management (PPM)
- TC07: Complex Emergencies/Crises & Ukraine Case Study
- TC08: The Afghanistan & Rohingya Case Studies
- TC09: DRM & the Sustainable Development Goals (SDGs)
- TC10: DRM & Climate Change**

Topic 10 Overview

An overall video for the PDRM can be accessed at <https://vimeo.com/708045852>. After a short recall, Topic 10 consists of the following components:

- Re-visiting the Disaster Risk Reduction (DRR) diagram
- Climate Change Explained
- The Intergovernmental Panel on Climate Change (IPCC)
- Causes of Greenhouse Gases (GHG) Emissions
- Paris Agreement, COP 26 & COP 27
- Effects of Climate Change
- The move towards Net Zero CO₂

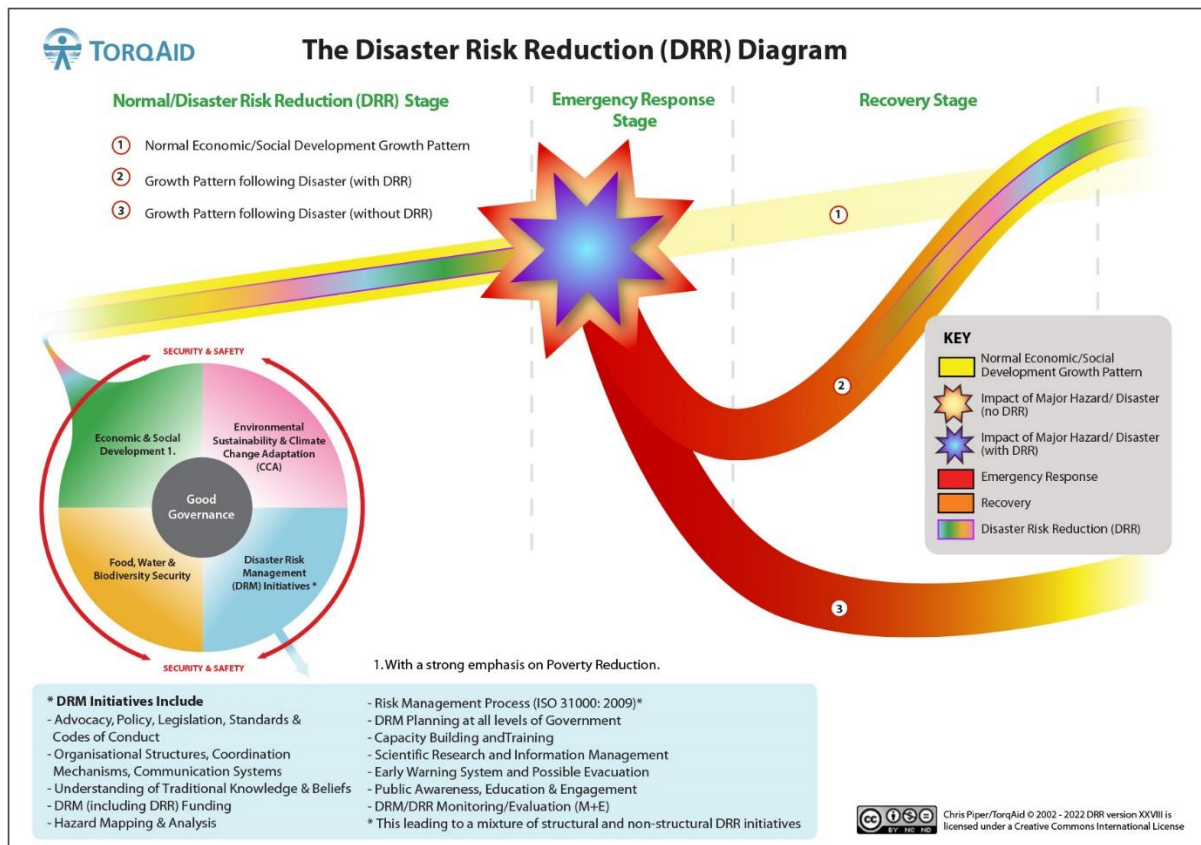
The Disaster Risk Reduction (DRR) diagram is first re-introduced, together with the links between Environmental Sustainability and Climate Change Adaptation (CCA) and other five main components comprising Disaster Risk reduction (DRR). An explanatory overview of Climate Change is then introduced, together with the role played by the Intergovernmental Panel on Climate Change (IPCC), and particularly its latest Assessment Report (AR) 6 component. Causes of Greenhouse Gas (GHG) emissions are touched upon, as well as a brief overview of both the UN Paris Climate 2015 Agreement, the UN Climate Change Conference (COP 26) objectives, and the forthcoming COP 27. A summary of some key effects of Climate Change are drawn from the 2021 Alliance of World Scientists Report, and the challenges facing stakeholders attending COP 26/27 and beyond, are drawn from the Climate Action Tracker (CAT) and some 2022 BBC reports.

¹ www.torgaid.com/online-pdrm-program

Revisiting the Disaster Risk Reduction (DRR) Diagram

References & Agencies:

Piper, C.A.H. (2002-2022). *TorqAid Disaster Risk Management (DRM) Diagrammatic Framework*. Retrieved from <http://www.torqaid.com/drm-framework/>



- Throughout the PDRM, it has been argued that effective DRR is a combination of six complementary components². When all these work well and together, then the impact from, and likelihood of, natural and man-made hazards, is likely to diminish.
- Climate Change comprises one of these components. When insufficient human resources and advocacy are focussed on combatting the rise of surface and ocean temperatures, due largely to increased greenhouse gas emissions, then the following occurs:
 - ✓ There is more likelihood that there will be more extreme weather events such as droughts bushfires and flooding
 - ✓ These events in turn will work against components such as the move towards improved Food, Water and Biodiversity Security
 - ✓ These events in turn will lead to increased pressure on other social and economic components such as Security & Safety, Economic & Social Development, and Good Governance.

² Namely Security & Safety; Economic & social Development; Environmental Sustainability & Climate Change Adaptation (CCA); Food, Water & Biodiversity; 12 DRM Initiatives; and Good Governance

Key Agencies & References

Key Agencies & References

Intergovernmental Panel on Climate Change (IPCC). *Sixth Assessment Report (AR6)*. Retrieved from <https://www.ipcc.ch/assessment-report/ar6/>. This consists of 8 reports³, including:

- ✓ *Working Group Report 3: Climate Change 2022. Mitigation of Climate Change*. Retrieved from https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_SPM.pdf
- ✓ *Working Group Report 2: Climate Change 2022. Impacts, Adaptation & Vulnerability (Summary for Policy Makers)*. Retrieved from https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_SummaryForPolicymakers.pdf
- ✓ *Working Group Report 1: Climate Change 2021. The Physical Science Basis – Summary for Policy Makers (SPM)*. Retrieved from https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM.pdf

United Nations Climate Change Conference UK 2021 (COP 26) Glasgow Climate Pact – <https://ukcop26.org/wp-content/uploads/2021/11/COP26-Presidency-Outcomes-The-Climate-Pact.pdf>

United Nations Climate Change Conference, Egypt 2022 (COP 27) – <https://cop27.eg>

United Nations Framework Convention on Climate Change (UNFCCC)- <https://unfccc.int/>

Climate Action Tracker (CAT) - www.climateactiontracker.org

Climate Council of Australia - www.climatecouncil.org.au

Alliance of World Scientists. (2021). *World Scientists Warning of a Climate Emergency 2021*. *Bioscience Journal*, Vol 71, Issue 9. Retrieved from <https://academic.oup.com/bioscience/article/71/9/894/6325731>

Climate Action Tracker (CAT) & others. (2022). *State of Climate Action 2022*. Retrieved from <https://climateactiontracker.org/publications/state-of-climate-action-2022/>

United Nations Environment Program (UNEP). (2022). *Emissions Gap Report 2022*. The Closing window – Climate crisis calls for rapid transformation of societies. Retrieved from <https://www.unep.org/resources/emissions-gap-report-2022>

Key BBC 'Our Planet Now' articles - <https://www.bbc.com/news/topics/c4y3wxdx24nt/our-planet-now>

BBC. (2022). *Is the 1.5°C climate change target still possible?* Retrieved from <https://www.bbc.co.uk/news/science-environment-63607627>

BBC. (2022). *COP 27: Are nations on track to meet their climate goals?* Retrieved from <https://www.bbc.com/news/science-environment-61494531>

BBC. (2022). *COP27: Why the latest UN climate conference matters* <https://www.bbc.co.uk/news/science-environment-63502762>

BBC. (2022). *Climate change: UN warns key warming threshold slipping from sight* <https://www.bbc.co.uk/news/science-environment-63407459>

BBC. (2022). *COP27: What have global leaders done on climate change in 2022?* <https://www.bbc.co.uk/news/science-environment-63458945>

BBC. (2022). *COP27: Climate change threatening global health - report* <https://www.bbc.co.uk/news/science-environment-63386814>

BBC. McGrath, M. (2022). *What is Climate Change? A really simple guide*. Retrieved from <https://www.bbc.com/news/science-environment-24021772>

BBC. Stylianou, N. & others. (2020). *Climate Change: Where we are in seven charts, and what you can do to help*. Retrieved from <https://www.bbc.com/news/science-environment-46384067>

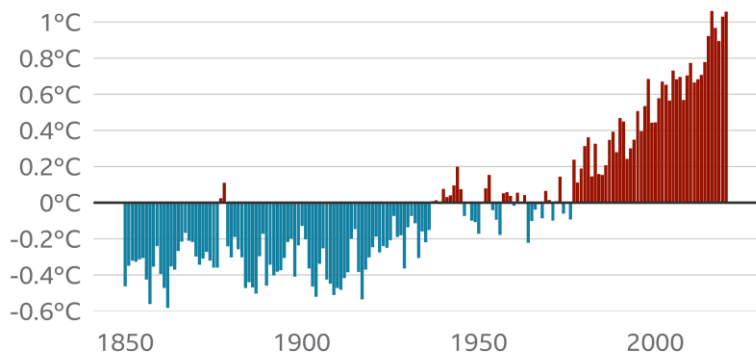
³ Namely three Working Group Reports; three Special Reports; a Methodological Report; and a final Synthesis Report. By October 2022, the three Working Group Reports (all cited here); Methodological and three Special Reports had all been completed.

Climate Change Explained⁴

Climate Change is a shift in the average weather patterns over a number of years. World temperatures have risen approximately 1.1°C since pre-industrial (1850-1900) times. The key determinant of this is warming through largely man-made⁵ greenhouse gas (GHG) emissions. The main culprit is Carbon Dioxide (CO₂), but also there are also five other families of pollutants⁶. Rising temperatures cause extreme weather conditions, events such as more severe incidents of drought, bushfires, flooding. They also contribute to sea-level rises; alter farming patterns; and adversely impact on biodiversity, the complex and interlinked variety of plant and animal life in the world.

The world is getting warmer

Annual mean land and ocean temperature above or below average, 1850 to 2020



BBC

The Intergovernmental Panel on Climate Change (IPCC)

The Intergovernmental Panel on Climate Change (IPCC) is the key body for assessing the science related to climate change. It is currently finalising its Sixth Assessment Report (AR6)⁷. This composes eight separate but complementary reports⁸, with the findings of its First Working Group Report (The Physical Science Basis) concluding:

- Greenhouse Gas (GHG) concentrations for CO₂ reached 410 ppm⁹ in 2019, with concentrations in other pollutants also rising¹⁰
- Each of the past four decades had been hotter than the decade which preceded it
- The rise in human-induced global surface temperature was 1.07°C
- Human influence was very likely the main cause in glacial retreat since the 1900s, as well as decrease in Arctic ice over the past 40 years
- The global mean sea-level rise was 0.2 metres over the period 1901-2018, although this has been increasing to 3.7mm per year from 2006-2018

⁴ The key evidence based resources for this are the various reports produced by the IPCC's Sixth Assessment Report (AR6) – see References on page 3 for details

⁵ Sometimes called anthropogenic

⁶ Carbon Dioxide causes 43.1% of global warming; methane - Methane (MtCH₄) - 26.7%; black carbon (11.9%); industrial chemical (halocarbons), 7.8%; industrial chemicals and Volatile Organic Compounds (VOCs), 6.7%; and nitrous oxide (MtN₂O) - 3.8%. These figures taken from Al Gore's 2009 'Our Choice: A Plan to Solve the Climate Crisis', page 47

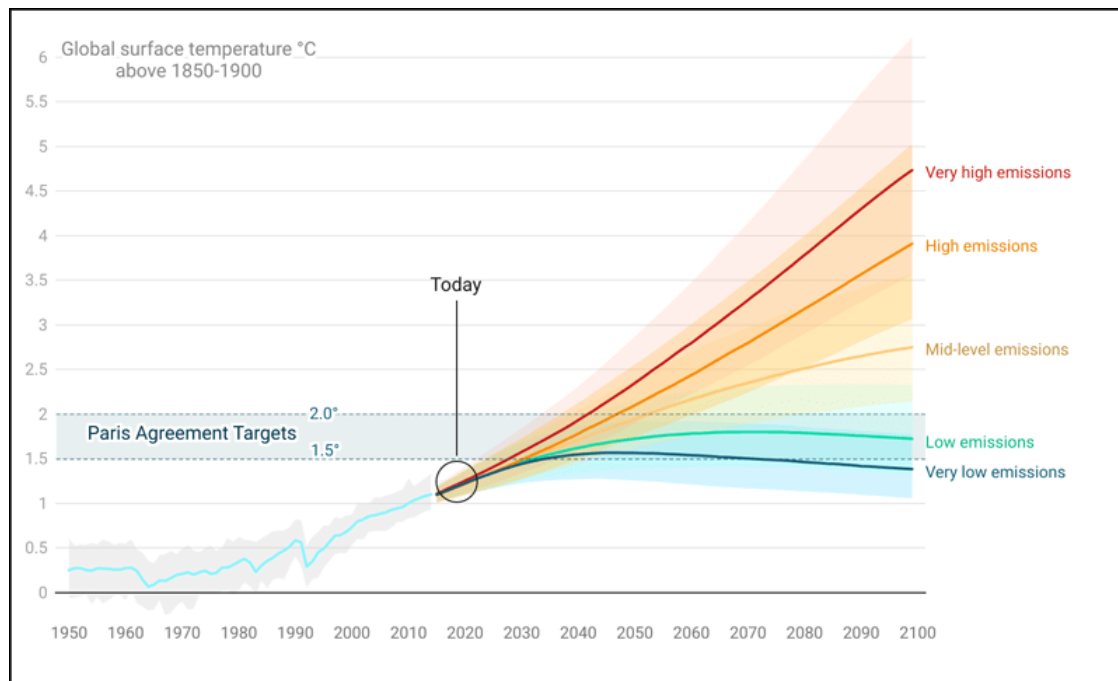
⁷ See References on page 3

⁸ Three Working Group Reports; three Special Reports; a Methodological Report; and a Final Synthesis Report. All of these have been completed other than the Final Synthesis Report.

⁹ Parts Per Million

¹⁰ For example, Methane reaching 1866 parts per billion (ppb), and nitrous oxide 332 ppb

In order to combat anthropogenic climate change rises, this first IPCC AR6 Working Group Report proposed five scenarios to reduce GHG emissions from CO₂ and other pollutants, primarily methane and nitrous oxide. In order to keep global surface temperatures rising by less than 1.5°, the very low emissions option (see diagram above) would need to be adopted¹¹. This would aim to reach a position of carbon neutrality, or net zero CO₂ emissions, by 2050.



The AR6 Final Synthesis Report is due to be released in late 2022 or early 2023. It will have a Summary for Policy Makers (SPM) of 5-10 pages, and a Longer Report (30-50 pages). It will include an Introduction, together with three sections:

- Section 1: Current Status and Trends
- Section 2: Long -term Climate and Development Futures
- Section 3: Near-term¹² Responses in a Changing Climate

¹¹ The credit for this diagram is Jennessa Duncombe, Source IPCC (2021)

¹² From now until 2030-2040

Causes of Greenhouse Gas (GHG) Emissions

Climate Action Tracker (CAT)¹³, together with other agencies, has produced the State of Climate Action 2022¹⁴. On page 4 of this document is a chart giving the breakdown of Global Greenhouse Gas (GHG) emissions for 2019. The key details of this are summarised below. The Climate Council of Australia¹⁵ provides complementary information on the situation appertaining to Australia.

Global GHG emissions 2019 = 58.8 GtCO₂e¹⁶

Sector	GtCO ₂ e	Percentage (%) of GtCO ₂ e
Energy	19.45	33.16
Agriculture, forestry & other land uses	13.1	22.40
Industry	11.6	19.83
Transport	8.7	14.88
Buildings	3.3	5.64
Waste	2.4	4.10
Totals	58.80	100.00

Paris Agreement, COP 26 & COP 27

The United Nations Framework Convention on Climate Change (UNFCCC) came into being in 1994, and there are 194 countries as signatories¹⁷ to this. UNFCCC secretariat is the UN Climate Change, and this UN entity is responsible for supporting global responses to climate change. Prior to the Paris Agreement, the 1997 Kyoto Protocol was the key international agreement aimed at managing and reducing carbon dioxide emissions and greenhouse gases. This became international law in 2005, but was limited in its scope, as not all countries were signatory to this. The Paris Climate 2015 Agreement was the first time when all global nations came together to jointly tackle climate change. This had four key elements:

- To keep global temperatures ‘well below’ 2.0°C, above pre-industrial times, and ‘endeavour to limit’ them even more, to 1.5°C
- To limit the amount of GHGs emitted by human activity to the same levels that trees, soil and oceans can absorb naturally¹⁸, beginning at some point between 2050 and 2100
- To have each country reduce their GHGs emissions by set targets¹⁹, and review progress on this after every five years.
- For advanced economies to assist developing economies by providing ‘climate finance’²⁰ to adapt to Climate Change, and explore renewable energy options.

¹³ See Key Agencies & References on page 3

¹⁴ See Key agencies & References on page 3

¹⁵ See also reference on page 3

¹⁶ Gigatonnes of Carbon Dioxide emissions equivalent

¹⁷ Called Parties to the Convention

¹⁸ ie to be emissions neutral

¹⁹ Called Nationally Determined Contributions (NDCs)

²⁰ With targets set at USD 100 billion per year.

The last United Nations Climate Change Conference (COP 26) was held in Glasgow in November 2021. There were four main stated objectives:

- To secure global net zero by mid-century, and to keep 1.5° within reach
- To adapt to protect communities and natural habitats
- To mobilise finance for developing nations (at least USD 100 billion annually)
- To work together to deliver the Paris Rule book, through collaboration between governments, businesses and civil societies

The achievements of COP 26 are incorporated into the ***Glasgow Climate Pact***²¹ which covers four main areas:

- Mitigation
- Adaptation
- Finance
- Collaboration

The next United Nations Climate Change Conference (COP 27)²² is being held in in Sharm El-Sheikh, between the 6-18th November 2022, and will continue discussions around these four key areas of Mitigation, Adaptation, Finance and Collaboration. The five 2022 BBC references on page 3²³ highlight the challenges facing stakeholders at COP 27.

Effects of Climate Change

The Alliance of World Scientists²⁴ has, over the past few years, researched into 31 key variables relating to Climate Change. These are illustrated graphically over the 40 year period from 1980-2020. Of these variables, 28 of these are mentioned below. They cover two key areas.

Climate Related Global Human Activities

Human population	Total fertility rate	Ruminant livestock	Per capital meat production
World GDP	Global tree cover loss	Brazilian Amazon forest loss	Energy consumption
Air transport	Total institutional assets divested	CO ₂ emissions	Per capita CO ₂ emissions
GHG emissions covered by carbon pricing	Carbon price	Fossil fuels subsidies	Government declaration of climate emergency

Time series of Climate Related Responses

Carbon Dioxide (CO ₂)	Methane (MtCH ₄)	Nitrous Oxide (MtN ₂ O)	Surface temperature anomaly
Minimum arctic sea ice	Greenland ice mass	Antarctica ice mass	Glacier thickness change

²¹ See Key Agencies & Reference at page 3

²² See also Key Agencies & References at page 3

²³ See Key Agencies & References at page 3

²⁴ See Key Agencies & References on page 3. The Alliance consists of nearly 14,000 scientists, who, together, have analysed 31 variables relating to Climate Change

Ocean heat content change	Ocean acidity	Sea level change	Area burned in Us
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The Alliance of Scientists makes six recommendations to address the overall exploitation of the earth's resources:

- Energy: Eliminate fossil fuels and, concurrently, shift to renewables
- Short-lived air pollution: Slash black carbon, methane & hydrofluorocarbons
- Nature: Restoring & permanently protecting the earth's ecosystems, to store and accumulate carbon, and restore biodiversity
- Food; Switch to mostly plant-based diets; reduce food waste; and improve cropping practices
- Economy; Moving from indefinite GDP growth and overconsumption by the wealthy, to ecological economics and a circular economy, where prices reflect full environmental costs of goods and services
- Human population: Stabilising, and gradually reducing the human population, by providing voluntary family planning, and supporting education and rights for all girls and young women

The move towards Net Zero CO₂

The UNEPS Emission Gaps Report 2022 focuses on the pledges made at the COP 26 meeting in Glasgow, and analyses progress on achieving these objectives. COP 26 set targets of limiting Greenhouse Gas (GHG) emissions by 45% by 2030 in order to reach the carbon-neutral position of 2050, which would limit global warming to 1.5°C. The key to success or not will be the setting and adherence to robust Nationally Determined Contributions (NDCs) by all the major GHG emitters.

The Climate Action Tracker (CAT)²⁵ complements the UNEP report, and is an independent scientific analysis produced by two research organisations tracking climate action since 2009. It tracks progress towards the globally agreed²⁶ aim of holding warming well below 2°C, and pursuing efforts to limit warming to 1.5°C. CAT covers all the biggest emitters and a representative sample of smaller emitters covering about 85% of global emissions and approximately 70% of global population. The national actions it tracks are:

- **Effect of climate policies and action on emissions:** The policies a government has implemented or enacted and how these are likely to affect national emission over the time period to 2030, and where possible beyond.
- **Impact of pledges, targets and NDCs²⁷** on national emissions over the time period to 2030, and where possible beyond.
- **Comparability of effort against countries' fair share and modelled domestic pathways:** Whether a government is doing its "fair share" compared with others towards the global effort to limit warming consistent with the Paris Agreement, and whether its mitigation efforts on its own territory are in line with global least cost pathways.

²⁵ See details at Key Agencies and References on page 3

²⁶ At Paris Agreement 2015

²⁷ Nationally Determined Contributions

The CAT analyses its targeted countries' progress under four categories namely Policies and Action; Domestic Target; Fair Share Target; and Climate Finance. It then scores each of these four again five criteria, namely 1.5°C Compatible; Almost Sufficient; Insufficient; Highly Insufficient; and Critically Insufficient.

Tasks.

- Climate Change Explained: The key articles to read are the IPPC AR6 three Working Group Reports. These can be complemented by 2020 and 2021 BBC articles cited in the Key Agencies and References section on page 3.
- Causes of Greenhouse Gases: Read through the State of Climate Action 2022 Forward and Executive Summary (p.1-20), as well as the Climate Council of Australia website.
- Paris Agreement & COP26: Read through the UNFCCC website and the COP26 Glasgow Climate Pact.
- Effects of Climate Change: Read through the Alliance of World Science article.
- Net Zero CO₂: Read the UNEP Emissions Gap report 2022 Forward & Summary. Check the Climate Action Tracker (CAT) review of progress towards climate change objectives of a number of countries you are most interested in.

Chris Piper
TorqAid Director
www.torqaid.com
pipercm@iprimus.com.au
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These Teaching Notes (Disaster Risk Management {DRM} & Climate Change) are from Topic 10 of the TorqAid accredited, Participatory Disaster Risk Management (PDRM) program – see www.torqaid.com/2023-pdrm-training. The PDRM is taught both as a workshop and online program. Individual PDRM topics can also be offered to tertiary or secondary students, as well as to agency or government practitioners or employees.