

Challenges for Climate Change Resilience and Adaptation in EIA of Myanmar



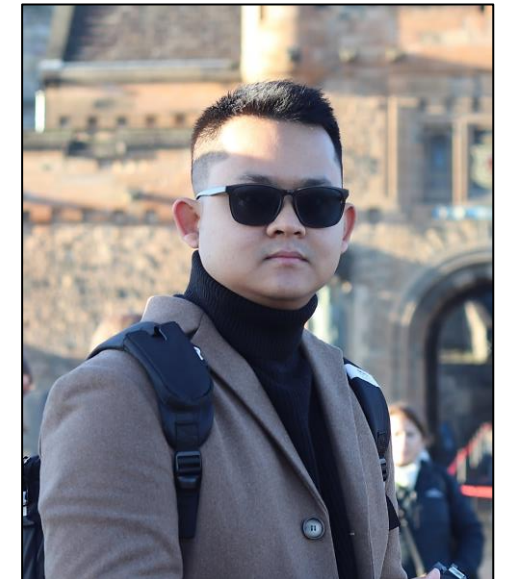
Htet Wai Yan Aung (Wai Yan)

Environmental and Energy Coordinator / Marshall Motor Group

UK

lewiswaiyan@gmail.com

<https://www.marshall.co.uk/>



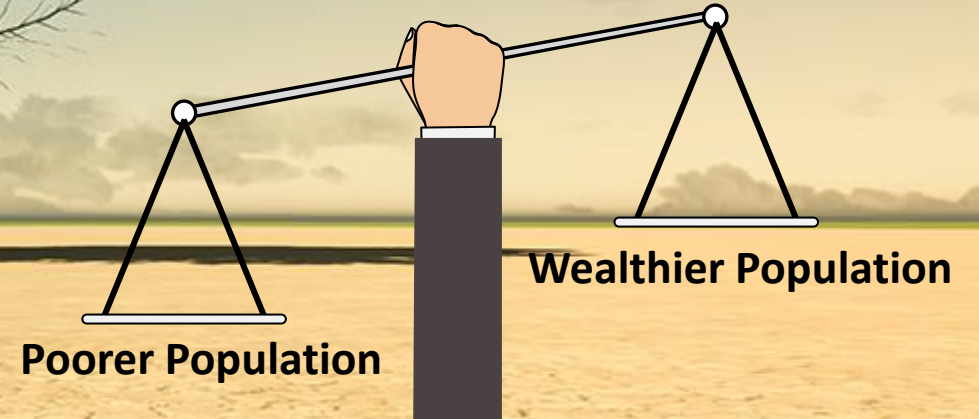
Introduction



Climate Change

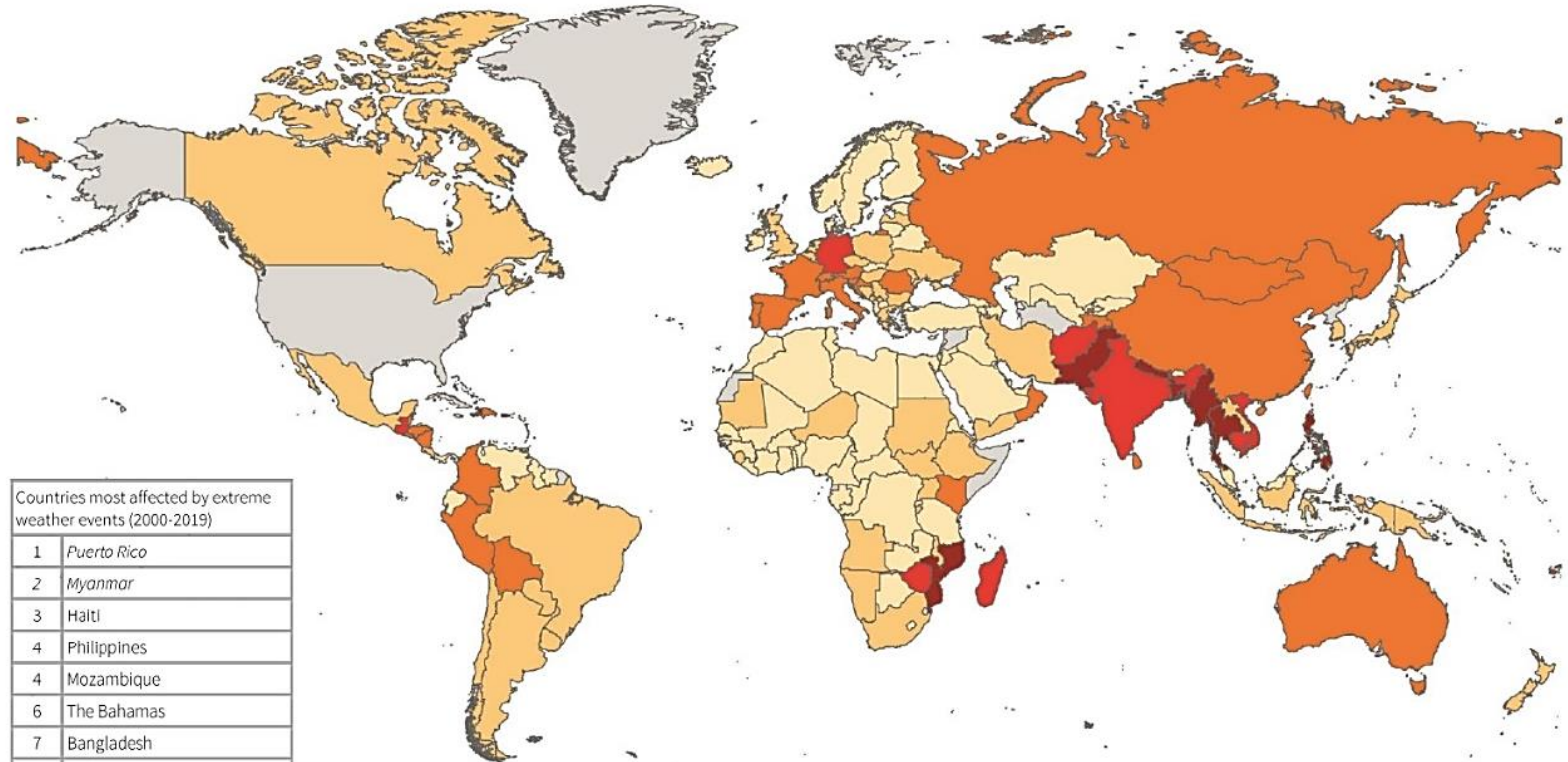


Consequences



Countries Most Affected between 2000 - 2019

- ∅ Climate change is an existential threat to the ASEAN countries
- ∅ In terms of Climate Risk Index, Myanmar Ranked 2nd
- ∅ Followed by the Philippines (4th), and Thailand (9th) in the last two decades



Countries most affected by extreme weather events (2000-2019)	
1	<i>Puerto Rico</i>
2	<i>Myanmar</i>
3	Haiti
4	Philippines
4	Mozambique
6	The Bahamas
7	Bangladesh
8	Pakistan
9	Thailand
10	Nepal

Italics: Countries where more than 90% of the losses or deaths occurred in one year or event

Climate Risk Index: Ranking 2000 - 2019



Myanmar's Approach for Addressing Climate Change Issues

Plans and Policies

National Sustainable Development Strategy (2009)

Myanmar's National Adaptation Programme of Action (2012)

Myanmar Climate Change Strategy (2018 – 2030)

Myanmar Sustainable Development Plan (2018 – 2030)

Myanmar Climate Change Master Plan (2018 – 2030)

Myanmar Climate Change Policy (2019)

National Environmental Policy (2019)

Paris Agreement (2016)
Intended Nationally Determined Contributions (INDC) (2017)
Nationally Determined Contributions (NDC) (2021)

Ministry of Natural Resource and Environmental Conservation (MONREC)

Environmental Conservation Law (2012)

Environmental Conservation Rules (2014)

Environmental Impact Assessment Procedures (2015)

Specific Sector EIA guidelines (drafted)

Hydropower

Oil and gas

Mining

Incorporation of Climate Change into the EIA System?

Legislative and Policy Setting

UK



EU Directive 2014/52/EU

**IEMA EIA GUIDE TO
CLIMATE CHANGE RESILIENCE
AND ADAPTATION (2015)**

**Town and Country Planning (EIA) Regulations 2017
(UK Law)**

- Assessing the impact of the project on climate
- Vulnerability of the project to climate change

**IEMA EIA GUIDE TO
CLIMATE CHANGE RESILIENCE
AND ADAPTATION
(Revision - 2020)**

Myanmar



**Environmental Conservation Law/Rules
(ECL/ECR) (2012/2014)**

EIA Procedures (2015)

- Description of the surrounding climate
- Identification and assessment of the project's potential impacts on climate change
- Impacts of climate change on the project

**Specific Sector EIA Guidelines for Oil and Gas,
Mining and Hydropower (Draft)**



IEMA

Gaps and Challenges for Integrating Climate Change Resilience and Adaptation in EIA of Myanmar

IEMA's EIA Guide
to: Climate
Change
Resilience &
Adaptation

Key Principles (4 out of 8)



Climate change integration into the design process

Inclusion of a clear characterisation of the future climate

Inclusion of Climate Change Adaptation and Resilience Coordinator (CCAR)

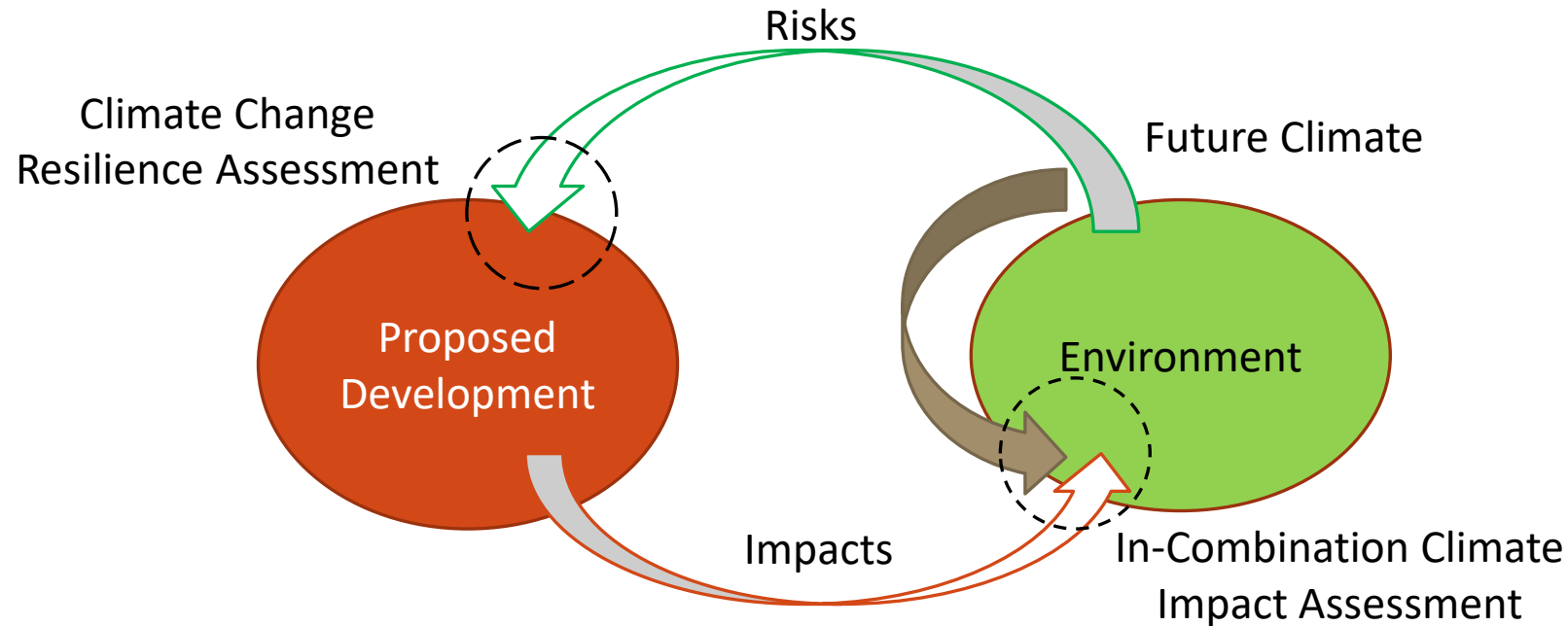
Two Key Strands of IA:

1: Project Resilience to Climate Change Impacts

2: In-Combination Assessment

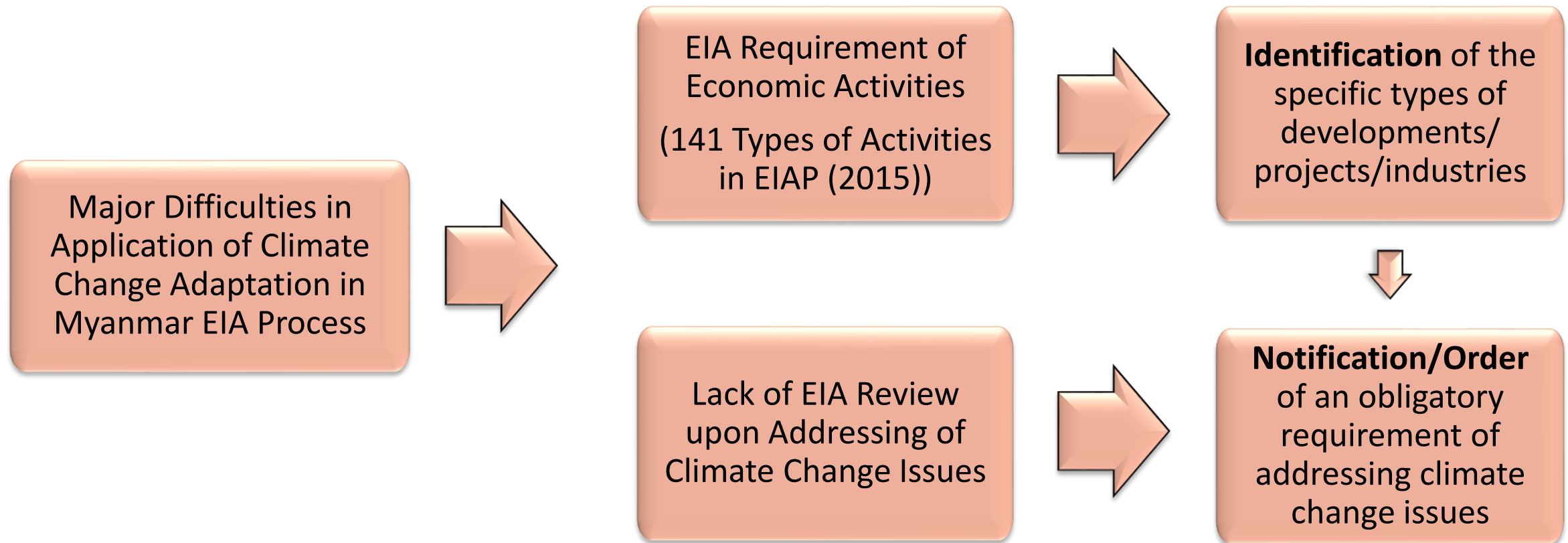
Climate Change Resilience Assessment & In-Combination Climate Impact Assessment

- An assessment of the resilience of the design, construction and operation of the proposed development to potential climate change impacts.



- An assessment of the combined effects of the proposed development and potential climate change impacts on the receiving environment and community.

Challenges & Recommendations



IEMA's EIA Guide to: Climate Change Resilience & Adaptation

Pre-EIA

- Step 0 – Building climate resilience into the project.

Scoping

- Step 1 – Scoping CC Requirements for the EIA.

EIA Stage

- Step 2 – Defining the future (climate) baseline.
- Step 3 – Identifying and determining sensitivity of receptors.
- Step 4 – Reviewing and determining magnitude of the effect.
- Step 5 – Determination of significance.
- Step 6 – Developing additional adaptation/EIA mitigation measures.

Post-EIA Stage

- Step 7 – Monitoring and Adaptive Management.

Pre – EIA
Stage

Step 0 – Building climate
resilience into the
project

Step 0 – Building climate resilience into the project (Design Stage)

IEMA's EIA Guide

- Delivery of a **Climate Change Risk Assessment**
- **Changing the design or terminate** if no longer viable to extreme weather events
- Consider as **alternatives, or in a separate climate chapter**

Myanmar EIAP

- Not particularly addressed

EIA Guidelines for Hydropower

- Recognize climate change as design factor, but climate change risk assessment is not addressed specifically
- Change project design if there is a resettlement issue
- Consideration for selecting climate change alternatives is not clearly defined

Table 4 – Likelihood and consequence criteria used in Highways England EIA projects

Likelihood categories

Likelihood Category	Description (probability and frequency of occurrence)
Very high	The event occurs multiple times during the lifetime of the project (60 years), e.g. approximately annually, typically 60 events.
High	The event occurs several times during the lifetime of the project (60 years), e.g. approximately once every five years, typically 12 events.
Medium	The event occurs limited times during the lifetime of the project (60 years), e.g. approximately once every 15 years, typically 4 events.
Low	The event occurs during the lifetime of the project (60 years), e.g. once in 60 years.
Very low	The event may occur once during the lifetime of the project (60 years).

Measure of consequence.

Consequence of Impact	Description
Very large adverse	National-level (or greater) disruption to strategic route(s) lasting more than 1 week.
Large adverse	National-level disruption ¹ to strategic route(s) lasting more than 1 day but less than 1 week OR Regional level disruption to strategic route(s) lasting more than 1 week.
Moderate adverse	Regional level disruption to strategic route(s) lasting more than 1 day but less than 1 week.
Minor adverse	Regional level disruption to strategic route(s) lasting less than 1 day.
Negligible	Disruption to an isolated section of a strategic route lasting less than 1 day.

Significance matrix

		Measure of Likelihood				
		Very low	Low	Medium	High	Very High
Measure of Consequence	Negligible	NS	NS	NS	NS	NS
	Minor	NS	NS	NS	S	S
	Moderate	NS	NS	S	S	S
	Large	NS	S	S	S	S
	Very large	NS	S	S	S	S

Table notes:

- NS = Not significant
- S = Significant

Examples of Climate Change Risk Assessment (IEMA's Guide)

Table 5 – PIEVC Methodology: Probability scores, Severity scores and risk matrix

PIEVC (Version 10) Probability Scores – Method B

Score	Probability	
0	<0.1%	< 1 in 1,000
1	1%	1 in 100
2	5%	1 in 20
3	10%	1 in 10
4	20%	1 in 5
5	40%	1 in 2.5
6	70%	1 in 1.4
7	> 99%	> 1 in 1.01

PIEVC (Version 10) Severity Scores – Method E

Score	Method E
0	Negligible or Not Applicable
1	Very Low/Unlikely/Rare/Measurable Change
2	Low/Seldom/Marginal/Change in Serviceability
3	Occasional Loss of Some Capacity
4	Moderate Loss of Some Capacity
5	Likely Regular/Loss of Capacity and Loss of Some Function
6	Major/Likely/Critical Loss of Function
7	Extreme/Frequent/Continuous/Loss of Asset

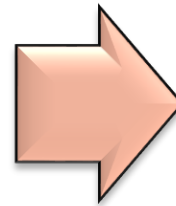
PIEVC Risk Rating Matrix

	7	6	5	4	3	2	1	0	
Severity	7	0	7	14	21	28	35	42	49
	6	0	6	12	18	24	30	36	42
	5	0	5	10	15	20	25	30	35
	4	0	4	8	12	16	20	24	28
	3	0	3	6	9	12	15	18	21
	2	0	2	4	6	8	10	12	14
	1	0	1	2	3	4	5	6	7
	0	0	0	0	0	0	0	0	0
	0	1	2	3	4	5	6	7	
	Probability								
	Low Risk	Special Case	Medium Risk	High Risk					

Examples of Climate Change Risk Assessment (IEMA's Guide)

Challenges & Recommendations

Requirement of **Climate Change Risk Assessment** in Pre-EIA Stage



Inclusion of **Climate Change Risk Assessment** in **Feasibility Stage / Design Stage / Pre-EIA Stage** – when the **specific sector EIA guidelines** are developed/ revised in the future.

Scoping
Stage

Step 1 – Scoping CC
Requirements for the
EIA

Step 1 – Scoping CC Requirements for the EIA

IEEMA’s EIA Guide

- Identification of **climatic parameters and their anticipated changes**
- Identification of **the potential impacts on the environment and its sensitivity due to Climate Change.**
- Identification of Policies & Regulatory Regime
- Assignment of **CCAR Coordinator**

Myanmar EIAP

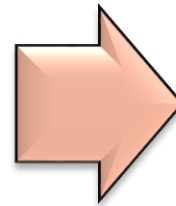
- No guidance on the identification of climatic parameters
- Identify the project’s environmental impacts but not particularly about climate change
- No detailed instruction
- None

EIA Guidelines for Hydropower

- Similar to EIAP
- None

Challenges & Recommendations

Requirement of **Scoping C/C Requirement** since **Scoping Stage**



Mainly depending on **EIA Review on Scoping Report** to decide whether the c/c requirements are **scope in or scope out**.

EIA

Step 2 to Step 6



Defining the future (climate) baseline



Identifying and determining sensitivity of receptors



Reviewing and determining magnitude of the effect



Determination of significance



Developing additional adaptation/
mitigation measures in EIA

Step 2 – Defining the future (climate) baseline

IEMA's EIA Guide

- Describe about the Future Climate (UKCP 18)

Myanmar EIAP

- Not particularly addressed

EIA Guidelines for Hydropower

- Include project area's climate patterns
- Identify potential hazards in the project's location

Short-term Weather Events

- heat waves;
- extreme flooding conditions;
- hurricane force windstorms;
- storm surges along coastlines.

Longer-term Climatic Variability

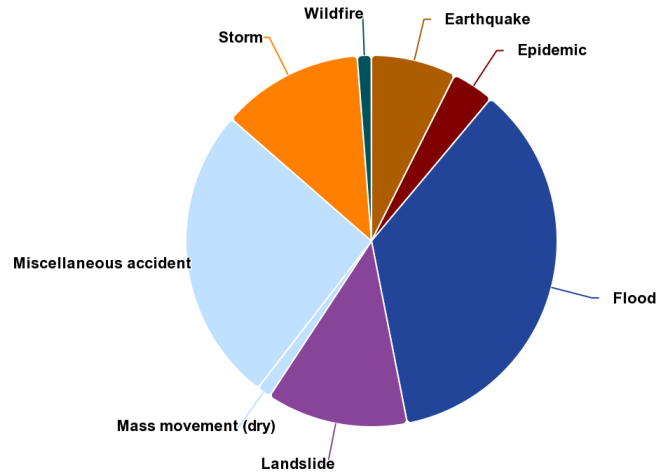
- variations in precipitation over one or more seasons resulting in drought or extremely wet conditions;
- variations in average temperature which might affect receptors reliant on temperature;
- potential changes in prevailing wind directions.

Average Climate Norms

- sea level rise;
- changes in seasonal rainfall patterns.

Source of Climate Change Projection Data for Myanmar

Average Annual Natural Hazard Occurrence for 1980-2020



Climate Change Knowledge Portal
For Development Practitioners and Policy Makers

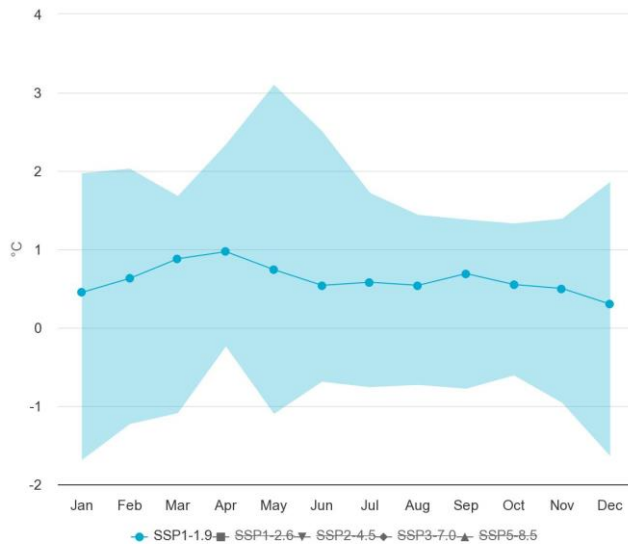
USER MANUAL GLOSSARY METADATA CONTACT US LOG IN
COUNTRY WATERSHED DOWNLOAD DATA COUNTRY PROFILES GENERAL RESOURCES ABOUT TUTORIAL

Precipitation

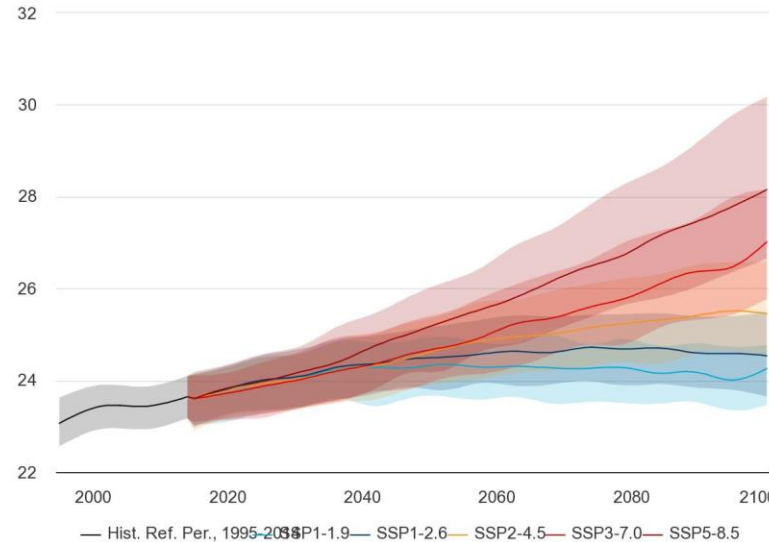
Projected Change in Seasonal Precipitation as Percentage - Projected percent change in total precipitation for the data aggregation period, shown below by season. This is a precipitation anomalies, or changes. Percent change should be compared with precipitation anomalies to understand absolute values of precipitation (mm) to gain a more in precipitation dynamics. The identified sub-national units with the highest and lowest values reflect the projected time period, 2040-2059.

	Units: %	2020-2039				2040-2059				2060-2079			
		DJF	MAM	JJA	SON	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON
Country: Myanmar (Burma)	4.39 (-38.18,53.59)	5.87 (-20.10,41.61)	1.28 (-10.33,11.15)	7.16 (-16.85,30.07)	16.31 (-31.19,63.68)	7.21 (-26.75,44.86)	3.79 (-7.39,13.10)	9.72 (-18.66,31.42)	10.66 (-23.06,69.50)	-0.52 (-32.94,31.51)	3.48 (-8.61,12.59)	9.69 (-17.13,30.91)	-2.11 (-31.03,21.24)
SSP1-1.9 Highest: Bago (E)	-0.08 (-47.74,62.59)	1.37 (-29.98,55.88)	1.34 (-12.48,8.74)	5.55 (-24.10,40.91)	31.89 (-43.15,108.97)	8.77 (-46.57,45.55)	3.57 (-2.88,12.16)	16.55 (-11.20,44.13)	28.08 (-11.05,122.82)	-1.55 (-43.23,54.62)	4.53 (-9.37,14.47)	9.94 (-18.89,41.13)	-31.11 (-19.03,21.24)
SSP1-1.9 Lowest: Kachin	2.61 (-31.92,30.68)	5.42 (-10.25,20.60)	2.15 (-9.43,11.68)	1.71 (-10.14,14.74)	6.95 (-23.99,30.23)	6.43 (-10.88,36.45)	0.56 (-8.64,9.68)	1.35 (-17.81,15.20)	1.70 (-26.08,30.74)	-1.77 (-18.51,11.35)	3.11 (-11.16,9.85)	8.60 (-19.03,21.24)	-11.11 (-19.03,21.24)

Projected Mean-Temperature Anomaly for 2020-2039 Myanmar (Burma); (Reference Period: 1995-2014), SSP1-1.9, Mult Model Ensemble



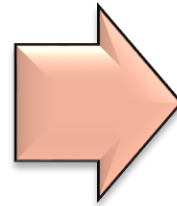
Projected Mean-Temperature Myanmar (Burma); (Ref. Period: 1995-2014), Multi-Model Ensemble



Some Country Specific Climate Projections Data would be available from World Bank Knowledge Portal and Myanmar Information Management Unit (MIMU) website.

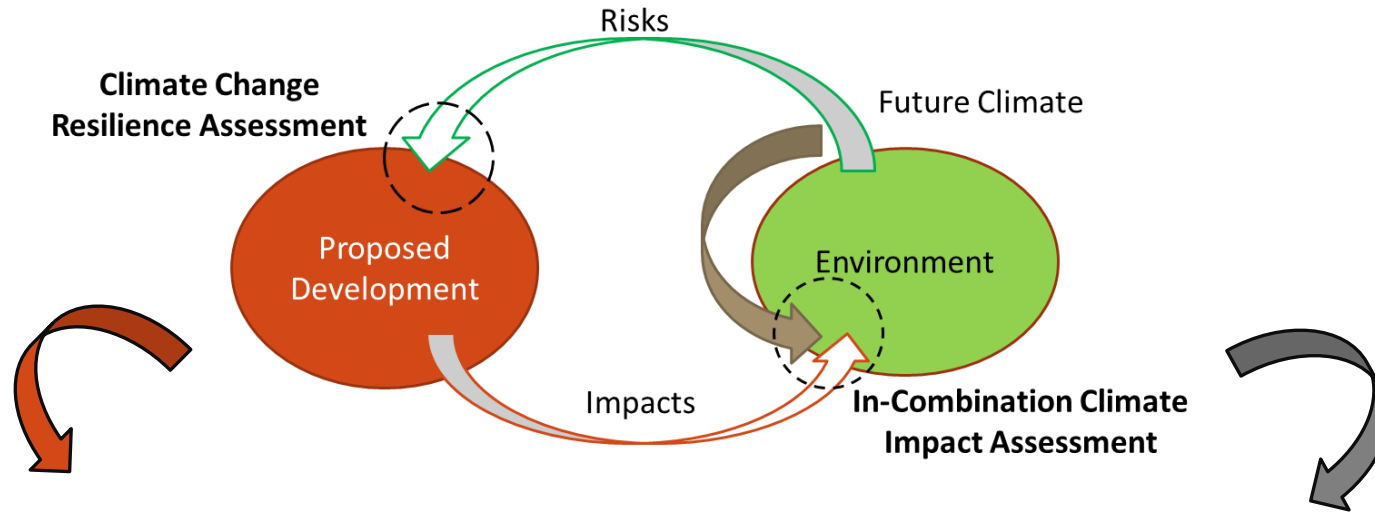
Challenges & Recommendations

Limited Availability of Climate
Change Projection Data
(Project Area Specific)



Establishment of Climate
Portal?

Step 3,4,5 – Determination of Sensitivity of Receptors, Magnitude of the Effect and Significance



- Step 3**
 - **Receptors within the elements** of the project
 - Evaluate of the sensitivity of receptors
- Step 4**
 - Review likely effects **associated with the climate change resilience**
 - Consider probability and consequence
- Step 5**
 - **Determine the significance** by using the sensitivity of receptors and magnitude of effect.

- Step 3**
 - Receptors relevant to the location, nature and scale of the project (**as Identified in EIA**)
 - Evaluate of the sensitivity of receptors
- Step 4**
 - Collate the likely effects identified as part of the EIA
 - Evaluate whether the probability and/or consequence of the **effect change with future climatic projections.**
- Step 5**
 - Determine the significance of the effects of development on the receptors because of the changes in **projected future climate conditions.**

Step 3 – Identifying and determining sensitivity of receptors (EIA Stage)

IEMA's EIA Guide

Climate Resilience

- Identify **receptors within the elements**
- Evaluate the Sensitivity

In-combination Climate Impacts

- Identify **receptors relevant to the location, nature and scale of the project (as Identified in EIA)**

Evaluate of the sensitivity of receptors

Myanmar EIAP

- Not yet developed.

EIA Guidelines for Hydropower

- Identify sensitive receptors in assessing some impacts but no determination of climate resilience.

- Consideration of Receptors for In-combination Impacts has not been developed.

Step 4 & 5 – Determining the magnitude of the effect and significance (EIA Stage)

IEMA's EIA Guide

Climate Resilience

- Likely effects **associated with the climate change resilience.**

In-combination Climate Impacts

- Whether the probability and/or consequence of the **effect change with future climatic projections**

Myanmar EIAP

- Identify impacts of climate change based on available climate change projections.

- Not yet developed.

EIA Guidelines for Hydropower

- Suggest assessing impact on and from the climate change.

- Not yet developed.

Step 6 – Developing EIA Mitigation Measures (EIA Stage)

IEMA's EIA Guide

Identify **addition mitigation measures** for fixed elements and project elements subject to maintenance/future change by climate effects.

Prepare a **Climate Change Resilience and Adaptation Plan**.

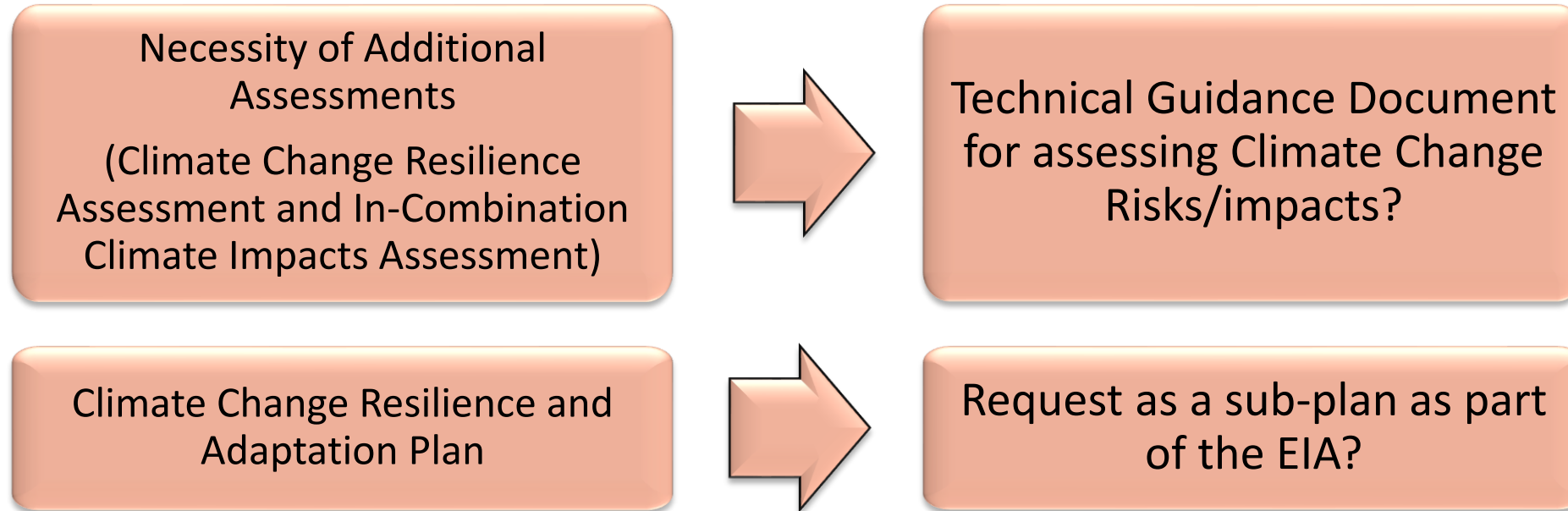
Myanmar EIAP

- Not particularly addressed

EIA Guidelines for Hydropower

- Not particularly addressed

Challenges & Recommendations



Step 7 – Monitoring and Management (Post EIA Stage)

IEMA's EIA Guide

Integration of the **Adaptive Management** in monitoring and management

Myanmar EIAP

- Not particularly addressed

EIA Guidelines for Hydropower

- Not particularly addressed



Conclusions

Let's continue the conversation!

Post questions and comments in the IAIA23 app.



Htet Wai Yan Aung

Environmental and Energy Coordinator / Marshall Motor Group

UK

lewiswaiyan@gmail.com

<https://www.marshall.co.uk/>