



Timor-Leste Development Partners Meeting

Climate Adaptation and Disaster Risk Reduction

Presented by:

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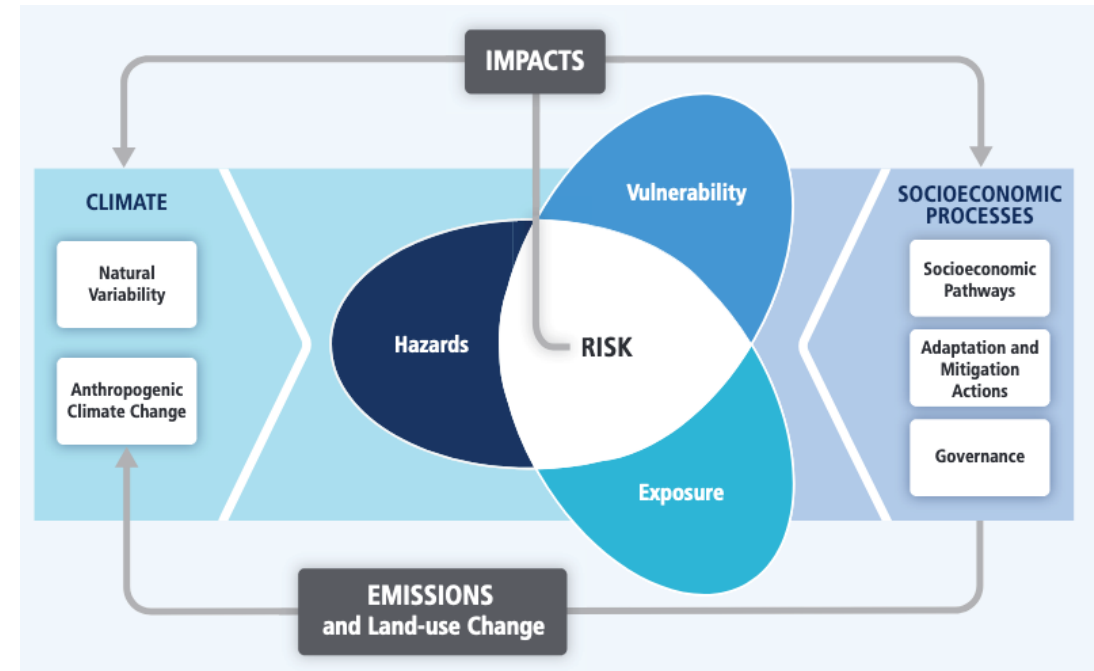
10 June 2022

Ministry of Finance, Dili



Climate Change Impacts - Timor-Leste

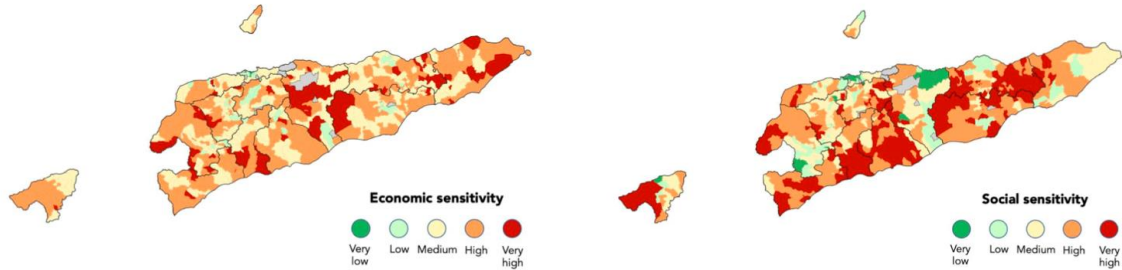
- The impacts of climate change are already more **frequent and severe**.
- We are **locked into even worse impacts** from climate change in the near-term.
- **Risks will escalate quickly** with higher temperatures, causing irreversible impacts of climate change.
- Inequity, lack of social protection, and development challenges heighten vulnerability to climate risks.
- **Adaptation is crucial**. More support must reach the most vulnerable communities
- Some impacts of climate change (such as **meteorological extremes**) will become too severe and costly to adapt to. Therefore, urgent action will be needed to address **damages and losses** (DRM).



Changes in both the climate system (left) and socioeconomic processes including adaptation and mitigation (right) are drivers of hazards, exposure, and vulnerability.

Timor-Leste Hazards & Risk Profile

UNDP MHRA 2022 (ongoing)



World Risk Report [2021](#)

Climate Change Impacts

- More frequent and severe flooding, landslides, droughts
- Slow-onset disasters, reduce access to water
- Impact from coastal erosion and storm surges
- Loss of critical infrastructure assets due to climate disasters
- Sea level rise causing saltwater intrusion and salinization of coastal lands (including agricultural lands)
- Impact on food security – including negative impact on crop yields, food shortages, and impact on aquaculture and fisheries
- Health impact – increased deaths and injuries due to disasters, increase in diarrheal and vector borne diseases

Rank	Country	WorldRiskIndex	Exposure	Vulnerability	Susceptibility	Lack of coping capacities	Lack of adaptive capacities
1.	Vanuatu	47.73	82.55	57.82	39.66	81.21	52.59
2.	Solomon Islands	31.16	51.13	60.95	46.07	81.14	55.63
3.	Tonga	30.51	63.63	47.95	28.42	79.81	35.62
4.	Dominica	27.42	61.74	44.41	23.42	71.13	38.67
5.	Antigua and Barbuda	27.28	67.73	40.28	23.80	64.41	32.62
6.	Brunei Darussalam	22.77	58.17	39.14	15.33	68.13	33.96
7.	Guyana	21.83	43.93	49.69	25.96	77.23	45.88
8.	Philippines	21.39	42.68	50.11	28.63	82.14	39.56
9.	Papua New Guinea	20.90	30.62	68.27	55.28	86.16	63.37
10.	Guatemala	20.23	36.79	54.98	32.55	85.66	46.72
11.	Cape Verde	17.72	37.23	47.59	28.86	72.71	41.21
12.	Costa Rica	17.06	44.27	38.54	19.96	65.33	30.34
13.	Bangladesh	16.23	28.11	57.74	32.57	85.57	55.07
14.	Fiji	16.06	34.51	46.55	22.06	76.63	40.95
15.	Cambodia	15.80	26.89	58.76	38.89	86.61	50.79
16.	Timor-Leste	15.75	28.27	55.73	41.83	75.72	49.64
17.	Djibouti	15.48	25.78	60.03	36.19	84.33	59.58
18.	El Salvador	15.32	31.62	48.46	24.31	78.66	42.41
19.	Kiribati	15.14	26.41	57.34	39.67	82.82	49.52
20.	Comoros	14.91	23.62	63.13	45.93	85.39	58.06
21.	Haiti	14.54	21.41	67.91	49.93	90.36	63.44
22.	Nicaragua	14.12	26.02	54.25	32.27	83.29	47.19
23.	Niger	13.90	19.27	72.15	61.72	87.91	66.83
24.	Guinea-Bissau	13.39	18.88	70.92	60.17	89.20	63.39
25.	Cameroon	13.07	20.35	64.21	47.38	88.58	56.66

UNDP-GCF Timor-Leste Project



Empowered lives. Resilient nations.

Safeguarding Rural Communities and their physical assets from climate induced disasters in Timor-Leste



Areas affected by Flood Hazard (based on Topographic Wetness Index) of Timor-Leste (UNDP 2016)



Areas affected by Landslide Hazard of Timor-Leste (RDTL-MSS-UNDP-ADPC 2012 data)

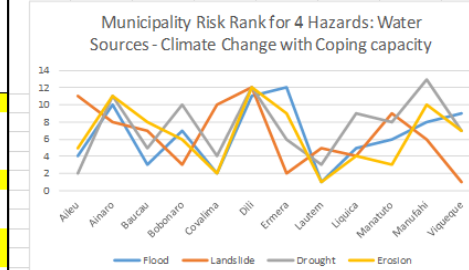
Moderate and High										
Rank	Municipality	No of Properties	Total Pop'n	Value of Property Damage	Crop Income	Total Income	Water Supply	Irrigation System	IS Beneficiaries	Service Area (ha)
1	Dili	5,063	32,824	19,696,211	212,675	3,028,838	1	-	-	-
2	Ermera	1,005	6,002	2,450,995	69,513	406,160	1	4	644	478
3	Lautem	1,272	6,779	2,301,196	96,120	455,902	13	7	337	435
4	Baucau	1,083	6,011	2,075,327	76,623	429,428	1	17	2,357	2,408
5	Covailima	1,611	8,238	2,039,998	135,443	497,431	5	3	801	310
6	Liquica	1,222	7,444	1,997,989	98,422	394,533	4	1	200	20
7	Bobonaro	1,151	6,184	1,672,655	87,731	407,143	6	3	216	470
8	Manufahi	900	4,995	1,322,823	68,676	317,809	2	1	200	200
9	Manatuto	584	3,351	1,135,483	47,912	182,292	4	12	890	850
10	Aileu	289	1,820	605,359	21,925	102,964	-	4	168	177
11	Viqueque	1,415	7,053	509,922	108,227	497,858	1	8	5,709	1,465
12	Ainaro	361	1,975	447,677	28,261	122,373	-	-	-	-
Grand Total		15,976	92,676	36,255,640	1,051,528	6,838,728	38	60	11,522	6,813

Flood risk areas

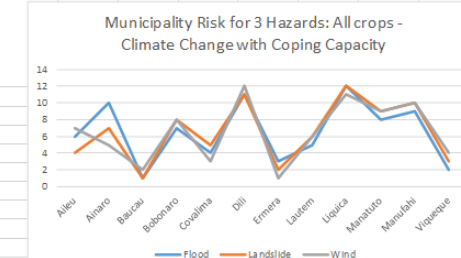
High and Very High												
Rank	Municipality	No of Properties	Total Pop'n	Value of Properties	Total Income	Length of Road	Road Beneficiaries	Water Supply	WS Beneficiaries	Irrigation System	IS Beneficiaries	Service Area (ha)
1	Ermera	15,810	92,706	72,268,973	5,427,855	422	35,308	5	2,707	10	1,159	925
2	Bobonaro	6,476	34,960	29,190,788	2,182,926	215	15,028	10	2,470	3	403	455
3	Ainaro	3,342	13,946	12,462,455	1,729,281	88	9,618	-	4	-	1,103	636
4	Liquica	4,336	25,404	18,763,473	1,384,913	94	11,257	4	3,867	-	-	-
5	Aileu	2,619	16,618	17,202,702	853,882	81	6,438	-	-	1	82	50
6	Manufahi	1,222	7,293	5,706,831	431,405	28	4,515	-	-	-	-	-
7	Baucau	1,179	5,546	4,833,312	349,263	39	8,416	-	-	7	436	474
8	Manatuto	708	4,810	4,625,122	208,601	16	1,666	1	3,223	-	-	-
9	Dili	688	4,645	3,658,884	286,644	9	16,262	-	-	-	-	-
10	Viqueque	886	4,009	3,644,073	264,343	31	3,548	-	-	1	78	112
11	Covailima	424	3,349	2,551,167	184,671	22	1,456	-	-	-	-	-
12	Lautem	163	761	668,678	48,462	0	738	-	-	-	-	-
Grand Total		40,053	232,047	186,966,807	13,352,244	1,042	134,250	15	9,960	16	2,122	1,767

Landslide risk

Climate Change with Coping Capacity	Ranking of Water Sources affected by Hazards				Mean Rank	Standard Deviation	Combined Rank
	Flood	Landslide	Drought	Erosion			
Aileu	4	11	2	5	5.5	3.9	3
Ainaro	10	8	11	11	10.0	1.4	11
Baucau	3	7	5	8	5.8	2.2	5
Bobonaro	7	3	10	6	6.5	2.9	7
Covailima	2	10	4	2	4.5	3.8	2
Dili	11	12	12	12	11.8	0.5	12
Ermera	12	2	6	9	7.3	4.3	9
Lautem	1	5	3	1	2.5	1.9	1
Liquica	5	4	9	4	5.5	2.4	3
Manatuto	6	9	8	3	6.5	2.6	7
Manufahi	8	6	13	10	9.3	3.0	10
Viqueque	9	1	7	7	6.0	3.5	6



All crops Climate change with Coping Capacity	Ranking of Land Use affected by Flood			Mean Rank	Standard Deviation	Combined Rank
	Flood	Landslide	Wind			
Aileu	6	4	7	5.7	1.5	5
Ainaro	10	7	5	7.3	2.5	7
Baucau	1	1	2	1.3	0.6	1
Bobonaro	7	8	8	7.7	0.6	8
Covailima	4	5	3	4.0	1.0	4
Dili	11	11	12	11.3	0.6	11
Ermera	3	2	1	2.0	1.0	2
Lautem	5	6	6	5.7	0.6	5
Liquica	12	12	11	11.7	0.6	12
Manatuto	8	9	9	8.7	0.6	9
Manufahi	9	10	10	9.7	0.6	10
Viqueque	2	3	4	3.0	1.0	3



Impact of existing moderate and high flood & landslide risk on key receptors

These results are based on a Multi-Hazard Risk Analysis was carried out for 12 Municipalities in 2016.

UNDP GCF project is presently conducting the countrywide MHRA

Multi-hazard Analysis – Municipal ranking

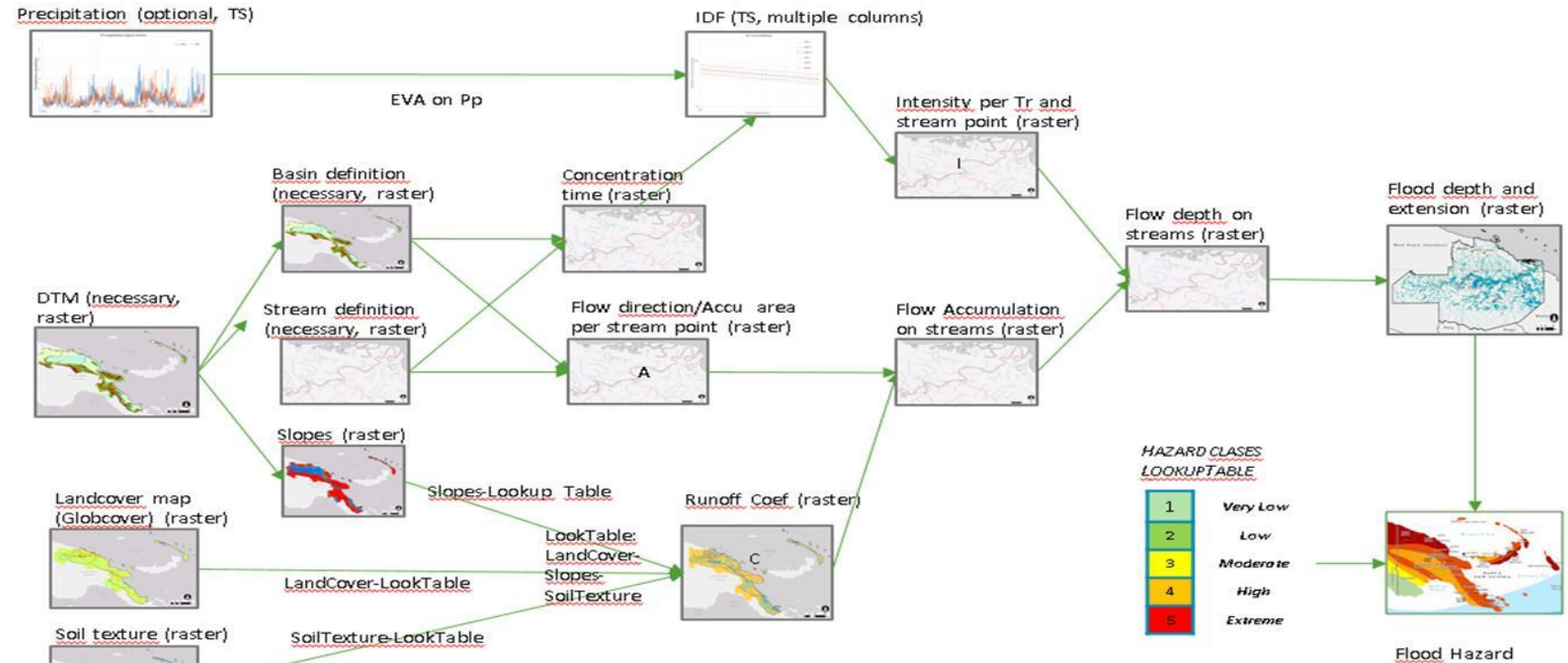
Hazards



Yayasan
Humanis
dan Inovasi
Sosial

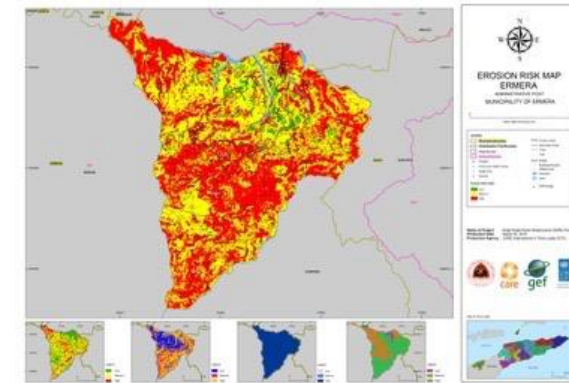


1. Inland Flood
2. Coastal Flood
3. Heat waves
4. Wind gusts
5. Coastal erosion
6. Inland erosion
7. Seismic hazard
8. Landslides
9. Drought
10. Wildfires



Timor-Leste is at risk from multiple climate hazards

The model will also downscale Climate Projections: (most recent CMIP6)



(Possible) Consequences of Natural Hazards on Key Sectors in Timor-Leste



Climate change is a multi-dimensional phenomena

Dimensions of vulnerability

- Social
- Physical
- Economic
- Ecological

Elements-at-risk

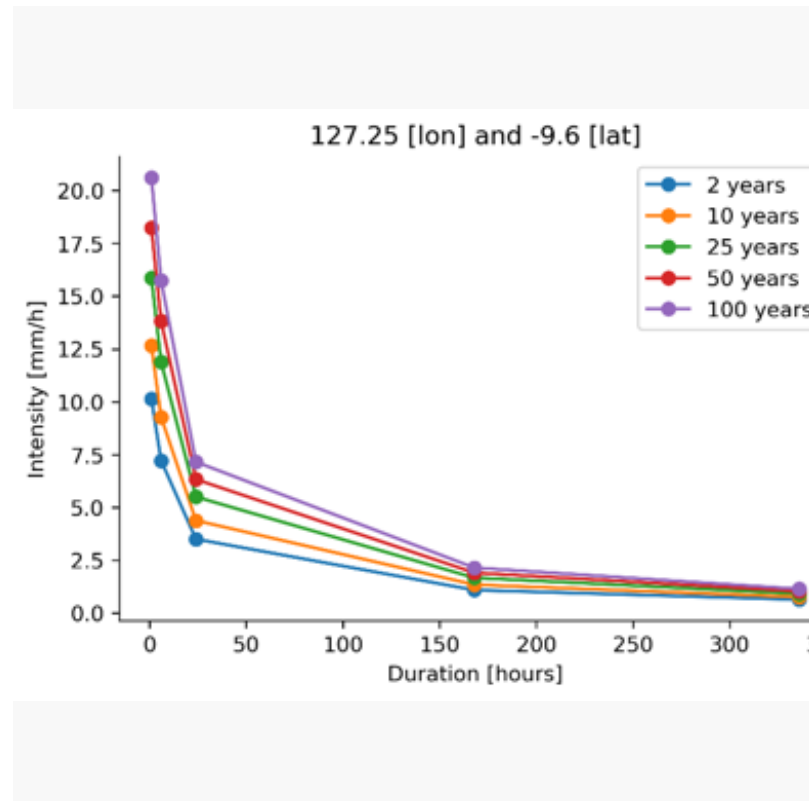
- Population affected (fatalities)
- Property (houses)
- Crops & livestock
- Public infrastructure (roads, bridges, health centers, schools, water supply, ...)

Focus

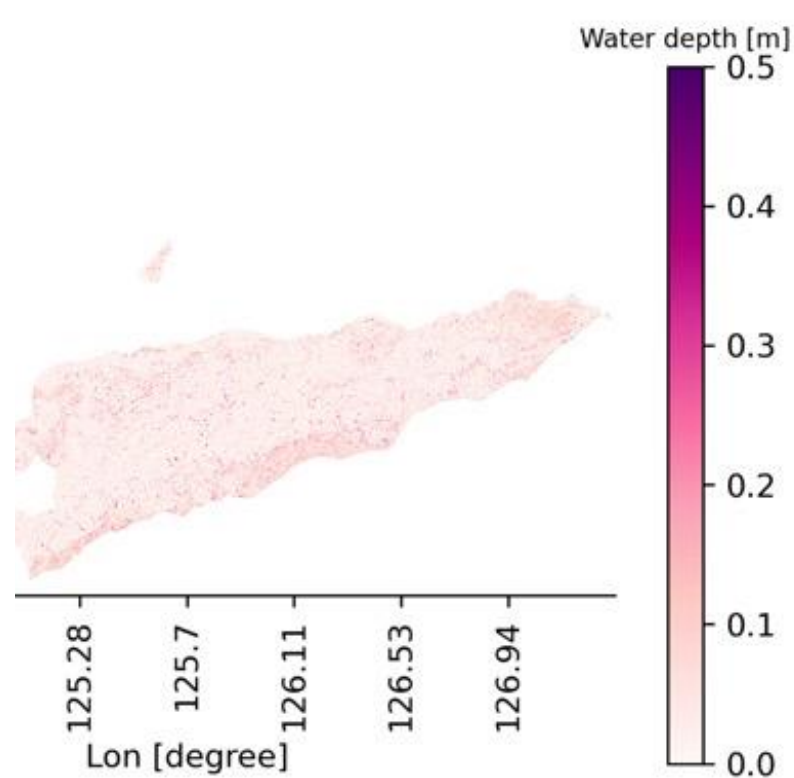
- Currently we focus on direct and quantifiable impacts

Sectors

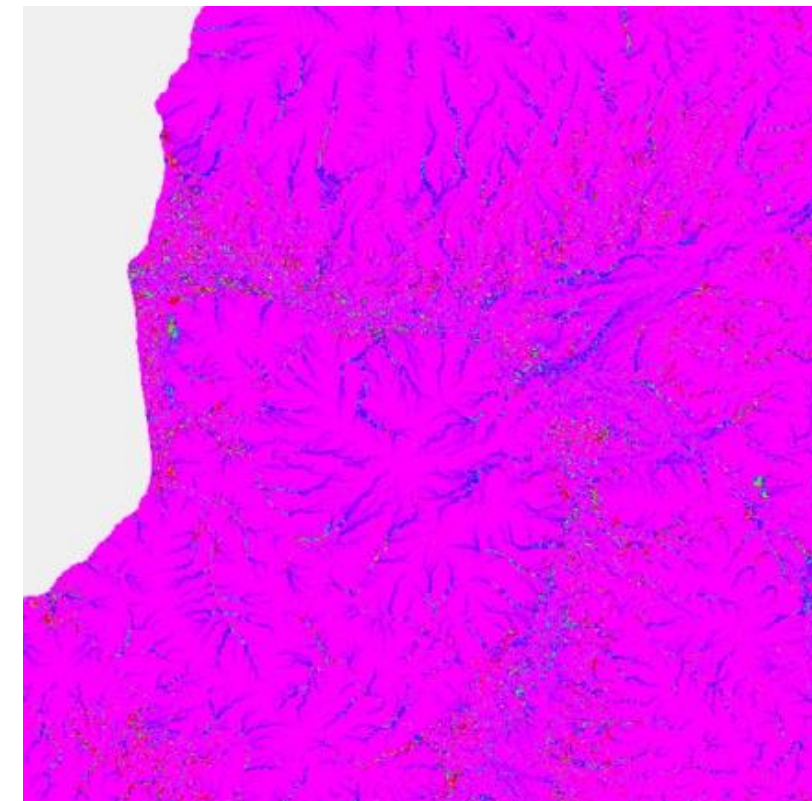
1. Infrastructure:
 - Cities, settlements and key infrastructure including critical infrastructure & transportation
2. Agriculture
 - Including fisheries and aqua-/mariculture: *'Food, fibre and other ecosystem products'*
3. Water sector:
 - Water supply and sanitation (Integrated Water Resource Management)
4. Tourism sector
 - Cultural heritage & nature-based tourism
5. Health sector
 - Infrastructure related to the Public health sector



Rainfall statistics
(IDF curve)



Model scenario
(Flash Flood of 1hr)



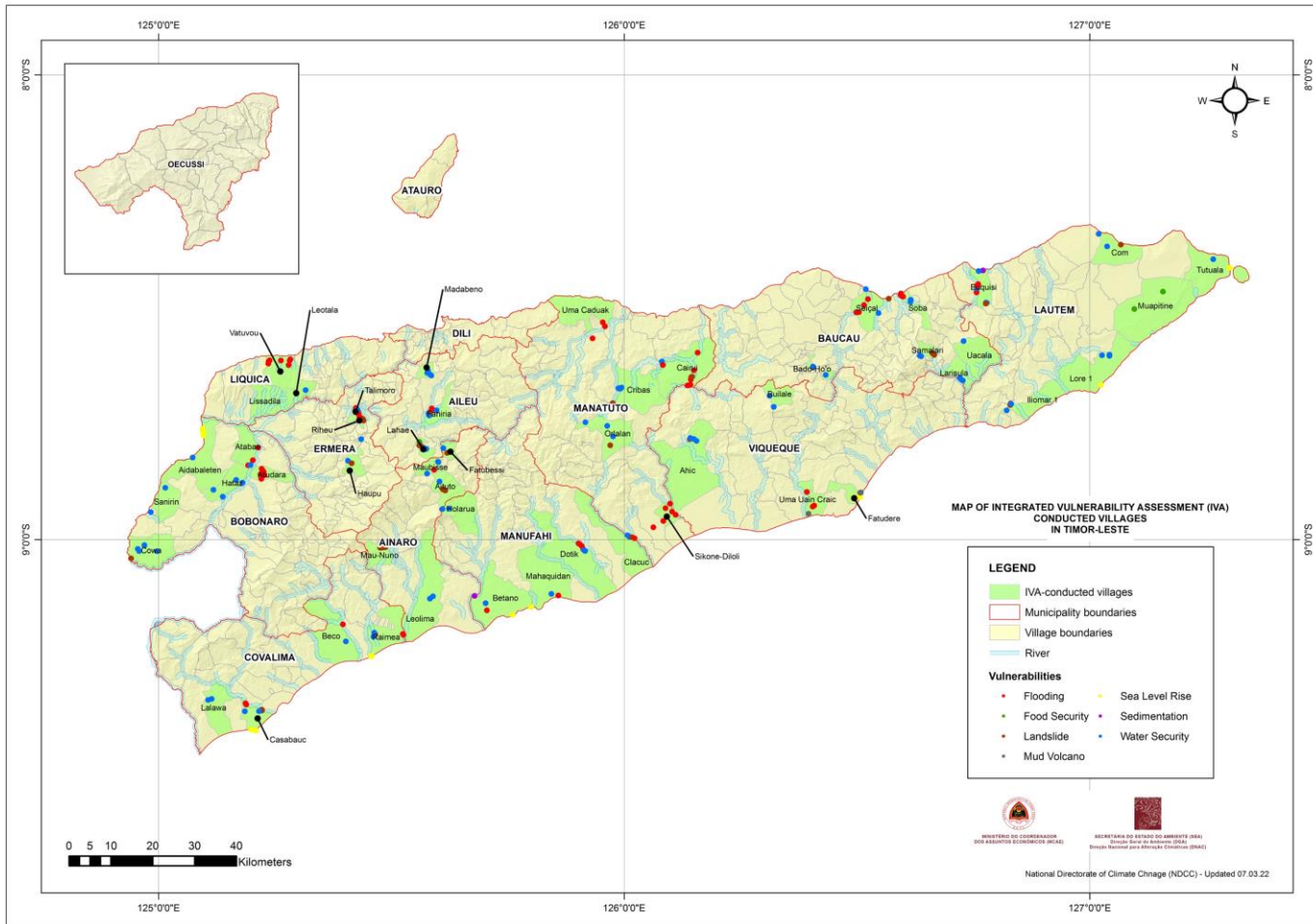
Zoom in
(Max. water depth in m)

Timor-Leste Country-Wide Inland Flood Model

Flash flood scenario for the entire country



Integrated Vulnerability Assessment (IVA) (Findings Preliminary)

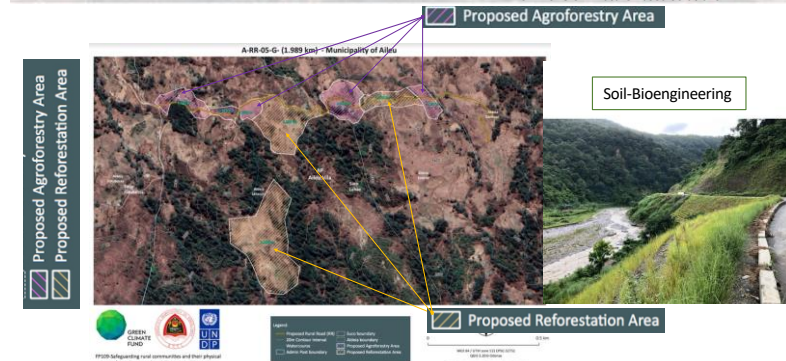
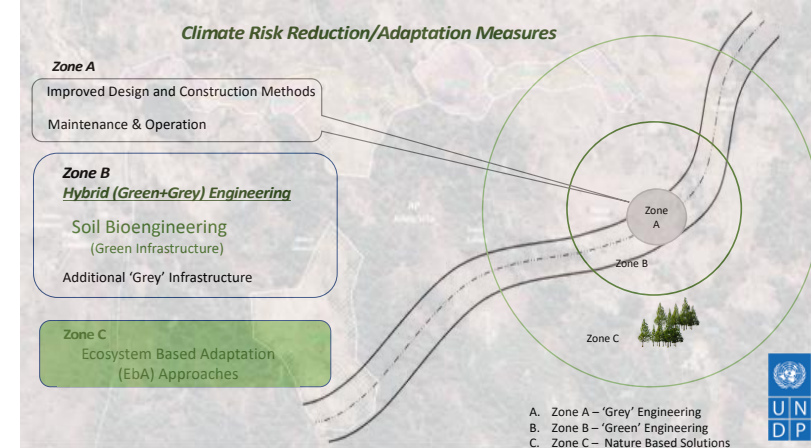


- **Environmental degradation and Water Security** are the most vulnerable human security objectives (HSOs)
 - The environmental and water security vulnerabilities have been caused mainly by human activities which significantly contributed to environmental degradation and low water yield;
- The climate variability especially during prolonged dry season contributed significantly to low level of water volume;
 - Women, children and specially people with disabilities are the most vulnerable groups;
- **Food security and Security of place** were listed second as the most vulnerable HSOs in most villages;
 - Intervention from the relevant government agency is required to train the communities on flood and landslide risk mitigation. Streambank protection walls must be constructed in areas identified as prone to erosion; and
- The **energy, health and income security** have been assessed as third vulnerable group.

50 villages are covered in the Preliminary Findings
IVA will continue in next phase covering additional 96 villages

Approaches to Climate Resilience and Safeguarding Communities and its Assets

- Developing guidelines and SOPs for climate risk reduction measures for critical infrastructure
- Adopting the multi-hazard approach to climate proofing of infrastructure projects
- Reforestation and landscape restoration in the hazard prone areas in the upper catchments
- Agroforestry and reforestation interventions undertaken to safeguard vulnerable landscapes
 - Ai-Ba Futuro project agroforestry activities covering 6,000 ha and planting a total of three million trees in 4 Municipalities and 40 sucos.
 - UNDP GCF Project and MAF covering 1500 hectares in 6 municipalities
- Reducing Coastal Vulnerabilities – protection through mangrove and sea grass restoration
 - UNDP Mangrove Restoration Project over 2000 ha of mangroves rehabilitated and conserved
 - SSE Seagrass restoration pilots in Hera
 - GoTL Mangrove restoration with 400K for 2022

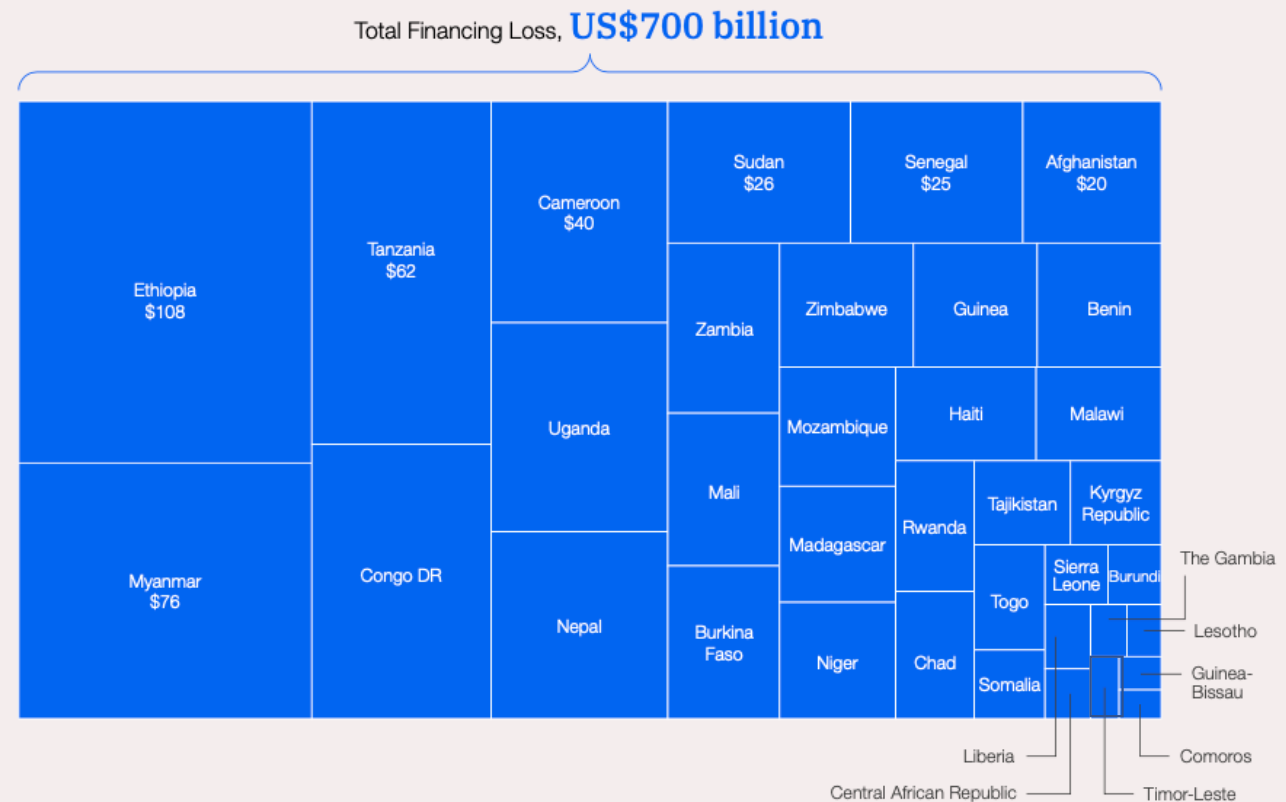


Damages and Losses Confirmed by Post Disaster Needs Assessment 2021

Total damage and loss due to the Easter flood are estimated to be approx.

- **US\$307.7 million.** Of this total amount, 90% is for the damage and 10% for the losses.
- The maximum damage and loss has been in the infrastructure sectors (58%), followed by social sectors (27%), productive sectors (9%) and cross-cutting sectors (5%). The transport (infrastructure) and housing (social) have been the most affected sectors.

Developing Countries' Financing Loss versus GDP, 2020 (US\$ billions)

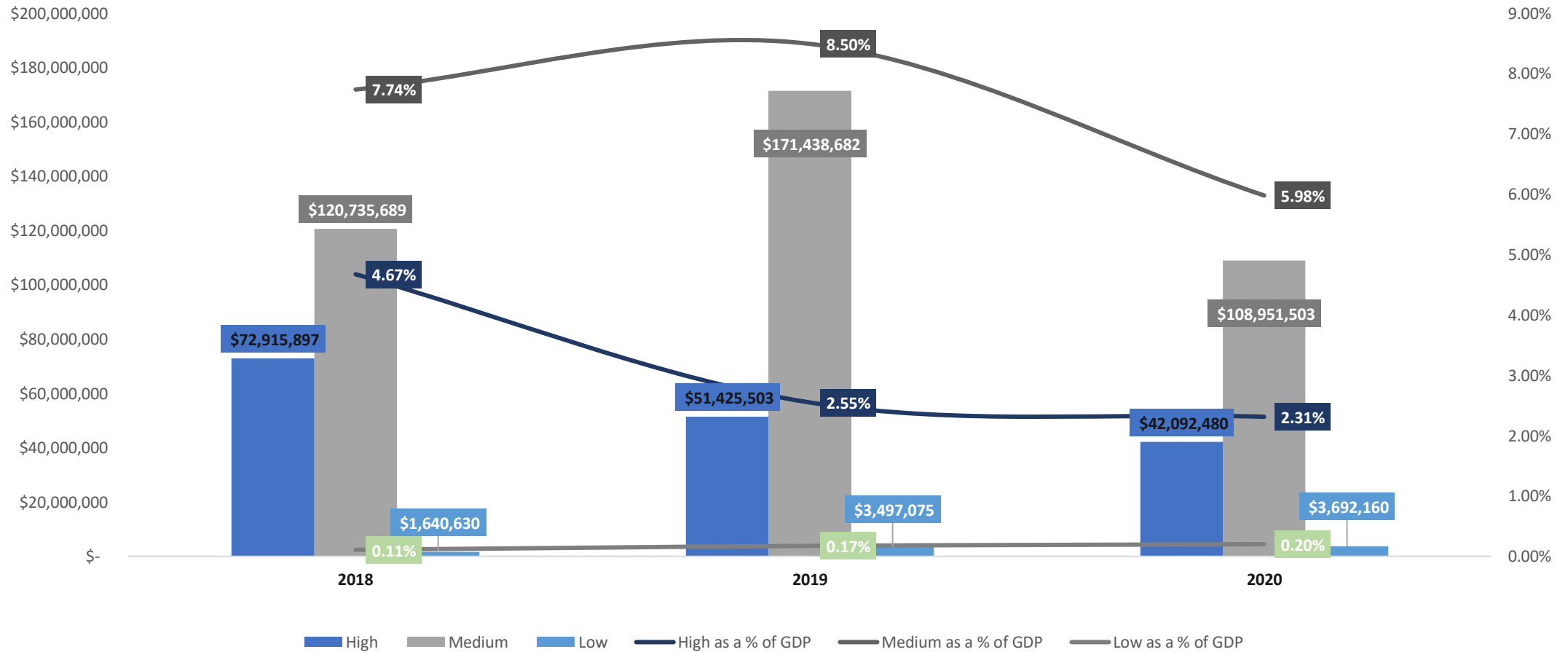


Source: Data from OECD. Global Outlook on Financing for Sustainable Development 2021. <https://www.oecd.org/development/global-outlook-on-financing-for-sustainable-development-2021-e3c30a9a-en.htm>; World Bank Open Data, "GDP (current US\$)" and "GDP per capita (current US\$)". <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD>, accessed 1 December 2021.

Key Findings from CPEIR

- In 2018, Timor-Leste spent 4.67% of its GDP in highly climate relevant programs and projects, but it came down to 2.31% of GDP in 2020.
- Most of the climate relevant expenditure has been financed by the Infrastructure Fund over the last four fiscal years, but that is also declining at a fast rate.
- In 2018, \$48,168,000 was spent out of Infrastructure Fund on highly climate relevant projects, but the expenditure came down to \$20,724,000 in 2020.
- Roads and Bridges sector has received the highest amount of highly climate relevant public expenditure in the last four fiscal years (\$103,854,420).
 - This sector has been followed by agriculture (\$25,549,948), health (\$19,514,591), and urban and rural development (\$14,360,315).
- Some sectors like culture and heritage, and sea ports management do not attract any climate relevant expenditure, while others like health, and tourism are completely reliant on development partners for climate finances.

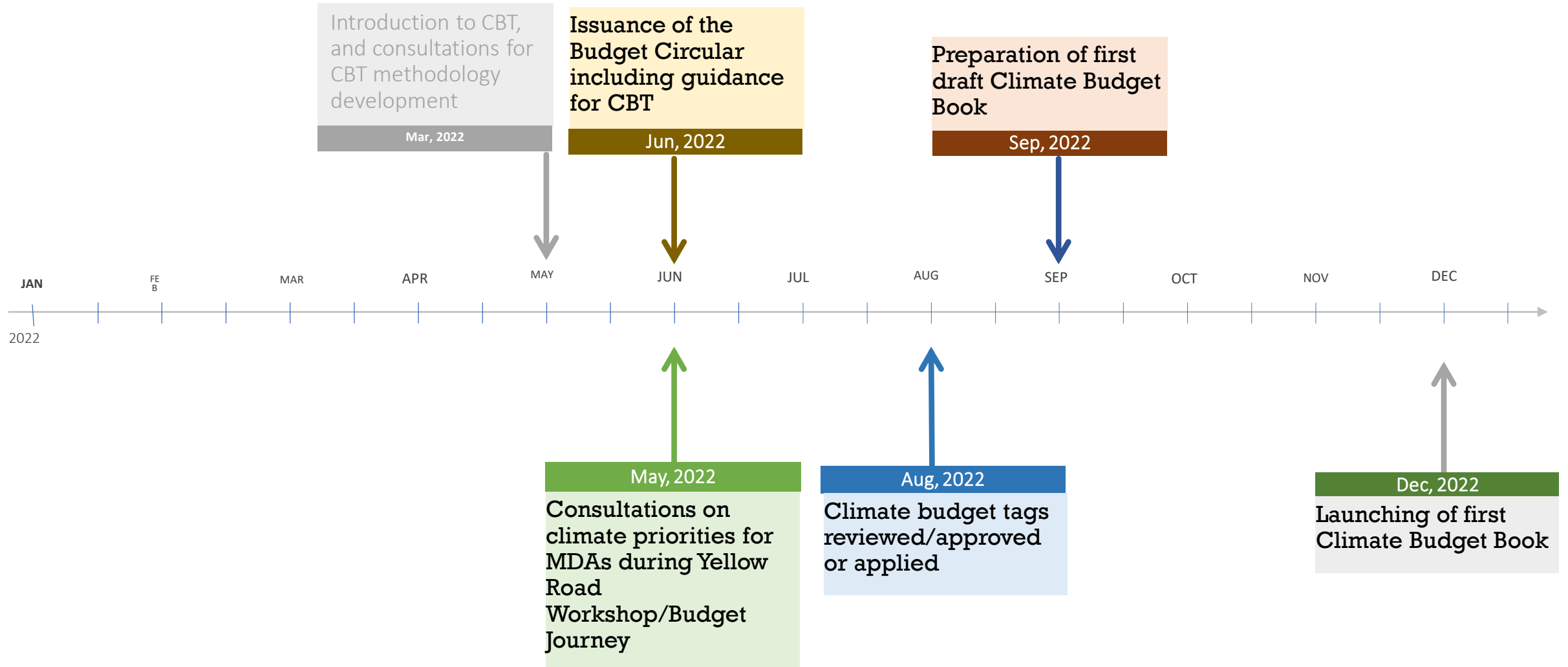
Even amidst the pandemic in 2020, Timor-Leste spent 5.98% of its GDP to fight climate change



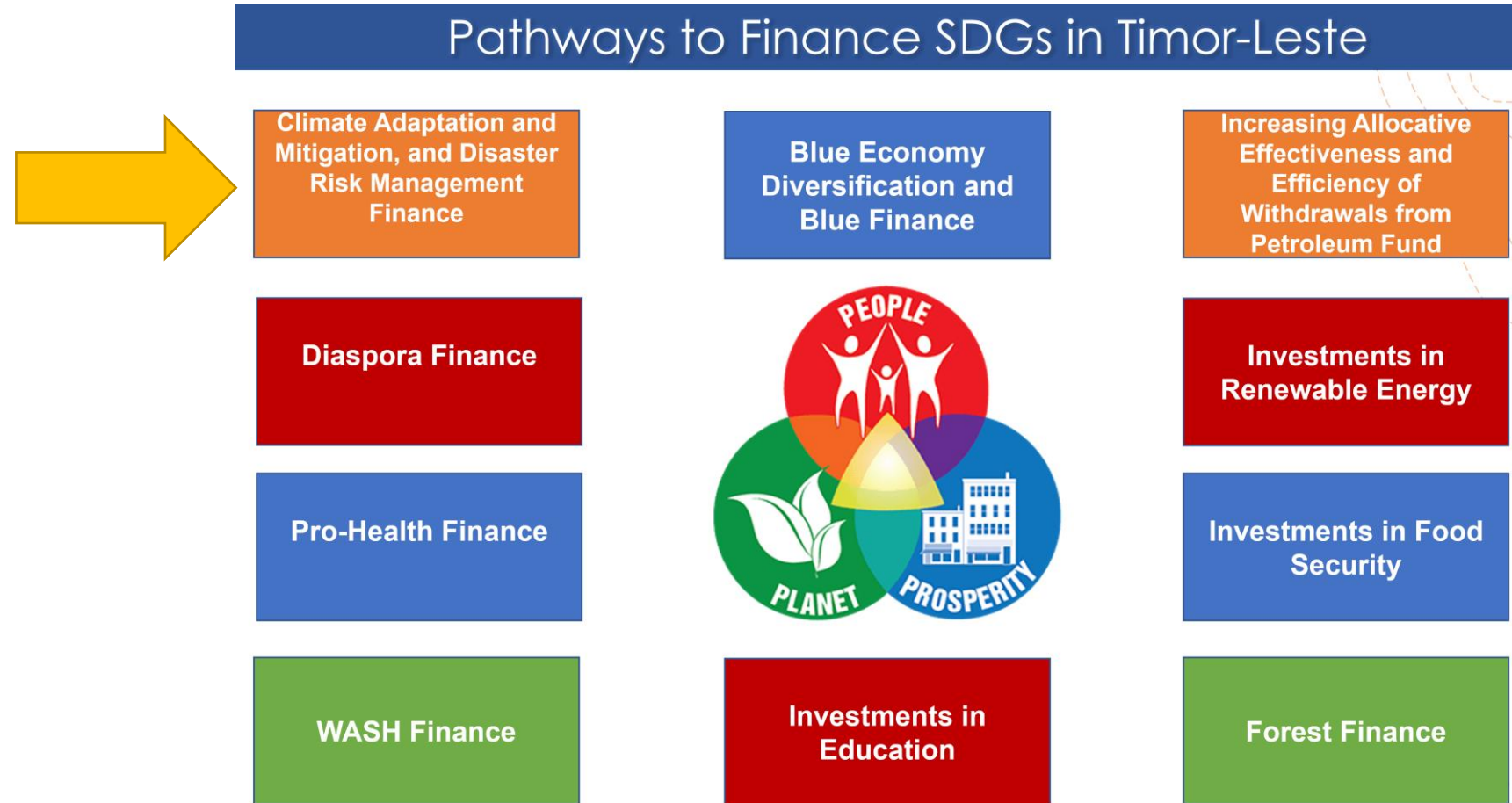
From CPEIR to Climate Budget Tagging (CBT)

Problems identified in CPEIR	Solutions Proposed in CPEIR	Key Benefits of CBT
<p>Declining climate public expenditures</p> <p>Non-alignment of budgetary allocations with climate policies adopted</p> <p>Inadequate integration of climate priorities in Annual Action Plans (AAPs)</p> <p>Absence of measures to track climate public expenditures</p> <p>Lack of a strategy to finance sustainable development at sectoral and national levels</p>	<p>Placement of climate relevant Key Performance Indicators (KPIs) in the AAPs</p> <p>Introduction of Climate Budget Tagging (CBT)</p> <p>Development of sectoral and national Sustainable Development Goals (SDG) financing strategy</p>	<p>Increased awareness about climate change at central and line ministries</p> <p>Increased transparency regarding climate finances, and increased climate accountability</p> <p>Increased mobilization of climate finance from development partners</p>

Roadmap for Adopting CBT



Towards an Integrated National Financing Framework for Sustainable Development



Work is underway for developing an INFF for Sustainable Development that will talk about financing strategies for the key development priorities of the nation. This will include, but not be limited to, strategies to finance climate adaptation, climate mitigation, and disaster risk management.

Partnerships and Recommendations for CCA & DRR

- **Climate-proof public investments:** Ensure the ethos of climate change adaptation and disaster risk reduction are factored into all public investment decisions. This should include climate and disaster proofing not only infrastructural investments but also public service systems. Climate change assessment and design for structural climate resilience should be made an integral component of all public investment management. Further, in devising climate policy response for service sectors like education and health, systems thinking approach should be adopted.
- **Invest to mitigate the impacts of natural disasters to lessen losses in the aftermath of climatic events:** Natural disasters can't be prevented, but actions can be taken to increase the social, economic, and infrastructural resilience against them. CPEIR revealed that only 6.9% (\$12,514,630) of the highly climate relevant public expenditure between 2018 to 2021 were directed towards building resilience and pre-disaster preparedness. Such investments should be increased so that damages caused by natural disasters can be lessened.
- **Integrate climate change and disaster response into PFM processes:** Assess the strengths and weaknesses of national PFM system to respond to climate change and post-disaster emergencies with effectiveness and efficiency, without compromising integrity and accountability, and embed the findings into overall PFM reform processes.
- **Collaborate, assimilate, replicate:** Collaborate to learn from and replicate successful piloted adaptation initiatives at scale.
- **Find the fund:** Map strategies to capitalize on national and international sources of public and private finance to finance climate adaptation and disaster risk management. This should include, but surely not be limited to, proactive initiatives to directly access Green Climate Fund and incentivizing private sector engagement. Initiatives should also be taken to find the balance between market-based fiscal instruments for sectors like tourism, and private sector investment, and non-market based fiscal tools for sectors like roads and bridges, water and sanitation, and health.
- **Quantify damages and losses:** Establish systems to measure and report climate change induced damages and losses.
- **Produce Climate Budget Reports:** Initiatives to introduce Climate Budget Tagging should be supplemented by production of Climate Budget Reports to enable the parliamentarians, civil society, and other stakeholders monitor the climate relevant public expenditures of the government.
- **Climate aware public cadre:** One of the benefits of CBT is that it increases awareness about climate change at central and line ministries. Training sessions tailored for line ministries responsible for key sectors should be arranged so that climate change adaptation and disaster risk reduction is internalized by the relevant public officials. For example, custom designed training sessions should be arranged that contextualizes what climate change adaptation and disaster risk reduction means for health and education sectors.