

# **Advanced Climate Change Adaptation & Mitigation**

Course Code SENV1405E

## **Student Guide**

November 2019

MSc Marine Science & Sustainability  
Faculty of Business and Sustainable Development  
University of Seychelles

This student guide is for the use of University of Seychelles students registered for the programmes in the fields of Environmental Sciences and Sustainable Development. The content of this guide is correct at the time of publication. The University reserves the right to change courses and the degree specifications offered.

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DRAFT FOR DISCUSSION

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# Introduction

## Introduction to Course

Advanced Climate Change Adaptation & Mitigation (ACCAM) is a solutions-focused course designed to equip Masters level students with an understanding of the complex challenge of mitigating and adapting to climate change and develop some of the skills needed to craft an effective response. The course provides an overview of the science, history and politics of the global climate change regime, addresses the ways in which the global community is responding to climate change, and hones in on Seychelles' position and how this relates to international commitments. Students will learn about and critically review diverse political, technical, economic and social responses to climate change both from the literature as well as actual mitigation and adaptation projects being implemented in the country, and compare the different approaches to climate financing used to support these actions. Students will have the opportunity to develop practical skills in conducting a community vulnerability assessment and planning community-based actions and nature-based solutions that provide co-benefits for adaptation and mitigation.

## Pre-requisites and Course Requirements

Refer to the student handbook for pre-requisites. This course is semester-based. It is taught over 150 hours of study, which includes 50 hours contact time (lectures and practical class-based activities), and 100 hours of non-contact time (independent study).

## Aims of Course

This course aims to equip students with an appreciation of and the ability to apply CCA&M knowledge and research techniques to instigate adaptation and mitigation activities and to solve adaptation and mitigation problems. The module examines adaptation and mitigation from a range of perspectives and types, and offers a range of solutions to overcoming barriers preventing adaptation and mitigation. Included in the course structure are: practice in integrating knowledge of the interactions and processes that determine the form, function and well-being of social-ecological systems, and appreciation of their vulnerabilities and resilience to a changing climate. The modules covering energy efficiency and renewable energy technologies are important additions with regards to the resilience of communities around the world.

## Learning Outcomes

<i>On successful completion of this course student should be able to:</i>	<i>Student will be assessed on the learning outcomes in task/s:</i>	<i>Completing the tasks successfully will contribute to student becoming:</i>
<ul style="list-style-type: none"> <li>• Describe a body of knowledge on CCA&amp;M theories and practices.</li> <li>• Demonstrate a specialised understanding of the types of barriers to CCA&amp;M.</li> <li>• Critically analyse and evaluate barriers to CCA&amp;M and possible solutions.</li> <li>• Demonstrate a specialised knowledge of the types of renewable energy technologies and their uses.</li> <li>• Produce innovative proposals to reduce energy consumption through the use of renewable energy technologies.</li> </ul>	Task 1 – critical literature review Task 2 - presentation Task 5 - exam	<ul style="list-style-type: none"> <li>• <b>Knowledgeable</b> – building disciplinary and interdisciplinary knowledge through a scholarly approach incorporating global, regional and local perspectives.</li> <li>• <b>Creative and critical thinkers</b> - generating original ideas and concepts, and appreciating innovation and entrepreneurship</li> <li>• <b>Skilled writers</b>, able to craft concise analytic and technical report</li> </ul>
<ul style="list-style-type: none"> <li>• Utilise advanced and integrated reasoning to address complex barriers to CCA&amp;M.</li> <li>• Generate innovative solutions to the application of adaptive practices and technologies in the field of CCA&amp;M.</li> </ul>	Task 1 & 2 – critical literature review and presentation Task 4 – vulnerability assessment project	<ul style="list-style-type: none"> <li>• <b>Capable facilitators</b> – working with a community to identify vulnerabilities and propose relevant plans for action</li> </ul>

## Course Content

<b>UNIT 1 - Climate Change Science</b>
<ul style="list-style-type: none"><li>• Anthropogenic Drivers of Climate Change</li><li>• Trends and Impacts of Climate Change</li><li>• Climate Modeling</li><li>• Sources of Scientific Data</li></ul>
<b>UNIT 2 - International Legal and Policy Framework for CC</b>
<ul style="list-style-type: none"><li>• The International Climate Change Policy Framework</li><li>• Multilateral Environmental Agreements on climate change</li><li>• Main Issues and Negotiation Streams</li><li>• Towards a Post-2020 Regime</li><li>• Climate Change Education &amp; Communication</li><li>• Global Grassroots Climate Movement</li></ul>
<b>UNIT 3 - Climate Change Mitigation</b>
<ul style="list-style-type: none"><li>• Overview of Mitigation and Low Carbon Development</li><li>• Carbon accounting</li><li>• Renewable energy and energy efficient technologies</li><li>• Sectors with High Mitigation Potential</li><li>• Renewable Energy in Seychelles</li><li>• Climate change Mitigation and Forests</li><li>• Climate change Mitigation and Oceans</li></ul>
<b>UNIT 4 - Climate Change Adaptation</b>
<ul style="list-style-type: none"><li>• Climate Change Adaptation &amp; Development Planning</li><li>• Ecosystem Based Adaptation (EBA)</li><li>• Coastal and Marine Adaptation</li><li>• Conducting a Vulnerability Assessment</li><li>• Identifying and Selecting Adaptation Options</li><li>• Vulnerability Assessment Project</li></ul>
<b>UNIT 5 - Climate Change Finance</b>
<ul style="list-style-type: none"><li>• National Climate Change Finance</li><li>• Cost-Benefit Analysis for decision-making</li><li>• International Climate Change Finance</li><li>• Climate Change and the Blue Economy</li></ul>
<b>UNIT 6 - Planning for Climate Change</b>
<ul style="list-style-type: none"><li>• The Role of National, Sectoral and Community-Based Institutions</li><li>• Climate Change Planning</li><li>• Community Engagement and Partnerships</li><li>• Climate Change Policy and Planning in Seychelles</li></ul>

## COURSE ACTIVITIES

TEACHING MODULE	What key concepts/content will I learn?	What activities will I engage in to learn the concepts/content?	
Off campus	<ul style="list-style-type: none"> <li>Practice information gathering skills and written or oral presentation skills</li> <li>Observe and describe problems and issues relating to climate change adaptation and mitigation</li> <li>Describe energy efficient practices and technologies</li> <li>Describe renewable energy technologies and usage</li> </ul>	<b>Directed Study Activities</b>	<b>Independent Study Activities</b>
		Lecturer provided information PDF's and web links	Independent literature and resource review and preparation for delivery as oral or written work Independent exploration of adaptation and mitigation technologies and project sites
On campus	<ul style="list-style-type: none"> <li>Learn, practice and receive feedback on demonstrated knowledge and communication of CCA and energy use terms, concepts and practices</li> </ul>	Lectures, tutorials, discussion groups, assessment task preparation	Daily reading and preparation for group and independent presentations

## READINGS

Readings are suggested in each Unit. Additional reading recommendations will be provided by the lecturer or can be accessed via the Internet. Access to the Internet will be a necessity, as the course requires Internet research to be conducted for all activities as well as use of the UNFCCC online e-learning tool on climate change.

## ASSESSMENT TASKS<sup>[1]</sup>

Task No.	Assessment tasks	Individual or group	Percent (%)	Duration or length +/- 10%	Due date	Where to submit?
1	Paper: Literature Review and critical analysis of selected CCA&M topics	Individual	25	3000 words	Wk 3	To Lecturer
2	Presentation of paper	Individual	5	10 min	Wk 5-7	In class
3	Group project: community vulnerability assessment, action plan and report	Group	30	4000 words	Wk 12	To lecturer
4	Examination	Individual	40	2 hours	Exam period	
<b>Total</b>			<b>100</b>			
<b>Submission penalties</b>	Late submission of assignments will be penalized at the rate of 10% (of total available marks) per day from the date identified as the due date for the assessment task. Weekdays and weekend days are included in the calculation of days late <sup>[2]</sup> .					
<b>Mandatory assessments</b>	The completion of all assessment tasks is required for the student to successfully complete this course.					
<b>Plagiarism</b>	All assessments will be scanned for plagiarism by lecturer. Small infringements (<30%) result in students receiving a pass mark (40%) for the assessment task. Infringements of 30–40% will result in the student receiving zero for the assessment task. Severe infringements result in students being formally charged with plagiarism and will be subject to severe penalties e.g. expulsion from programme.					

# Unit 1: Climate Change Science

## Introduction

Unit 1 will help students refresh their knowledge of the causes and impacts of anthropogenic climate change, and to gain a better understanding of the methods scientists use to study past and current trends and model future scenarios. Students will become familiar with some of the key literature documenting current scientific understanding of climate change, and overall gain a solid foundation for the rest of the course.

## Learning Objectives

By the end of this unit, students should be able to:

- Explain the basic concepts of climate change science.
- Identify the anthropogenic drivers of climate change.
- Explain observed and projected trends and impacts in the climate.
- Analyse different climate change scenarios and their implications

## Key Topics and Content

For this unit, the key topics and content are delivered through lectures, discussions, films, and readings. The key topics covered are listed below.

KEY TOPICS	CONTENT	INDICATIVE CONTACT HOURS
Anthropogenic Drivers of Climate Change	Climate vs weather, the greenhouse effect, greenhouse gas emissions and sources, climate forcing	1
Trends and Impacts of Climate Change	Past and projected global and local trends in surface and ocean temperatures, sea level and acidification, precipitation, ocean currents, arctic sea ice, Impacts on ecosystems and human systems – globally and locally	2
Climate modeling	Rationale for modeling Different types of models Modeling techniques and requirements	1
Sources of Scientific Data	History of climate science Local, regional and international climate data and monitoring programs Intergovernmental Panel on Climate Change, World Meteorological Organisation	1

## Required Readings

Charney, J.G. et al. (1979). *Report of an Ad Hoc Study Group on Carbon Dioxide and Climate*. For the Climate Research Board Assembly of Mathematical and Physical Sciences National Research Council - National Academy of Sciences, Washington, D.C. Available at:

[https://www.bnl.gov/envsci/schwartz/charney\\_report1979.pdf](https://www.bnl.gov/envsci/schwartz/charney_report1979.pdf)

IPCC, 2018, Global warming of 1.5°C: IPCC Special Report Summary for Policymakers.

[https://www.ipcc.ch/site/assets/uploads/sites/2/2018/07/SR15\\_SPM\\_version\\_stand\\_alone\\_LR.pdf](https://www.ipcc.ch/site/assets/uploads/sites/2/2018/07/SR15_SPM_version_stand_alone_LR.pdf)

## Recommended Further Reading

Agricole, W. (2009). Draft National Circumstances Report, Second National Communications to the United Nations Framework Convention on Climate Change.

Bray, D., 2010. The scientific consensus of climate change revisited. [Environmental Science and](#)

[Policy](#), 13: 340-350.

IPCC, 2014: *Climate Change 2014: Synthesis Report*. (Summary for Policymakers). Available at: [https://www.ipcc.ch/site/assets/uploads/2018/02/AR5\\_SYR\\_FINAL\\_SPM.pdf](https://www.ipcc.ch/site/assets/uploads/2018/02/AR5_SYR_FINAL_SPM.pdf)

Pierce, David W., et al. 2009. Selecting global climate models for regional climate change studies, *Proc. National Academy of Science*, 106(21): 8441-8446. Available at: <https://www.pnas.org/content/pnas/106/21/8441.full.pdf>

IUCN (2009). *The Ocean and Climate Change –Tools and Guidelines for Action*. Available at: [https://cmsdata.iucn.org/downloads/the\\_ocean\\_and\\_climate\\_change.pdf](https://cmsdata.iucn.org/downloads/the_ocean_and_climate_change.pdf)

### **Internet Resources**

UNCC e-learn – Introductory e-Course on Climate Change (2012): Module 1 – Introduction to Climate Change Science: <https://unccelearn.org/course/view.php?id=7&page=course>

World Resources Institute - The WRI's Climate Watch program offers open data, visualizations and analysis to help policymakers, researchers and other stakeholders gather insights on countries' climate progress. <https://www.climatewatchdata.org/>

National Academy of Sciences, USA (2012), Climate Modeling 101. <http://nas-sites.org/climate-change/climatemodeling/>

### **Videos**

Climate Science: What you need to know. (PBS, USA - 2014), 6 minutes. <https://youtu.be/ffjlyms1BX4>

Climate Change 101 with Bill Nye (National Geographic, USA- 2015). 4 minutes. <https://www.youtube.com/watch?v=EtW2rrLHs08>

Causes and Effects of Climate Change (National Geographic, USA-2017). 3 min [https://www.youtube.com/watch?v=G4H1N\\_yXBIA](https://www.youtube.com/watch?v=G4H1N_yXBIA)

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## Unit 2: Climate Change Policy

### Introduction

Unit 2 provides an overview of how the international legal and policy framework to address climate change developed over time and points out some of the key issues under negotiation. Students will become familiar with the history of international climate change negotiations and the United Nations Framework Convention on Climate Change (UNFCCC), as well as key commitments by signatories including the Kyoto Protocol and the Paris Agreement. The unit also provides an overview of the main negotiation issues, with a special focus on SIDS, and highlights some of the key issues moving forward, with a special look at the grassroots climate movement and climate change communication strategies.

### Learning Objectives

By the end of this unit students should be able to:

- Describe the main aims and provisions of the UNFCCC, Kyoto Protocol and Paris Agreement
- Explain why the UNFCCC and its Kyoto Protocol are important to developed and developing countries.
- Analyse key points relevant for a post-2020 climate change regime
- Describe the development of a grassroots global climate movement
- Discuss challenges and strategies for effective climate change communication

### Key Topics and Content

For this unit, the key topics and content are delivered through lectures, discussions, films, readings and a project. The key topics covered are listed below.

KEY TOPICS	CONTENT	INDICATIVE CONTACT HOURS
The International Climate Change Policy Framework	UNFCCC, history of climate change regime, recent UNFCCC special reports	1
Kyoto Protocol and Paris Agreement	Highlights of the two key documents of the UNFCCC	1
Main Issues and Negotiation Streams	Emerging issues, special considerations for SIDS, Seychelles position	1
Towards a Post-2020 Regime	Key issues relevant to future climate change regime	1
Climate change education & communication	Highlights of CC communication research findings, current practices globally and in Seychelles, gaps and challenges	3
Global grassroots climate movement	History of global grassroots action, youth climate activism, the climate movement in Seychelles	1

### Required Readings

GCCA (2019). A Guide for Seychellois Climate Change Negotiators. Available at:

<https://ideas.stantec.com/i/1092283-gcca-guide-for-seychelles-climate-change-negotiators/0?>

GoS (2009). Seychelles National Climate Change Strategy. Seychelles National Climate Change Committee, Victoria, Seychelles. 96 pp. Available at:

[https://www.preventionweb.net/files/20091100\\_seychelles\\_climate\\_change\\_strategy\\_2009.pdf](https://www.preventionweb.net/files/20091100_seychelles_climate_change_strategy_2009.pdf)

Center for Research on Environmental Decisions. (2009). The Psychology of Climate Change Communication: A Guide for Scientists, Journalists, Educators, Political Aides, and the Interested Public. New York. Available at: <http://guide.cred.columbia.edu/>.

## Recommended Further Reading

- Australian Government/UNDP. (2015). SIDS Climate Change Negotiators' Guidance Manual. Available at: <https://reliefweb.int/report/world/sids-climate-change-negotiators-guidance-manual>
- Castree, N., et al., 2014. Changing the intellectual climate. *Nature Climate Change*, 4: 763-768. Available at: [https://www.researchgate.net/publication/270874705\\_Changing\\_the\\_Intellectual\\_Climate](https://www.researchgate.net/publication/270874705_Changing_the_Intellectual_Climate)
- Castree, N., 2014. The Anthropocene and the environmental humanities: extending the conversation. *Environmental Humanities*, 5, 233-260. Available online: <http://environmentalhumanities.org/arch/vol5/5.13.pdf>
- Government of Seychelles. (2011). Chapter 5.4: Education, Training and Public Awareness. In *Seychelles' Second National Communication Under the United Nations Framework Convention on Climate Change*.
- Markowitz, E. M., & Guckian, M. L. (2018). *Climate change communication. Psychology and Climate Change*, 35–63. doi:10.1016/b978-0-12-813130-5.00003-5
- Moser, S.C. (2016). Reflections on climate change communication research and practice in the second decade of the 21st century: what more is there to say? *WIREs Clim Change* 7, 345–369

## Internet Resources

- UNCC e-learn– Introductory e-Course on Climate Change (2012) : Module 2 – Introduction to the International Legal and Policy Framework to Address Climate Change: <https://unccelearn.org/course/view.php?id=7&page=overview>
- World Resources Institute  
<https://www.wri.org/our-work/topics/climate>

## Videos

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## Unit 3: Climate Change Mitigation

### Introduction

Unit 3 focuses on the science and politics of mitigation and strategies for low carbon development. Students will explore the concepts of carbon accounting, energy efficiency and renewable energy, and gain an in-depth understanding of the potential of different renewable energy technologies as well as barriers to their application. The unit provides an opportunity for students to learn about the main economic sectors where mitigation can be most effectively applied, and discuss the potential of forest and ocean based mitigation strategies. Students will also become familiar with some of the key international mechanisms created to assist countries in planning and implementing mitigation actions.

### Learning Objectives

By the end of this unit students should be able to:

- Explain the importance of climate change mitigation and low carbon development.
- Describe relevant policy approaches and strategic frameworks.
- Describe the pros and cons of different renewable energy/low emission technologies
- Identify key sectors for low carbon development and outline relevant mitigation options.
- Define main international mechanisms to support climate change mitigation and low carbon development.

### Key Topics and Content

For this unit, the key topics and content are delivered through lectures, discussions, films, readings and a field trip. The key topics covered are listed below.

KEY TOPICS	CONTENT	INDICATIVE CONTACT HOURS
Overview of Mitigation and Low Carbon Development	Definitions, overview of mitigation strategies and priorities, international mechanisms to support low carbon development	1
Carbon Accounting	Methods for tracking and monetizing carbon emissions	1
Renewable energy and Energy Efficient Technologies	Renewable energy technologies Energy efficient technologies Barriers and opportunities	2
Sectors with High Mitigation Potential	Economic sectors with high GHG emissions globally, regionally and locally Strategies for reducing emissions International	1
RET in Seychelles Climate Change	Status of mitigation efforts in Seychelles	4
Mitigation and Forests	Potential of reducing emissions through afforestation and reforestation, comparative sequestration of different plant species, case studies, co-benefits with adaptation	2
Mitigation and Oceans	Mitigation strategies using ocean biotic and abiotic resources, co-benefits with adaptation	2

### Required Readings

REN21 Renewables Now. (2019) Renewables 2019 global status report. Executive Summary

pp.17-27. Available at: [https://www.ren21.net/wp-content/uploads/2019/05/gsr\\_2019\\_full\\_report\\_en.pdf](https://www.ren21.net/wp-content/uploads/2019/05/gsr_2019_full_report_en.pdf)

Vitale, G. (2016). Renewable energies – Future perspectives. *Renew. Energy Environ. Sustain.* 1(17). Available at: <https://www.rees-journal.org/articles/rees/pdf/2016/01/rees160035-s.pdf>

### **Recommended Further Reading**

IPCC-Intergovernmental Panel on Climate Change, 2014. Summary for Policymakers. In: [Climate Change 2014 : Mitigation of Climate Change](#) : summary for policymakers. [http://www.ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc\\_wg3\\_ar5\\_summary-for-policymakers.pdf](http://www.ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_summary-for-policymakers.pdf)

IUCN. (2017). Issues Brief: Forests and Climate Change. Available at:

[https://www.iucn.org/sites/dev/files/forests\\_and\\_climate\\_change\\_issues\\_brief.pdf](https://www.iucn.org/sites/dev/files/forests_and_climate_change_issues_brief.pdf)

Khaliwala, S., et al. (2013). Global ocean storage of anthropogenic carbon, *Biogeosciences*, 10, 2169–2191. Available at: <https://www.biogeosciences.net/10/2169/2013/bg-10-2169-2013.pdf>

Hogarth, J.R. et al. (2015). Low-carbon development in sub-Saharan Africa: 20 cross-sector transitions. ODI/German Development Institute. Available at:

### **Internet Resources**

UNCC e-learn – Introductory e-Course on Climate Change (2012) : Module 4 – Introduction to Climate Change Mitigation: <https://unccelearn.org/course/view.php?id=7&page=overview>

World Resources Institute – The WRI Greenhouse Gas Protocol program provides standards, guidance, tools and training for businesses and government to measure and manage climate-warming emissions. <https://ghgprotocol.org/>

Carbon Pricing Leadership Coalition: What is Carbon Pricing?  
<https://www.carbonpricingleadership.org/what/>

### **Videos**

Drawdown: <https://www.drawdown.org/solutions-summary-by-rank>

Renewable energy, global examples: [https://www.youtube.com/watch?v=cEjT2\\_NCeFc](https://www.youtube.com/watch?v=cEjT2_NCeFc)

Renewable energy, US focus: <https://www.youtube.com/watch?v=uStFvcz9Or4>

SIDS lighthouse initiative for renewable energy:

<https://www.youtube.com/watch?v=UM7ydYdhLDM>

## Unit 4: Climate Change Adaptation

### Introduction

Unit 4 introduces the concept of climate change adaptation, and explores linkages between adaptation measures and sustainable development strategies. The unit highlights some of the expected consequences of climate change on key sectors, and familiarises students with key concepts related to adaptation, with a special focus on ecosystem based adaptation and coastal and marine adaptation issues. In this unit students will gain an in-depth of understanding of a framework for assessing climate vulnerability, and how to use this process to identify different adaptation measures that can be implemented for various vulnerable sectors. Students will also presents a number of important international adaptation initiatives and programmes.

### Learning Objectives

By the end of this unit students should be able to:

- Explain the importance of adaptation in preparing for and coping with climate change.
- Analyse linkages between climate change adaptation and development planning.
- Outline key elements of a vulnerability assessment.
- Identify adaptation options.

### Key Topics and Content

For this unit, the key topics and content are delivered through lectures, discussions, films, readings and a field trip. The key topics covered are listed below.

KEY TOPICS	CONTENT	INDICATIVE CONTACT HOURS
Overview: Climate Change Adaptation & Development Planning	Definitions, key climate impacts internationally, regionally and in Seychelles that require adaptation, International mechanisms to support adaptation & development planning	1
Ecosystem Based Adaptation (EBA)	Definition, case studies, focus on projects in Seychelles	2
Coastal and Marine Adaptation	Climate impacts on the coast, adaptation responses, from hard engineering, to nature based solutions, and hybrid responses	2
Conducting a Vulnerability Assessment	Overview of rationale, frameworks and tools, practical experience, project work	5
Identifying and Selecting Adaptation Options	Interpreting the vulnerability assessment, criteria for identifying and prioritizing actions, prioritizing options	2

### Required Readings

- Cinner, J. E., et al. (2018). Building adaptive capacity to climate change in tropical coastal communities. *Nature Climate Change*, 8(2), 117–123.
- IPCC-Intergovernmental Panel on Climate Change, 2012. [Managing the risks of extreme events and disasters to advance climate change adaptation : special report](http://ipcc-wg2.gov/SREX/images/uploads/SREX-SPMbrochure_FINAL.pdf) (SREX), Special Report of the International Panel on Climate Change. Cambridge: Cambridge University Press [http://ipcc-wg2.gov/SREX/images/uploads/SREX-SPMbrochure\\_FINAL.pdf](http://ipcc-wg2.gov/SREX/images/uploads/SREX-SPMbrochure_FINAL.pdf)
- Licuanan, W.Y. et al. (2015). I-C-SEA Change: A participatory tool for rapid assessment of vulnerability of tropical coastal communities to climate change impacts. *Ambio* 44:718–736.
- Vincent, K. (2004). Creating an index of social vulnerability to climate change for Africa. Working Paper 56, Tyndall Centre for Climate Change Research. AVAILABLE AT:

- UNISDR. (2017) Quick Risk Estimation (QRE) Tool. Available at:  
 Etongo, D. (2019). Climate Change Adaptation in Seychelles: Actors, Actions, Barriers and Strategies for Improvement. Seychelles Research Journal. 1(2). Available at:  
<https://seychellesresearchjournalcom.files.wordpress.com/2019/08/climate-change-adaptation-in-seychelles-daniel-etongo.pdf>  
 GoS. (2013). Seychelles Damage Loss and Needs Assessment: 2013 Floods. Available at:  
<http://documents.worldbank.org/curated/en/689161468106741988/pdf/788140WP0Box370A0June0201300PUBLIC0.pdf>

### Recommended Further Reading

- Campbell, A., et al. (2009) Review of the literature on the links between biodiversity and climate change: impacts, adaptation and mitigation. Secretariat of the Convention on Biological Diversity. Technical series 42. Available at: <https://www.cbd.int/doc/publications/cbd-ts-42-en.pdf>
- UNFCCC Secretariat. (2011). *Ecosystem-based approaches to adaptation: Compilation of information*. Subsidiary Body for Scientific and Technological Advice (SBSTA). Available at: <https://unfccc.int/resource/docs/2011/sbsta/eng/inf08.pdf>
- Charles, A. 2012. People, oceans and scale: governance, livelihoods and climate change adaptation in marine social–ecological systems. *Current Opinion in Environmental Sustainability*.4: 351-357. Available at:  
[https://www.researchgate.net/publication/257721869\\_People\\_oceans\\_and\\_scale\\_Governance\\_livelihoods\\_and\\_climate\\_change\\_adaptation\\_in\\_marine\\_social-ecological\\_systems](https://www.researchgate.net/publication/257721869_People_oceans_and_scale_Governance_livelihoods_and_climate_change_adaptation_in_marine_social-ecological_systems)
- Hoegh-Guldberg, O. et al 2010. The Impact of Climate Change on the World's Marine Ecosystems. *Science* 328: 1523. DOI: 10.1126/science.1189930. Available at:  
[https://www.researchgate.net/publication/44683425\\_The\\_Impact\\_of\\_Climate\\_Change\\_on\\_the\\_World's\\_Marine\\_Ecosystems](https://www.researchgate.net/publication/44683425_The_Impact_of_Climate_Change_on_the_World's_Marine_Ecosystems)
- Holling, C.S., 1973. Resilience and stability of ecological systems. *Annual review of Ecology and Systematics*, 4(1): 1-23. Available at: <http://pure.iiasa.ac.at/id/eprint/26/1/RP-73-003.pdf>
- Khan, A. and V. Amelie. (2014). Assessing climate change readiness in Seychelles: implications for ecosystem-based adaptation mainstreaming and marine spatial planning. *Reg. Environ. Change*. Available at:  
[https://www.researchgate.net/publication/271621172\\_Assessing\\_climate\\_change\\_readiness\\_in\\_Seychelles\\_implications\\_for\\_ecosystem-based\\_adaptation\\_mainstreaming\\_and\\_marine\\_spatial\\_planning](https://www.researchgate.net/publication/271621172_Assessing_climate_change_readiness_in_Seychelles_implications_for_ecosystem-based_adaptation_mainstreaming_and_marine_spatial_planning)
- Government of Fiji. (2019). Climate Vulnerability Assessment: Making Fiji Climate Resilient. World Bank Group. Available at:  
<https://openknowledge.worldbank.org/bitstream/handle/10986/28870/120756-WP-PUBLIC-nov-9-12p-WB-Report-FA01-SP.pdf?sequence=1&isAllowed=y>
- Rice, H. et al. (2019). Evaluating the Impacts of Sea Level Rise and Storm Surges on Seychelles' Critical Infrastructure. University of Michigan, School for Environment and Sustainability/MEECC.

### Vulnerability Assessment Tools

- CARE International. (2019). Climate Vulnerability and Capacity Analysis Handbook. Available at:  
<https://careclimatechange.org/wp-content/uploads/2016/06/CARE-CVCA-Handbook-EN-v0.8-web.pdf>

### Internet Resources

- UNCC e-learn – Introductory e-Course on Climate Change (2012) : Module 3 – Introduction to Climate Change Adaptation. <https://unccelearn.org/course/view.php?id=7&page=overview>
- WeAdapt - A collaborative platform on climate change adaptation issues. It allows practitioners, researchers and policy-makers to access credible, high-quality information and connect with one another. <https://www.weadapt.org/>
- Seychelles Marine Spatial Plan. Access to reports, maps and other resources related to this initiative. <https://seymsp.com/>
- University of Michigan. (2019). Interactive story map on sea level rise and critical infrastructure in Seychelles. Produced by a team of Masters students. Available at:

<https://umich.maps.arcgis.com/apps/MapSeries/index.html?appid=529d197fc7374f9b9fcc40c6106baa6d>

## **Videos**

“Climate change threatening the future of Seychelles”. (2018). 8 mins. Channels Television.

Available at: <https://www.youtube.com/watch?v=e1DWDWhssS8&t=222s>

Voices from Small Island Developing States. (2014). 5mins. UNDP/GEF. Available at:

<https://www.youtube.com/watch?v=ujO2GWS29GI&t=145s>

**DRAFT FOR DISCUSSION**

## Unit 5: Climate Change Finance

### Introduction

Unit 5 provides students with an understanding of existing financing flows and future needs, as well as a basic typology of financing sources. They will discuss the different meanings of the term climate finance, review national financing and the centrality of the national budget in leveraging other sources of finance, including private sector finance and review . Section the major streams of international climate finance. Students will also explore the linkages between climate finance and the blue economy concept and practices.

### Learning Objectives

By the end of this unit students should be able to:

- Describe the overall landscape of climate change finance sources
- Identify main elements of national planning for climate finance.
- Explain the steps and analyse the pros and cons of using cost benefit analysis to inform climate action decision-making
- Define key elements of the international climate change finance architecture.
- Analyse challenges and opportunities for developing countries, SIDS, and Seychelles in terms of accessing and managing climate finance

### Key Topics and Content

For this unit, the key topics and content are delivered through lectures, discussions, films, readings and a field trip. The key topics covered are listed below.

KEY TOPICS	CONTENT	INDICATIVE CONTACT HOURS
National Climate Change Finance	National budgeting for CC, Current and potential funding sources for Seychelles	1
Cost-Benefit Analysis for Decision-making	Steps of CBA, features of community based CBA, case studies from Seychelles	1
International Climate Change Finance	Climate finance structures and sources of funding	1
Climate Change and the Blue Economy	Blue economy definition, linkage with climate finance, Seychelles Blue Bond and SeyCCAT	1

### Required Readings

Pigato, M.A. (2019). Fiscal Policies for Development and Climate Action. World Bank Group.

Available at

<https://openknowledge.worldbank.org/bitstream/handle/10986/31051/9781464813580.pdf?sequence=4&isAllowed=y>

### Recommended Further Reading

Benjamin K., Sovacoola, B.K. et al. (2019). Processes of elite power and low-carbon pathways: Experimentation, financialisation, and dispossession. *Global Environmental Change* 59 (101985). Available at: [www.elsevier.com/locate/gloenvcha](http://www.elsevier.com/locate/gloenvcha).

GCCA+/Stantec. (2018). Mapping of International Finance Options Relevant to Seychelles.

Available at: <https://ideas.stantec.com/i/1053191-mapping-of-international-climate-finance-options-relevant-to-seychelles/0?>

GCCA+ & MFTIEP. (2019). Climate Public Expenditure Review (CPEIR).

GoS. (2013). Seychelles Damage Loss and Needs Assessment: 2013 Floods. Available at: <http://documents.worldbank.org/curated/en/689161468106741988/pdf/788140WP0Box370A0June0201300PUBLIC0.pdf>

- IMF. (2018). Adapting to Climate Change: Pricing Right, Taxing Smart, and Acting Now. Available at: <https://www.imf.org/en/News/Articles/2018/01/31/sp013118-adapting-to-climate-change-pricing-right-taxing-smart-and-acting-now>
- Krogstrup, S. and W. Oman. (2019). Macroeconomic and Financial Policies for Climate Change Mitigation: A Review of the Literature. IMF Working Paper. Available at: <https://www.imf.org/en/Publications/WP/Issues/2019/09/04/Macroeconomic-and-Financial-Policies-for-Climate-Change-Mitigation-A-Review-of-the-Literature-48612>
- Silver, J.J. and L.M. Campbell. (2018). Conservation, development and the blue frontier: the Republic of Seychelles' Debt Restructuring for Marine Conservation and Climate Adaptation. International Social Science Journal. Available at: [https://www.researchgate.net/profile/Jennifer\\_Silver/publication/327629338\\_Conservation\\_development\\_and\\_the\\_blue\\_frontier\\_the\\_Republic\\_of\\_Seychelles%27\\_Debt\\_Restructuring\\_for\\_Marine\\_Conservation\\_and\\_Climate\\_Adaptation\\_Program/links/5b9e75b8299bf13e603677d8/Conservation-development-and-the-blue-frontier-the-Republic-of-Seychelles-Debt-Restructuring-for-Marine-Conservation-and-Climate-Adaptation-Program.pdf](https://www.researchgate.net/profile/Jennifer_Silver/publication/327629338_Conservation_development_and_the_blue_frontier_the_Republic_of_Seychelles%27_Debt_Restructuring_for_Marine_Conservation_and_Climate_Adaptation_Program/links/5b9e75b8299bf13e603677d8/Conservation-development-and-the-blue-frontier-the-Republic-of-Seychelles-Debt-Restructuring-for-Marine-Conservation-and-Climate-Adaptation-Program.pdf)
- Watson, C. et al. (2016). Climate Finance Briefing: Small Island Developing States. Climate Finance Fundamentals 12. Overseas Development Institute / Heinrich Böll Stiftung North America. Available at [www.climatefundsupdates.org](http://www.climatefundsupdates.org)
- World Bank. (2018). Sovereign Blue Bond Issuance: Frequently Asked Questions. Available at: <https://www.worldbank.org/en/news/feature/2018/10/29/sovereign-blue-bond-issuance-frequently-asked-questions>
- World Bank. (2009). The Economics of Adaptation to Climate Change. Available at: <http://documents.worldbank.org/curated/en/646291468171244256/pdf/702670ESW0P10800EACCSynthesisReport.pdf>

### **Internet Resources**

- UNCC e-learn – Introductory e-Course on Climate Change (2012) : Module 5 – Introduction to Climate Change Finance <https://unccelearn.org/course/view.php?id=7&page=overview>
- World Resources Institute – Global Architecture of Climate Finance [https://wriorg.s3.amazonaws.com/s3fs-public/Funds\\_flowchart\\_v2.png](https://wriorg.s3.amazonaws.com/s3fs-public/Funds_flowchart_v2.png)
- Heinrich Böll Stiftung (German) – info on equitable climate policy and finance, factsheets and 3 part video series on climate finance. The Heinrich Böll Foundation is a non-profit organization that is part of the global green movement with offices around the world, advancing political and socioeconomic transformations through civic engagement and political dialogue. <https://us.boell.org/categories/climate-policy-finance>

### **Videos**

- What is Climate Finance? (2019). 5 min. Produced by the Heinrich Böll Stiftung Washington,DC. Available at: <https://www.youtube.com/watch?v=Y9vM4e9XaM>

## Unit 6: Planning for Climate Change

### Introduction

Unit 6 provides an overview of planning processes for climate change, including different dimensions and entry points for climate change planning. Students will examine the roles of different levels of government in climate change planning, as well as the role of institutions, sectors, the private sector and civil society. By the end of the unit students will be familiar with a methodology for preparing a low-emission climate-resilient development strategy, as well as some of the main international initiatives that support climate change planning.

### Learning Objectives

By the end of this unit students should be able to:

- Explain why it is important to integrate climate change into planning processes in a country.
- Explain the roles of national, sub-national and local institutions in planning for climate change.
- Discuss the roles of government, the private sector and civil society in planning for climate change.
- Analyse the main elements of a recognised climate change planning methodology.
- Identify international initiatives which support countries to plan for climate change.

### Key Topics and Content

For this unit, the key topics and content are delivered through lectures, discussions, films, readings and a field trip. The key topics covered are listed below.

KEY TOPICS	CONTENT	INDICATIVE CONTACT HOURS
The Role of National, Sectoral and Community-Based Stakeholders	Identifying different stakeholder groups Stakeholder mapping for climate change planning	1
Climate Change Planning	Steps to climate change planning Cross-sectoral coordination of climate change planning and implementation Aligning climate change into national development planning	2
Community Engagement and Partnerships	Strategies for community engagement Strategies for building partnerships	1
Climate Change Policy and Planning in Seychelles	Seychelles National Climate Change Committee Key planning documents: climate change strategy, SSDS, climate change policy, NDC, National Development Strategy	4

### Required Readings

**NEED TO SEARCH A BIT MORE FOR A GOOD OVERALL READING**

Hafezi, M. et al. (2018). Creating a Novel Multi-Layered Integrative Climate Change Adaptation Planning Approach Using a Systematic Literature Review. *Sustainability* **2018**, *10*, 4100. Available at: <https://www.mdpi.com/2071-1050/10/11/4100>

### Recommended Further Reading

International Monetary Fund. (2017). Seychelles climate change policy assessment IMF Country Report No. 17/162. Available at: <https://www.imf.org/en/Publications/CR/Issues/2017/06/20/Seychelles-Climate-Change-Policy-Assessment-44997>

- UNISDR (2015). Working Papers on Public Investment Planning and Financing Strategy for Disaster Risk Reduction: Review of Seychelles. UNISDR, Geneva.
- Slocum, N. (2003). Participatory Methods Toolkit: A practitioner's manual. King Baudouin Foundation / Flemish Institute for Science and Technology Assessment (viWTA) in collaboration with the United Nations University. Available at: [http://archive.unu.edu/hq/library/Collection/PDF\\_files/CRIS/PMT.pdf](http://archive.unu.edu/hq/library/Collection/PDF_files/CRIS/PMT.pdf)
- Ogali, C., J. Davies and R. Ouedraogo. (n.d.) Planning and stakeholder engagement tools. IUCN. Available at: [https://www.iucn.org/sites/dev/files/content/documents/documentation\\_of\\_the\\_planning\\_and\\_stakeholder\\_engagement\\_tool.pdf](https://www.iucn.org/sites/dev/files/content/documents/documentation_of_the_planning_and_stakeholder_engagement_tool.pdf)
- Regmi, B.R. et al. (2010). Participatory Tools and Techniques for Assessing Climate Change Impacts and Exploring Adaptation Options. UK Aid, Livelihoods and Forestry Programs. Available at: [https://unfccc.int/files/playground/application/pdf/participatory\\_tools\\_and\\_techniques\\_for\\_assessing\\_climate\\_change\\_impacts\\_and\\_exploring\\_adaptation\\_options.pdf](https://unfccc.int/files/playground/application/pdf/participatory_tools_and_techniques_for_assessing_climate_change_impacts_and_exploring_adaptation_options.pdf)

### **Internet Resources**

- UNCC e-learn – Introductory e-Course on Climate Change (2012) : Module 6 – Introduction to Planning for Climate Change <https://unccelearn.org/course/view.php?id=7&page=overview>
- World Resources Institute- International Climate Action Initiative – A program that uses analysis, innovation and partnerships to achieve effective national policies and ambitious, equitable international climate action <https://www.wri.org/our-work/project/international-climate-action>
- WeAdapt. This is weADAPT is a collaborative platform on climate change adaptation issues. It allows practitioners, researchers and policy-makers to access credible, high-quality information and connect with one another. Website: <https://www.weadapt.org/>

### **Videos**

- What is Climate Action Planning? (2016). 8mins. Planetizen courses. Available at: <https://www.youtube.com/watch?v=oSobY349Ooc>
- Planning for Climate Change in the Cook Islands. (2014). 6mins. Department of Environment and Energy. Available at: <https://www.youtube.com/watch?v=WbJT2IRXp4k>.

## Appendices

### Appendix 1: Assessment Task Details **TO BE REVIEWED BY DANIEL**

#### Overview of Assessment Tasks

Task No.	Assessment tasks	Individual or group	Percent (%)	Duration or length +/- 10%	Due date	Where to submit?
1	Paper: Literature Review and critical analysis of selected CCA&M topics	Individual	25	3000 words	Wk 3	To Lecturer
2	Presentation of paper	Individual	5	10 min	Wk 5	In class
3	Group project: community vulnerability assessment, action plan and report	Group	30	4000 words	Wk 12	To lecturer
4	Examination	Individual	40	2 hours	Exam period	

#### **Assessment Task 1: Paper: Literature review and critical analysis of selected climate change adaptation and mitigation topics (25% of final mark)**

<b>Goal:</b>	The goal of this assignment is for students to investigate and critically review literature regarding recent developments and research in a selected field of mitigation/adaptation. Find information relevant to the function, processes and activities related to the topic. Critically review this information and present the strengths, shortcomings, questions or gaps left to address in the literature, with particular consideration for the context of SIDS.
<b>Product:</b>	A well written essay that uses key terms and concepts correctly to present information on climate change mitigation/adaptation.
<b>Format:</b>	An individual paper (3000 +/- 10% words).
<b>Criteria</b>	5 mks - Concepts and terms 8 mks – Breadth of resources 8 mks – Clarity of critical review 4 mks – Format, style and presentation
<b>Generic skills assessed</b>	<b>Skill assessment level</b>
Critical thinking, researching, writing, communicating	Graduate

#### **Assessment Task 2: Presentation of Paper (5% of final mark)**

<b>Goal:</b>	The goal of this assignment is for students to present the key findings of their literature review and key analysis on a selected topic. Through the presentation, they will teach the content to the other students in the class.
<b>Product:</b>	A well organized presentation summarizing key findings
<b>Format:</b>	A fifteen minute presentation including 10 minutes of presentation time and five minutes discussion, using powerpoint or a similar presentation format.
<b>Criteria</b>	2 mks - Content 1 mks – Clarity of slides 2 mks – presentation style and creativity
<b>Generic skill assessed</b>	<b>Skill assessment level</b>
Presenting, communicating, organising	Graduate

#### **Assessment Task 3: Group project: community vulnerability assessment, action plan and report (20% of final mark)**

<b>Goal:</b>	The goal of this assignment is for students to work in groups to plan and conduct a community vulnerability assessment in collaboration with a local community, and to help the community draft an action plan. Students will compile a report to
<b>Product:</b>	Students compile a report to communicate the results of their project
<b>Format:</b>	A group project report paper (4000 +/- 10% words) describing the process, the

	results of the vulnerability assessment and plan, describing and analyzing the process in light of literature on community vulnerability assessment methodologies and feedback from stakeholders and their own observations.
<b>Criteria</b>	8 mks – Content -description and results of vulnerability assessment and action plan 8 mks – Critical analysis of the process 4 mks – Format, style and presentation
<b>Generic skills assessed</b>	<b>Skill assessment level</b>
Researching, facilitating, writing, communicating	Graduate

**Assessment Task 4: Final Examination (40% of final mark)**

<b>Goal:</b>	The goal of the final examination is for students to demonstrate their overall understanding of the course content
<b>Product:</b>	A written exam paper
<b>Format:</b>	A 3 hour final examination consisting of multiple choice, short answer and essay questions, based on material covered during the entire course.
<b>Criteria</b>	<b>DANIEL PLEASE ADD IN HERE, BASED ON HOW YOU PLAN TO STRUCTURE THE EXAM</b>
<b>Generic skills assessed</b>	<b>Skill assessment level</b>
Critical thinking, writing	Graduate

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