

Course Outline: The Economics of Disasters and Climate Change (ECON 3071)

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|---------------------------------------|---|--|
| Course Title | The Economics of Natural Disasters and Climate Change | |
| Course Code | ECON 3071 | |
| Course Coordinator/ Lecturer | Mrs. Malini Maharaj | |
| Location and Office Hours | FSS Room 206; | |
| Level | Undergraduate Level III | |
| Semester of Offering | Semester II 2019/2020 | |
| Course Start Date | January 21st 2020 | |
| Department and Faculty | Department of Economics; Faculty of Social Sciences | |
| Units of Credit | Three (3) | |
| Pre-requisites | ECON 3034 – Environmental Economics; and ECON 2020 – Caribbean Economy | |
| Teaching Methods: | 1 (One) Lecture session per week (2 Hours); 1 (One) Tutorial session per week (1 Hour; attendance will be monitored with regards to the application of Examination Regulation 19) | |
| Estimated study hours (weekly) | Pre-reading (reading before lecture sessions) Post Reading Tutorial preparation Online Activities Independent Study | 2 Hours 2 Hours 1 Hour ½ Hour 1 Hour |
| Total Number of Assessments | 2 Coursework Assignments (10%) 1 Group Project/Report (25%) 1 Final Examination (65%) | |

Course Overview

Course Description

This course is meant to enlighten students to the economic impacts of two major environmental threats facing Caribbean SIDS: Natural disasters and Climate Change. These threats unless fully assessed and managed, could affect the overall sustainable development of the region. This course intends to establish the specific relevance of Natural disasters and climate change to the region and highlights the links between the two.

From an economic perspective, this course surveys current Natural disaster Management issues-primarily methods that can be utilized to better manage and reduce the impacts of natural disasters in the region. The main topics explored are: economic vulnerability assessment, risk reduction, improving disaster preparedness and post-disaster recovery as well as the institutional frameworks necessary for the aforementioned.

An in-depth survey of the Economics of Climate Change issues is presented. Focus is placed on two (2) main sub-issues of Climate Change: the predicted socio-economic impacts of Climate Change particularly on SIDS and the various costs associated with mitigating carbon emissions and adapting to Climate change.

It satisfies the University's and Department's need to increase the consciousness of students to current issues that impact on the Caribbean, and that has paved and will continue to pave to a large extent the developmental path of Caribbean Economies. This course will explore an area that may be interpreted as outside the scope of Social Sciences and establish a link with such "Natural" processes with Economic and Social implications.

Aims

1. To familiarize students with the concepts of disaster risk reduction and response and the essential events, critical issues and major discussions relating to the concept.
2. To explore a range of interpretations of disaster management in the context of the global environment, first and third worlds.
3. To review institutions, stakeholders and processes at various levels and evaluate the role of intergovernmental, governmental and non-governmental organizations with reference to disaster risk reduction and response.

4. To critically examine the principles, practice and policy of disaster risk reduction and disaster management at various levels.
5. Investigate through case studies and the application of conceptual frameworks the circumstances that give rise to disaster risk or disaster resilience.
6. To recognize good practice in interventions for disaster management and sustainable development.

Objectives

The Objective of this course it to deliver the course material and execute tutorial sessions over the (13) thirteen week teaching period to allow students to understand and apply the theories adequately enough to meet the learning outcomes as indicated.

Learning Outcomes

At the end of this course students should be able to:

1. Define, using examples, the key concepts underlying: Natural Hazards, Natural Disasters, Vulnerability and Climate Change.
2. Discuss the critical elements in determining the socio-economic impact of disasters at the micro and macro levels.
3. Critically evaluate the ideological interpretations, principles and practice of disaster risk reduction and response, from the local to the global levels.
4. Identify and explain the characteristics of institutions involved in disaster risk reduction and the response and policies for achieving disaster resilience.
5. Distinguish and economically justify the costs and benefits of adaptation vs mitigation strategies in climate change.
6. Appraise, using examples, good practice in interventions for disaster risk reduction and response to climate change.

Learning Outcomes Guide

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|--|-----------------------------|-------------------------------|-----------------------------|
| Upon Successful Completion of ECON 3071:, students will be able to: | Cognitive Domain | Psychomotor Domain | Affective Domain |
|--|-----------------------------|-------------------------------|-----------------------------|

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|---|--|------------------------------|---------------------------|
| 1. Define and distinguish basic concepts and economic terminologies | Knowledge Comprehension | Perceptual Ability | Receiving Organization |
| 2. Describe, explain and evaluate Caribbean issues. | Knowledge Comprehension Application Analysis Synthesis | Manipulation Articulation | Responding Valuing |
| 3. Analyse and solve problems using the concepts and literature introduced. | Application Comprehension Application Analysis Synthesis Evaluation | Manipulation Articulation | Characterization |

Assessment and Assignments

All students are required to complete the assessments as outlined below. Details of these assignments are also available on the mylearning course site. Please note the following with respect to course assignments:

1. In-course assessment of 35%

| Assignment Type | Weighting | Details |
|------------------------|-----------|---|
| Online Coursework Quiz | 5% | AN introductory coursework quiz made up of multiple choice questions based on pre-requisite courses and theoretical foundations of the course. |
| Essay Submission | 5% | Each student will be responsible for preparing and presenting/submitting tutorial responses. These questions would be marked according to past paper marking schemes. |
| Research Project | 25% | Students will be required to participate in a research project and prepare written submissions to contribute to this project. |

2. A 65% final exam (2 Hours)

Teaching Strategy

Method of Description

Delivery

Lectures

- Teaching will primarily take place through descriptive face to face lecture sessions and class discussions. Visual presentations along with videos would be used largely to facilitate discussions. Online interactions will also complement these sessions.
- There will be guest lecturers from disaster risk management practitioners and/or researchers. Lectures will be conducted on Tuesdays from 12- 2pm. Lectures are complimented by one (1) hour of tutorials. Tutorial Sessions will facilitate discussions outside of the lectures, guided by a tutorial sheet. Students are required to attend and participate in tutorial sessions. In this connection students should be guided by Regulation 19.
- Make-up or additional lectures will be arranged in consultation with students.

Course Units

This course is structured into 4 main parts as follows:

1. Introduction: Disasters their socio economic impact and the climate change link and how these may impact on Sustainable Economic Development
2. Economics of Climate change: Adaptation and Mitigation ;
3. Risk management and Mitigation of Natural disasters;
4. Conclusion

1. Introduction

A. Introduction to Hazards, Disasters and Vulnerability

- (i) What are Natural Hazards, Natural disasters and Vulnerability: why Hazards do not = Disaster
- (ii) Vulnerability frameworks
- (iii) Disaster, Economic development and Sustainable Development

B. Economic aspects of key issues in disaster risk reduction

- (i) Sectoral impacts – tourism, agriculture, infrastructure

- (ii) Vulnerability and capacity of different social groups – poverty as an exacerbating factor
- (iii) Health – Psycho-social impacts of disaster
- (iv) Actions and strategies related to disaster stages

C. Macro and Micro economic impacts of disasters on Caribbean Islands.

- (i) The direct one off costs of disasters
- (ii) The indirect and long term costs

2. Managing Natural disasters

A. The importance of Risk management + Disaster Preparedness

- (i) Economic Policy Instruments for Disaster Risk Management
- (ii) Cost benefit of Risk management vs. Disaster response

B. Mitigating the effect of Natural disasters

- (iii) Economic and Social vulnerability indices and their use for risk management

C. The Economics of Mitigating Natural disasters + risk management

- (iv) Cost Benefit analysis for disaster risk mitigation prioritization
- (v) GIS and Land Use planning for disaster risk reduction

3. Climate change Adaptation and Mitigation

A. Expected impacts of Climate change on the Region

- (i) Physical impacts (sea-level rise etc)
- (ii) Economic Estimations and methods

B. Mitigation and its associated difficulties

- (i) What is mitigation and why is it important? 1.5° vs. 2°C in temp
- (ii) Past efforts to curb emissions (Kyoto protocol), and their failings
- (i) Current efforts and the role of the developing regions in mitigation
- (ii) Introduction to the Kaya identity and the difficulty of reducing emissions.

C. Adaptation

- (i) Current adaptation science and practices

4. Conclusion

A. Adapting Natural disaster management tools for Climate Change

- (i) Successful risk reduction and disaster mitigation strategies. Case studies

Reading List and Useful Websites

Journals:

- Disasters;
- Journal of Environmental Management
- Climate Change
- Environmental Hazards
- Climate Policy

Core Texts and Readings:

1. Pantin, Dennis and Marlene Attzs. 2009. Economic Impact Of Climate Change Regional Analysis Of Extreme Events in Caribbean Countries of the ECLAC (Final Report).
2. Davis I., Bender, S., Krimgold F., and F. McDonald (2011): Reducing Disaster Risks Progress and Challenges in the Caribbean Region. [Environmental Hazards Series](#). ISBN 9781849713573
3. World Bank, 2010. Natural Hazards, UnNatural Disasters: The Economics of Effective Prevention. Washington D.C.: The World Bank
4. Mark Pelling, Alpaslan Özerdem and Sultan Barakat. 2002. The macro-economic impact of Disasters. Progress in Development Studies 2,4 (2002) pp. 283–305.
5. Albala Bertrand, J.M. 1993. The political economy large natural disasters with special reference to developing countries. Oxford: Clarendon Press.
6. Yasuhide Okuyama. 2003. The economics of natural disasters: a critical review.

Supplementary texts and readings:

- Anderson, Mary B. and Peter J. Woodrow. 1989. *Rising from the Ashes: Development Strategies at times of Disasters*. Boulder, Colorado: Westview Press.
- Yang, Dean (2008) "Coping with Disaster: The Impact of Hurricanes on International Financial Flows, 1970-2002," *The B.E. Journal of Economic Analysis & Policy*: Vol. 8: Iss. 1 (Advances), Article 13. Available at: <http://www.bepress.com/bejeap/vol8/iss1/art13>
- ECLAC. 2003. *Handbook for Estimating the Socio-economic and Environmental Effects of Disasters*. Available at: http://www.eclac.org/publicaciones/xml/4/12774/lcmexg5i_VOLUME_Ia.pdf
- Houghton, J.T. et. al. eds. 1996. Climate Change 1995 : the science of Climate Change. Contribution of Working Group I to the Second Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge: Cambridge University Press.
- Houghton, John Theodore. 1997. Global Warming: the Science of Climate Change. Cambridge: Cambridge University Press.
- Quarantelli E.L. (1998) *What Is A Disaster?* Routledge Alexander, D. (2000) *Confronting Catastrophe*, Terra Publishing
- William D. Nordhaus, 2007. "A Review of the *Stern Review on the Economics of Climate Change*," *Journal of Economic Literature*, American Economic Association, vol. 45(3), pages 686-702, September.

Readings

1. Introduction

A. Introduction to Hazards, Disasters and Vulnerability

(i). What are Hazards , disasters and Vulnerability. why Hazards do not = Disaster:

1. Charlotte Benson, and Edward J. Clay. 2004. *Understanding the Economic and Financial Impacts of Natural Disasters*. The World Bank. Disaster Risk Management Series No. 4
2. Quarentelli E.L. (1998): *What is a disaster?* Routledge.

(ii)Vulnerability frameworks

1. B.L. Turner (2003): *A framework for vulnerability analysis in sustainability*

- science Proceedings of the National Academy of Sciences **July 8, 2003** vol. 100 no. 148074-8079
2. Anderson , Mary B. Vulnerability to disaster and sustainable development : A general Framework for assessing Vulnerability
 3. World Disasters Report - various years
 4. UNDP - Hyogo Framework for Action 2005-2015: Building the resilience of nations and communities to disasters :
http://www.unisdr.org/files/1037_hyogoframeworkforactionenglish.pdf

B. Key issues in disaster risk reduction

- (i) Vulnerability and capacity of different social groups
- (ii) Yamin, F. and Huq, S. (2005) '[Vulnerability, Adaptation and Climate Disasters](#)', *IDS Bulletin* 36.4, Brighton: IDS
- (iii) International Federation of Red Cross and Red Crescent Societies. 2002. World Disasters Report: focus on reducing risk. Geneva: International Federation of Red Cross and Red Crescent Societies.

C. Macro and Micro economic impacts of disasters on Caribbean Islands.

(i) The direct one off costs of disasters:

1. Pelling, M. and Uitto, J. I. (2001): Small island developing states: natural disaster vulnerability and global change, **Environmental Hazards**, 3, 49–62.
2. Rasmussen , Tobais (2004): Macroeconomic Implications of Natural Disasters in the Caribbean. Washington D.C. International Monetary Fund.
3. Alm, A., E. Blommestein, and J.M. Broadus, (1993): Climatic changes and socio-economic impacts. In: Climatic Change in the Intra-Americas Sea edited by Maul, G.A.: London: Edward Arnold.
4. Briguglio, Lino. (1995): “Small Island Developing States and their Economic Vulnerabilities”. *World Development*, 23 (9): 1615-1632.
5. Caribbean Development Bank (2000): Comparative Vulnerability to Natural Disasters in the Caribbean.
6. Naude, Wim et al eds. (2009): *Vulnerability in Developing Countries*. UNU Press
7. Benson, Charlotte and Edward J. Clay. (2004). *Understanding the Economic and Financial Impacts of Natural Disasters (Disaster Risk Management Series)*. Washington D.C: The World Bank.

(ii) The indirect and long term costs:

1. Economics of Disaster risk Mitigation in the Caribbean, World Disasters Report.

(ii) Disasters and Economic development:

1. Cavallo, E. (2010): The Economics of Natural Disasters. A survey. IADB Working Paper series No. IDB-WP- 124.
2. *UNDP-Reducing disaster risk a challenge for development (section 1)*
3. Clarke, C., and M. Munasinghe. (1995): “Economic Aspects of Disasters and Sustainable Development”, in M.Munasinghe and C. Clarke (eds).

2. Managing Natural disasters

A. The importance of Risk management + Disaster Preparedness

(i). Cost benefit of Risk management vs Disaster response

1. Report on Economics of Disaster risk Mitigation in the Caribbean (section 4).

B. Mitigating the effect of Natural disasters

(ii). Vulnerability indices , and their use for risk management

Joern Birkmann (): Risk and vulnerability indicators at different scales: Applicability, 1. Usefulness and policy implications.

C. The Economics of Mitigating Natural disasters + risk management

- i. **Cost Benefit analysis for disaster risk mitigation prioritization.**
- ii. **Economic development and Risk reduction.**
- iii. **Economic Policy instruments for disaster risk reduction Tax and non-tax based.**
- iv. **GIS and mitigation?**

D. The Social aspect of natural disasters

(i). Gender and Disasters in the Caribbean context, an economic perspective

1. Attzs, Marlene (2005): “When all things are not equal: natural disasters and attainment of the Millennium Development Goals”. Available from (Pg 51): http://www.commonwealthfoundation.com/sites/cwf/files/downloads/Breaking_within_busines_as_usual_Sep_2005.pdf

(ii). Institutional factors for disaster risk reduction, SIDS focus + Case studies

1. FRC. (2001): World Disasters Report: Focusing on Recovery. http://www.ifrc.org/Global/Publications/disasters/WDR/21400_WDR2001.pdf
2. Attzs , Marlene (2008): Natural disasters and Remittances; Exploring the Linkages between Poverty , Gender and Disaster Vulnerability in Caribbean SIDS.

3. Climate change Adaptation and Mitigation

A. Introduction and Expected impacts of Climate change on the Region

(i). Physical Impacts

1. Climate Change (2007): Impacts, Adaptation and Vulnerability. IPCC.
http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_wg2_report_impacts_adaptation_and_vulnerability.htm
2. Stern, N.H., et al (2006), *Stern Review: The Economics of Climate Change*.
3. Cambridge University Press, Cambridge. Tol, R.S.J. (2009) “The Economic Effects of Climate Change”, *Journal of Economic Perspectives*, vol. 23, Spring: 29-51.
4. Attzs, Marlene (2008). Natural Disasters, Climate Change and the Caribbean Tourism Industry. In D.A. Pantin et al.2010 From Ridge to Reef

(ii). Economic Estimation and methods

1. Climate Change, The Physical Science Basis, IPCC. Available at: <http://ipcc-wg1.ucar.edu/wg1/>
2. ECLAC (2010): Economics of Climate Change in Latin America and the Caribbean. Summary 2010. UNECLAC.

B. Mitigation and its associated difficulties

(i). What is mitigation and why is it important? 1.5 vs 2C in temp

1. Climate Change (2007): Mitigation of Climate Change, Summary for Policymakers, IPCC. Available at: <http://www.ipcc.ch/pdf/assessment-report/ar4/wg3/ar4-wg3-spm.pdf>

C. Adaptation

(i). Current adaptation science and practices

(ii)Using Vulnerability and risk science to Guide adaptation

1. Burton, Ian, Huq, S., Lim, B., Pilifosova, O., and Schipper, E.L. (2002): “From Impacts assessment to adaptation priorities: the shaping of adaptation policy.” *Climate Policy* 2, 145-159.
2. Climate Change (2007): Impacts, Adaptation and Vulnerability, Summary for Policymakers, IPCC. Available at: <http://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4-wg2-spm.pdf>

4. Conclusion

- (i) Successful risk reduction and disaster mitigation strategies: Case studies.

- (ii) Challenger, Brian (2002): Linking Adaptation to Climate Change and Disaster Mitigation in the Eastern Caribbean: Experiences and Opportunities. Available from Internet, (Pg 203):
http://mona.uwi.edu/cardin/virtual_library/docs/1140/1140.pdf

Course Calendar

| Teaching Week | Unit/Content |
|---------------|--|
| Week 1 | Introduction A. Introduction to Hazards, Disasters and Vulnerability : i. What are Natural Hazards, Natural disasters and Vulnerability: why Hazards do not = Disaster ii. Vulnerability frameworks iii. Disaster, Economic development and Sustainable Development |
| Week 2 | B. Economic aspects of key issues in disaster risk reduction: i. Sectoral impacts – tourism, agriculture, infrastructure ii. Vulnerability and capacity of different social groups – poverty as an exacerbating factor iii. Health - Psycho social Impacts of disaster iv. Actions and strategies related to disaster stages |
| Week 3 | C. Macro and Micro economic impacts of disasters on Caribbean Islands: i. The direct one off costs of disasters ii. The indirect and long term costs |
| Week 4 | Managing Natural Disasters A. The importance of Risk management + Disaster Preparedness: i. Economic Policy Instruments for Disaster Risk Management ii. Cost benefit of Risk management vs. Disaster response |
| Week 5 | B. Mitigating the effect of Natural disasters: i. Economic and Social vulnerability indices and their use for risk management |
| Week 6 | C. The Economics of Mitigating Natural disasters + risk management: ii. Cost Benefit analysis for disaster risk mitigation prioritisation iii. GIS and Land Use planning for disaster risk reduction |
| Week 7 | E. The Social and Political dimensions of natural disasters: i. Gender and Disasters in the Caribbean context - an economic perspective ii. Institutional factors for disaster risk reduction - SIDS focus and Case studies |
| Week 8 | Climate change Adaptation and Mitigation A. Expected impacts of Climate change on the Region: i. Physical impacts (sea-level rise etc) ii. Economic Estimations and methods |
| Week 9 | B. Mitigation and its associated difficulties: i. What is mitigation and why is it important? 1.5o vs. 2oC in temp ii. Past efforts to curb emissions (Kyoto protocol), and their failings iii. Current efforts and the roll of the developing regions in mitigation iv. Introduction to the Kaya identity and the difficulty of reducing emissions. |
| Week 10 | C. Adaptation: i. Current adaptation science and practices ii. Using Vulnerability and risk science to Guide adaptation |
| Week 11 | Conclusion and Recap A. Adapting Natural disaster management tools for Climate Change: i. Successful risk reduction and disaster mitigation strategies. Case studies |

Additional Information

1. Students are reminded of **UWI Examination regulation no. 78** which states, inter alia,

- 78. (i) *Cheating shall constitute a major offence under these regulations.*
- (ii) *Cheating is any attempt to benefit one's self or another by deceit or fraud.*
- (iii) *Plagiarism is a form of cheating.*
- (iv) *Plagiarism is the unauthorised and/or unacknowledged use of another person's intellectual efforts and creations howsoever recorded, including whether formally published or in manuscript or in typescript or other printed or electronically presented form and includes taking passages, ideas or structures from another work or author without proper and unequivocal attribution of such source(s), using the conventions for attributions or citing used in this University.*

UWI Examination Regulation No. 19 “Any candidate who has been absent from the University for a prolonged period during the teaching of a particular course for any reason other than illness or whose attendance at prescribed lectures, classes, ... tutorials, ... has been unsatisfactory or who has failed to submit essays or other exercises set by his/her teachers, may be debarred by the relevant Academic Board, on the recommendation of the relevant Faculty Board, from taking any University examinations. The procedures to be used shall be prescribed in Faculty Regulations.”

In this connection, the Faculty of Social Sciences **requires students to attend and participate in at least 75% of tutorials.**

2. Students are reminded of UWI Examination regulation no. 78 which states, inter alia,

- 78. (i) *Cheating shall constitute a major offence under these regulations.*
- (ii) *Cheating is any attempt to benefit one's self or another by deceit or fraud.*
- (iii) *Plagiarism is a form of cheating.*
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In addition to the above, Students are reminded that deliberate collaborations during the completion of any University Examination inclusive of online quizzes regardless of location will also constitute cheating and will be penalized accordingly.

How to Study for this Course

All material is examinable for this course. As such students should READ thoroughly all recommended literature and also expand their knowledge through additional readings. Tutorial sessions should facilitate further learning so long as students are prepared to discuss the tutorial questions. Students should also use research as a means of obtaining relevant and current course content.

Marking Scheme for Examinations in the Faculty of Social Sciences

21. (i) In the determination of GPA, the grades with corresponding quality points shall be as defined in the University Regulations governing the GPA.

The authorized marking scheme as of Academic Year 2014/2015 is as follows:

| Grade | % Range | Quality Points |
|--------------|----------------|-----------------------|
| A+ | 90-100 | 4.3 |
| A | 80-89 | 4 |
| A- | 75-79 | 3.7 |
| B+ | 70-74 | 3.3 |
| B | 65-69 | 3.0 |
| B- | 60-64 | 2.7 |
| C+ | 55-59 | 2.3 |
| C | 50-54 | 2.0 |
| F1 | 40-49 | 1.7 |
| F2 | 30-40 | 1.3 |
| F3 | 0-29 | 0.0 |

**Department of Economics
January 2020**