

T869 Climate Change: from science to lived experience

Module 1: Introduction to climate change in the context of sustainable development

WORKBOOK

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MODULE 1 WORKBOOK

Welcome to the workbook for Module 1 *Introduction to climate change in the context of sustainable development*. This workbook complements the textbook for this module and also makes use of the Water Case Study which is used in all three modules and appropriate additional reading.

This workbook assumes *either*:

That you have at least read quickly the textbook for Module 1, and preferably also the Water Case Study.

Or

You are currently reading the textbook for Module 1 and are attempting to do the workbook activities as and when they are suggested in that textbook.

This workbook should help you realise the learning outcomes as set out at the start of the textbook. More generally it aims to:

- Enable you to deepen your understanding of the ideas, concepts, frameworks and issues that are raised in the textbook.
- Gain a critical appreciation of the concepts and frameworks, and develop them further.
- Apply the ideas, concepts and frameworks to new situations and to use them to make your own arguments.
- Develop an appreciation of ‘transboundary competence’ (see Box 1) through participation via the virtual learning community in group work and engagement with others.

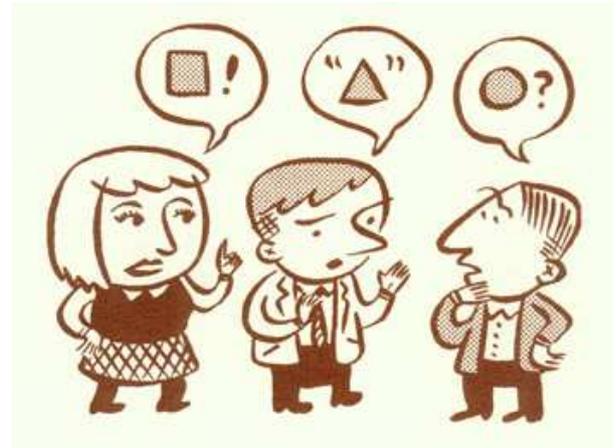
These aims lead to the overall purpose of the workbook: to increase your satisfaction of studying this module through your active and deep engagement with it. The workbook is not confined to academic frames of reference, therefore, and is equally appropriate for registered Masters students and for those who are studying it more informally as a ‘lifelong learning’ experience.

The workbook is structured through a number of Activities for you to undertake. These Activities are designed for you to extend and deepen your learning, and with one possible exception¹, not directly for formal assessment. Apart from the possible exception noted, you do not have to do them, but I hope you do for the aims and overall purpose cited above. Given that the module 1 textbook is in the style of a ‘Reader’, with different authors for each chapter, the Activities below are also grouped by main chapter.

¹ The exception concerns any workbook activities which might be deemed compulsory by your accrediting institution. The obvious example is workbook activities which are designed for group work. If the key skill of transboundary competence or similar formulation is part of the learning outcomes of the accrediting institution, satisfactory participation in activities that deliver that learning outcome is likely to be a requirement.

Box 1 Developing transboundary competence

Given the scale and complexity of climate change, many uncertainties surround the issue, whereas its lived experience is largely contextually determined. As a consequence, there is a valid diversity in perspectives on the issue. To use this diversity as a source of inspiration and better solutions instead of conflict and political paralysis, one should learn to think, communicate, collaborate and learn across the boundaries of the different perspectives. We refer to this ability as 'transboundary competence'.



Transboundary competence is important for professional practice, because it constitutes the basis for achieving common ground among stakeholders and the development of broadly acceptable and supported interventions for sustainable development.

In this module, development of transboundary competence is stimulated in various Activities by a combination of actual practice and explicit reflection on what and how to learn from that practice. The actual practice involves exposure to a diversity of perspectives on climate change issues, understanding, elaborating and debating different perspectives, and eventually negotiating common ground. This will be practised in individual Activities and in group work. The latter is preferred, as the experience of the diversity in perspectives is more direct and authentic.

The Activities are varied. Some simply ask you to test your own understanding of parts of the textbook and are accompanied by no further comment from me. Others ask you to apply critically the textbook ideas and concepts to new areas, such as the water case study, selected readings and to areas which you have identified yourself through, for example, an internet search. Related Activities ask you to apply critically these ideas and concepts to your personal context.

Sometimes, after each 'critical application' Activity, a 'Discussion' is provided which comprises the personal attempt of the chapter author to do it and might also contain a further commentary on anything of interest the Activity has raised. Please do not take this Discussion as the definitive answer to the Activity, rather use it as a point of critical comparison with your own attempt. Do, however, attempt the Activity yourself before reading the Discussion. The nature of this module means that there are only rarely objectively 'right' answers.

Each Activity contains an indicative maximum time which you should spend on it, assuming that you have read the textbook and relevant chapters already, and what the Activity is aiming to achieve. We stress that this is the maximum time. You can cut corners, and you may be familiar enough with the ideas which an Activity is exploring to reduce the time significantly.

Finally, you do not have to follow the Activity format as set out exactly. Adapt it as you wish. All of the Activities can be adapted. We, the authors, particularly recommend that, instead of attempting them as an individual, you adapt them where appropriate for collective discussion in the electronic forums. Then, for example, you might not write a given number of words as requested, but contribute to the electronic forum discussion instead. Also, instead of writing a given number of words, you might wish to make your own podcast to convey your message. Note that some Activities are specifically designed for group work.

However, having given you freedom to communicate in alternative, appropriate formats, you might decide in addition to write for yourself an individual answer as a short essay or report. You might decide to do this even if you have made a podcast or engaged in electronic forum discussion of the activity, the reason being that you need practice in writing essays or reports. This might be a daunting task for some who have relatively little experience of communicating in this way, and especially if English is not your first language. Appendix 1 at the end of this workbook provides guidelines on writing essays or reports.

Workbook for Chapter 1: Introduction

The key points of chapter 1

Chapter 1 of the textbook, including its 'before you start' section does three main things. It:

- Provides you with the learning outcomes of the module – what you should know, understand and be able to do having studied it. Learning outcomes can come across at the start as being rather abstract. They do, however, represent a checklist for you as you progress through the module, and they also start to make increasing sense. If you are being formally assessed, this will be in relation to one or more of the learning outcomes.
- Tells you how to study the module and how long it should take you.
- Provides a brief introduction to, and justification for, the textbook content.

Activity 1.1 (maximum time 30 minutes)

This activity gives you practice in the important skill of summarising arguments and key messages succinctly. Summarising forces you to encapsulate your overall thoughts at a high level and takes you to the heart of the text. You have to first understand the text well to be able to summarise effectively, and your summary then forms the starting point for a more thorough consideration. Summarising also forces you to answer basic questions about why the subject is important.

1. Summarise in a single sentence the key message of the module.
2. Why does the module suggest that the concept 'sustainable development' might be useful when discussing climate change?

Discussion

1. Various parts of the chapter might be your focus for the key message. Our answer below draws on Section: '**1. Introduction to module 1**'. An alternative we considered but eventually decided not to use was the module question in the 'Before you start' section, and there are undoubtedly other places in chapter 1 on which you could draw for your answer. Don't worry, therefore, if your sentence is different from ours below, but use the difference as a point for you to reflect further.

For us, the key message is encapsulated by the following sentence:

Our knowledge of climate change is uncertain, but we do know that it has the potential to cause serious disruption of dominant models of development, lives and livelihoods in affluent and poor countries alike across the world.

2. The chapter argues that, while knowledge of the physical mechanisms of climate change that is provided by the natural sciences is important, the explanation in terms of human beings, their activities, and the impacts that climate change is likely to have on them, is also crucial. The concept of sustainable development neatly encapsulates these human factors into an integrated whole, while allowing us for analytical purposes to divide them into three areas (or pillars of sustainable development): environment, economy and society. Moreover, sustainable development contains within it a positive vision whereby the different human impacts are addressed holistically.

Workbook for Chapter 2: What science tells us about climate change

The key points of Chapter 2

Following the chapter introduction (Section 2.1), Section 2.2 describes the evidence for global warming together with its physical manifestations in terms of precipitation, changes in ocean dynamics, and shrinking ice packs. The physical mechanisms by which global warming is happening are explained through analysis of the Earth's energy budget which is represented through multiple feed backs concerning absorbed solar energy and reflected energy (and the wavelength at which it is reflected). For the past 150 years, an imbalance in this energy budget has resulted in the Earth warming, a phenomenon which, the evidence indicates, is attributable to increasing concentrations of greenhouse gases in the atmosphere.

Section 2.3 then steps back into 'deep' time to establish how and why our climate has changed in the past. Knowing this is important as it establishes a baseline for what is happening in the present, and the extent to which we might attribute global warming to different kinds of 'forcings'. This leads to the final substantive Section 2.4 which concerns modelling what is different now, when compared with the past, about climate variability, and how this variability is projected into the future. Different models are used for different purposes. Relatively simple is modelling of the global energy budget (i.e. the thermodynamic features of climate variability). Another relatively simple model simulates the dynamic aspects of oceans. The more complex general circulation models (GCMs) combine a variety of factors (called prognosis variables). Some of these factors are thermodynamic (i.e. related to the global energy budget), while others concern, for example, the movements of air and ocean currents to inform us about the *distribution* of temperature rise across the globe. Some models are actually 'models of models' where they combine the results of different GCMs into an 'average' prediction.

Activities for Chapter 2

The activities below are intended to improve your understanding and appreciation of the science of climate change. These activities are principally designed for you to check for yourself your basic comprehension of each of the main sections. Overall, the activities contribute to your realisation of the learning outcomes of Chapter 2 which are outlined in the textbook.

Activity 2.1 (maximum time 2 hours)

The aim of this activity is for you to review and embed for yourselves the key points of chapter 2.

Review Sections 2.2–2.4. Make notes on the extent to which you agree or disagree with the key points that we have indicated above concerning each of these sections. Expand in your notes where necessary these key points.

There is no discussion for this activity.

Activity 2.2 (maximum 1 hour)

The aim of this activity is for you to test your understanding of two key concepts and the mechanism of current global warming in terms of the energy budget.

Review Section 2.2 and answer the following questions:

1. What is 'black body' radiation and what is its importance for the earth's energy budget? Explain in your own words.

2. If water vapour contributes 55% of the so-called greenhouse effect (Figure 2.14), why are carbon dioxide (and to a lesser extent methane and nitrous oxide) held to be the main culprits in global warming?
3. What are 'forcings' and what role might they play in climate variability?

Discussion

1. Black body radiation is that emitted by any body above absolute zero temperature (0 degrees Kelvin or -273.15°C). The emitted radiation is at every wavelength, but the relevant part of the spectrum in the context of global warming is from short wave ultraviolet radiation through the wavelengths that correspond to visible light to long wave infrared radiation (see Figure 2.13 in the module 1 textbook). The intensity at which a given wavelength is emitted, however, depends on the temperature of the body. The sun at a high temperature emits mainly in the visible range, whereas the much cooler earth emits significant radiation in the infrared range. The ability of gases in the earth's atmosphere to absorb both incoming solar radiation and outgoing infrared radiation from the earth's surface is crucial to maintaining the energy budget.
2. The water vapour concentration in the atmosphere (averaged over the globe) is roughly constant. Thus, while it is definitely helping to keep the Earth relatively warm at a roughly constant temperature, it is not contributing to the imbalance that is represented by global warming. The explanation for global warming is therefore posited in the increasing atmospheric concentrations of carbon dioxide (mainly), methane and nitrous oxide. However, a further feedback effect is that increasing temperature will increase the concentration of water vapour and also cloud formation. Whereas, other things being equal, this will increase the amount of infrared radiation absorbed by the atmosphere, clouds can also have negative feedback effects (i.e. they can also reflect radiation), and therefore the overall effect on global warming is not clear with respect to water vapour.
3. 'Forcings' are sources with the capacity to induce physical change within the climate system. They include (from Figure 2.19 in the textbook) changes in plate tectonics, changes in the earth's orbit, volcano eruptions, changes in the sun's radiation (correlated with sunspot activity), and, crucially for us, human activities.

Activity 2.3 (maximum time 1 hour)

The aim of this activity is for you to test your understanding of the role that external forcings might have played in climate variability in the past.

Summarise briefly, making notes for yourself, each of the following external forcings and how they might account for past climatic variability:

Variations in solar activity

Volcanic eruptions

Variations of the earth's orbit

Changes in ocean circulation patterns.

There is no discussion to this activity as the answers can easily be found in the textbook.

Activity 2.4 (maximum time 1 hour)

The aim of this activity is for you to check your basic understanding of climate models.

- 1 Summarise briefly in your own words, your understanding of the concept of parameterisation, and why it is a fundamental component of climate modelling. Also, indicate why the process of parameterisation is generally a source of uncertainty.
- 2 Give a simple example of parameterisation in relation to each of the following:

Energy balance models

General circulation models (GCMs).

- 3 Explain two ways of validating GCMs.

Discussion

1. In the context of climate models, parameterisation is the method of using a simplified process to replace processes that are too small-scale or complex to be physically represented in the model. It is necessary in climate modelling because the scale of resolution in terms of space in the models is too low to incorporate directly many of the factors which contribute to climate. Modellers have to make some assumptions on how these factors should be incorporated. For this reason, parameterisation is modeller-dependent and a source of uncertainty.
2. A simple example in relation to energy balance models concerns incorporation of the albedo effect. This is the proportion of incident radiation that is reflected directly back to the atmosphere by the earth's surface. The albedo effect varies considerably, however, over the surface of the earth, depending on the temperature. Areas of snow and ice, for example, have a higher albedo as they reflect more radiation than other surfaces at higher temperatures. Parameterisation here involves averaging the different albedos over the earth's surface to give a global mean which can then be fed into the climate model.

Clouds offer a very good example of parameterisation in relation to GCMs. Their size is much smaller than the resolution of the grid and thus cannot be included "directly" into the model.

3. There are several GCMs, and one way of checking their validity is to compare what they compute with known records of climate variability in the past. Another way is to compare their predictions with one another (usually there is a close alignment of the models).

Workbook for Chapter 3: Economics matters in climate change

The key points of Chapter 3

Economics matters in climate change because, locally, nationally, regionally and globally, economic analysis creates a major justification for policy. There are many approaches to economics – from conventional to alternative – and the textbook introduces the important ones. When it comes to actual policy, however, the approach which matters most of all is neoclassical economics based on laws of supply and demand and market competition, where the role of policy is largely to correct for ‘market failures’ (of which climate change is considered one such market failure). Within neoclassical economics, cost benefit analysis (either as a technical tool or as informing the broad approach) comprises the ubiquitous method for analysing interventions to correct market failures, and the textbook spends some time interrogating it in relation to climate change.

Activities for Chapter 3

The activities below are intended to improve your critical understanding and appreciation of the different economics perspectives on climate change, and in particular the neoclassical perspective. One activity also provides hands-on practice in developing a climate change-related cost benefit analysis through working in a team. Overall, the activities contribute to your realisation of the learning outcomes of Chapter 3 which are outlined in the textbook.

Activity 3.1 (maximum time 2 hours)

The aim of this Activity is to ensure that you have a basic understanding of Chapter 3 of the textbook, in particular the cost-benefit framework for analysing the economics of climate change and the conservative and radical critiques of this approach as adopted by the Stern Review.

1. Re-read Chapter 3 of the textbook and check your understanding of:
 - a) The following concepts and their application to climate change: market failure, opportunity costs, discounting the future.
 - b) The general framework of cost-benefit analysis (CBA) as adopted by the Stern Review.
 - c) The basis of the conservative and radical critiques of the Stern Review.
2. To what extent do you agree with Stern’s conclusion that the costs of inaction outweigh the costs of immediate action? Write no more than 500 words and/or discuss with fellow students on the electronic forum.

Discussion

This covers question 2 only. The different parts of Question 1 are for you to check your basic understanding.

The position you take in answer to Question 2 depends on several factors. These include the extent to which you believe that:

- a) Stern’s interpretation of the predicted impacts from scientific analyses is reasonable. For example, if you believe that the impacts of allowing greenhouse gas emissions to rise above his ceiling of 500ppm CO₂e have been exaggerated by Stern, then the costs of inaction are correspondingly lower.
- b) His assumption of maintaining an increase in global economic growth is justified.

- c) Transfers to developing countries are justified, and if they are, whether or not the money involved is about right, too little or too much.
- d) His choice of discount rate is justified. This in turn depends on the value you think should be placed, and is possible to place, on future generations.
- e) His faith is justified that a mixture of public research and development, and creating a 'carbon market', can bring down the cost of developing low-carbon technologies.
- f) He has adequately taken into account the human transition costs of moving to a low carbon economy.

The above is only an outline of the factors you will need to take into account when creating an answer. You would need to expand on each of them to create an answer of about 500 words.

Activity 3.2 (maximum time 2 hours)

The aim of this Activity is to assess the applicability of CBA and other approaches to issues that are identified in the water case study, for example salination of the Nile delta, water stress in the Sahel and flood control in the Netherlands.

Select any two of the issues raised in the water case study, one from the Nile basin and one from the Rhine basin. What do you consider to be the strengths and weaknesses of applying a cost-benefit analysis of possible action to address the issue you have selected?

Discussion

This discussion is based on choosing livelihoods as an issue that applies to both the Nile and Rhine basins. In theory it is possible to put an economic value on the livelihood activities associated with each river, the potential damage that may be caused (including the damage to livelihoods, property, etc.) by climate-related events (both immediate and long-term), and the costs of action. A discount rate can also be included according to the present value of net benefits for future generations.

However, there are further issues:

- Valuation might be difficult. How for example do you measure the ecological value of the 18 wetlands of international importance along the Rhine (Water case study Section 3.1.1)? Such valuation extends beyond livelihood considerations. And, of course, what discount rate do you choose?
- Who and whose livelihoods should be included? Both river basins have a wide range of stakeholders?
- What is the distribution of net benefits among stakeholders? An action might be good for some but have negative consequences for others, which an aggregated CBA would not reveal. The most obvious example is at the international level along the Nile, where actions in upstream countries might have an adverse impact on downstream countries. However, flood control of the Rhine in the Netherlands would have little or no impact on upstream countries, although it might have local impact as presumably it takes up more land.

A CBA might have more use as a tool for multi-stakeholder discussion and negotiation (see Section 3.6 of chapter 3) to resolve these issues than if it is developed solely by professional experts. The Nile and Rhine case studies both end with sections on stakeholder participation.

Of course, you might take instead a radically different approach to argue that the very nature of the climate change issue precludes attempts at valuation of any mitigation/adaptation measure within an economic 'business as usual' paradigm.

Activity 3.3 (maximum time 2 hours)

The aim of this activity is to engage in a wide-ranging fundamental debate about the economics of climate change.

Discuss the following statement. You might either write a short essay (700 words maximum) for yourself which you compare with our Discussion below, or prepare a podcast, or (better) you might debate the statement with others on the module learning community.

‘Climate change mitigation requires more capitalism, not less.’

Discussion

More capitalism is assumed to involve:

- Acceptance of the claim that human well-being is predicated on increasing economic growth
- Developing market and other mechanisms to correct for the ‘greatest market failure the world has seen’ (Stern quoted at the start of Section 3.2 of the textbook). Within this view, Stern’s promotion of transfers to developing countries is considered to be a strategy to bring them into a functioning carbon market ultimately. Also, his advocacy of increasing public Research and Development (R&D) is a strategy to enable low-cost technologies to be developed and facilitate the transition to a low-carbon, capitalist economy.

Your answer should critically engage with these two basic assumptions that lie behind the proposition of ‘more capitalism’, noting strengths as well as weaknesses. In dealing with the weaknesses you should draw on some of the counter arguments that are contained in Section 3.5 of the textbook on alternative economics. Thus:

- *The Marxist critique.* ‘More capitalism’ assumes that economic growth is maintained through a market-led transition to a low-carbon economy. Stern notes the costs of R&D that will be involved, and also the transfers that will be necessary to bring on board developing countries. However, he ignores the relations of production in the capitalist economy and the consequence that the cost of transition in terms of de- and re-skilling, unemployment and overall job security may be high and that there will be losers.
- *The institutional critique.* ‘More capitalism’ makes a false assumption that markets can be made to operate in the same way everywhere, when in fact they develop within local institutional contexts which modify the ‘rules of the game’, sometimes making them ‘less capitalist’. One classic example would be to protect ‘infant’ low carbon national economies from global competition in order to establish them, just as Germany did generally with respect to its industrialisation in the mid-19th century in order to catch up with the original industrial revolution in Britain. Thus, although ‘more capitalism’ might work in some idealised circumstances, we cannot assume that one size fits all.

- *The contraction and convergence critique.* ‘More capitalism’ assumes ‘business as usual’ in a world of finite resources that are under increasing pressure. Climate change is not an isolated challenge, but part of a broader challenge of sustainability. The problem is ultimately about the mantra of economic growth, whose energy and other natural resource demands will overwhelm attempts to mitigate the climate change challenge by correcting for the market failure. Moreover ‘more capitalism’ concerns both gaining and maintaining competitive advantage, when we should be working together to face the challenge. Working together between countries can only be achieved if current structural inequalities between developing and developed countries are addressed, by developed countries accepting that their economies should contract to some extent, while allowing developing countries to continue to grow until there is a steady state convergence of economies across the world. This can be justified for all countries if one moves away from purely economic measures of human welfare to multi-dimensional measures where, above a certain level, human welfare becomes less dependent on economic growth.

Activity 3.4 (maximum time 8 hours)

The aim of this major Activity, which you undertake with others, is to develop a CBA on a climate-related project from a particular perspective, which you then compare with CBAs derived from other perspectives.

We suggest that you spread the 8 hours over one or two weeks, on the following steps.

1. Read the brief provided in Box 2 which concerns a CBA for flood defences for a river.
2. Group formation. With the help of a moderator, establish a viable group: six active members would allow a minimum of two per team in step 3 below.
3. Divide into the following teams that will consider the proposed flood defence project from different perspectives:
 - a) A local community association which is primarily concerned about flood protection in the neighbourhood.
 - b) An environmental NGO which is more concerned to promote mitigation rather than adaptation, and frames all of its policies within the context of sustainable development.
 - c) A prospective private developer to build houses on the land for which flood protection is proposed.
4. Using the brief provided for your team and the spreadsheet which is also supplied, create a CBA for the project which reflects your team’s perspective. Submit this CBA and a supplementary document which explains and justifies your input data (see the briefs for details) to the Activity electronic forum discussion by the date set by the forum moderator.
5. The moderator (representing the Local Planning Authority responsible for the flood defence proposal) will structure a limited discussion of the CBAs. If there is time, you will be asked to explore the possibility of negotiation between teams to create a common CBA. If this is not possible the moderator reaches a decision, which is final.
6. Finally, step back from the process and write an individual reflective essay for yourself (500 words maximum) about the group work process, the technological medium of virtual forums, what was achieved, what was not achieved, and developing your own transboundary competence skills.

Discussion

This Activity should be moderated by a tutor who will provide a summary at key points and pointers for the final personal reflection in Step 6.

Box 2: The general scenario for Activity 3.4

East Middling is a small town of 6,000 inhabitants on the River Tow somewhere in the European Union. From the 14th to late 19th Century it was famous for its manufacture of quality cloth which could be found in the palaces of the Kings and Queens of Europe. Since then, however, both industry and town have slowly declined in wealth and importance. Today East Middling has mostly an ageing population, and the workforce to a large extent commutes to larger towns up to two hours of travel away.

About 15 years ago, attempts were started to revive the town by exploiting its heritage in cloth making and some of its grand historic buildings. This has succeeded in attracting significant tourism and shops have opened to cater for the trade. The Local Planning Authority (LPA), however, would like to put these gains on a sustainable footing by encouraging younger, career-minded people with families to live in the town, attracted by its low-crime rate and attractive, peaceful surroundings. It has formally incorporated this desire as an aim in its strategic plan.

The River Tow runs roughly North-South and the main town is situated on a rise above its East bank. As an experiment in its overall plan to attract young, working families to the town, the LPA gave permission 10 years ago for a small development of 50 houses on the West Bank of the river, in effect on its flood plain. After several years of dry summers and no floods in living memory, the LPA scarcely gave a thought to this possibility, considering it to be of minimal risk. Neither did the young families who moved into the houses, who were hailed by the local newspaper as 'pioneers of East Middling's next generation'.

Three years ago, the property developer which had built the first houses on the West Bank applied for permission to build a further 150 family houses on unoccupied flood plain adjacent to the original development. Again the LPA was well-disposed to the proposal as it considered the initial 50 to have been an 'experiment' which was successful. However, a number of residents, mostly from the original development, unexpectedly objected to the proposal, mostly on amenity grounds, which slowed down the process of granting permission to develop the land.

The LPA was still examining the objections to the proposed new development when, two years ago, the area was hit by unseasonal, torrential rainfall which lasted several days. The River Tow burst its banks and of course became the talking point of the town and also, for a short time, it featured on the national news. The floods in fact did not do much physical damage to the 50 houses and nobody had to be evacuated (although helicopters were put on standby). Nevertheless, and in keeping with national news of the moment, the local newspaper announced that 'climate change has hit our town'.

This event, the associated bad press and the fear that it would impact negatively on the town's tentative revival galvanised the LPA into action. In the aftermath of the floods it declared that defences would be built along the relevant part of the river to guard against any future risk of flooding. It also put into abeyance the planning application to build further houses, stating that it would be 'irresponsible' to consider such an application until flood defences were in place. It indicated also, however, that in principle it was still in favour of the development in order to expand the town, encourage young families to live there, and expand the local economy. Other possibilities for housing away from the river were limited in size and had various other problems associated with them, such as being located on prime agricultural land and difficult to attach to services.

The political members of the LPA had also learned a lesson from the surprise objections to the proposal to further develop the housing on the West Bank. They decided that, far better in the long run, would be to consult relevant stakeholder groups from the outset, rather than make top-down expert-led decisions. As one member put it: 'It's all very well for different interest groups to protest, but they must also come forward with their own viable proposals, and we will consider them carefully before making our final decision.' The LPA decided, therefore, to put this new principle of prior consultation in place in relation to options for the new flood defences.

Another LPA member suggested successfully that the consultation should be around the economics of alternative schemes for flood defences, on the grounds that 'money always makes people focus on the hard choices'. Thus, the idea came about of inviting key stakeholder groups to each submit a cost benefit analysis (CBA) of their favoured scheme for flood defences. It would not, however, be an open consultation and the LPA would set the boundaries and provide several of the cost/benefit estimates. The key stakeholders invited to submit a CBA would be the property developer (*Family Homes*) and the residents' association of the original West Bank development (*The Riverside Community Association*). More controversially, but eventually accepted, was that an alternative view would be sought from a well-known national environmental NGO (*Help the Environment*). Crucially, however, the old town on the East Bank would not be included in the consultation.

To aid the CBA, LPA experts have provided low and high cost options for flood schemes, and have estimated the tangible benefits to the original community and to the LPA. The latter comprise the net benefits of releasing the flood plain land rather than, for example higher value agricultural land and/or land that is difficult to connect to services elsewhere. The LPA has further declared that it will not countenance from stakeholders in the consultation changes to the benefits to itself, being confident that these have been accurately quantified. It does recognise, however, that it might have to consider additional benefits to the community that lie beyond its estimate. These must be quantified, and must not exceed the value of the tangible benefits to the community which the LPA has already estimated.

The LPA has also set the project life at 60 years and indicated the range of acceptable discount rates (0–10%) in order to limit stakeholders arbitrarily choosing discount rates to make the 'sums come right'. Each stakeholder will also have to submit a supplementary document justifying its analysis.

This is where the simulation starts. You will be in a small team representing one of the stakeholder groups. Your job is to create a CBA which is in line with your stakeholder interests, while being based on reasonable assumptions, and yielding a positive net present value (NPV). You will submit your CBA and justifying documentation to the LPA by a stated deadline. There will then be opportunity to consider and discuss the three CBAs and even form alliances with other stakeholders to promote your case.

Workbook for Chapter 4: The politics of climate change

The key points of Chapter 4

This chapter introduces the “Politics of Climate Change”. Reflecting the politics at the international level, it analyses the major steps in the development of international climate change negotiations. It focuses on the major international conferences like Rio and Kyoto. Furthermore, it discusses the most important problems and the constraints for a binding international agreement. It introduces global governance as a concept for analysing the evolution of policies required at various levels of policymaking below and beyond the level of the nation-state. It uses the policy cycle as a tool for analysing climate change negotiations in a historical perspective. In another step, chapter 4 describes the main types of actors relevant in climate change politics. It argues that states are the most relevant actors in the international negotiating process and illustrates major lines of political conflict which determine international negotiations -- for example the North-South problematic. It uses the terms ‘pushers’ and ‘laggards’ as an important distinction in order to identify different mindsets of states.

Chapter 4 emphasises that international organizations, transnational actors such as business companies or NGOs and expert groups are also important players in climate change in addition to the role of states.

Activities for Chapter 4

The activities which you find below are intended to enhance and deepen your understanding of the complexity of international climate change politics. You can test and demonstrate your ability to reflect and apply the main arguments or concepts by working on these activities. The activities will require you to apply both your theoretical and empirical understanding of the text. They can be done alone or in a group with other students. We recommend that you should exchange experiences and learning outcomes with your fellow students. You may use the electronic discussion forums or other forms of communication for collaboration.

Activity 4.1 (maximum time 2 hours)

The aim of this activity is to ensure that you have a basic understanding of Section 4.2 which introduces basic theoretical concepts of political science which can be used for exploring climate change politics and the evolution of international climate change politics. In particular, Section 4.2 describes how climate change became a central issue on the international political agenda. To develop this basic understanding you should:

1. Re-read Section of 4.2 and try to summarise each sub-section in a few sentences.
2. a) Try to create an overview about the current institutional architecture of the climate change regime. By this we mean the political structure, which includes the actors and institutions that are involved, and how they are linked. You can also give an idea of their relative importance.
 - b) Then answer questions which help to identify important actors or institutions. For example: What are the most important institutions? How and by whom are the international conferences organised? How influential is science for agenda-setting, for national interests, or in negotiations?
 - c) Write for yourself some notes on this current institutional architecture. Alternatively, if you are used to the technique, you can create a mind map to illustrate your thoughts.

There is no discussion to this activity. The answers are found relatively easily within the Section 4.2 text.

Activity 4.2 (maximum time 1 hour)

The aim of this activity is to apply some of the key concepts of Section 4.2 and Activity 4.1 to the water case study.

1. To what extent can the following be described as international regimes:
 - The Nile Basin Initiative (NBI)
 - The International Commission for the Protection of the Rhine (ICPR)?
2. Why does international cooperation along the Rhine appear to be easier than it is along the Nile?

Discussion

1. Answers to this question are inevitably a matter of judgement. Our view is that the NBI cannot be described substantively as an international regime, although it contains some of the elements of one. Taking Box 4.2 of the textbook as our guide, the NBI does not provide an institutionalised system for problem solving and a framework for negotiation among states along the river. It has drawn up a Nile River Cooperative Framework Agreement, which is on the table and could form the basis of such a rule-based regime, but this has still to be ratified. However, the NBI has agreed a set of policy guidelines with the intention of achieving basin-wide cooperation, but substantive cooperation on key issues does not appear to be the case.

On the other hand, the ICPR can be described as an international regime in our view, in that it does provide a framework for cooperation by the riparian states, including settlement of disputes. The states have signed up to it and engaged in substantive actions along the river.

2. Our view is that there are two main elements to this question; a) the nature of the problem along each river; b) political history of conflict and institutions for resolution.
 - a) The length of the Nile is characterised by extreme climatic variability, from the equatorial rains of, for example, Uganda at one of the river's sources, to the desert of Sudan and Egypt downstream. Maintaining the flow of the river downstream is therefore critical to Sudan and Egypt, and anything that is done upstream that might alter this flow (such as diversion of the river for irrigation or the building of a hydro-electric power plant along it) is strongly resisted, with the threat of force.

The Rhine does not experience the same climatic extremes as the Nile. One of the main problems concerns water quality and the riparian states share a common interest in improving it. The most downstream country, The Netherlands, suffers the opposite problem to that of Egypt – the risk of flooding. The Netherlands considers controlling flooding within its territory to be its responsibility – the activities of upstream countries are unlikely to contribute significantly to the problem.
 - b) Early treaties along the Nile were drawn up with the main colonial power of the region, Britain. They primarily met the interests of the most important country politically along the river, Egypt, through protecting the flow of the river from upstream activities. Post-colonial treaties and agreements have followed this pattern, with Egypt forming alliances with, for example Sudan. Such arrangements, deemed to be inequitable by other riparian countries and hindering their development, have inevitably led to stand-offs and belligerent rhetoric from political leaders.

There is a longer history of negotiated conventions and protocols along the Rhine which led to the ICPR being established in 1950. Also, all countries belong to the supra-national European Union with powers to set Framework Directives. Relevant to the Rhine is the European Water Framework Directive of 2000.

Activity 4.3 (maximum time 4 hours)

In this activity we want you to apply the empirical and the theoretical approaches which were introduced in the textbook, especially sections in which the obstacles and problems were discussed which determine the climate change negotiations. This activity should invite you to think about future events and perspectives of climate change politics.

1. Make notes on the development and achievements of climate change negotiations. You can use your notes which you developed in Activity 4.1. The future perspectives for a binding climate change agreement are discussed in Section 4.2.5 of the textbook. Your theoretical and empirical knowledge should enable you to discuss the following questions:
 - a) What basic theoretical concepts can be used for dealing with climate change as a political issue? Which specific research questions concerning climate change politics come to your mind?
 - b) What have been the most important obstacles to developing an international agreement? Where do you see focal points or major lines of conflict for further negotiations?
 - c) Who are the most relevant actors?
 - d) What could be the next steps in this process?
 - e) What might be alternative ways for reaching an international consensus outside of the UN process? Are international institutions indispensable for achieving an effective global solution? Please try to explain your answer.
2. Write a small essay for yourself with no more than 500 words that covers at least two of the questions a)-e) above.

Discussion

The ideas you have developed in your essay should be the basis for further discussions about the future climate change negotiations. The e-discussion forums give you the possibility to present your thoughts and ideas or to debate them with other students. Although the discussion should be done in collaboration with other students you might also use other platforms as a basis for communication. Please consider the following points in your discussion:

- What issues do you consider to be most important in dealing with the topic of climate change from a perspective of political science?
- What are the most important issues in future negotiations?
- Which actors (or type of actors) do you consider as most important for future problem-solving?

A useful resource for helping you to organise your ideas is the book edited by Giddens, Latham and Little (2009) "Building a low carbon future: The Politics of Climate Change"². The chapters in this book deal with the domestic dilemmas and a potential

² A complete version of this book is available at

<http://politicsofclimatechange.files.wordpress.com/2009/06/building-a-low-carbon-future-pamphlet-web.pdf>

framework for action. As an example in Box 3 below, we reproduce an extract of the chapter by Hugh Compston and Ian Bailey.

Box 3. ‘How can we build political support for action on climate change in western democracies?’

Introduction

Numerous policies, initiatives and instruments have been developed over the last decade in an effort to curb human emissions of greenhouse gases. Some have been more effective than others and to an extent the search for the “holy grail” policy goes on, with emissions trading perhaps the nearest to achieving this status. This “policies-and-instruments” approach has focused attention on many core concerns for climate policy (effectiveness, economic efficiency and equity) but arguably pays insufficient attention to the problem of how to build political support for climate policies, despite the fact that the short history of climate policy in Britain and elsewhere is already littered with good ideas that, due to lack of support from the public, industry and special interests – as well as obstacles within governments, legislatures, departments and political parties – had to be abandoned or diluted to the point where they lost most of their impact.

A political strategy approach in contrast focuses on the tactics that governments might employ to maximise the chances of strengthening climate policies while avoiding the loss of significant amounts of political support. This approach deals less with normative views of what climate policy should look like in a hypothetical world free from political constraints and instead focuses attention on how policies can be structured, linked and presented to weaken potential opposition. Here we summarise early results from an international project aimed at identifying political strategies that may enable governments to take more effective action on climate change without suffering significant political damage (Compston and Bailey 2008, Compston forthcoming 2009). Although it may seem presumptuous for academics to advise politicians and officials on political strategy, so far those involved in policymaking have not been able to deliver a programme that will bring climate change under control, and academic perspectives bring different theories and analytical methods to bear on the problem.

Our analysis indicates that political strategies for strengthening climate policies can be divided into four broad categories: playing it safe, improving communications, changing the rules of the game, and venturing beyond consensus.

Playing it safe

1. Stick to consensus policies

The most obvious way for governments to maximise political support for climate policy is to stick to policies on which they have already secured the prior agreement of the main affected political actors and, implicitly, of the electorate as indicated by the results of opinion polls. This approach has pervaded much of the climate politics of western democracies. One indication of this is the profusion of voluntary or negotiated agreements whereby industry groups agree to reduce their emissions in exchange for the non-imposition or delay of legal requirements or economic instruments. The classic example of this was the granting of 80 per cent reductions in the UK’s climate change levy to energy-intensive sectors that signed climate change agreements. The disadvantage of the consensus approach, of course, is that it can impede further progress due to the effective veto that the perceived need for agreement gives to all stakeholders.

2. Small steps on many fronts

Strengthening policies in repeated small steps is a well-recognised technique for getting something done while not arousing political opposition and, in addition, enables experimentation with new ideas before they are rolled out on a large scale. Although restricting policy changes to incremental steps can make it difficult to introduce entirely new types of climate policies, the impact of this strategy can be maximised by moving on as many fronts as possible. This approach too has been widely adopted by western governments.

3. Take advantage of windows of opportunity

Although it is impossible to be certain of a causal link in individual cases, research indicating that climate change is responsible for an increase in the frequency and seriousness of extreme weather events has fuelled media speculation about this link whenever weather related disasters occur (Boykoff 2007). Similar spikes in coverage have occurred with the publication of high-level scientific reports on climate change. Consequent rises in public concern about climate change create potential windows of opportunity for governments to introduce or strengthen climate policies while sustaining less political damage than might be the case at other times. In some cases governments might even benefit politically, as appeared to happen in Germany in 2002 when the Elbe floods were instrumental in the government introducing new targets (Michaelowa 2008).

In Australia, prolonged droughts were utilised effectively by Kevin Rudd's Labour Party first to win the 2007 election and then to push through Kyoto ratification and the Carbon Pollution Reduction Scheme.

It follows that one effective tactic for governments is to have policies ready to go in order to take advantage of these windows of opportunity when they occur, provided that these policies are properly thought through in order to avoid accusations that they are ill-considered, "knee-jerk" reactions. Although events can also draw attention away from climate change, as has occurred since the onset of the global economic downturn, if climate scientists are right we can expect windows of opportunity caused by extreme weather events to occur more and more frequently as time goes on.

4. Continue to push for international agreements

Pressing for international agreements has the advantage, if successful, of both getting more countries involved in carbon reduction and reducing the likelihood that domestic climate policies which increase business costs will be undermined by foreign competition and/or carbon leakage. One tactic is for governments to steer international debates by making strong declarations prior to major conferences. This was used by the EU prior to the UNFCCC Bali negotiations when it issued a unilateral declaration that it would reduce its domestic emissions to 20% below 1990 levels by 2020 and by 30% if other major emitting nations followed suit. International agreements also can be used to develop alternative approaches, as occurred with the Asia-Pacific Partnership on Clean Development where the USA, Australia and Japan enlisted China, India and South Korea into joint initiatives on technology transfer and sharing of best practice. Whatever criticism might be levelled at the partnership, it does offer an alternative to the "targets-and-timetables" approach of the Kyoto Protocol by instead focusing on the means of implementing climate policy, and arguably drew leading developing economies into more active participation than the UNFCCC had managed.

5. Improve policy design

Policies need to be not only technically and economically well-designed but also politically well-designed. For example, climate policies that are seen to distribute costs equitably, or which also contribute to the achievement of other policy objectives, such as energy security, should encounter less political opposition than policies that are perceived as being unfair or which have no co-benefits.

6. Offer tradeoffs

Obtaining the agreement of powerful political actors to policy changes in one area in exchange for policy concessions in another is a well-known feature of governance.

The finer skill here is to identify concessions that are not especially significant to the government but are significant enough to the political actor(s) concerned to elicit their acceptance of new and/or strengthened climate policies. One example, discussed by Macdonald (2008), is the case of the Canadian federal government providing its oil-dependent provinces and major oil companies with subsidies for technological development in return for their acceptance of a carbon tax.

7. Introduce spillover policies

Spillover policies in this context mean policies that: (1) are relatively easy to transfer to other countries; (2) are difficult to reverse once introduced; and/or (3) create functional or political pressure for further strengthening or the introduction of related measures, for instance policies that increase investment and employment in the renewables sector and in so doing increase pressure on governments to take further steps in this area. Policies that tend to increase pressure for new or stronger policies at European level have been used extensively by the EU across its policy areas. In relation to climate policy perhaps the best example is the EU emissions trading scheme, where the Commission initially accepted a relatively decentralised system and undemanding targets during the scheme's first two phases but used this experience and the problems encountered during these periods to garner support for a more centralised system and stronger targets.

(...)

The text is an abstract (p.53–56) from Compston, Hugh; Bailey, Ian (2009). How can we build political support for action on climate change in western democracies? P.53–61. In: Giddens, Anthony; Latham, Simon; Liddle, Roger (Eds.) (2009). Building a low carbon future: The politics of climate change. London: Policy Network.

Workbook for Chapter 5: Climate change – a sociological perspective on lives and livelihoods

The key points of Chapter 5

This chapter argues that whilst sociology, in comparison to natural science, is somewhat of a newcomer, it has made headway into contributing towards an understanding of climate change. This is because it addresses the notions of power and inequality, and explores the relationship between individuals and societal structures, both local and global, in analysing issues, impacts and actions around climate change.

Activities for Chapter 5

The activities below will help you expand and deepen some of the points raised in the chapter. They will also develop a critical understanding of a sociological perspective in relation to climate change. This will help you to achieve the Learning Outcomes identified at the beginning of Chapter 5 in the textbook.

Activity 5.1 (maximum time 3 hours)

The aim of this activity is to engage with the relationship between historical change, and individual behaviour and social structures (Section 5.1 of the module 1 textbook) with specific reference to climate change.

- 1) Read Box 4 below where I have expanded on this relationship for India. Here, I have used the material on India in Section 5.1 as a starting point, augmenting it with my personal knowledge of that country and an internet search for relevant information. Also note that I have set the relationship within a historical perspective of change stretching back to the mid-20th century when India gained independence. Use Box 4 as an exemplar of what I expect of you when you answer questions 2a-2c below.
- 2) For a country of your choice (one which you know well and/or about which you are able to obtain relevant information from an internet search):
 - a) What is the global context for the contemporary economy of the country?
 - b) What is the country-specific political, economic and social context within which individuals operate?
 - c) What is the relationship between these contexts (and the historical changes from which they derive), individual behaviour and climate change? Take one facet of individual behaviour, such as ‘middle class consumption’ as I did in the case of India (Box 4).

Given that I do not know the country you have chosen there is no discussion to this Activity.

Box 4 The inter-relationship between context and individual behaviour in India

The global context of 21st historical change for India is set within a globalised world, dominated by a free market ideology. To join this, India has to shed its image as a developing country and make competitive headway into global markets.

The country specific political economic and social context includes a radical shift from the post-independent (1947 onwards) closed economy which was based on socialist-democratic principles, with a leaning towards Gandhian anti-industrialisation and pro-poor principles. This involved a protected (whose strategy included import restrictions), centrally planned economy based on 5-year plans of the Soviet Union style. However, in 1991, the then Prime Minister Narasimha Rao quickly (within a week or so), lifted import restrictions and put in place structural reforms to enhance exports and encourage entry to global markets. Thus trade subsidies were removed, currency adjusted, global trading partnerships and investment were encouraged, tax reforms carried out, and deregulation and privatisation introduced to manage corruption and efficiency in public services. In sum, a few weeks in 1991 represented a dramatic shift towards economic liberalisation.

The social context is one of a secular society which nevertheless sees frequent conflict between different Hindu caste groups and other religious groups such as Muslims. Politically too there are battles between fundamentalists with differing religious affiliations. The biggest, most apparent disparity is between the urban and rural areas and the rich and the poor. The rich include the “super-rich” (many of whom are major industrialists), while at the same time there are millions of poor who go hungry and eke out a living with incomes below US\$1 a day. There is a large and increasing middle class population which has made major educational, scientific and income inroads.

The relationship between these contexts (and the historical changes from which they derive), individual behaviour and climate change: As indicated above, I focus on individual consumption. During the period when India had a full internal economy and markets, together with underlying principles of a pro-poor, rural-sympathetic Gandhian philosophy, consumption focussed on Indian manufactured products. State shops (such as Gandhi Bhandar) which sold village crafted goods (such as home-spun cloth) were abundant even in urban areas. Conspicuous consumption was not the norm and recycling of all goods was “traditional”. A national underlying belief in a Gandhian simplicity meant that even those who travelled abroad were only allowed a very limited sum of hard currency to take with them, purchase of export goods was under close customs scrutiny, and generally self-sufficiency was encouraged. Whilst India continued a path towards industrialisation during this period, it still retained a very large informal labour force which allowed it to contain much of the domestic production and consumption.

With a major historical change towards trade liberalisation, Indian consumption patterns have changed. There is more freedom to deal with hard currency and import/export markets. Foreign supermarkets, shopping centres, and high consumer goods such as cars can now be seen in abundance especially in the big cities such as Mumbai and Delhi. Trading, increase in manufacture and entry to the world market in a major way has increased the spending power of the middle classes and the super-rich who no longer have to hide their access to foreign currency. The result is that consumption for millions of people has become akin to their “western” counterparts, i.e. conspicuous and demanding of new gadgets, fashions, design, replacement and “throw-away” goods. The links between individual behaviour and a historical move towards trade liberalisation are thus quickly apparent. However, this does raise the question: What does this mean for climate change? Certainly it reminds me of this quote from Gandhi:

“God forbid that India should ever take to industrialism after the manner of the west. The economic imperialism of a single, tiny island kingdom is today keeping the world in chains. If [our nation] took to similar economic exploitation, it would strip the world bare like locusts.” (Young India, 1926, 7th October, <http://www.mkgandhi.org/encyclopedia/sources.htm>)³.

³ *Young India* was an Ahmedabad (Gujarat) based pre-independence weekly journal edited by Mahatma (M.K.) Gandhi.

Shall the trend towards conspicuous consumption by the millions in India also threaten our world in this way, including a massive contribution to global warming?

Activity 5.2: (maximum time 2 hours)

This activity relates to Section 5.2 of the textbook. The aim of the activity is for you to apply the concepts of, and explore the relation between, structure and agency in the context of climate change to your own personal circumstances.

1. Think of how your own behaviour and life chances have been influenced by (a) the structures of the society you live in and (b) how much agency you can exercise within these. You can also reflect on the extent to which you feel you have some power within your particular social setup.
2. Reflect on the extent to which your personal interaction of structure and agency has affected your response to climate change.

As an exception to the general rule, you should read the discussion below, which is a worked example, before attempting this activity in relation to your personal circumstance.

Discussion

Here is a worked example based on the story of Fatou (Box 5), a fish seller in a busy market in the Gambia on the west coast of Africa who talked to me about her life on a research trip that I undertook. This will help you to develop your own reflection.

Box 5. Fatou's story

Fatou (short for Fatoumata) is the second wife of Abdoulie, living in Birkhama, a small township which is an hour's ride from the capital of Gambia, Banjul. She has no formal education beyond broken primary schooling and her father arranged her marriage when she was about eighteen. She has four children, who according to the Gambian context of polygamy, are her responsibility. She is keen to educate them but often struggles with fees and uniforms, so keeps them off school.

Fatou travels every morning to Gunjur which is some distance away and has to take three crowded bush taxis to buy fish from the canoe fishermen that she and her daughter can sell at the Birkhama market. She has to do this every day as she does not have icing facilities and is obliged to sell her stock, often at a low price so that none is left to rot at the end of the day. Sometimes, however, if the leftover stock is significant, she takes it back home to smoke and preserve for future sales.

She can only afford to buy a limited amount of 'bonga', a local small fish popular in the Gambia, Senegal, Guinea and other surrounding areas. Although the bonga is also dried and smoked, fresh bonga is more popular and likely to attract better sales. However, the competition between market women to acquire and sell fresh bonga is fierce. There is also increasing competition from larger (male) traders who have the ability to buy the fish in large quantities and transport it quickly to the markets using insulated vans with icing facilities or bicycles. Fatou is hoping that the government will help market women obtain fridge and icing facilities to store the fish and she has attempted to campaign for this with other women. However, nothing has as yet resulted.

Fatou says that her profit margin is low due to high fish prices, cost of ice blocks, travel to Gunjur, and the municipal (council) payment for selling in the market. She also needs to work very long hours, rising very early in the morning to catch the fishing boats, working in the market all day and returning home to many domestic chores including lighting cooking fires, fetching water and looking after the household needs. Her co-wives (her husband has four wives altogether) help her with the childcare and the tending of the vegetable plot that they share near their compound. Selling fish is hard work with low profit margins but she has little choice, particularly as the price of rice (the staple) and other goods is rising every day. She is also responsible for her children's school fees, health care, clothing and other general expenses. She is worried that she is getting old and will not be able to sustain the pace required for very long.

Like Fatou, millions of people on the coast of the Gambia and Senegal rely directly or indirectly on fishing and aquaculture livelihoods. Fish and sea foods also form the mainstay of protein diet within households. There is evidence that fish stocks are affected by climate change due to phenomena such as the loss of coral reefs, warming of waters and decreasing seasonal rainfall, which together disrupt fish migration and spawning patterns (National Adaptation Programmes for Action on Climate Change, NAPA 2007, <http://unfccc.int/resource/docs/napa/gmb01.pdf>). While all of this leads to a threat to livelihoods and malnutrition, as the government recognises, climate change is projected to exacerbate poverty, hunger and migration in The Gambia.

There are a number of ways of looking at how structure and agency have shaped Fatou's behaviour and life chances. For instance,

- Fatou's localised overall poverty is structurally constrained by her country's economic position as one of the poorest countries in the world. This means that at a local level, she is experiencing price rises in the cost of food and other commodities.
- Fatou is also working within the framework and constraints of global trade negotiations (even if she is not aware of this). For instance, she and her people rely on a smaller, less meaty fish for their standard diet caught by local canoe fishermen, while Japanese and other large fishing fleets have gained access to fishing rights in the Gambian waters for more expensive fish such as cod.
- Her poverty is also gendered. For instance, as a woman Fatou has received little education which can better her life chances.
- Patriarchal structures also shape her behaviour and social relations within the household and her place within the wider society. Thus Fatou is a co-wife, with her marriage arranged by her father. She is responsible for raising her children and general domestic duties. Fatou lacks the capital to buy transport, icing facilities or even more profitable fish, both because of general household poverty, but also because men, who are heads of household, have better and more direct access to capital in the society she lives in.
- Fatou is also vulnerable to the wider processes of climate change. Firstly, the Gambia has a low-lying coastal zone which has always been prone to flooding and visible coastal erosion such as the sinking of tourist beach hotels. In recent years, this has increased so much so that the Government has enforced a ban on the removal of sand from the coast. In turn, this affects the national economy through loss of tourism (Gambia's primary sector), tourism-connected luxury commodities, and income.

Does this make Fatou powerless? Not quite. She does exercise agency in attempting to address her needs. She therefore seeks help from her co-wives, and she attempts to organise and campaign with other women to lobby government authorities for help with icing facilities. She is ready to compete with other women (and men) in the market in spite of her personal struggles. Fatou is also struggling and working hard for her family

survival and the future of her children. She is also teaching her daughter trading as a future means to her own livelihood.

However, this is done within overall power contexts of international and local markets, a patriarchal society and poverty which do not allow her individual efforts and agency to flourish, contextualising her attempts in a level of powerlessness. Then there is the direct implication of changing climate on her mode of livelihood which is based on fishing and aquaculture. Changing patterns of rainfall, national poverty and lack of capacity to adapt, and continuing dependence on the high consumption demands of tourism all generate severe structural constraints, restricting the agency of the individual.

Activity 5.3: (maximum time 2 hours)

Drawing on Section 5.2 of the Module 1 textbook, the aim of this activity is to use a sociological perspective to engage critically with claims made by the World Trade Organisation and United Nations Environment Programme in relation to trade and climate change.

1. Consult the following report: Trade and Climate Change, 2009, World Trade Organisation (WTO)/United Nations Environment Programme (UNEP) Report, Geneva, WTO Publications. It is also available as PDF which you can download on: http://www.wto.org/english/res_e/booksp_e/trade_climate_change_e.pdf. Read the Executive Summary, focusing in particular on the Section 'Trade and climate change: theory and evidence'. Do not worry too much about the 'technical' economic language, although you should check your understanding of 'comparative advantage' which is explained in module 1 textbook chapter 3 (Box 3.10) and the OECD group of rich countries (chapter 4, Box 4.5).
2. What is the overall conclusion of this section of the Executive Summary regarding trade and carbon dioxide emissions?
3. What potential does the section offer for trade to help meet the challenge of climate change?
4. From your reading of this section what is emphasised, structure or agency, with respect to trade meeting the challenge of climate change?
5. The second paragraph of the section states that the historical expansion of trade raises questions with respect to climate change. The paragraph identifies two such questions. Identify a third question that a sociological perspective might raise.
6. Provide an outline hypothesis which derives from the question you formulate under Question 5. Consider a hypothesis to be a general statement about a situation, usually containing a claim that requires testing through research, for example: 'Expanding trade in low-carbon technologies will help mitigate climate change globally.' Try to provide the hypothesis in a single sentence, but also provide 2-3 supporting statements.

Discussion (Questions 2-6)

2. The overall conclusion is that the scale effect of more open trade will most likely lead to increased CO₂ emissions, and will offset possibilities for mitigation and adaptation. There may, however, be 'differences in outcomes between developed and developing countries, with environmental improvement being met in OECD countries and environmental deterioration in developing countries'. The Executive Summary section does not elaborate on this last point.
3. The main potential of trade to mitigate climate change is claimed to arise from 'spreading technologies' and learning about 'production methods and design'. The main potential for trade to aid adaptation is that it allows countries where climate change has created scarcity of key goods to import in order to meet their needs.

4. The 'meta'-structure of open international trade, which the World Trade Organisation promotes and polices, is taken as a 'given'. Within this, the focus is clearly on agency – what countries might do through international trade.
5. Drawing on the subject matter of module textbook Section 5.2 and my answer to question 4, my additional question from a sociology perspective is: 'What are the structures which frame trading relations between countries, and how do they link to climate change adaptation and mitigation through trade?'
6. My hypothesis (others are possible): 'The structures of inequality between countries, in particular between rich, developed countries and poor, developing countries will frame trade in favour of the former, and any claimed positive impacts in relation to climate change mitigation/adaptation will be minimised for the latter.' Thus, it is fanciful to suggest that a poor, developing country may simply import the goods that it can no longer produce itself as a result of climate change impacts. It is equally fanciful that a poor, developing country can import the technologies it needs to mitigate its own contribution to climate change, or that it has the capacity to learn new production methods and design from developed countries.

It can also be argued that the idea of comparative advantage rationalises power and inequality between countries into an abstract economic concept, which means again that poor, developing countries are likely to be hit hardest by climate change. This is because many of them (especially the poorest) trade internationally in primary commodities – mining and agricultural produce – which have low added value compared with the manufactured and processed goods into which they make an input. Agricultural produce is particularly vulnerable to climate change. The Executive Summary section itself hints at this, singling out those countries 'whose comparative advantage stems from climatic or geophysical sources' as being vulnerable to shifts in patterns of international trade.

Activity 5.4 (maximum time 2 hours)

This activity relates to the textbook Section 5.3 discussion on mediating social relations and asks you to reflect on your own positioning in society and what has influenced your personal behaviour and life chances, especially in matters related to climate change. This is therefore a very personal exercise which you may or may not wish to discuss with others. To do the activity, answer the following:

- 1: How would you describe yourself in terms of age, gender, race, class, caste/tribal or other group affiliations, nationality, physical ability, religious and political party affiliation that identify you as a person.
- 2: Which of these factors do you feel have either helped or hindered you in shaping your life chances and individual behaviour?
- 3: From the above, write a short summary of up to 700 words reflecting on how local and global power relations have mediated your life chances and individual behaviour, especially in relation to climate change.

There is no discussion to this Activity

Activity 5.5 (maximum time 2 hours)

This activity requires you to make a preliminary evaluation of the following argument which is made in the Chapter 5 textbook: 'There is a need to develop partnerships which respect all facets of knowledge in the struggle to manage climatic change.' (Section 5.3).

1. Read Box 6 below, in which the Intergovernmental Climate Prediction and Application Centre (ICPAC) highlights the value of indigenous knowledge in environmental and disaster management.
2. If you have time, search for similar examples that are specifically related to climate management.

3. What are the potential strengths and weaknesses for climate management of knowledge partnerships between natural scientists, social scientists, and local people possessing indigenous knowledge?

Discussion

Our points on the above questions are that the potential strengths of such knowledge partnerships are:

- They allow for an increase in the knowledge data base (whatever the source) for environmental management; through tapping into and disseminating the knowledge that people who are experiencing the social impacts of climate change understand and are comfortable with;
- They engage seriously with issues of participation and equity, and challenge the elitism of scientific knowledge.
- It is also claimed that they lead to capacity building of sustainable communities and livelihoods. Capacity building includes development of:
 - preparedness and coping strategies for disaster management;
 - community memory through storage of knowledge of nature and natural cycles.

The potential weaknesses are that:

- Natural science and social science might only pay lip service to indigenous knowledge in these partnerships, claiming that it lacks the rigour of the sciences.
- Indigenous knowledge could be seen as undermining the basis on which scientific knowledge (both 'mainstream' and social science) stands, and therefore resented
- Whereas, 'mainstream' and social science can respect each other, their mindsets are too far away from that of indigenous knowledge to enable any fruitful synthesis.
- Indigenous knowledge could not be easily assimilated in scientific reports.

You will find much more discussion of local experiential knowledge in Module 2 of this series: *The lived experience of climate change*.

Box 6: 'Good traditional practices in environmental management'

The Intergovernmental Authority on Development Climate Prediction and Application Centre (ICPAC) is based in East Africa. It is part of the East Africa Intergovernmental Authority on Development (IGAD). ICPAC has identified the application of good traditional practices in **environmental management**, monitoring prediction and early warning. Examples include:

(a) Fish resources conservation including traditional indigenous knowledge of fish breeding periods and places, behaviour of fish-eagles enabling fishermen to know the movements of schools of tilapia and other types of fish; types of winds and their direction allowing fishermen to determine whether fish had changed their direction and the depths of water in which they could be found; the behaviour of different kinds of fish in order that fish nutrients could be maintained during all seasons;

(b) Land use conservation: shifting cultivation was a traditional practice in which land was never overused nor cultivated repeatedly, season after season and year after year; but was left to rest and plant cover was restored to enable it to accumulate vegetable manure. The practice of mixed crop cultivation enabled leguminous crops to restore nitrogen in the soil for other food plants. Knowledge of when to expect long and short rain seasons allowed farmers to plan which crop was suited to a particular season and traditional indigenous knowledge terminologies of types of soil and their reaction to water facilitated the planting of appropriate seeds for each type of soil;

(c) Biodiversity conservation: knowledge that local birds socialised in local trees and bushes and that, once those trees and bushes were cleared, the birds would migrate, leaving the local community without ecological indicators of the natural environment.

Disaster management practices identified include:

(i) Wind patterns: traditional indigenous knowledge of storm routes and wind patterns enabled people to design their disaster management practices in advance by constructing appropriate shelters, wind break structures, walls, and homestead fences. Preparedness for hydrological disasters was crucial, including traditional indigenous common sense, understanding of wind patterns and their level and intensity, which enabled people to plan their daily economic and social activities with foresight;

(ii) Cloud and rain patterns: knowledge of local rain corridors made it possible for people to prepare for storms; knowledge of the cloud colour that might carry hailstones enabled people to take cover; knowledge of thunderclaps, clouds and winds taught them to expect storm and lightening; knowledge that prolonged drought was followed by storm, thunder and lightening during the first few rains enabled them to prepare for and expect a disaster; knowledge that changes in birds' cries or the onset of their mating period were indicators of seasonal change; knowledge of positions of the local clouds enabled the community to assess changes in cloud movement and take appropriate action;

(iii) Animal behaviour: observing the migration of a large swarm of butterflies, for example, was a sign of a pending army worm infestation and famine which meant that people should begin planting potatoes and cassava, as a precaution since those were dry season crops; observing bees migrating in large swarms was an indication of a pending dry season requiring livestock herders to migrate to high or low ground in search of grass and water; animal behaviours were indicators of climatic change, weather change, pending storm, droughts, or seasonal change; and knowledge of snake behaviour when they were thirsty enabled elders to assess the extent of droughts; their presence also reduced the problems of rat infestation.

Source: Kenya: Intergovernmental Authority on Development Climate Prediction and Application Centre.

Workbook for Chapter 6: Conclusion – integrating perspectives within the paradigm of sustainable development

The key points of chapter 6

This relatively short chapter starts by summarising the main messages of the natural science, economics, political science and social impact chapters. It acknowledges the valuable depth of analysis in each while pointing out that they are inherently also constrained (disciplined) by their own core ideas and concepts. This leads to consideration of complementary, interdisciplinary, integrated approaches.

The Integrated Assessments of the Intergovernmental Panel on Climate Change are considered as steps in the right direction, but these too are lacking in some respects. The concept of sustainable development, with its attempts to integrate the pillars of environment, economy and society, is also considered. Like the Integrated Assessments, however, sustainable development, at least in this version, fails to take into account the ‘realpolitik’ of climate change policy-making (see also Activity 4.2 above). Extending this critique, chapter 6 ends by arguing that climate change in the context of sustainable development should be considered as a process rather than a final state, a process of engagement and learning from both our differences and interdependence.

Activity for Chapter 6

This single activity is intended to help you engage critically with the notion of climate change in the context of sustainable development as a process of learning and engagement. Overall, it contributes to your realisation of the following module learning outcomes that are outlined in chapter 1 of the textbook:

- The integration of different scientific perspectives on climate change through the concept of sustainable development.
- Examine critically a range of media and perspectives on climate change and sustainable development
- Apply the concept of sustainable development to integrate a range of climate change perspectives
- Marshall evidence, and develop and communicate in your own words an argument.

Activity 6.1 (maximum time 2 hours)

Make a plan for an essay which would provide a structure for answering the following assignment:

‘Climate change in the context of sustainable development is best approached as a process of engagement and learning.’ Critically evaluate this conclusion of chapter 6.

Include in your plan, some of the key concepts that you would use to drive your answer, and demonstrate briefly how you would build an argument around them.

Appendix 1 of this workbook, which provides advice on structuring essays and reports, should help you with this task.

Discussion

Below is our attempt. Don’t worry if your attempt is different, but use it as a point of comparison to reflect on the strengths and weaknesses of your plan. We make some

further notes about this plan, and essay/report plans in general at the end of this discussion

1. Introduction which states our approach and the basic argument we intend to make (and to which we will return in the conclusion).
2. Content words comprising brief explanations of:
 - human-induced climate change and its underlying driver of global warming;
 - the context of sustainable development;
 - engagement and learning (i.e. engagement between individuals and between groups across social and cultural divides; and joint (social) learning to construct new knowledge).

3. Argument based on:

Points for and against the proposition that climate change in the context of sustainable development is best approached as a process of engagement and learning. Cite evidence and examples where possible to illustrate your points.

Discussion of these points for and against, which involves questioning them, perhaps qualifying them and weighing the points for against the points against. Again, illustrate with evidence and examples where appropriate.

Conceptual drivers for the argument. Our choices are diversity, interdependence and power. Thus, the argument of chapter 6 is basically that diversity is a source for social learning, constructing new knowledge and ultimately action on climate change. This requires our engagement with each other and builds on our interdependence. The points that can be made against this argument are that (i) engagement is likely to be dominated by powerful actors which will skew the learning and knowledge in certain directions, (ii) we have no means of verifying that the new knowledge we construct is 'good' knowledge for addressing the climate change challenge, and (iii) the whole process might be too long and confusing and not address the urgency of the climate change challenge.

4. Conclusion where, having assessed the points for and against and the evidence, you state your own position – for, against, or mainly neutral.

A few words in conclusion about essay/report plans. Plans such as the one above should be treated as *starting points* for the actual essay or report that you eventually write. They provide a framework which you can certainly adapt as appropriate.

Adaptations to the formal plan are almost certainly likely to occur at the finer levels of detail. For example, if the explanation of your content words and phrases is relatively simple, then this might become part of your Introduction. When you are discussing the points for and against, it might be best not to separate rigidly into 'points for' followed by 'points against', because many of the latter are qualifiers on the former and vice versa. In other words, you can treat your plan quite roughly.

The above plan is for an essay where, generally speaking you would not have any headings and sub-headings (although sometimes this does occur in an essay). Instead, you would use signposting words (see Appendix 1) below to make your essay flow from one section to the next, especially at the finer levels of detail. If you were writing a report, you would almost certainly use headings and sub-headings to indicate direction and coherence, but not necessarily using the words we have used above to indicate the main sections. For the above assignment in report-style, our headings and sub-headings would be:

1. Introduction
2. Climate change, the context of sustainable development, and engagement and learning

- 2.1 Climate change
- 2.2 The context of sustainable development
- 2.3 Engagement and learning on the climate change challenge
- 3. Meeting the climate change challenge through engagement and learning
 - 3.1 The challenge of diversity
 - 3.2 Power versus interdependence
 - 3.3 Verifying knowledge
- 4. Conclusion

Appendix 1

Advice on structuring and writing essays or reports

If you are studying the Lived Experience of Climate Change modules for accreditation within a university, you will eventually have to communicate an answer to a formal assessment by way of an essay or report. In this Appendix We provide advice on ensuring that a longer piece of writing, such as an essay or report, contains a clear structure around which your argument is developed, that it flows well from beginning to end, and that it is persuasive and clear to the reader.

As a general guide, a good essay or report will:

- Answer the question you have been asked, which requires a thorough understanding of the question.
- Make an argument in relation to the question that has been asked.
- Have an appropriate overall structure.
- Use concepts to drive the answer, rather than the other way round (which would most likely be to immerse yourself in detail and examples at the expense of rigorous analysis).
- Use signposting words to make the text flow nicely from one sentence or paragraph to another.
- Back up your argument with appropriate evidence.
- Draw the text to an appropriate conclusion.

1. Types of question that you are likely to be asked

It can be useful to divide an essay or report topic into its *content* and *process* words and phrases.

Content words and phrases concern what the essay is about. Thus in the examples that we use below to illustrate process words, the content words are:

Climate change, the policy of the United States, the policy of the European Union
(The compare and contrast example)

Action on climate change, the United States, the European Union (the discuss, critically evaluate and to what extent examples).

Usually, and before you do much else of substance, you need to explain these content words. This might be definitional, but often something more discursive is required to set the scene for your answer. Thus, you don't have to describe the United States and the European Union in a physical geography sense, but in these examples you do need to explain their political and socio-economic contexts, because it is these that is the basis for differences between them with respect to action on climate change.

Process words and phrases concern what you are going to do to the content words. The list of what you are going to do could be very long indeed, so we will restrict ourselves here to the most common types:

Compare and contrast asks you to look for similarities and differences between two or more situations, and then to balance them.

Example: Compare and contrast the policies of the United States and the European Union in relation to climate change.

Discuss is used often in relation to a statement or proposition where you are required to look for points for and against the proposition and come up with a balanced conclusion.

Example: 'The United States is less willing to take action on climate change than the European Union.' Discuss.

Critically evaluate is basically the same as 'Discuss', but often in relation to a general argument rather than a statement or proposition.

Example: Critically evaluate the argument that the United States is less willing to take action on climate change than the European Union.

To what extent...? Here the statement or proposition is turned into a question, which asks you to examine the evidence that the United States is less willing than the European Union to take action on climate change, and that which suggests it is not less willing, and, again, come up with a balanced conclusion. It is also useful to think of your possible range of answers to 'To what extent' questions as being framed by two extremes: a) The United States is always less willing than the European Union to take action on climate change, or b) The United States is never less willing than the European Union to take action on climate change. Your own argument is likely to be somewhere between these two extremes, but is also likely to be inflected towards one or the other.

Example: To what extent is the United States less willing to take action on climate change than the European Union?

2. Structuring your answer

2.1 Essays or reports

Essays and reports have basic features in common. They both require you to:

- Demonstrate an understanding of the content words in relation to your topic
- Make an argument.
- Demonstrate an understanding of all sides of the argument, including opposing views and their supporting evidence;
- Arrive at a considered judgement which leads to your own argument, and which itself uses supporting evidence
- Communicate effectively using a clear structure and writing style.

The difference between essays and reports is therefore one of emphasis, rather than substance. A report is usually written to advocate a policy, strategy or action, while an essay is more discursive and prone to 'sitting on the fence' (although an essay might also make a strong case). As a result, a report has a particular audience in mind, beyond that of the person who will be marking your work. It is also more formally structured than an essay, with section headings and sub-headings to guide the reader. An essay tends to be more in continuous prose with greater use of signposting words and phrases (see below) to link different parts of the argument.

2.2 The overall macro-structure of an essay or report

Whether it is an essay or report, you need to introduce it, consider the different viewpoints and evidence, and conclude it. A long report usually also contains an executive summary of its main points and recommendations at the start.

The overall macro-structure of both an essay and report is:

1. Introduction, where you should state what you understand by key terms. For example from the sample questions above, the key term would be 'action on climate change'. The introduction will also set out the general terms of the debate in no more than a few sentences, and you might also state what your overall argument will be.
2. Give the arguments for and against, treating even those you don't like or with which you don't agree, with respect.

3. Discuss the arguments, carefully weighing them up against each other. Don't forget to back up with evidence and illustrations.
4. Conclude, stating where, on balance, you stand and why. A conclusion should not normally introduce new evidence or arguments.

2.3 The micro-structure of the text -- words, phrases and paragraphs

2.3.1 Use concepts to drive your argument

Concepts are words and phrases that express what is general or typical and they are the key to how we communicate. We would add that they are the building blocks of a 'shared language' in a subject area such as climate change in that they form the basis of collective understandings. This is what we are trying to do throughout the textbook of module 1 *Introduction to climate change in the context of sustainable development* – build up a common language that we can share. Concepts that we all can use, and know the meaning of, are the place to start. This is essential for a good answer.

The sample questions above might use concepts which appear in Chapters 3 and 4 of module 1. They include: the climate change regime, global policies, state and non-state actors, cooperation, conflict, market mechanisms, etc. The United States or the European Union are not concepts, however, as there is only one United States and one European Union – they do not express what is general or typical.

Concepts that link to and reinforce one another form conceptual frameworks, and they can be used to structure your essay or report. Conceptual frameworks lead to theories of why things are as they are. Often more than one conceptual framework can be applied to the same problem, where they compete with one another in terms of their explanatory power. For example, in Chapter 3 of module 1, one conceptual framework is based on the concept of market failure, and linked concepts include economic growth, global carbon markets, low-carbon technologies, property rights, R&D investment, and so on. A quite different framework, however, would be based on sustainability, human welfare, justice, contraction and convergence.

Use concepts as the basis of headings and sub-headings to structure your answer and drive it forward. Of course, in an essay of continuous prose, they might be invisible headings/sub-headings in the final answer and you rely instead on signposting words and phrases for your linking (see below).

2.3.2 Provide evidence to support the points you make under your conceptual drivers

This is an obvious point but easily missed. A common structural mistake is to start with the evidence and add the concepts as an afterthought. In English we call this 'putting the cart before the horse'.

2.3.3 Use 'signposting' words to link sentences and paragraphs and to construct an argument that flows through your writing

If you don't do this you will almost certainly produce an answer that is a list of unlinked sentences. These sentences may be individually very powerful and use important concepts, but overall there will be no coherent thread of an argument running through your text. It's a bit like a sports team, where individual players are very skilful but play as isolated individuals with no overall game plan. They are likely to lose to a well organised team that may be less skilful individually.

Signposting words keep the reader informed as to where the argument is going. They are used to:

- Draw out similarities or extend the argument (use words/ phrases such as: *and, similarly, moreover, furthermore, in addition*):

“Moreover, the United States never signed the Kyoto Protocol.”

- Contrast two items, facts or points (use words/ phrases such as: *but, however, on the other hand, yet*):

“The United States never signed the Kyoto Protocol, *but* at a different level it has invested heavily in low-carbon technologies.”

- Illustrate an argument or point (use words/ phrases such as: *for example, that is, as is*):

“*For example*, the European Union was among the first to sign the Kyoto Protocol.”

- Conclude a point, topic or argument. (use words/ phrases such as: *so, consequently, thus, as a result, therefore*):

“*Thus*, the European Union has been a global leader in relation to climate change.”

- Move on to the next stage in your argument or description (use words/ phrases such as: *then, after that, ultimately*):

“*Ultimately*, if the Eurozone economy goes into long-term decline, *then* the European Union will find it difficult to maintain its role as a leader on climate change action.”

Try to use both concepts and appropriate signposting in essay/report answers. Those outlined above are examples only so use your own signposting words or phrases if you wish.